



**AUXILIUM COLLEGE (Autonomous)**  
**(Accredited by the NAAC with A+Grade with a CGPA of 3.55 in the 3<sup>rd</sup> Cycle)**

**Gandhi Nagar, Vellore – 632 006**

**ACADEMIC PROGRAMME - REGULATIONS**

**With effect from the Academic Year 2020 - 2021**

Auxilium College, an autonomous institution, follows the Semester Pattern with Choice Based Credit System (CBCS) of evaluation, requiring 3 years of study for an Undergraduate Degree Programme and 2 years of study for a Postgraduate Degree Programme. The duration of a semester is 90 days of instruction.

The CBCS offers internal assessment, inter-departmental academic collaboration and course credits. It offers freedom to the departments to design the course structure, to frame rules pertaining to academic programmes and also to introduce new study programmes. It aims at making the academic programme student-oriented, interdisciplinary, flexible and relevant to the times. Under this system, the students will have ample freedom to select the electives to suit their interest, aptitude and needs.

A curriculum is a programme of studies and/or activities (curricular, co-curricular and extra curricular). Arising from the basic needs and moving on to individual, social and cultural needs, the curriculum attempts to fulfill the ideal needs also, such as moral, intellectual, aesthetic and spiritual needs.

**Credit System**

The Autonomous status of the College offers a student the benefits of Choice Based Credit System. Every paper is allotted a certain number of credits. A student is awarded the specified credits on obtaining a pass in the respective paper.

The student has abundant opportunities during the course of study to obtain additional credits by doing Optional Certificate Courses offered by different Departments of the College. This facility will strengthen the academic potential of the student, as it provides flexibility in the choice of courses offered beyond the framework of the respective discipline of study. The introduction of the CBCS ensures compatibility with the academic norms practiced in other educational institutions of repute in India and abroad.

The structure of undergraduate programmes provides a wide range of choice for students to opt for courses based on their eligibility, aptitude and career goals. The undergraduate curriculum will include the following categories of courses in order to accomplish a holistic approach to undergraduate education.



offered by the respective Department. Allied courses complement the Major courses of Study.

**(iv) Part III –Major Electives/Project**

Each Department offers three papers, of which one may be a project. It will help the student to acquire knowledge in a specialised area of interest related to the core selected.

**(iv) Part IV – Courses in Tamil/ Non-Major Electives**

Each Department offers one/two papers during the last two semesters.

**(a) Basic Level Course in Tamil**

It is mandatory for a student who has not studied Tamil up to Std. XII and has taken a non-Tamil language under Part I, to do two Basic level courses in Tamil (The level is of Std. VI)

**(b) Advanced Level Course in Tamil**

It is mandatory for a student who has studied Tamil up to Std. XII and has taken a non-Tamil language under Part I, to take two Advanced level courses in Tamil.

**(c) Those who do not come under (a) or (b) above, will choose any two non-major electives offered by other departments.**

Each Department will offer to the students of other disciplines, courses with a syllabus containing fundamental concepts of the respective course. It will facilitate the student to acquire a basic knowledge of other disciplines and will enhance her competency for acquiring a suitable job.

The student is required to register her name for the course she opts for, with the department concerned, by the date specified.

**(v) Part IV – Skill-Based Electives**

They are job-oriented, skill-based and need-based courses designed to develop skills in the student to enhance her competency for acquiring a suitable job.

Every Department will offer at least one skill-based course per semester. This provides a wide choice for the student to select the course of her choice. Each student should take six skill-based electives, one in each semester. Each student may take two general skills, two soft skills and two skills in the core course of study.

The student is required to register her name for the course she opts for, with the department concerned, by the date specified. The number of students per course will be 30. (30 to 35, if needed)

**(vi) Part IV – Environmental Studies**

This paper offered in the fourth Semester provides awareness to the student regarding the basic concepts of environment and environment-related issues. It is intended to motivate the students to develop a positive attitude towards environmental concerns of the society. It is mandatory for every student to obtain a pass in this course as per the directives of the Supreme Court.

**(vii) Part IV – Value Education**

This course offered every semester, is intended to build up the moral values in the student. It also offers inputs for personality development and social consciousness.

**(viii) Part V - Extension Activities**

Extension Activities is a part of the Curriculum. A student should put in 90 hours of extension activity during the course of study. It includes service activities extended by a student through the Department or any service group of the College, to any marginalised community outside the College premises. It should be carried out after/before the regular working hours of the College, as the case may be. The Head of the Department/ the concerned staff-in-charge will certify for the work done by the student to earn the respective credits.

**(ix) Others**

**(a) Certificate Course in Computers**

**(b)**

A student should complete a basic course in Computers. This is to make the student computer literate. The student may or may not attend the classes offered by the College for the said course, but should appear for the examination in the course conducted by the College (and should obtain a Pass to complete the Degree Course).

**(c) Other Certificate Courses**

These courses are not a part of the curriculum. They are job-oriented, skill-based and need-based courses designed to develop skills in the student to enhance her opportunities for acquiring a suitable job.

The student may or may not attend the classes offered by the College for the said courses, but should appear for the examination in those courses conducted by the College and should obtain a pass to receive additional credits.

The duration of the Certificate Courses will be 75 hours per semester (2 semesters).

*Medium of Instruction and Examination* The medium of instruction and examination will be English. Distribution of Hours:

**(a) Undergraduates: B.A – 15 Weeks/Semester**

Part	Course	Hours/Week						Total Credits
		Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	
I	Language: Tamil/Hindi	6	6	5	6	-	-	12
II	Part II: English	6	6	6	5	-	-	12
III	Core	10	10	6	9	19	19	60
	Allied	5	5	5	5	-	-	20
	Project/Major Elective	-	-	5	-	5	5	15
IV	Non-Major Electives	-	-	-	-	3	3	4
	Skill-Based Electives	2	2	2	2	2	2	12
	Environmental Studies	-	-	-	2	-	-	2
	Value Education	1	1	1	1	1	1	2
V	Extension Activities							1
<b>Total</b>		<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>140 Credits</b>





### Branches of Study Offered

<b>Degree</b>	<b>Programme</b>	<b>Code</b>	<b>Category</b>
B.A.	History	HI	Aided
	English	EN	Aided & Unaided (2 Sections)
B.Sc.	Mathematics	MA	Aided & Unaided (2 Sections)
	Chemistry	CH	Aided
	Zoology	ZO	Aided
	Physics	PH	Unaided
	Biochemistry	BC	Unaided
	Computer Science	CS	Unaided
	Microbiology	MB	Unaided
	Visual Communication and Multimedia	VC	Unaided
	Psychology	PY	Unaided
B.Com.	Commerce	CO	Aided & Unaided
	Commerce (Banking and Insurance)	BI	Unaided
B.B.A.	Business Administration	BA	Unaided
B.H.A.	Hospital Administration	HA	Unaided
B.C.A.	Computer Applications	CA	Unaided (2 Sections)

## Requirements of Attendance

1. The minimum requirement of attendance for a candidate is 75% per semester, to enable her to appear for the Semester Examinations.
2. If the attendance of a candidate is between 65 - 75%, due to any of the following reasons, the candidate is eligible to appear for the current Semester Examinations only after obtaining condonation from the Principal, by payment of the prescribed Condonation Fee:
  - a. Prolonged illness
  - b. Major surgery
  - c. Accident, which requires a long period of rest

The reason for the long period of absence should be informed to the Principal and the sanction obtained, within a week from the commencement of absence.

If the attendance of a candidate is between 55% - 65% in a semester, **she is not eligible to appear for the current Semester Examinations**. But she is permitted to appear for the arrear courses, if any. She is also permitted to move to the next Semester.

If the attendance of a candidate is below 55%, she is **not eligible to continue her studies** but can complete the Programme by re-joining the same Semester in the following academic year, if vacancy is available. She should obtain the approval from the University through the concerned Head of the Department and the Principal.

## TESTING, ASSESSING AND VALUATION

Each Undergraduate Programme consists of six Semesters.

There are two components in the Valuation and Assessment of a student - **Internal Assessment (CA)** and **Semester Examinations (SE)**.

### Continuous Assessment (CA):

1. The maximum marks for CA is 40 and SE is 60, both for theory and practical papers.
2. Each CA written examination is of two hours duration for 50 marks. The tests will be conducted centrally. The average of two such CA is calculated for 35 marks.
3. Other Innovative Components will be for 5 Marks

The innovative component is for 5 marks, conducted during the class hours by the Staff member in charge of the course, in the form of assignments/ quiz/ seminars /presentations/Online/Open Book/Viva Voce/ Group work/ Mini Project/ Exhibition,

etc. The topic and time for submission/ presentation will be announced by the staff member in charge of the course in advance. Each student should explain and defend her presentation.

4. For SBE courses: 2 CA examinations of one hour each for 25 Marks converted to 35 Marks. Other Innovative Components will be for 5 Marks. The Semester Examination will be of 2 hours duration for 60 Marks.
5. For Environmental Studies: One CA of one hour for 25 Marks, Project for 25 Marks, converted to 40 Marks. The Semester Examination will be of 2 hours duration for 60 Marks.
6. For major and allied papers, the Semester Examination will be of 3 hours with maximum 100 marks which will be converted to 60.
7. Syllabus of not less than two units shall be included for each CA.
8. A retest for CA will be conducted for those students who were absent due to participation in NSS/NCC/Sports activities on prior written permission obtained through the concerned staff member.
9. There is no passing minimum for CA.
10. There is no provision for improvement in CA.

### **Semester Examinations (SE)**

1. A student should register herself to appear for the Semester Examinations by payment of the prescribed fee.
2. The Semester Examinations will be in the form of a comprehensive examination covering the entire syllabus in each course. It will be of 3 hours duration, irrespective of the number of credits allotted to it.
3. If a candidate fails to obtain Pass marks even after the third attempt due to less marks in the CA examination, the marks of the next examination will be converted to be out of 100.
4. The maximum marks for each course shall be 100.

### **Valuation of Answer Scripts**

1. There shall be single valuation for Undergraduate, Postgraduate as well as M.Phil. Programmes. The Panel of Examiners will consist of internal and external examiners.
2. The valuation will be centralised.
3. A student has a maximum period of five years from the Date of Admission to clear all the course prescribed for the Programme at the time of her admission.

After the fifth year, to complete the programme, the student has to appear for an examination in the same/equivalent paper offered under the revised syllabus structure. Fraction of final marks in CA and SE shall be rounded off to the nearest integer.

#### Revaluation

1. A student can apply for the photocopy of answer scripts, if needed, on payment of the prescribed fee.
2. A student can apply for revaluation of any course, on payment of the prescribed fee within the specified date. Receipt of the photocopy of the answer script is a pre-requisite for revaluation.

#### Supplementary Examination

After the declaration of the results of the final semester, a student who has only one paper in any semester can apply by the specified date, for Supplementary Examination, either for reappearance or for improvement. This facility is available only for those students who have not obtained a pass due to one paper or want to improve performance in one paper. The examination will be conducted and results published within a month of the first publication of the result.

#### Improvement:

The facility to improve one's performance in any paper(s) is offered to all the students. A student, who wishes to improve her performance in any paper(s), may apply for the examination in the same, if the examination is conducted in that paper(s) during that particular semester/ Supplementary Examination. This provision is available till the Supplementary Examination after the final semester examination.

#### Note:

A student can report any grievance regarding CA or SE, to the Controller of Examinations, who in turn, will present the same to the Examination Committee, chaired by the Principal.

### CA and SE for Laboratory and Practical Work

CA		SE	
Components	Marks	Components	Marks
Performance during regular practicals	10	Record	10
Regularity and submission of Observation Notebook and Record	5	Practical Examination	45
Practical Examination	25	Viva	5
<b>Total</b>	<b>40</b>	<b>Total</b>	<b>60</b>

#### Passing Minimum:

A candidate shall be declared to have passed in a course if she secures

For Undergraduate Programme	For Postgraduate Programme
40% and above in the SE. If a candidate fails in any paper, she shall be required to appear only for the SE in the respective paper.	50% and above in the SE. If a candidate fails in any paper, she shall be required to appear only for the SE in the respective paper.

#### Classification of Successful Candidates:

Conversion of Marks to Grade Points and Letter Grade:

Range of Marks	Grade Points	Letter Grade	Description
90 - 100	9.0 – 9.5	O	Outstanding
80 – 89	8.0 – 8.9	D+	Excellent
75 – 79	7.5 – 7.9	D	Distinction
70 – 74	7.0 – 7.4	A+	Very Good
60 – 69	6.0 – 6.9	A	Good
50 – 59	5.0 – 5.9	B	Average
40 – 49 #	4.0 – 4.9	C	Satisfactory
00 – 39	0.0	U	Re-appear
ABSENT	0.0	AA	ABSENT

## Calculation of Grade Point Average

Based on the grades obtained by a candidate, the Grade Point Average (GPA) is calculated as follows:

$$\text{Grade Point Average (GPA)} = \frac{\sum_{i=1}^C G_i}{\sum_{i=1}^C C_i}$$

i.e.,  $\text{GPA} = \frac{\text{Sum of the multiplication of Grade Points by the credits of the courses}}{\text{Sum of the credits of the courses in a Semester}}$

Where  $C_i$  = Credits earned for course  $i$  in any semester

$G_i$  = Grade Point obtained for course  $i$  in any semester

**For the Entire Programme:**

Based on the grades obtained by a candidate for the entire programme, the Cumulative Grade Point Average (CGPA) is calculated as follows:

$$\text{Cumulative Grade Point Average (CGPA)} = \frac{\sum \sum \frac{C_n G_n}{n}}{\sum C_n}$$

i.e.,  $\text{CGPA} = \frac{\text{Sum of the multiplication of Grade Points by the credits of the entire programme}}{\text{Sum of the credits of the courses of the entire programme}}$

Where  $C_i$  = Credits earned for course  $i$  in any semester

$G_{nj}$  = Grade Point obtained for course  $i$  in any semester

$n$  refers to the Semester in which such courses were credited.

The final classification is based on the following Grade Conversion Table:

CGPA	GRADE	CLASSIFICATION OF FINAL RESULT
9.5 – 10.0	O+	First Class with Exemplary*
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction*
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
4.5 and above but below 5.0	C+ #	Third Class
4.0 and above but below 4.5	C #	
0.0 and above but below 4.0	U	Re-appear

\* The candidates who have passed in the first appearance and within the prescribed semester of the U.G. programme (Major, allied and elective courses alone) are eligible.

# Only applicable to U.G. Programme

### **Ranking of Successful Candidates**

Ranking will be based on CGPA. Candidates who passed in all the examinations prescribed for the Programme in the very first appearance only are eligible for ranking.

### **Important Note:**

It is mandatory for a student to secure a Pass in the Certificate Course in Computers as well as to fulfill the 90 hour-requirement of the Extension Activities, in order to be declared as **'Programme Completed'**. Only such a candidate is eligible to receive the Diploma.

Malpractices:

**Resolved that the following norms be followed in dealing with the cases of malpractices in CA/Semester Examinations.**

<b>S.No.</b>	<b>Nature of Malpractice</b>	<b>Action Suggested</b>
1.	Appeal by a candidate for favourable consideration or mercy in the answer script	Warn the candidate
2.	Letter of appeal for favourable consideration, promising bribe in cash or kind.	Cancel the examination taken in that particular Course only
3.	Candidate writing her own name in any part of the answer book	Warn the candidate
4.	Candidate writing her own Register Number in any part of the answer book other than on the front page	Warn the candidate
5.	Possessing notes or books relevant to the course of the examination	Cancel the examination taken in that particular Course only
6.	Possessing notes or books relevant to the course of the examination (repeated)	Cancel the examinations taken previously and not to allow to appear for the remaining examinations in that Semester
7.	Using or copying from notes or books relevant to the course of the examination	Cancel the examination taken in that particular Course only
8.	Using or copying from the answer scripts of other candidates	Cancel the examination taken by both the candidates in that particular Course only
9.	Inserting pre-written answer sheet(s) brought from outside, in the main answer book.	Cancel the examinations taken previously and not to allow to appear for the remaining examinations in that Semester
10.	Threatening or assaulting the Invigilator or behaving in any insubordinate manner	Cancel the examination taken

11.	Manhandling or injuring any examination personnel	Cancel the examination taken
12.	Impersonation	Cancel the examination taken and debar from the examination for the next three years
<b>S.No.</b>	<b>Nature of Malpractice</b>	<b>Action Suggested</b>
13.	Tampering with spelling/ name /initials in any certificate	The candidate has to produce fresh certificates and a fine of ₹ 1,000/-
14.	Tampering with the Date of Birth in the certificate issued by the College	The candidates should not be permitted to appear for any examination of this College for a period of two years from the date of submission of documents and not to pursue any course of studies for the corresponding period
15.	Tampering with the Grade Certificate or any other Certificate issued by the College	The College will retain the tampered certificate and duplicate certificate will not be issued for three years from the date of presentation of documents. The candidate should not pursue any course of studies in this College for the corresponding period

Important Note:

The above rules are intended to guide the Examination Committee and to be judiciously applied to any form of malpractice by candidates.

**The decision of the Principal shall be final in all matters pertaining to the Academic Programme.**

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## **PROGRAMME OUTCOMES (PO) (INSTITUTIONAL LEVEL)**

**PO1:**Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:**Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:**Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:**Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:**Emulate positive social values and exercise leadership qualities and team work.

**PO6:**Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

## **PROGRAMME SPECIFIC OUTCOME (DEPARTMENT LEVEL)**

**On completion of B.A. Programme in English, students will be able to**

**PSO1** - Remember the principles of Literature in general and English Literature in particular and understand its typological, critical, socio cultural aspects (K1, K2)

**PSO2** - Attain fluency, accuracy and a good command in the four skills (listening, speaking, reading and writing) of English Language (K3)

**PSO3** - Apply the knowledge of form, structure, history and contextual cultural diversity and comprehend the applications of the English Language in practice (K3)

**PSO4** - Appreciate life, think critically, and develop positive, interpersonal relationship with fellow humans (K4, K5)

**PSO5** - Discern avenues for higher learning, career options, and venture entrepreneurship (K4)

**PSO6** - Formulate research questions and identify relevant approaches and sources to find answers/solutions for questions/problems related to Language, Communication, Art and Culture. (K5, K6)

## PO-PSO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	<b>H</b>	H	H	M	M	M
PSO2	H	<b>H</b>	M	M	M	M
PSO3	H	H	<b>H</b>	M	M	M
PSO4	H	H	H	<b>H</b>	M	M
PSO5	H	H	H	H	<b>H</b>	M
PSO6	H	H	H	H	H	<b>H</b>

**H - High – (3), M - Moderate (2), L - Low (1)**

**FOUNDATION COURSE FOR B. A. / B. Sc. / B. Com. / B. B. A. / B. C. A.****SEMESTER I****GENERAL ENGLISH: PAPER – I**

<b>Year:</b> <b>2020</b>	<b>Code:</b> UENGA20	<b>Title:</b> General English I	<b>Course</b> <b>Type:</b> Theory	<b>Course</b> <b>Category:</b> Language	<b>H/W:</b> <b>6</b>	<b>Credits:</b> <b>3</b>	<b>Marks:</b> <b>100</b>
<b>Sem: I</b>							

**COURSE OUTCOMES (COs):**

CO1: Recognize the elements of English language at the levels of vocabulary, spelling, grammar and pronunciation

CO2: Rephrase ideas into sentences in both speech and writing with accuracy, clarity and fluency

CO 3: Use the LSRW (listening, speaking, reading & writing) skills in English language with ease in academic and real-life situations.

CO4: Explain one's ideas and opinions on any given subject, clearly and effectively

CO5: Discern (figure out) effective ways of communication with etiquette

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	<b>H</b>	M	M	M	M	M
<b>CO2</b>	H	<b>H</b>	M	M	M	M
<b>CO3</b>	H	H	<b>H</b>	H	M	M
<b>CO4</b>	H	H	M	<b>H</b>	M	M
<b>CO5</b>	H	H	M	M	<b>M</b>	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	<b>H</b>	M	M	M	M	M
<b>CO2</b>	H	<b>H</b>	M	M	M	M
<b>CO3</b>	H	H	<b>H</b>	H	M	M
<b>CO4</b>	H	H	M	<b>H</b>	M	M
<b>CO5</b>	H	H	M	M	<b>M</b>	M

<b>Unit 1</b>	<b>(18 Hours)</b>
1.1. Poetry - The Piper	K3
1.2. Fairy Tale –The Ugly Duckling	K2
1.3. Short Story - Panchatantra Tales- Book III- Crows and the Owls- 1. How the Birds Picked a King	K2
1.4. How the Rabbit Fooled the Elephant	K2
1.5. From Raymond Murphy’s Essential English Grammar. Grammar Units 1-11	K1, K2
Composition - Jumbled Sentences	K3- Writing Skills
<b>Unit 2</b>	<b>(18 Hours)</b>
2.1. Poetry - The Donkey	K3
2.2. Poetry - The Kitten and Falling Leaves	K3
2.3. Fairy Tale - The Country Mouse and the Town Mouse	K2
2.4. Short Story - The Gift of the Magi	K2
2.5. Grammar Units 12-22	K1, K2
2.6. Composition - Writing Advertisement - Writing Skills	K3
<b>Unit 3</b>	<b>(18 Hours)</b>
3.1. Poetry-The Owl and the Pussy Cat	K3
3.2. Fairy Tale -The Leap-Frog	K2
3.3. Short Story- Arabian Nights The Seven Voyages – Third Voyage	K3
3.4. Of Sindbad the Sailor - Fourth Voyage	K3
3.5. Grammar Units 23-33	K1, K2
3.6. Composition - Precise Writing - Writing Skills	K3
<b>Unit 4</b>	<b>(18 Hours)</b>
4.1. Poetry -The Brook	K4
4.2. Fairy Tale -Rumpelstiltskin	K2
4.3. The Elves and the Shoemaker	K2
4.4. Short Story -The Golden Deer	K2
4.5. Grammar Units 34-44	K1,K2
4.6. Composition – Letter Writing- Informal Letter –Writing Skills	K3
<b>Unit 5 – Fiction- The Tales From Shakespeare</b>	<b>(18 Hours)</b>
5.1. The Tempest	K4
5.2. The Winter’s Tale	K4
5.3. The Merchant of Venice	K4
5.4. King Lear	K4
5.5. Othello	K4
5.6. Grammar Units 45-57	K1, K2
Composition- Story Writing-own imagination	K4

### **Text Books**

1. *Darts: A Voyage of Learning English* by the Department of English, Auxilium College, Vellore. Bloomsbury Publications: New Delhi, 2017.
2. Murphy, Raymond. *Essential English Grammar*, Cambridge University Press. Ed. 2. New Delhi.
  - a. 2017

### **Reference Books**

Charles & Mary Lamb, *Tales from Shakespeare*, New Delhi, 2018.

### **OER (Open educational resources):**

1. <https://open.umn.edu/opentextbooks>
  2. <https://www.saylor.org/>
  3. <https://textbooks.opensuny.org/browse-by-subject/>
1. [www.bloomsbury.com](http://www.bloomsbury.com)

## SEMESTER II

### UENGB17 - GENERAL ENGLISH: PAPER –II

<b>Year: 2020</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W:</b>	<b>Credits:</b>	<b>Marks:</b>
Sem II	UENGB20	General English – Paper II	Theory	Language	6	3	100

#### COURSE OUTCOMES (COs):

CO1: Relate with the time-tested values of Indian culture and assimilate communicative skills through the reading of texts by Indian English writers

CO2: Outline the values and ideas from the prescribed texts in self-made sentences with accuracy, clarity and fluency

CO 3: Use the LSRW (listening, speaking, reading & writing) skills in English language with ease in academic and real-life situations.

CO4: Explain one's ideas and opinions on any given subject, clearly and effectively

CO5: Figure out effective ways to make a point and describe one's standpoint

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	M
CO2	H	H	M	M	M	M
CO3	H	H	H	M	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	M	M	M
CO2	H	H	M	M	M	M
CO3	H	H	H	M	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	H	M

**Unit 1****( 18 Hours)**

- 1.1. Poetry-Where the Mind is without Fear K3
- 1.2. Prose - Science and Religion K4
- 1.3. Short Story -The Tree Speaks K3
- 1.4. Autobiography - Shyness My Shield K3
- 1.5. Grammar Units 58-70 K2, K3
- Writing Skills Composition: Email Writing – K3

**Unit 2****( 18 Hours)**

- 2.1. Poetry - Peace K3
- 2.2. Prose - Dynamic Life K4
- 2.3. Short Story - Father and Son K3
- 2.4. Autobiography - Wings of Fire K3
- 2.5. Grammar Units 71-82 K2, K3
- 2.6. Composition: Dialogue Writing –Writing Skills K4

**Unit 3****(18 Hours)**

- 3.1. Poetry- Freedom K3
- 3.2. Prose - The India of My Dreams K4
- 3.3. Short Story – Sparrows K2
- 3.4. Biography - Bankim Chandra Chattopadhyaya K4
- 3.5. Grammar Units 83-95 K2, K3
- 3.6. Composition: Report Writing – Writing Skills K3

**Unit 4****(18 Hours)**

- 4.1. Poetry - A Scratch K3
- 4.2. Prose - How Economic Growth Has Become Anti-Life K4
- 4.3. Short Story - Eight Rupees K2
- 4.4. Biography – The Saint of the Gutters K3
- 4.5. Grammar Units 96-107 K2, K3
- 4.6. Composition - Preparing Posters K3

**Unit 5****(18 Hours)**

- 5.1. Poetry- On Killing a Tree K3
- 5.2. Prose- Future of Our Past: Towards a Critique of Globalization and Culture Industry K4
- 5.3. Short Story-The Guest K2
- 5.4. Biography- Daring to Dream K3
- 5.5. Grammar Units 108-114 K2, K3

**Text Books**

1. *Darts: A Voyage of Learning English* by the Department of English, Auxilium College, Vellore.
  - a. Bloomsbury, New Delhi, 2017.
  - Murphy, Raymond. *Essential English Grammar*, Cambridge University Press. Ed. 2. New Delhi. 2017.

**Reference Books**

1. Hall, Donald and Sven Birkerts. *Writing Well*. New York: Harper Collins Publishers, 1991.
2. Kahn, John Ellison (Ed.) *Reader's Digest: How to Write and Speak Better*. New York: Reader's Digest, 1993.

**OER (Open educational resources):**

1. [www.bloomsbury.com](http://www.bloomsbury.com)
2. Open Textbook Library
3. Saylor.org
4. <https://textbooks.opensuny.org/browse-by-subject/>

**SEMESTER III**  
**ENGLISH PAPER - III**

<b>Year: 2020</b>	<b>Course Code:</b>	<b>Title :</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W:</b>	<b>Credits:</b>	<b>Marks:</b>
<b>Sem-III</b>	UENGC20	English Paper – III	Theory	Language	5	3	100

Course Outcomes(CO):

1. Evolve newer ways to approach language-learning goals.
2. Enable students to be aware of the contemporary social issues of national and global importance.
3. Improve speaking ability both in terms of fluency and comprehensibility.
4. Paraphrase the online sources effectively and accurately.
5. Develop comprehensive abilities as to read, write and speak.

	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>CO1</b>	<b>H</b>	H	H	H	M	M
<b>CO2</b>	H	<b>H</b>	H	H	M	M
<b>CO3</b>	H	H	<b>H</b>	H	H	M
<b>CO4</b>	H	H	H	<b>H</b>	H	M
<b>CO5</b>	H	H	H	H	<b>H</b>	H

**H - High – (3), M - Moderate (2), L - Low (1)**

	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>CO1</b>	<b>H</b>	H	H	H	M	M
<b>CO2</b>	H	<b>H</b>	H	H	M	M
<b>CO3</b>	H	H	<b>H</b>	H	H	M
<b>CO4</b>	H	H	H	<b>H</b>	H	M
<b>CO5</b>	H	H	H	H	<b>H</b>	H

<b>Unit 1</b>	<b>(18 Hours)</b>
1.1. Life and Liberty	K3
1.2. Dignity and Security	K3
1.3. Grammar Units 1 – 6 (Intermediate English Grammar)	K2, K3
1.4. Grammar Units 7 – 12	K2, K3
1.5. Skill Development: News Reading - Reading Skills	K2
1.6. Composition: Prose Comprehension - Writing Skills	K4
 <b>Unit 2</b>	 <b>(18 Hours)</b>
2.1. Children’s Rights	K3
2.2. Living on the Edge	K3
2.3. Grammar Units 13 - 20 (Intermediate English Grammar)	K2, K3
2.4. Grammar Units 21 -25	K2, K3
2.5. Skill development: Vocabulary (Analogies) -Writing Skills	K5
2.6. Composition: Expansion of an Idea - Writing Skills	K5
 <b>Unit 3</b>	 <b>(18 Hours)</b>
3.1.Science and Technology can shape our Future	K3
3.2. Make peace, Not War	K3
3.3. Grammar Units 26-31 (Intermediate English Grammar)	K2, K3
3.4. Grammar Units 32-38	K2, K3
3.5. Skill development: Listening TED Talks- Listening Skills	K3
3.6. Composition: Writing Instructions – Writing Skills	K3
 <b>Unit 4 (18 Hours)</b>	
4.1. Defenders of Peace	K3
4.2. Grammar Units 39-42	K2, K3
4.3. Grammar Units 43-47	K2, K3
4.4. Grammar Units 48-51	K2, K3
4.5. Skill development: Group discussion - Speaking Skills	K5
4.6. Composition: Correction of sentences - Writing Skills	K4
 <b>Unit 5</b>	 <b>(18Hours) 5.1.</b>
Violence and Non-Violence	K3
5.2. Grammar Units 52 –56	K2, K3
5.3. Grammar Units 57-62	K2, K3
5.4. Grammar Units 63-67	K2, K3,
5.5. Composition: Check List-Writing Skills	K4
5.6. Skill development: Writing minutes –Writing Skills	K4

### **Text Books**

1. Malini Seshadri & Helen Thimmayya, *A Window to your World*. Orient Black Swan, Hyderabad. 2018.
2. Murphy, Raymond. *Intermediate English Grammar*, Cambridge University Press. Ed. 2. 1994.

### **Reference Books**

1. Millward, Celia. *Handbook for Writers, 2<sup>nd</sup> Edition*. New York: Holt, Rinehart & Winston,
2. 1980.
3. Rao, M. S. *Soft Skills - Enhancing Employability: Connecting Campus with Corporate I*. K International Publishing House: New Delhi. 2011.
4. Reid, Ian. *The Short Story: The Critical Idiom Series*. London: Methuen & Co, 1986.
5. Saxena, Sunil. *Headline Writing*. New Delhi: Sage Publications, 2006.
6. Scott, Bill. *The Skills of Communicating*. Mumbai: Jaico Publishing House, June 1995.

### **OER (Open educational resources):**

1. [www.bloomsbury.com](http://www.bloomsbury.com)
2. Open Textbook Library
3. Saylor.org
4. <https://textbooks.opensuny.org/browse-by-subject/>

## SEMESTER IV

### GENERAL ENGLISH- PAPER – IV

<b>Year: 2020</b> <b>Sem –IV</b>	<b>Course Code:</b> UENGD20	<b>Title of the Course:</b> General English –IV	<b>Course Type:</b> Theory	<b>Course Category:</b> Language	<b>H/W:</b> 6	<b>Credits:</b> 3	<b>Marks:</b> 100
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Course Outcomes(CO):

1. Relate with real life situations by reading the literary text from the past.
2. Respect and protect the differences among nations and practice positive social values.
3. Instill the ability to analyze texts critically and practice writing through assignments.
4. Develop knowledge about the system of Governance and its regulations.
5. Create a sense of belonging towards the community and nation.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	H

#### Unit 1

(18Hours)

- |   |        |
|---|--------|
| 1.1. Women’s Rights   | K3     |
| 1.2. Rights of the elderly  | K3     |
| 1.3. Grammar Units 68 – 75  | K2, K3 |
| 1.4. Grammar Units 76 – 82  | K2, K3 |
| 1.5. Skill development: Listening comprehension and answering<br>- Listening Skills | K3     |
| 1.6. Composition: Essay writing on current Topics<br>-Writing Skills                | K5     |

#### Unit 2

(18 Hours)

- |                               |    |
|-------------------------------|----|
| 2.1. Being Wise, not wasteful | K3 |
|-------------------------------|----|

2.2. Grammar Units 83 – 86	K2, K3
2.3. Grammar Units 87 – 91	K2, K3 Grammar Units 92 – 96 K2, K3
2.4. Skill development: Interview skills -Speaking Skills	K4
2.5. Composition: Curriculum Vitae and Job application - Writing Skills	K4

**Unit 3 (18 Hours)**

3.1. The Role of the Government	K3
3.2. Strengthening the Roots	K3
3.3. Grammar Units 97 – 100	K2, K3
3.4. Grammar Units 101 – 107	K2, K3
3.5. Skill Development: Telephone Conversations - Speaking Skills	K3
3.6. Composition: Note making - Writing Skills	K5

**Unit 4 (18 Hours)**

4.1. Religious Harmony	K3
4.2. Grammar Units 108-112	K2, K3
4.3. Grammar Units 113-115	K2, K3
4.4. Grammar Units 116-119	K2, K3
4.5. Skill development: Interpretation of Graphs (Pie Chart, Flow chart) - Writing Skills	K5
4.6. Composition: Writing Recommendations - Writing Skills	K4

**Unit 5 (18 Hours)**

5.1. Peace + Balance = Harmony	K3
5.2. Grammar Units 120-125	K2, K3
5.3. Grammar Units 126-130	K2, K3
5.4. Grammar Units 131-136	K2, K3
5.5. Skill Development: Conducting Mock Interview -Speaking Skills	K3
5.6. Composition: Writing Book Review - Writing Skills	K5

**Text Books**

1. Malini Seshadri & Helen Thimmayya. *A Window to your World*. Orient Black Swan. Hyderabad 2018.
2. Murphy, Raymond. *Intermediate English Grammar*, Cambridge University Press. Ed. 2. New Delhi. 2014.

**Reference Books**

1. Millward, Celia. *Handbook for Writers, 2<sup>nd</sup> Edition*. New York: Holt, Rinehart &

Winston, 1980. Rao, M. S. *Soft Skills - Enhancing Employability: Connecting Campus with Corporate*. I. K International Publishing House: New Delhi. 2011.

2. Reid, Ian. *The Short Story: The Critical Idiom Series*. London: Methuen & Co, 1986.
3. Saxena, Sunil. *Headline Writing*. New Delhi: Sage Publications, 2006.
4. Scott, Bill. *The Skills of Communicating*. Mumbai: Jaico Publishing House, June 1995.

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  2. Open Textbook Library
  3. Saylor.org
  4. <https://textbooks.opensuny.org/browse-by-subject/>
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**Auxilium College(Autonomous), Gandhi Nagar, Vellore-632 006**

**Department of English (UG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**NAME OF THE PROGRAM: B. A. English literature**

**Vision Of The Program**

The Vision of the Program is to produce empowered women graduates in English Literature with a working knowledge and mastery of literary, linguistic and critical skills in English Studies with an open and sensitive mind to appreciate, make sense of and search for enduring human values in life and literature beyond boundaries of any kind.

**Mission Of The Program**

The Mission of the Program is to produce employable women graduates, well-equipped with skills required for teaching English, undertaking research, translation, writing for print media, mass media, social media and journalism.

**List of Courses**

**Structure of the Program and Scheme of Examination**

Sem	Part	Paper Code	Title	Hours	Exam Hours		Credits	Marks
					Th.	Pr.		
I	I	ULTAA18	Tamil Paper I	6	3		3	40+60
	II	UENGA20	English Paper I	6	3		3	40+60
	III	UCENA20	An Introduction to Literary Studies	5	3		4	40+60
	III	UCENB20	English Pronunciation: Theory and Practice	5	3		4	40+60
	III	UALSC20	Allied I: Language Skills for Communication	5	3		5	40+60
	IV		Skill-Based Elective - I	2	2		2	40+60

	IV		Value Education	1	-		-	-
<b>Total</b>							<b>21</b>	<b>600</b>
Sem	Part	Paper Code	Title	Hours	Exam Hours		Credits	Marks
					Th.	Pr.		
II	I	UALTAB20	Tamil Paper II	6	3	-	3	40+60
	II	UENGB20	English Paper II	6	3	-	3	40+60
	III	UCENC20	Indian Writing in English	5	3	-	4	40+60
	III	ECEND20	Literary Forms and Terms	5	3	-	4	40+60
	III	UAEEG20	Allied II: Elements of English Grammar	5	3	-	5	40+60
	IV		Skill-Based Elective - II	2	2	-	2	40+60
	IV		Value Education	1	-		-	-
<b>Total</b>							<b>21</b>	<b>600</b>
III	I	ULTCAC20	Tamil Paper III	5	3	-	3	40+60
	II	UENGC20	English Paper III	6	3	-	3	40+60
	III	UCENE20	Elizabethan Literature	5	3	-	4	40+60
	III	UCENF20	American Literature	6	3	-	4	40+60
		UAHEL20	Allied III: The History of English Literature	5	3	-	5	40+60
	IV		Skill-Based Elective III: English for Competitive Examinations	2	2	-	2	40+60
	IV		Value Education	1	-	-	-	-
<b>Total</b>							<b>21</b>	<b>600</b>

IV	I	ULTAD20	Tamil Paper IV	6	3	-	3	40+60
	II	UENGD20	English Paper IV	5	3	-	3	40+60
	III	UCENG20	Neo-Classical Literature	5	3	-	4	40+60
	III	UCENH20	Romantic Literature	4	3	-	4	40+60
	III	UTOT20	Allied IV: Techniques of Translation	5	3	-	5	40+60
	IV	-	Skill-Based Elective IV: Journalism	2	2	-	2	40+60
	IV	UNEVS20	Environmental Studies	2	2	-	2	40+60
	IV	-	Value Education	1	-	-	-	-
<b>Total</b>							<b>23</b>	<b>600</b>
Sem	Part	Paper Code	Title	Hours	Exam Hours		Credits	Marks
					Th.	Pr.		
V	III	UCENI20	Shakespeare	6	3	-	6	40+60
	III	UCENJ20	Victorian Literature	6	3	-	6	40+60
	III	UCENK20	History of English Language and Linguistics	6	3	-	5	40+60
	III	UEENA20	Elective I A: Indian Writing in Translation	6	3	-	5	40+60
	III	UEENB20	Elective I B: Literary Theory					
	IV	-	Non-Major Elective I	3	2	-	2	40+60
	IV	USENC520	Skill-Based Elective: Theatre and Dramaturgy	2	2	-	2	40+60
	IV	-	Value Education	1		-	-	-

<b>Total</b>							<b>26</b>	<b>600</b>
VI	III	UCENL20	Twentieth Century	6	3	-	6	40+60
	III	UCENM20	Literary Criticism	6	3	-	5	40+60
	III	UEENC20	Elective II A: Women's Writing	6	3	-	5	40+60
	III	UEEND20	Elective II B: Practical Criticism					
	III	UEENE20	Elective III A: New Literatures in English	6	3	-	5	40+60
	III	UEENF20	Elective III B: Communicative English Grammar					
	IV	-	Non-Major Elective II	3	2	-	2	40+60
	IV	USEND620	Skill-Based Elective: Critical	2	2	-	2	40+60
			Approaches to Literature					
	IV		Value Education	1	2	-	2	40+60
<b>Total</b>							<b>27</b>	<b>700</b>
	V		Extension Activities (90 Hours)	-	-	-	1	-
<b>Grand Total</b>							<b>140</b>	<b>3800</b>

## SEMESTER – I

### UCENA20 - INTRODUCTION TO LITERARY STUDIES

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> UCENA20	<b>Title of the Course:</b> Introduction to Literary Studies	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Recognize fundamental literary forms, terms, expressions, techniques and the outline of English literary studies from 16<sup>th</sup> to 20<sup>th</sup> century.
2. Explain various genres such as poetry, essays, dramas and ballads
3. Apply the knowledge of the form, structure, narrative techniques, devices and style of literary works to read and interpret literature
4. Compare and contrast the key structural and stylistic aspects of all the literary genres
5. Analyse literature with its historical, social, philosophical and political contexts

<b>CLO/PSO</b>	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

<b>CO/PO</b>	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I: Why we study Literature Knowledge Level - K1 – K4 (15 Hours )**

- 1.1. What is Literature?
- 1.2. Writing and Immortality
- 1.3. Literature and Life
- 1.4. Literature and Wit
- 1.5. Literature and Creative Imagination
- 1.6. Literature, Morality and Meaning

**Unit II: Poetry Knowledge Level - K1 – K4 (15 Hours)**

- 2.1. Ballad
- 2.2. Epic, Paradise Lost
- 2.3. Narrative Poetry, *The Canterbury Tales*
- 2.4. Lyrical and Reflective Poetry
- 2.5. *Lyrical Ballads*
- 2.6. Victorian Poetry and Modern Poetry

**Unit III: Tragic Drama Knowledge Level - K1 – K4 (15 Hours)**

- 3.1. Greek Tragedy, Aristotle's *Poetics*
- 3.2. Shakespearean Tragedy
- 3.3. Marlowe and Webster
- 3.4. Tragic Drama in the Eighteenth and Nineteenth Century England
- 3.5. Bernard Shaw and T.S.Eliot
- 3.6. Tragedy in the Twentieth Century

**Unit IV: Comedy Knowledge Level - K1 – K4 (15 Hours)**

- 4.1. 'comos' – History of Comedy
- 4.2. Mystery and Miracle Plays
- 4.3. Romantic Comedy
- 4.4. Shakespeare, Ben Jonson – Comedy of Humours
- 4.5. Comedy of Manners
- 4.6. Comedy in the Twentieth Century

**Unit V: The Novel, Short Story and Essay Knowledge Level - K1 – K4 (15 Hours)**

- 5.1. History of the Novel
- 5.2. Major English Novelists
- 5.3. Short Story: History and Evolution

5.4. American Short Story Writers

5.4. Essay in English

5.5. Satire

**Books for Study:**

**Rees, R.J. English Literature: An introduction for foreign Readers, Hong Kong :Macmillan press LTD,978.print.**

**Additional Reading** (if applicable) (can also be suggested unit wise) [Meant for self study/  
internal assessment (assignment/seminar/presentation/discussion) only

**Books for Reference**

Mohanty, Uday. Literal and figurative English, New Delhi: Pacific Books international, 2009.

Nair, Ramachandran K.R. Literary forms, Chennai: Emerald publishers, 1995.

Styan, J.L, The Dramatic Experience, London. Cambridge UP, 1971.

Richardson, Jack, Dictionary of Literature, New Delhi: Lotus press, 2014.

**SEMESTER – I**

**UCENB20 - ENGLISH PRONUNCIATION: THEORY AND PRACTICE**

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> UCENB20	<b>Title of the Course:</b> English Pronunciation: Theory and Practice	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Infer/recognize the role of speech sounds in human language
2. Demonstrate understanding of the structural organization of speech sounds of English language and the subtle variations in its pronunciation
3. Illustrate, identify and label the parts of the human articulator system
4. Remember the English vowels, consonants and diphthongs along with their corresponding (IPA) Phonetic symbols
5. Identify the difference between (i) consonants and vowels, (ii) pure vowels and diphthongs, (iii)voiced and voiceless consonants, (iv) place of articulation and manner of articulation

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	H	M

## Course Syllabus

### Unit I – Theory

**Knowledge Component: K1-K4**

**(15 Hours)**

- 1.1. Phonetics
- 1.2. Consonants, Voiced and Voiceless Sounds
- 1.3. Place of Articulation
- 1.4. Familiar and Unfamiliar Symbols
- 1.5. Transcribing Sounds
- 1.6. Manner of Articulation

### Unit II – Theory

**Knowledge Component: K1-K4**

**(15 Hours)**

- 2.1 Consonant Chart
- 2.2 Glottal Stops and Flaps
- 2.3 Vowels
- 2.4 Diphthongs
- 2.5. American and British

#### Diphthongs

- 2.6. Subtle Individual Variation

### Unit III - Theory

**Knowledge Component: K1-K4**

**(15 Hours)**

- 3.1. Phonology
- 3.2. Phonemes
- 3.3. Natural Classes
- 3.4. Phones and Allophones
- 3.5. Complementary Distribution and Minimal Pairs
- 3.6. Phonotactics

**Unit IV – Theory**

**Knowledge Component: K1-K4**

**(15 Hours)**

- 4.1. Syllables
- 4.2. Coarticulation Effects
- 4.3. Assimilation
- 4.4. Nasalization
- 4.5. Elision
- 4.6. Normal Speech

**Unit V: Practice**

**Knowledge Component: K1-K4**

**(15 Hours)**

- 5.1. Phonemic Symbols for Vowels
- 5.2. Phonemic Symbols for Consonants
- 5.3. Sound pairs in Vowels
- 5.4. Sound pairs in Consonants
- 5.5. Word Stress: Practice
- 5.5. Sentence Stress: Practice

**Books for Study**

Yule, George. *The Study of Language*. 6<sup>th</sup> Ed., Cambridge University Press, 2017.  
Hancock, Mark. *English Pronunciation in Use*. Cambridge University Press, 2003.

**Books For Reference**

Jones, Daniel. *English Pronouncing Dictionary*. 17<sup>th</sup> Ed., Cambridge University Press, 2006.

**Open Educational Resources (OER)**

“English Pronunciation in Use” - Android Application

## SEMESTER – I

### UALSC20 - Allied-LANGUAGE SKILLS FOR COMMUNICATION

<b>Year:</b> I <b>Sem:</b> I	<b>Course Code:</b> UALSC20	<b>Title of the Course:</b> Language Skills for Communication	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

Apply the art of rhetoric in oral and written communication in English, convincingly

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	M

#### **Unit I –Vocabulary Building      Knowledge Component - K1-K4      (15 Hours)**

- 1.1 . The Concept of Word Formation
- 1.2 . Root words from Foreign Languages and Their Use in English
- 1.3. Acquaintance with Prefixes and Suffixes from Foreign Languages in English to Form Derivatives
- 1.3 . Synonyms, Antonyms
- 1.4 . Standard Abbreviations
- 1.5 . Effective Listening Skills, Effective Speaking Skills

**Unit II – Basic Writing Skills**  
**Component: K1-K4 (15 Hours)**

**Knowledge**

- 2.1. Sentence Structures
- 2.2. Use of phrases and clauses in sentences
- 2.3 Importance of Proper Punctuation
- 2.4 Creating Coherence
- 2.5 Organizing Principles of Paragraphs in Documents Techniques for writing Precisely, Conversations: Situational Dialogues

**Unit III - Identifying Common Errors in Writing Knowledge Component: K1-K4 (15 Hours)**

- 3.1. Subject-Verb Agreement
- 3.2. Noun-Pronoun Agreement
- 3.3. Misplaced Modifiers
- 3.4. Articles
- 3.5. Prepositions
- 3.6. Redundancies, Cliches, Oral Presentation

**Unit IV–Nature and Style of Sensible Writing Knowledge Component: K1-K4 (15 Hours)**

- 4.1 Describing
- 4.2 Defining
- 4.3 Classifying
- 4.4 Providing Examples or Evidence
- 4.5 Writing Introduction, Group Discussion
- 4.6 Conclusion

**Unit V–Writing Practices**  
**K1-K4 (15 Hours)**

**Knowledge Component:**

- 5.1 Comprehension
- 5.2 Precis Writing
- 5.3 Essay Writing: An Art
- 5.4 E.mail Writing
- 5.5 Business Memos
- 5.6 Letter Writing, Technical Report  
Writing Interview Skills

**Books for Study**

Ujjwala, Kakarla, Tanu Gupta and LeenaPundir, Functional English for Communication. Sage Publications India Pvt.Ltd, New Delhi 2019.

**Books for Reference**

Shaffer, Lawrence, Skill’s Editing. Delhi: IV Y Publishing House, 2004.

Collins,Sandrad. Listening and responding. India: AakashPress, 2009.

A.W. Heffernan & John E.Lincoln. Writing a college Work Book WW.  
Norton & Company, 1982.

Joshi,PoonamP,Essentials of Communication Skills and Grammar. Delhi:Tarun Printers,  
2009.

Taylor,Grant.English Conversation Practice. Tata Mc Graw-Hill,1975.Dr.A.Devaraj&K.S.Antonysamy.  
Effective Communication. Vijay Nicole,2006.

### **Open Educational Resources (OER)**

To make the students prepare, write charts,reports,assignments.

Newspaper cutting(advertisement), to read books interrupt and write reviews.

**SEMESTER – II**  
**UCENC20 - INDIAN WRITING IN ENGLISH**

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> UCENC20	<b>Title of the Course:</b> Indian Writing in English	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Identify different literary genres in Indian writing in English
2. Discuss the history of Indian writing in English
3. Interpret and appraise different style and themes in Indian writing in English
4. Appreciate the diverse themes which are intrinsic to Indian culture
5. Appraise translated texts from the regional languages of India for their indigenous sensibilities.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## Course Syllabus

### Unit I:Poetry (Detailed) (15 Hours)

- 1.1.Critical appreciation of poetry K4
- 1.2.Spiritual writing K4
- 1.3.Rabindranath Tagore -*Gitanjali* (1-10) K2,K4
- 1.4.Sarojini Naidu - *The Soul's Prayer* K2,K4
- 1.5.Nissim Ezekiel - *The Railway Clerk* K2,K4
- 1.6.JayantaMahapatra - *An October Morning* K2,K4

### Unit II:Poetry (Non - Detailed) (15 Hours)

- 2.1.Introduction toA.K. Ramanujam K1,K2
- 2.2.A.K. Ramanujam - *The Striders* K2,K4
- 2.3. ArunKolatkarr - *An Old Woman* K2,K4
- 2.4. Introduction to - *Kamala Das* K1,K2
- 2.5.Kamala Das - *Nani* K2,K4
- 2.6.Meena Alexander - *Her Garden* K2,K4

### Unit III: Prose (20 Hours)

- 3.1.Non-fiction as a genre - K1,K4
- 3.2.Arundhati Roy - *The End of Imagination* K2
- 3.3.Nirad C. Chaudhuri- *Money and the Englishman* K2

#### Short Stories

- 3.4. Short story as a genre K1,K4
- 3.5. Mahasweta Devi - *Arjun* K2
- 3.6.Anita Desai - *Circus Cat, Alley Cat* K2

### Unit IV:Drama (10 Hours)

- 4.1. Introduction to Regional Theatre K1, K2
- 4.2. Life and Works of Vijay Tendulkar K1
- 4.3.Vijay Tendulkar - *Silence the Court is in Session* K2
- 4.4.Life and Works of BadalSircar K1,K2
- 4.5.Third Theatre K1,K2
- 4.6.BadalSircar - *EvamIndrajit* K1,K2

### Unit V:Fiction (15 Hours)

- 5.1.Introduction to R.K.Narayan K1
- 5.2.R.K. Narayan - *The Bachelor of Arts* K1,K2
- 5.3.Introduction toRaja Rao K1
- 5.4.Raja Rao - *Kanthapura* K1,K2
- 5.5.Introduction toKamala Markandeya K1
- 5.6.Kamala Markandeya - *Nectar in a Sieve* K2

### Books for Study

Ed. Haneefa.S., Rajendran.N.P. Our Country, Our Literature: An Anthology of Indian Writings in English. Cambridge University Press, 2015

Narayan. R. K. The English Teacher. Chennai: Indian Thought Publications, 2009.

Karnad, Grirish., Sircar, Badal., Tendulkar, Vijay. Three Modern English Plays. Oxford University Press.2008

### **Books for Reference**

De Souza, Eunice. Ed. Nine Indian Women Poets. Oxford Paperbacks, 2001

Parthasarathy. R. Ed Twentieth Century Indian Poets. Oxford India Paperbacks, 2001

Devi, Mahasweta. Our Non-Veg Cow and Other stories. Trans. Paramita Banerjee. Seagull Books. 2009

Arundhati Roy. The Algebra of Infinite justice. New Delhi: Penguin Books, 2013.

## SEMESTER – II

### UCEND20 - LITERARY FORMS AND TERMS

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> UCEND20	<b>Title of the Course:</b> Literary Forms and Terms	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Explain the significance and characteristics of different ages and movements in literature
2. Identify figures of speech in literary texts
3. Compare and Contrast literary forms
4. Apply the knowledge of forms and other aspects to understand literary texts
5. Analyse literary texts based on form and other literary aspects

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

#### Course Syllabus

**Unit I: Literary Terms – Part A K Level (1 – 4) (18 Hours)**

- 1.1. Allegory, Alliteration, Allusion, Ambiguity, Anachronism, Anecdote, Anticlimax, Archaism, Assonance
- 1.2. Ballad & Folk Ballad, Bathos, Bildungsroman, Blank Verse, Catharsis, Characterization, Cognitive Language
- 1.3. Comic Relief, Conceit, Conflict, Connotation, Cosmic irony, Criticism,
- 1.4. Denouement, Dirge, Dramatic Irony, Elegy, Epigram, Epithet, Euphemism, Euphony
- 1.5. Farce, Folklore, Free Verse, Heroic Poem, Hegemony, Hyperbole
- 1.6. Metonymy, mis en scene, Personification, Portmanteau word, Protagonist, Sarcasm

**Unit II: Literary Terms – Part BK Level(1 – 4) (18 Hours)**

- 2.1. Essay, Formal Essay, Formal Satire, Irony, Italian Sonnet
- 2.2. Interlude, Internal Rhyme, Invocation, Graveyard Poets, Horatian Ode, Mock Epic
- 2.3. Objective Correlative, Parody, Pastoral Elegy, Pathetic Fallacy, Petrarchan Conceit
- 2.4. Popular Ballad, Petrarchan Sonnet
- 2.5. Pindaric Ode, Poetic License, Paradox, Quatrain, Rhetoric, Roman a clef, Rhyme
- 2.6. Synecdoche, Synesthesia, Shakespearean Sonnet, Sestet, Simile, Soliloquy Spenserian Sonnet, Stanza, Sprung Rhythm, Terza rima, Trochee, Trope, Wit, Zeugma

**Unit III: Drama - Types and Features K Level(1 – 4) (18 Hours)**

- 3.1. Fable, Fiction, Farce, Flashbacks
- 3.2. Folk Drama, Heroic Drama, Historical Play, Heroic Tragedy, History Plays, Interior Monologue
- 3.3. Leitmotif, Miracle Plays, Poetic Justice
- 3.4. Problem Play, Pantomime, Revenge Tragedy, Romantic Comedy, Senecan Tragedy, Satiric Comedy
- 3.5. Stock Characters, Structure, Style, Suspense
- 3.6. ThreeUnities, Tragic Flaw, Tragic Irony, Tragicomedy, Travesty

**Unit IV: FictionK Level(1 – 4) (18 Hours)**

- 4.1. Short Story, Epistolary Novel, First Person Narrative
- 4.2. Folk Tale, Novella, Gothic Novel, Historical Novel
- 4.3. Medieval Romance, Satire, Stream of Consciousness
- 4.4. Picaresque Narrative, Prosopopoeia
- 4.5. Sentimental Comedy, Novel
- 4.6. Sociological Novel, Psychological Novel

**Unit V: Ages and MovementsK Level(1 – 4) (18 Hours)**

- 5.1. Edwardian Period, Elizabethan Age, Jacobean Age, Neoclassical Age
- 5.2. Reformation, Renaissance, Restoration, Victorian Period, Romantic Period, Modern Period, Symbolist Movement
- 5.3. Existentialist Philosophy, Expressionism, Impressionistic Criticism, Humanism & Humanistic Criticism
- 5.4. Humour, Black Humour, Harlem Renaissance, Irish Literary Revival
- 5.5. Naturalism, Mythology, New Humanism, Neo Classic, Neo Platonists, New Criticism, Reader Response Criticism
- 5.6. Realism, Science Fiction, Surrealism

**Books for Study:**

M. H. Abrams. *A Glossary of Literary Terms*. Singapore: Thomson & Heinle. 2004  
M. H. Abrams. *A Glossary of Literary Terms*. India: Macmillan Publishers India Ltd., 2013  
Gibaldi, Joseph. *MLA Handbook for Writers of Research Papers*. VII Edition. East West Publishers. New Delhi

**Books for Reference:**

Nair, Ramachandran K.R. *Literary Forms*. Chennai: Emerald Publishers, 1995.  
Mohanty, Uday. *Literal and Figurative English*. New Delhi: Pacific Books International, 2009.  
Styan, J.L. *The Dramatic Experience*. London: Cambridge UP, 1971  
Richardson, Jack. *Dictionary of Literature*. New Delhi: Lotus Press, 2014  
Michaelson, R. *Dictionary of Rhetorics*. Delhi: IVY Publishing House. 2005.

## SEMESTER – II

### UAEEG20 - Allied- ELEMENTS OF ENGLISH GRAMMAR

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> UAEEG20	<b>Title of the Course:</b> Elements of English Grammar	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Recall the basic rules of English grammar
2. Explain basic concepts of grammar
3. Apply rules related to structure and correct pattern of English language
4. Use English Language with grammatical accuracy
5. Analyse and correct grammatical errors

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## Course Syllabus

### Unit I: Grammar (17 Hours)

1.1. Tenses: Present Tense	K1, K2
1.2. Tenses: Past Tense	K1, K2
1.3. Tenses: Future Tense	K1, K2
1.4. The Future	K3, K4
1.5. Modals	K2
1.6. Be, have, do make, etc.	K2

### Unit II: Grammar (17 Hours)

#### Sub-units:

2.1. Passives	K3
2.2. Questions	K1, K2
2.3. Verbs: infinitives	K2
2.4. Verbs: -ing forms etc.	K1, K2 Reporting K1, K2
2.5. Nouns and compounds	K3

### Unit III: Grammar (17 Hours)

#### Sub-units:

3.1. Articles	K1, K2
3.2. Determiners and quantifiers	K3
3.3. Relative clauses	K2
3.4. Other types of clauses	K2, K3
3.5. Pronouns	K1, K2
3.6. Substitution and leaving out words	K3, K4

### Unit IV: Grammar (20 Hours)

#### Sub-units:

4.1 Adjectives	K1, K2
4.2 Comparison with adjectives	K3, K4
4.3 Adverbs	K1, K2
4.4 Adverbial clauses	K3
4.5 Conjunctions	K2
4.6 Prepositions	K1, K2

### Unit V: Grammar<sup>4</sup>

5.1. Organising Information	K1
5.2. There Is, here was, etc	K1, K2
5.3. It	K1, K2
5.4. Focusing: it-clauses	K2, K3
5.5. Focusing: what-clauses	K2, K3
5.6. Inversion	K3

### Books for Study

Hewings, Martin. *Advanced English Grammar*. New Delhi: CUP. 1999. Print

### **Books for Reference**

Green, David. *Contemporary English Grammar structures and composition*.

India: Macmillan LTD, 2006. Print.

Joshi, Poonam P. *Essential of Communication Skills and Grammar*. New Delhi:

Adhyayan Publishers, 2009. Print.

Quirk, Randolph, & Greenbaum, Sidney. *A University Grammar of English*. Delhi:

Pearson Education, 2003. Print

Leech, Geoffrey, & Svartvik, Jan. *A Communicative Grammar of English*. Delhi: Pearson

Education, 2004. Print.

**SEMESTER – III**  
**CENE20 - ELIZABETHAN LITERATURE**

<b>Year:</b> II	<b>Course Code:</b> UCENE20	<b>Title of the Course:</b> Elizabethan Literature	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Identify the literary history of Elizabethan Age
2. Discuss the major themes and forms in the Literature of the Elizabethan period
3. Analyse the Elizabethan writing as both register and response to historical, social and political development of the era.
4. Examine texts from different perspectives.
5. Appreciate the works of Shakespeare and his contemporaries

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Course Syllabus**

**Unit I: Introduction**

1.1 The Renaissance

**K1-K4**

**( 15 Hours)**

- 1.2 The Reformation
- 1.3 The Dissolution of Monasteries
- 1.4 Colonial Expansion

**Poetry Detailed**

- 1.5 Edmund Spenser –Faerie Queen (Book-I, Stanza 1 to 15)
- 1.6 Thomas Wyatt – (i) Farewell, Love ( Pg 650)  
(ii) Forget not Yet (Pg656)

**Unit II: Poetry Detailed K1-K5 ( 20 Hours)**

- 2.1 William Shakespeare-Sonnet 1(Pg 1171)
- 2.2 Philip Sidney-From Astrophil and Stella (Pg 1054)
- 2.3 John Donne- The Sunne Rising

**Non-Detailed**

**Sir Walter Raleigh -The Nymph’s Reply to the Spheherd (Pg 1024)**

- 2.4 Earl of Surrey -So Cruel Prison How could be tide. (Pg 665)  
-Martial, the Things for to Attain. (Pg 669)
- 2.5 Lady Mary Worth - Pamphilia To Amphilanthus; Sonnet 1

**Unit III: Prose –Detailed K1-K5 ( 20 Hours)**

- 3.1. Francis Bacon
- 3.2. Of Truth
- 3.3 Of Ambition
- 3.4. Of Studies

**Non-Detailed**

- 3.5 Sir Thomas More
- 3.6 Utopia Book -2 (Pg 31-36)

**Unit IV: Drama Detailed K1-K5( 20 Hours)**

- 4.1 Christopher Marlowe
- 4.2 Elements of Renaissance
- 4.3 Dr. Faustus–Sources
- 4.4 Morality Play
- 4.5 Plot
- 4.6 Themes

**Unit V: Drama – Non- Detailed K1-K5 (15 Hours)**

- 5.1 Ben Johnson
- 5.2 Volpone
- 5.3 Plot and Themes
- 5.4 John Webster
- 5.5 The White Devil
- 5.6 Plot and Themes

**Books for Study**

Greenblatt, Stephen ed. *The Norton Anthology of English Literature*, Vol B, 16<sup>TH</sup> and early 16<sup>th</sup> century, W.W Norton & Company, Inc., 9th Edition. 2012

Spenser, Edmund. *Faerie Queene* Book-1 ed. MC Jussawalla, Hyderabad; Orient Black Swain

Private Limited.2012.

Johnson, Ben. *Volpone*. J.B.Bamborough.M.A, London, Macmillian Education Ltd.1974.

Marlowe, Christopher. *The Tragical History of Doctor Faustus*. Haryana. Macmillian Publishers India Ltd.2013.

#### **Books for Reference**

Dave, Smita.,*Christopher Marlowe*. New Delhi, Arnold Heinemann Publishers(India) Private Litmited. 1974.

Roberts, Gareth.,*The Faerie Queene*. New Delhi , Viva Books Private Limited. 2003.

Male, David.,*The White Devil*. New York, Palgrave Macmillian.2005.

Ellis – Fermor, Una.,*The Jacobean Drama*, London, University Paperbacks.1969.

## SEMESTER – III

### UCENF20 - AMERICAN LITERATURE

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> UCENF20	<b>Title of the Course:</b> American Literature	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Identify characteristic forms or styles of expression during different historical periods in different regions.
2. Discuss the issues, conflicts, preoccupations and themes of various literary texts.
3. Examine the historical, cultural, rhetorical contexts in which the literary texts were written.
4. Analyze literary works as expressions of individual or communal values within the social, political, cultural or religious contexts of different literary periods.
5. Write clear, focused and coherent essays about literature for an academic audience using standard English conventions of grammar and style.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Poetry – Detailed****(15 Hours)**

- |                      |                            |
|----------------------|----------------------------|
| 1.1. Walt Whitman    | A Noiseless Patient Spider |
| 1.2. Robert Frost    | Birches                    |
| 1.3. Carl Sandburg   | Chicago                    |
| 1.4. R. W. Emerson   | Hamatreya                  |
| 1.5. Maya Angelou    | Still I Rise               |
| 1.6. Edgar Allan Poe | A Dream within a Dream     |

**Unit II: Poetry – Non-Detailed****(10 Hours)**

- |                      |   |                |                     |
|----------------------|---|----------------|---------------------|
| 2.1. Amy Lowell      | Patterns                                | H.W.Longfellow | A Glean of Sunshine |
| 2.2. Emily Dickinson | After Great pain a formal feeling comes |                |                     |
| 2.3. Langston Hughes | The Negro Mother                        |                |                     |
| 2.4. E.E.Cummings    | Somewhere I have never travelled        |                |                     |
| 2.5. Allen Ginsberg  | Howl                                    |                |                     |

**Unit III: Prose – Detailed****(15 Hours)**

- |                       |                                    |
|-----------------------|------------------------------------|
| 3.1. William Faulkner | Nobel Prize Acceptance Speech      |
| 3.2. Jack London      | What life means to me              |
| 3.3. Thoreau          | Where I Lived and What I lived For |

**Prose: Non- Detailed**

- |                         |                |
|-------------------------|----------------|
| 3.4. Martin Luther King | I have a Dream |
| 3.5. R.W. Emerson       | Self-Reliance  |
| 3.6. R.W. Emerson       | Self-Reliance  |

**Unit IV: Drama (20 Hours)****Detailed**

- |                           |                     |
|---------------------------|---------------------|
| 4.1. – 4.3. Arthur Miller | Death of a Salesman |
|---------------------------|---------------------|

**Non- Detailed**

- |                                |                     |
|--------------------------------|---------------------|
| 4.4. – 4.6. Tennessee Williams | The Glass Menagerie |
|--------------------------------|---------------------|

**Unit V: Fiction Short Story:****(15 Hours)**

- |                      |                                |
|----------------------|--------------------------------|
| 5.1. J.D.Salinger    | Franny                         |
| 5.2. Edgar Allan Poe | The Fall of the House of Usher |
| 5.3. John Steinbeck  | TheChrysanthemums              |

**Novel:**

- |                      |                              |
|----------------------|------------------------------|
| 5.4. Mark Twain      | The Adventures of Tom Sawyer |
| 5.5. Herman Melville | Moby Dick                    |
| 5.6. Harper Lee      | To Kill a Mocking Bird       |

**Books for Study and References:**

Lee, Harper. *To kill a Mocking Bird*:- Warner Books Edition- 1982

Melville, Herman. *Moby Dick*: Tom Doherty Associates, 1996

Miller, Arthur. *All My Sons*- Ed: Harold Bloom: Viva Books Pvt. Ltd. Chennai, 2007

Poe, Edgar Allan. : *The Fall of the House of Usher and other Writing*: Penguin classics 2003

Whitman, Walt. *Leaves of Grass*: Oxford World's Classics, 1998(OUP)

Oliver. S. Egbert- *An Anthology of American Literature* 1890- 1965

## SEMESTER – III

### UAHEL20 - HISTORY OF ENGLISH LITERATURE

<b>Year:</b> II	<b>Course Code:</b> UAHEL20	<b>Title of the Course:</b> The History of English Literature	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Recognize the socio-political, historical background of English Literature down the ages.
2. Discuss Literature as an expression of author's interpretation and representation of life from their ages
3. Apply a critical enquiry to designate the style, technique and use of language of the writers of different ages.
4. Analyze the growth and transformation of English Literature from period to period and to evaluate the connections, text, context and continuity in English Literature down the ages.
5. Evaluate the influence of the individual writers upon an age.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

### Unit I (K1-K5)

(15 Hours)

- 1.1 Old English Literature- Part -I
- 1.2 Old English Literature- Part -II
- 1.3 Middle English Literature - Part -I
- 1.4 Middle English Literature- Part -II
- 1.5 Elizabethan Poetry
- 1.6 Elizabethan Prose

### Unit II

(15 Hours) Elizabethan

#### Drama- Part-I

- 2.1. Elizabethan Drama-Part- II
- 2.2. John Milton and his Time-Part-I
- 2.3. John Milton and his Time- Part- II
- 2.4. Restoration Drama
- 2.5. Restoration Prose

### Unit III

(15 Hours)

- 3.1 English Poets, 1600-1798- Part- I
- 3.2 English Poets, 1600-1798- Part -II
- 3.3 Eighteenth- century Prose- Part-I
- 3.4 Eighteenth- century Prose- Part- II
- 3.5 Nineteenth- century Poets
- 3.6 Later nineteenth- century Poets

### Unit IV

(15 Hours)

- 4.1. Nineteenth- century Novelists- Part- I
- 4.2. Nineteenth- century Novelists- Part- II
- 4.3. Other nineteenth- century Prose- Part- I
- 4.4. Other nineteenth- century Prose- Part- II
- 4.5. Early twentieth- century Novelists-Part -I
- 4.6. Early twentieth- century Novelists- Part- II

### Unit V

(15 Hours)

- 5.1 Modern Drama
- 5.2 History and Travel

- 5.3 Biography
- 5.4 Some Modern Women Writers
- 5.5 Poets of the twentieth century
- 5.6 Later Prose of the twentieth century

### **Books for Study**

G.C. Thornley. *An Outline of English Literature*. London: Longman Background Books, 1977. Print.

### **Books for Reference**

1. Albert, Edward. *History of English Literature*, 5th Edition. New Delhi: Oxford University Press, 1979.
2. Emile, LegouisCazamian. *History of English Literature*, Macmillan Publishers (Trinity Publications)
3. Hudson, William Henry. *An Outline History Of English Literature*, B.I Publications Pvt.Ltd.New Delhi, 1961.
4. Long, William J. *English Literature*, AITBS Publication, India – New Delhi, 2013.
5. Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford, UK: Oxford University Press, 1994. Print
6. Trevelyan G.M. *English Social History*, Longmans Green & Co., New York, 2011.

### **Open Educational Resources (OER)**

<https://nptel.ac.in/courses/109/106/109106124/>

## USENB320- ENGLISH FOR COMPETITIVE EXAMS

<b>Year :</b> II	<b>Course Code:</b> USENB320	<b>Title of the Course:</b> English for Competitive Exams	<b>Course Type:</b> Theory	<b>Course Category :</b> Allied	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 60
<b>Sem:</b> III							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

- CO1 Recall basic rules of grammar
- CO2 Understand current affairs of regional, national and international importance
- CO3 Apply vocabulary and communication skills
- CO4 Speak and write fluently in English
- CO5 Analyse different verbal and reasoning ability

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	M	L	L	M	M	M
<b>CO2</b>	H	L	M	L	H	H
<b>CO3</b>	H	L	M	L	M	M
<b>CO4</b>	L	L	M	L	H	H
<b>CO5</b>	M	L	M	L	M	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	L	M	M	M
CO2	H	L	M	L	H	H
CO3	H	L	M	L	M	M
CO4	L	L	M	L	H	H
CO5	M	L	M	L	M	M

**Unit I: Grammar**

**K Level (1 – 4)**

**(Hours 7)**

- 1.1 Elements of Grammar
- 1.2 Parts of speech
- 1.3 Kinds of sentences
- 1.4 Articles
- 1.5 Spotting the errors
- 1.6 Rearranging sentences

**Unit II: Vocabulary**

**K Level (1 – 4)**

**(Hours 7)**

- 2.1 Introduction to Vocabulary
- 2.2 Antonyms
- 2.3 Synonyms
- 2.4 Acronyms
- 2.5 Homophones
- 2.6 Homonyms

**Unit III: Spellings**

**K Level (1 – 4)**

**(Hours 7)**

- 3.1 Introduction to the importance of correct spelling
- 3.2 Jumbled words
- 3.3 One Word Substitutions
- 3.4 Misspelt words
- 3.5 Introduction to creating new words
- 3.6 Creating new words

**Unit IV: Reasoning**

**K Level (1 – 4)**

**(Hours 8)**

- 4.1 Verbal Reasoning
- 4.2 Comprehension and composition
- 4.3 Letter writing
- 4.4 Paragraph Writing
- 4.5. Cloze Test
- 4.6 Idioms and Phrases

**Unit V: General knowledge**

**K Level (1 – 4) (Hours 7)**

- 5.1 Introduction to the importance of General KnowledgeGeneral Intelligence and Reasoning
- 5.2 Current Affairs and recent developments
- 5.3 Static GK
- 5.4 General Awareness
- 5.5 Abbreviations

**Books for Study:**

R. Gopalan V. Rajagopalan Roopkumar Balasingh, General English for Competitive Examinations. Vijay Nicole Imprints pvt. Ltd ( Chennai) 2010.

R.P. Bhatnagar. *English for Competitive Examinations* 3<sup>rd</sup> Edition. India: MacMillan. 2009.

Bhatnagar R.P & Rajul Bhargava. *English for Competitive Examinations*. Special Edition. Macmillan Publishers, 2007.

Maison M.Margaret . *Examine Your English*. Orient Blackswan Private Limited, Hyderabad, 1964.

**Books for Reference**

Murphy, Raymond. *Essential English Grammar*. Cambridge University Press, 2003.

B.G.Tandon &Tandon,Loveena. *English Grammar and Composition*. Anne Books, 2007.

A.J. Thompson &A.V.Martinet. *A Practical English Grammar*. OUP, 1980.

T.L.H. Pearse, Smith. *The English Errors of Indian Students*. OUP, 1968.

## SEMESTER – IV

### UCENG20 - NEO - CLASSICAL LITERATURE

<b>Year:</b> II	<b>Course Code:</b> UCENG20	<b>Title of the Course:</b> Neo-Classical Literature	<b>Course Type:</b> Theory	<b>Course Category:</b> : Main	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Recall the historical, social and biographical details of the Era
2. Interpret the contextual structure of the literary texts of the Era
3. Apply Critical Perspectives on the Literary Works
4. Appreciate the contribution of the Texts and explore the social, historical, artistic and literary influences of the period.
5. Analyse insights to the various literary genres of the Era

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M

CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

- 1.1 Introduction to Neo-Classical Era
- 1.2 Puritanism
- 1.3 The Age of Queen Anne
- 1.4 John Milton (1608-1674) - Paradise Lost, Book I – Lines 1 to 155
- 1.5 Alexander Pope (1688-1744) - The Rape of the Lock – Canto III – Lines 75 to 178
- 1.6 William Blake (1757-1827) - Songs of Innocence: A Dream  
Songs of Experience: A Poison Tree

**Unit II: Poetry (Non-Detailed) K2-K4 (18 hours)**

- 2.1 Poetic Schools of the Era
- 2.2 Restoration England
- 2.3. Abraham Cowley (1618-1667) - Against Hope
- 2.4. Henry Vaughan (1621-1695) - The Retreat
- 2.5. Andrew Marvell (1621-1678) - On A Drop of Dew
- 2.6. Thomas Gray (1716-1771) - Ode to Adversity

**Unit III: Prose (Detailed & Non-detail) K1-K4 (18 hours)**

- 3.1 Introduction to Neo-Classical Prose
- 3.2 Coffee House Life in London
- 3.3 Jonathan Swift (1667-1745) The Battle of the Books  
(Whoever examines...sweetness and Light)
- 3.4 Addison and Steele (1672-1719) - The Coverley Papers: Sir Roger at Church
- 3.5 Addison and Steele (1672-1719) - The Coverley Papers: Sir Roger in London
- 3.6 Dr. Johnson (1709-1784) (**Non-detail**) Life of Milton (The life of Milton...gentlemen of  
Gray's Inn)

**Unit IV: Drama (Detailed & Non-detail) K1-K4 (18 hours)**

- 4.1 Introduction to Neo-Classical Drama
- 4.2 Introduction to Sentimental and Anti-Sentimental Comedies
- 4.3 Author Introduction
- 4.4 Richard Sheridan Brinsley (1751-1816) - The School for Scandal (Detailed)
- 4.5. Author Introduction
- 4.6 William Congreve (1670-1729) - The Way of the World (Non-Detailed)

**Unit V: Fiction K2-K4 (18 hours)**

- 5.1 Introduction to Types of Fiction
- 5.2 Introduction to Neo-Classical Fiction
- 5.3 Author Introduction
- 5.4 Daniel Defoe (1660-1731) - Robinson Crusoe
- 5.5 Author Introduction
- 5.6 Oliver Goldsmith (1730-1774) - The Vicar of Wakefield

**Books for Study:**

- 1. Lynn, Mary Johnson Ed., John E. Grant. *Blake's Poetry and Designs*. Norton Critical, 2004.

2. Defoe, Daniel. *Robinson Crusoe*. Peacock Books. 1719.
3. Goldsmith, Oliver. *The Vicar of Wakefield*. Macmillan Publishers, 1986.

**Books for Reference:**

1. Ellis, Frank H. *Twentieth Century Interpretations of Robinson Crusoe*. Spectrum Book. 1969.
2. Grierson, HJC. *Metaphysical Lyrics and Poems of the Seventeenth Century*. Oxford University. 1972.
3. *The Norton Anthology of English Literature: The Restoration and the Eighteenth Century*. Norton. 1962.
4. A. G. Xavier. *The Social History of England*. Viswanathan Printers & Publishers. 2009

## SEMESTER – IV

### UCENH20 - ROMANTIC LITERATURE

<b>Year:</b> II	<b>Course Code:</b> UCENH20	<b>Title of the Course:</b> Romantic Literature	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> IV							

#### Course Outcomes

The Learners will be able to

1. Locate the historical and cultural context of English Romanticism.
2. Discuss the traits of Romanticism with emphasis on concepts of self, imagination and the unconscious
3. Apply historical, social, philosophical and political contexts to interpret texts
4. Analyse the effects of the major events in that period.
5. Evaluate the impact of Romanticism on the development of literary form and modes of expression.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

#### Unit I: Introduction / Detailed Poetry

**K Level (20 Hours)**

- |   |        |
|---|--------|
| 1.1 The French Revolution: The American war of Independence   | K1, K3 |
| 1.2 William Wordsworth: Lines Composed upon Westminster Abbey | K2, K4 |
| 1.3 John Keats: Ode on a Grecian urn                          | K2, K3 |
| 1.4 Poetic Techniques in Ode on a Grecian urn                 | K3, K4 |
| 1.5 P. B. Shelley: Ode to the West Wind                       | K3, K4 |
| 1.6 Themes and Symbols in Ode to the West Wind                | K3, K4 |

**Unit II: Non- Detailed Poetry****K Level (20 Hours)**

2.1 S. T. Coleridge: The Rime of the Ancient Mariner	K1, K3
2.2 Themes of The Rime of the Ancient Mariner	K2, K4
2.3 Lord Byron: She walks in Beauty	K2, K3
2.4 Robert Southey: To the Genius of Africa	K3, K4
2.5 Charlotte Byrne: The Female Philosopher	K3, K4
2.6 Characteristics of English Romantic Poetry.	K3, K4

**Unit III: Prose – Detailed K Level (20 Hours)**

3.1 William Hazlitt: The Indian Jugglers	K1, K2
3.2 William Hazlitt as a Romantic Essayist	K2, K3
3.3 Characteristics of the Indian Jugglers	K2, K3
3.4 Salient Characteristics of Romanticism	K2, K3
3.5 William Hazlitt: On Nicknames	K3, K4
3.6 Charles Lamb: Dream Children	K3, K4

**Unit IV: Fiction****K Level (15 Hours)**

4.1 Walter Scott: Kenilworth	K2, K3
4.2 Kenilworth as a Romantic novel	K2, K3
4.3 Narrative art in Kennilworth	K2, K3
4.4 Jane Austen: Pride and Prejudice	K3, K4
4.5. Austen's portrayal of the women in Pride and Prejudice	K3, K4
4.6 Significance of the title Pride and Prejudice	K3, K4

**Unit V: Fiction K Level(15 Hours)**

5.1 Mary Shelley: Frankenstein	K2, K3
5.2 The role of suspense and foreshadowing in the novel	K2, K3
5.3 Theme of loneliness in Frankenstein	K2, K3
5.4 Horace Walpole: The Castle of Otranto	K2, K3
5.5 How was Walpole's novel connected to the actual Goths and their culture?	K3, K4
5.6 Symbolism and Imagery in The Castle of Otranto	K3, K4

**Books for Study:**

1. Nayar. K Pramod. The English Romantic Poets: An Anthology, Orient Blackswan Private Limited. 2013
2. Ed. Hollingworth. Essays: Hazlitt. University Tutorial Press Limited.
3. Austen, Jane, Pride and Prejudice, Rupa Publication. New Delhi, 2004.
4. Walpole Horace, The Castle of Otranto, Oxford University Press, India, 2008.

**Books for Reference:**

1. Plowman, Max. An Introduction to the Study of William Blake. Atlantic Publishers and Distributors. New Delhi. 1994.
2. Ed., Gill, Stephen, WU, Duncan, William Wordsworth Selected Poetry, Oxford University Press, New York, 2008.
3. Ed., Holloway, John, Selected Poems of Percy Bysshe Shelley, Heinemann

Educational Books Ltd., Hong Kong, 1964.

4. Ed., Blunden, Edmund, Selected Poems John Keats, Rupa Publications India Private Limited, New Delhi, 2011.
5. Ed., Bloom, Harold, Jane Austen's Pride and Prejudice, Viva Books Private Limited, New Delhi, 2010.

## SEMESTER – IV

### UATOT20 - Allied -TECHNIQUES OF TRANSLATION

<b>Year:</b> II	<b>Course Code:</b> UATOT20	<b>Title of the Course:</b> Techniques of Translation	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Identify the nuances of the process of translation.
2. Explain the concepts of translation and the role of the translator.
3. Apply theoretical approaches to translate literary and non-literary texts
4. Analyse the practicality of translation and use it to develop awareness of academic writing requirements.
5. Evaluate the translated and original texts.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	H	M

Course Syllabus

Unit I

K1-K4

(15 Hours)

- 1.1 Perspectives on Translation
- 1.2 Definition of Translation
- 1.3 Equivalence: semantic and stylistic
- 1.4 Discourse

Parameters 1.5 Rules:  
description

- 1.6 Prescription

**Unit II** **K1-K4** **(15 Hours)**

- 2.1 Key concepts
- 2.2 Key figures in Translation theory
- 2.3 Literary and Non-Literary and literal
- 2.4 Transliteration
- 2.5 Transcreation
- 2.6 Scientific Translation

**Unit III** **K1-K4** **(15 Hours)**

- 3.1 Definition of a Translator
- 3.2 Memory
- 3.3 Meaning
- 3.4 Language
- 3.5 The communication process
- 3.6 The translation process

**Unit IV** **K1-K4** **(15 Hours)**

- 4.1 Translation Theories
- 4.2 Models
- 4.3 Analogies
- 4.4 Requirements for a theory of Translation
- 4.5 Methodology; investigating translation
- 4.6 Unit of Translation

**Unit V** **K1-K4** **(15 Hours)**

- 5.1 Translating: Modelling The Process
- 5.2 The Translator: Knowledge and Skills
- 5.3 Ideal: Bilingual competence
- 5.4 Expertise
- 5.5 Communicative competence
- 5.6 Practice- Translating Texts (According to individual's mother tongue)

**Books for Study:**

Bell, Roger T. *Trans. and Translating: Theory and Practice*. UK: Longman Group. 1991  
<https://pandoraenglish.files.wordpress.com/2012/11/ebooksclub-org-translation-and-translating-theory-and-practice-applied-linguistics-and-language-study-.pdf>

**Books for Reference:**

Kumar, Bijay Das. *A Handbook of Translation Studies*. New Delhi: Atlantic Publishers and

Distributors, 2005.

Seturaman, ed. *Indian Aesthetics: An Introduction*. New Delhi: Macmillan, 2005.

Mukherjee, Sujit. *Translation as Recovery*. Delhi: Pencraft International.

## SEMESTER - IV

<b>Year: 2020</b> <b>Semester - IV</b>	<b>Course Code:</b> <b>16ENA</b>	<b>Title of the Course:</b> <b>Journalism</b>	<b>Course Type:</b>	<b>Course Category:</b> <b>Skill Based Elective-II</b>	<b>H/W: 4</b>	<b>Credits: 5</b>	<b>Marks: 60</b>
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course  
Outcomes  
(CO)

On Completion of the Course the Learners will be able to:

- CO1 Discuss the history and principles of journalism
- CO2 Discuss the role, duties and responsibilities of reporter, sub-editor and editor, the different press laws and acts
- CO3 Write news articles and edit news
- CO4 Analyse different types of news writing
- CO5 Discuss advertisement and ethics of advertising

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	H	H	M	M
<b>CO5</b>	H	H	H	H	M	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	H
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

**Unit 1: INTRODUCTION AND ETHICS** **K1, K2** **7 Hours**

- 1.1: Introduction to Journalism
- 1.2: A Short History of Journalism in India
- 1.3: Principles of Journalism
- 1.4: Press Codes and Press Council of India
- 1.5: Ethics of Journalism
- 1.6: The role played by Journalism as part of the mass media

**Unit 2: THE PRESS: LAWS & PRIVILEGES** **K2, K4** **7 Hours**

- 2.1: Freedom of Press, Challenges to Press Freedom
- 2.2: Press Laws- Defamation
- 2.3: Libel Contempt of Court
- 2.4: Copyright Laws
- 2.5: Press Regulation Act
- 2.6: Press Registration Act, Law of Privileges

**Unit 3: ROLES & REPORTS** **K4, K5** **7 Hours**

- 3.1: The Role of the Reporter
- 3.2: The Role of the Sub-Editor
- 3.3: The Role of the Editor
- 3.4: News Agencies
- 3.5 Types- Straight, Interpretative, Investigative
- 3.6 News Tracking

**Unit IV: DESIGNING-ADVERTISING** **K5, K6** **8 Hours**

- 4.1: Reporting
- 4.2: Headlines
- 4.3: Editing
- 4.4: Layout, Aims
- 4.5: Designing-Types-Advertisements
- 4.6: Advertising and Social Responsibility

## **Unit V: PRACTICALS**

**K3, K5, K6 7 Hours**

- 5.1 : Editing
- 5.2: Proof Reading
- 5.3: Photographic Journalism
- 5.4: Cartoon
- 5.5: News Reports
- 5.6: Advertisements

### **Books for study and reference:**

1. Vir Aggarwal & V.S.Gupta., **Handbook of Journalism and Mass Communication**, Concept Publishing Company, New Delhi.
2. Puri. G.K. **Competition Success: Review Communication** . New Delhi: Sudha Publication,
3. Roy, Baron, **Beginner's Guide to Journalism**, New Delhi: Pushtak Mahal, 2003.
4. Parthasarathy,Rangaswami, **Basic Journalism**,Macmillan Publications,New Delhi,1984 Print.

**SEMESTER – V**  
**UCENI20 -SHAKESPEARE**

<b>Year:</b> III	<b>Course Code:</b> UCENI20	<b>Title of the Course:</b> Shakespeare	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> V							

**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Remember the influence of the Age, Lines, Soliloquies and speeches
2. Understand the impact of the Elizabethan era, discuss and paraphrase the text
3. Apply concepts, explain & interpret, sketch character roles and situations
4. Analyze, Compare and contrast character sketches, examine the salient features of the text
5. Evaluate the nuances of meaning, the style and plot

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	M	H	L
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	H	M	M	H	L
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H



[From H.B. Charlton. Shakespearean Comedy. Methuen & Co. Ltd London 1969]

Midsummer Night's Dream (Pg. 98-104)

[From Hazlitt, William. Characters of Shakespeare's Plays, London: OUP, 1966. Print.]

*Macbeth*, A Tragedy. William Shakespeare.

London: Nassau Steam Press, 1889

**Books for Reference:**

Edwards, Philip Shakespeare and the confines of Art Methuen & Co. Ltd London 1972. Clemen, Wolfgang Shakespeare's Dramatic Art – Methuen & Co. Ltd London 1972. Norfolk.

**SEMESTER – V**  
**UCENJ20 - VICTORIAN LITERATURE**

<b>Year:</b> III	<b>Course Code:</b> UCENJ20	<b>Title of the Course:</b> Victoria n Literature	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Locate the realm of the Victorian era in the field of Historical Literary Studies
2. Discuss the shift/transition from an Idealistic to the Realistic World of Living
3. Examine different forms/genres personalized by Victorian writers with the predominant themes of the Age
4. Analyze literary works through careful study of the Age
5. Formulate a critical hypothesis so as to write creative literary pieces on diversified perspectives

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	T

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	T

**Unit I: Poetry (Detailed)**

**K1- K5**

**(10 hours)**

1.1 Introduction - The Victorian Age

1.2 The Industrial Revolution & The Agrarian Revolution, The Development of Education in the Nineteenth Century

1.3 Matthew Arnold - Dover Beach

1.4 Rudyard Kipling - The Glory of the Garden

1.5 Robert Browning - My Last Duchess

1.6 Alfred Tennyson - Tithonus

**Unit II: Poetry (Non – Detailed) K1- K5 (15 hours)**

2.1 Major Themes in the Poetry of the Age

.2 Authors' Introduction

2.3 Elizabeth Browning - Cry of the Children

2.4 Christina Rossetti - Echo

2.5 Gerard Manley Hopkins - The Habit of Perfection

2.6 Swinburne - Before the Beginning of Years

**Unit III: Prose K1- K5 (15 hours)**

3.1 Introduction to Victorian Prose as a genre

3.2 Predominant Essayists of the Age

3.3 Major themes of the age

3.4 Author's Introduction

3.5 Prose (Detailed):John Ruskin - The Stone of Venice

3.6 Prose (Non – Detailed):John Henry Newman - Accuracy of Mind

**Unit IV:Drama (Detailed) K1- K5 (20 hours)**

4.1 Introduction to the Plays

4.2 Key Playwrights of the Age

4.3 Major themes of contemporary plays

4.4 Analysis of different plays written by Oscar Wilde

4.5 Oscar Wilde - *Lady Windermere's Fan*

4.6 Characterization

**Unit V: Fiction K1-K5 (15 hours)**

5.1 Introduction to Fiction of the Victorian Age

5.2 Author's Introduction and analysis of their works

5.3 Thomas Hardy - *The Mayor of Casterbridge*

5.4 Emily Bronte - *Wuthering Heights*

5.5 George Eliot - *The Mill on the Floss*

5.6 Charles Dickens - *Oliver Twist*

### **Books for Study:**

- Eliot, George. *Mill on the Floss*. London: OUP, 1949.
- Gilbert, J. Garraghan S. J. *Prose Types in Newman*. New York: Schwartz, Kirwin&Faussi.
- Hill, Robert W. Jr. *Tennyson's Poetry*. New York: w.w. Morton & Co, 2010.
- Lamb, Charles. *The Essays of Elia*. London: OUP, 1964.
- Sen, S. G. M. *Hopkins: Selected Poems*. New Delhi: Unique Publishers, 2008.
- Wilde, Oscar. *The Importance of Being Earnest and Other Plays*. Unites States: OUP, 2008

### Books for Reference:

- Evans, Ray. *The Mayor of Casterbridge by Thomas Hardy*. London: Macmillan Publications, 1987.
- Sen, S. *Matthew Arnold: Selected Poems*. New Delhi: Unique Publishers, 2008.
- Singh & Singh. Ed. *Lamb's Essays*. Bareilly: Shri Ram Press, 1971.
- Steane, J. B. *Literature in Perspective: Tennyson*. London: Evans Brothers Limited.

## SEMESTER – V

### UCENK20 - THE HISTORY OF ENGLISH LANGUAGE AND LINGUISTICS

<b>Year :III SEM :V</b>	<b>Course Code :</b> UCENK20	<b>Title Of The Course :</b> The History of English Language and Linguistics	<b>Course Type</b> Theory	<b>Course Category</b> : Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Identify the values associated with the ways of speaking, to broaden the vocabularies and to develop appreciation of language
2. Interpret the cognitive and social dimensions of first and second language acquisition
3. Apply the tools of linguistics to analyse the sounds, words and sentences of a language
4. Analyse specific sounds and understand systematic properties of sound system of English
5. Compare and contrast languages in terms of systematic differences in phonetics, phonology, morphology and syntax

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I: Characteristics of English**

**K1 – K5**

**(18 hours)**

1.1 Introduction: Language and Linguistics

1.2 Inner Language and Outer Language

- 1.3 Indicative, Emotive, Symbolic
- 1.4 Origin of language
- 1.5 The General Character of English
- 1.6 New elements of Language

**Unit II: Individuals in the Making of Modern English: K1 – K5 (18 Hours)**

- 2.1. Bible Translations Shakespeare's Influence
- 2.2. New Compounds and Multitude of Phrases
- 2.3. Milton and the English Language
- 2.4. Landmarks in the History of English Language
- 2.5. Modern English

**Unit III: Classification of English Sounds and Neurolinguistics K1 – K6 (18 Hours)**

- 3.1 The Properties of Language
- 3.2 The Sounds of Language
- 3.3 Charting Consonant sounds
- 3.4 Vowel Sounds and Diphthongs
- 3.5 Language and the Brain
- 3.6 Parts of the Brain, Aphasia

**Unit IV: Language and its Variation K1 – K5 (18 Hours)**

- 4.1. Language and Regional Variation
- 4.2 The Standard Language
- 4.3 Accent and Dialect
- 4.4 Language and Social Variation
- 4.5 Sociolinguistics
- 4.6 Language Policy and Language Planning

**Unit V: Terms and Parts of English K1 – K5 (18 Hours)**

- 5.1 Morphology
- 5.2 Morphological description
- 5.3 Phrases, Sentences: Grammar
- 5.4 Traditional Grammar
- 5.5 Immediate Constituent Analyses
- 5.6 Syntax

**Books for Study**

1. Wrenn, C.L. *The English Language*. Methuen & Co. Ltd. London: 1996
2. Yule, George. *The Study of Language*. III Edition, Cambridge University Press. New Delhi: 2006

**Books for Reference**

1. Barber, Charles. *The English Language: A Historical Introduction*. Cambridge University Press. United Kingdom: 1999
- Wood F.T. *An Outline History of the English Language*. London: Macmillan, 1969

2. Lyons, John. *Language and Linguistics: An Introduction*. Cambridge University Press. United Kingdom : 2002
3. Bloomfield, Leonard. *Language*. Surjeet Publications, Delhi: 2010.
4. Baugh C. Albert and Thomas Cable. *The History of English Language*. Routledge. London: and New York. 2000.

**SEMESTER – VI**  
**UEENA20 - INDIAN WRITING IN TRANSLATION**

<b>Year :</b> III <b>SEM</b> :VI	<b>Course Code :</b> UEENA20	<b>Title Of The Course :</b> Indian Writing in Translation	<b>Course Type</b> Theory	<b>Course Category :</b> Elective	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Locate Indian literary tradition reflected in literary texts
2. Discuss the versatile culture of India.
3. Read texts in relation to their historical and cultural contexts.
4. Appreciate the diversity of literary and social voices within and sometimes marginalized by those traditions.
5. Analyse the “Indian-ness” and the writing style of the native writers.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I: Introduction to Translation K Level: K1, K2, K3, K4, K5 & K6 (10 Hours)**

1.1 Introduction to Translation

- 1.2 Introduction to Indian Writing in Translation  
 1.3 Survey of the history  
 1.4 Growth & role of translation in India  
 1.5 Key Concepts in Translation  
 1.6 From word worlds: Translation and Communication  
 Unit II: Poetry  
 K Level: K1, K2, K3, K4, K5 & K6  
 (15 Hours)
- 2.1 Author's Introduction of the Unit  
 2.2 Subramania Bharati's Wind, 9  
 2.3 Chemmanam Chacko's Rice (148 – 149)  
 2.4 Jyoti Lanjeswar's I Never Saw You (171 – 175)  
 2.5 Gaddar's It will not stop  
 2.6 Sahir Ludhianvi's Let's Weave a Dream

**Unit III: Prose** **K Level: K1, K2, K3, K4, K5 & K6**  
**(15 Hours)**

- 3.1 Introduction to translated essays  
 3.2. Introduction to the essayists  
 3.3. Rassundari Devi's Amar Jibar (My Life) The Sixth composition (199-202)  
 3.4. A.K. Ramanujan's Telling Tales: Tales have Relatives all over the word (456 – 462)  
 3.5. P. Sivakami's Land: Women's Breath and Speech  
 3.6. Durga Khote's Memories of the Marati Stage (1910 – 26)  
 I had inherited... taking its course

**Unit IV: Drama** **K Level: K1, K2, K3, K4, K5 & K6** **(20 Hours)**

- 4.1 Introduction to the playwright  
 4.2 Introduction to the characters in the play  
 4.3 Introduction to Girish Karnard's Tuglaq  
 4.4 Thematic analysis of the play  
 4.5 Theoretical analysis of the play  
 4.6 Theatrical aspects of the play

**Unit V: Fiction** **K Level: K1, K2, K3, K4, K5 & K6** **(15 Hours)**

- 5.1 Shanmugasundaram's Nagammal (Fiction)  
 5.2 R. Chudamani's Does Anyone Care?  
 5.3 Prabanchan's Brahma Vriksha  
 5.4 Satyam Sankarmanchi's The Flood  
 5.5 B.M. Zuhara's Literacy  
 5.6 Afrose Sayeeda's Destination Spring

**Books for Study:**

Wordscapes: Indian Literature in Translation

**SEMESTER – VI**  
**UEENB18 - LITERARY THEORY**

<b>Year :</b> III <b>SEM :V</b>	<b>Course Code :</b> UEENB 18	<b>Title Of The Course :</b> Literary Theory	<b>Course Type :</b> Theory	<b>Course Category :</b> Elective	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
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Course

**Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Discuss key concepts in the field of literary theory
2. Interpret texts based on Literary theories
3. Apply theoretical concepts to literary texts
4. Analyse the strength and drawbacks of various approaches
5. Evaluate literary texts and literary theories

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	H	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

### Unit I: Introduction

K1,K2

(18 hours)

1.1 Definition of Literature (Pg 27)

1.2 Introducing Literary theory (Pg 1)

1.3 Introducing Literary theory (Pg 1)

1.4 Literary Theory Timeline

1.5 Various literary theories/ movements

1.6 Key Contributors / Contributions

[Connors, Clare. *Literary Theory: Beginners Guide*. Chennai: Chennai Micro Print. 2011.]Unit II:  
Structuralism and Post structuralism K1-K5 (18 hours) Structuralism

#### 2.1 Introduction

2.2 **Terms:** Diachronic, Synchronic, Langue, Parole, Sign, Signifier, Signified, Semiotics.

2.3 **Text:** Structuralism – Robert Scholes

**Analysis:** James Joyce's *Ulysses*

[Panja, Shomishtha. Ed. *Critical Theory: Textual Application*. New Delhi: Worldview Publications, 2002.]

#### Post structuralism

#### 2.4 Introduction

2.5 **Terms:** Difference, Transcendental, Logocentric, Phonocentricism, Binary opposition

2.6 **Text:** Post-structuralism and Deconstruction – Peter Barry (Pg 60-63)

**Analysis:** Dylan Thomas' *A Refusal to Mourn the Death* (Pg 71-74)

[Barry, Peter. *Beginning Theory: An Introduction to Literary and Cultural Theory*. India: Viva Books. 2010]

### Unit III: Feminism and Psychoanalysis

K1-K5

(18 hours)

#### 3.1 Introduction

3.2 **Terms:** Essentialism, Biologism, Gynocriticism, Parler-femme

3.3 **Text:** Feminist Criticism – Peter Barry (Pg 116-120)

**Analysis:** Emily Bronte's *Wuthering Heights* (Pg 129-130)

[Barry, Peter. *Beginning Theory: An Introduction to Literary and Cultural Theory*. India: Viva Books. 2010]

#### Psychoanalysis

#### 3.4 Introduction

3.5 **Terms:** Oedipal complex, Unconscious, Libido

3.6 **Text:** Psychoanalytic Criticism – Peter Barry (Pg 92-97)

**Analysis:** William Shakespeare's *Hamlet* (Pg 101-103)

[Barry, Peter. *Beginning Theory: An Introduction to Literary and Cultural Theory*. India: Viva Books. 2010]

#### **Unit IV: Marxism and Postcolonialism**

**K1-K5**

**(18 hours)**

##### **Marxism:**

##### **4.1 Introduction**

4.2 **Terms:** Bourgeoisie, Proletariat, Class Conflict

4.3 **Text:** Marxist Criticism – Peter Barry (Pg 150-153)

**Analysis:** William Shakespeare's *Twelfth Night* (Pg 162-164)

[Barry, Peter. *Beginning Theory: An Introduction to Literary and Cultural Theory*. India: Viva Books. 2010]

##### **Postcolonialism:**

##### **4.4 Introduction**

4.5 **Terms:** Nativism, Subaltern, Nationalism

4.6 **Text:** Postcolonial Criticism – Peter Barry (Pg 187-191)

**Analysis:** Jane Austen's *Mansfield Park* (Pg 192-194)

[Barry, Peter. *Beginning Theory: An Introduction to Literary and Cultural Theory*. India: Viva Books. 2010]

#### **Unit V:**

**K1-K5**

**(18 hours)** Intertextuality

##### **5.1 Introduction**

5.2 **Terms:** Intertextuality,

5.3 Dramatic monologue,

5.4 Genre,

5.5 Truth, Falsehood

5.6 **Text:** Dramatic Monologue – SudhaShastri (Pg 20-24)

**Analysis:** Robert Browning's poems

[Shastri, Sudha. *Intertextuality and Victorian Studies*. India: Orient Longman. 2001]

##### **Books for Sources:**

Connors, Clare. *Literary Theory: Beginners Guide*. Chennai: Chennai Micro Print. 2011. Shastri, Sudha. *Intertextuality and Victorian Studies*. India: Orient Longman. 2001 Panja, Shomishtha. Ed. *Critical Theory: Textual Application*. New Delhi: Worldview Publications, 2002.

Barry, Peter. *Beginning Theory: An Introduction to Literary and Cultural Theory*. India: Viva Books. 2010

##### **Books for Reference:**

Bertens, Hans. *Literary Theory: The Basics*. New York: Routledge, 2003.

Panja, Shomishtha. Ed. *Critical Theory: Textual Application*. New Delhi: Worldview Publications, 2002.

Lodge, David. Ed. *Twentieth Century Literary Criticism*. London: Longman, 1972

Lodge, David. Ed. *Modern Criticism and Theory*. London: Longman, 1982.

Sethuraman, VS. Ed *Contemporary Criticism*. Madras: Macmillan, 1989.

**SEMESTER – V****USEND520- THEATRE AND DRAMATURGY**

<b>Year : III SEM :V</b>	<b>Course Code :</b> USEND520	<b>Title Of The Course :</b> Theatre and Dramaturgy	<b>Course Type</b> Theory and Practical	<b>Course Category :</b> Elective	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Identify the fact that real life and drama are inter connected and to portray the connectivity through English language.
2. Discuss theatre as a form of art referring to Classical, British, American and Indian stages
3. Use drama to showcase the problems and solutions of life.
4. Use theatre as a medium to bring out social awareness on ecological, psychological, sociological problems faced by the society.
5. Write scripts on various topics to express their ideas, feelings and concern towards mankind.

<b>CO/PSO</b>	<b>PSO</b>					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

<b>CO/PO</b>	<b>PO</b>					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

## **Course Syllabus**

### **Unit I**

**K1 K2 K3**

**( 6 Hours)**

- 1.1 The Nature of Drama
- 1.2 Definitions of Drama
- 1.3 Origin
- 1.4 Universality
- 1.5 Stage Conditions-Greek Theatre
- 1.6 Elizabethan Theatre
- Practical session – Voice training

### **Unit II**

**K1 K2 K3**

**( 6 Hours)**

- 2.1 The Physicality of the stage
- 2.2 Silence
- 2.3 Colour
- 2.4 Juxtaposition
- 2.5 Plot
- 2.6 Action
- Practical Session – Play-Reading

### **Unit III**

**K3 K4 K5**

**( 6 Hours)**

- 3.1 Religion
- 3.2 Tragedy
- 3.3 Marlowe
- 3.4 Dr. Faustus (Self-study)
- 3.5 Morality Play
- 3.6 Faustus as a Renaissance man
- Practical session – Stage Management

### **Unit IV**

**K3 K4 K5**

**( 6 Hours)**

- 4.1 Shakespearean Tragedy-Hamlet
- 4.2 Tragic Effect
- 4.3 Problems of the Situation
- 4.4 Role of Ghost
- 4.5 Appearance and Reality

4.6 Hamlet's Temperament

Practical Session –

Performance

**Unit V**

**K3 K4 K5 K6 ( 6 Hours)**

5.1 Indian Theatre

5.2 A history of Indian English Drama

5.3 Pre-independent English Drama

5.4 Post-independent English Drama

5.5 An overview of Tamil Drama

5.6 Genesis and Growth

Practical Session – Script Writing

**Books for Study**

1. G. J. Watson. *Drama: An Introduction*. London: Macmillan. 1988.
2. T. SaiChandaMouli. *Multicultural Theatre and Drama*.
3. Worldwide circulation through Authorspress Global Network, 2011

**Books for Reference**

Archer, William. *Play Making: A manual of craftsmanship*. Dover publication. New York. 1960

Rusell, John Brown. *Drama and the theatre: with radio, film and television*. Roultedge and Kean Pau: London, 1971.

**SEMESTER – VI**  
**UCENL20 -TWENTIETH CENTURY**

<b>Year</b> : III <b>SEM</b> :VI	<b>Course</b> <b>Code :</b> UCENL20	<b>Title Of The</b> <b>Course :</b> Twentieth Century	<b>Course</b> <b>Type</b> Theory	<b>Course</b> <b>Category :</b> Elective	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Recognise Modern Literature from a variety of cultures, languages and historic periods
2. Explain the concepts of Enlightenment, Revolution, Capitalism/Imperialism, Democracy and political history
3. Use the spiritual, social and intellectual background of the age to interpret the works of various writers during the ModernAge
4. Analyse various elements such as diction, tone, form, genre, imagery, figures of speech, symbolisms
5. Evaluate the elements of fiction like Narrative Technique, Setting, Themes, Style and Characterisation

<b>CO/PSO</b>	<b>PSO</b>					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

<b>CO/PO</b>	<b>PO</b>					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M



## 5.5 Literary Style and Themes

### 5.6 James Joyce

### The Dead

#### **Books for Study**

1. David, Green. *The Winged Word*. London: Macmillan, 1974
2. Eliot, T.S. *The Wasteland and Other Poems*. London: Faber and Faber, 1954
3. Golding, William. *Lord of the Flies*. London: Faber and Faber, 1969
4. Seamus, Heaney. *Death of a Naturalist*. Faber and Faber, 1999
5. Swarbrick, Andrew. *Selected Poems of T.S. Eliot*. Macmillan, 1988
6. Joyce, James. *Dubliners*. New Delhi: Rupa Publications, 2004.
7. D.H. Lawrence, *Selected Stories by D.H. Lawrence*. Rupa Publications New Delhi

#### **Books for Reference**

1. Shiva Kumar K. *Short Stories of Yesterday and Today*. Oxford University Press, 1980
2. Serena, Om Prakash. *A Critical Guide to Selected Poems of Robert Bridges*. Beharipur: Literary Publication Bureau, 1996.
3. Tewari, R.L., Agra and Rajendra Singh. *Arnold's Essays in Criticism*. Bareilly: Prakash Book Depot, 1975.
4. H.G. Wells, *Selected Stories*. New Delhi: Rupa Publications India PvtLmt, 2014.
5. Virginia Woolf, *The Common Reader*. Ed. R.L. Varshney. Meerut: Royal Book Depot.
6. Belloc, Hillaire, G.K. Chesterton, E.V. Lucas, Robert Lynd, A.A. Milne. *Essay by Modern Masters*, London 1926.
7. Ramji, Lall. *Unpopular Essays: A Critical Study*. Rama Brothers New Delhi, 2014

**SEMESTER – VI**

**UCENM20 - LITERARY CRITICISM: ANCIENT TO MODERN**

<b>Year :</b> III <b>SEM</b> :VI	<b>Course Code :</b> UCENM20	<b>Title Of The Course :</b> Literary Criticism: Ancient to Modern	<b>Course Type</b> Theory	<b>Course Category :</b> Elective	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Identify major theoretical/critical movements and theorists, as well as primary concepts with which they are associated
2. Discuss key terms and trace implications in source texts, the critical ideas, values, and themes that appear in literary and cultural texts
3. Apply specific theoretical concepts, theories, and terms to literary and cultural texts
4. Examine historical contexts for the development of contemporary theory and criticism
5. Evaluate the strengths and limitations of critical/theoretical arguments

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## **Unit I: Classical Criticism - Definitions of Literary Criticism(18 Hours)**

a)Aristotle's *On Poetics* –(Pg 64-68)

1.1. A Description of Tragedy k5

1.2.The Scope of the Plot k2

1.3.Unity of Plot k1

[Murry, Penelope. *Classical Literary Criticism*. England: Penguin Classics. 2004]

b) Bharata – *From*

*Natyasastra*(Pg 16-

23)1.4.The Sentiments k1

1.5.The Dominant States k2

1.6. The eight Temperamental States k5

[Seturaman V.S. *Indian Aesthetics: An Introduction*. India: Macmillan. 1986.]

## **Unit II: English Literary Criticism from the Renaissance and Elizabethan Age (18 Hours)**

a)Philip Sidney – *An Apology for Poetry* (Pg 9-

21) 2.1.The greatness of the Poet k2

2.2. Poetry: An art of Imitation k1

2.3. Objections against poetry, and refutation of them

k4 2.4.The definition and divisions of poetry k3

2.5.Poetry, the chief or architectonic science:Preeminence to poetry to Philosophy and History k6

[Enright D.J. and Chickera Ernst De. *English Critical Texts*. London: Oxford University Press. 1966]

2.6.b)Ben Jonson –*Prologue to Every Man in His Humour*(Pg 2) k4

[Ben Jonson. *Every Man in His Humour*. Ed. C.T. Thomas. India: Macmillan. 2013.]

## **Unit III: Neo-Classical Literary Criticism(18 Hours)**

a)Dryden's *Essay on Dramatic Poesy*(Pg 50-60; Lines 1-393)

3.1.The Nature and Function of Poetry k2

3.2.Definition on Drama k1

3.3.Violation of the Three Unities k4

b)Alexander Pope's *Essay on Criticism* (Pg 111-116; Lines 1-200)

3.4. General qualities needed by the critic (1-200)- Awareness of his own limitations (46-67).k2

3.5. Knowledge of Nature in its general forms (68-87)- Nature defined (70-79)- Need of both wit and judgment to conceive it (80-87).k2

3.6. Imitation of the Ancients, and the use of rules (88-200)- Value of ancient poetry and criticism as models (88-103) - Censure of slavish imitation and codified rules (104-117)

- Need to study the general aims and qualities of the Ancients (118-140).k2

3. Exceptions to the rules (141-168)- Particular laws for the critic (201-559) - Digression on the need for humility(201-232) - Consider the work as a total unit (233-252)- Seek the author's aim (253-260)k3

[Enright D.J. and Chickera Ernst De. *English Critical Texts*. London: Oxford University Press. 1966]

#### **Unit IV: Romantic and Victorian Criticism(18 Hours)**

- 4.1. William Wordsworth – Preface to Lyrical Ballads (Pg 162-170; Lines 1-299)The Characteristics of Romantic Poetry k2
- 4.2. The subject and language of Poetryk4
- 4.3. Definition of a Poet k1
- a) Samuel Taylor Coleridge – Biographia Literaria: Chapter XXV (Pg 190-197; Lines 1-265) 4.4.The Origin of "Lyrical Ballads k2
- 4.5. Coleridge's Views on Wordsworth's Poetic Creed k4
- 4.6. Definitions of Poet and Poetry k1

[Enright D.J. and Chickera Ernst De. *English Critical Texts*. London: Oxford University Press. 1966]

#### **Unit V: Modern criticism from 1920 – 50(18 Hours)**

- a) Northrop Frye : The Archetypes of Literature (Part – III)
- 5.1. Archetypal Criticism k3
- 5.2. Historical Criticism and Inductive Analysis k3
- 5.3. Deductive Method of Analysis k3
- b) Lionel Trilling : The Sense of the Past
- 5.4. Literature as a historical art k3
- 5.5. Individual and society; self and culture k2
- 5.6. Trilling and the American intellectual tradition k4

[Richards I.A. *Principles of Literary Criticism*. London: Routledge.]

#### **Books for Study**

1. Ben Jonson. *Every Man in His Humour*. Ed. C.T. Thomas. India: Macmillan. 2013.
2. Enright D.J. and Chickera Ernst De. *English Critical Texts*. London: Oxford University Press. 1966
3. Murry, Penelope. *Classical Literary Criticism*. England: Penguin Classics. 2004
4. Ramaswami S. and Sethuraman V.S. *The English Critical Tradition*. Vol. 2. India: Macmillan. 1986
5. Richards I.A. *Principles of Literary Criticism*. London: Routledge.
6. Seturaman V.S. *Indian Aesthetics: An Introduction*. India: Macmillan. 1986.

#### **Books for Reference**

1. Eagleton, Terry. *After Theory*. New York: Basic Books. 2003
2. Gower. R and Pearson M. *Reading Literature*. London: Longman.1986
3. Jones, R.T. *Studying Poetry*. London: Edward Arnold.1986
4. Richter, David (ed.). *The Critical Tradition*. New York: St. Martin's.1998
5. Ben Jonson. *Every Man in His Humour*. Ed. B.R. Sharma. Literary Publication Bureau.
6. Wimsatt Jr., William K. and Brooks, Cleanth. *Literary Criticism: A Short History*. Vol.

2 and 4. London: Routledge. 1970.

7. Open Educational Resources:

<http://pnu.ac.ir/portal/File/ShowFile.aspx?ID=11433f54-14a6-4501-9960-d85d9bd0ebb0>

[https://www.academia.edu/35304557/A\\_Dictionary\\_Of\\_Cultural\\_And\\_Critical\\_Theory.PDF?auto=download](https://www.academia.edu/35304557/A_Dictionary_Of_Cultural_And_Critical_Theory.PDF?auto=download)

[https://www.academia.edu/25264804/the\\_Routledge\\_dictionary\\_of\\_Literary\\_terms?email\\_work\\_card=view-paper](https://www.academia.edu/25264804/the_Routledge_dictionary_of_Literary_terms?email_work_card=view-paper)

[https://www.academia.edu/39788343/A\\_New\\_Handbook\\_of\\_Literary\\_Terms?auto=download&email\\_work\\_card=download-paper](https://www.academia.edu/39788343/A_New_Handbook_of_Literary_Terms?auto=download&email_work_card=download-paper)

[https://www.academia.edu/41644140/An\\_Introduction\\_to\\_Literature\\_Criticism\\_and\\_Theory?email\\_work\\_card=view-paper](https://www.academia.edu/41644140/An_Introduction_to_Literature_Criticism_and_Theory?email_work_card=view-paper)

**SEMESTER – VI**  
**UEENC20 - WOMEN’S WRITING**

<b>Year :</b> III <b>SEM</b> :VI	<b>Course Code :</b> UEENC20	<b>Title Of The Course :</b> Women’s Writing	<b>Course Type</b> Theory	<b>Course Category :</b> Elective	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Outcomes (CO)**

The Learners will be able to

1. Identify the positioning, stature & development of women in the society through ages via the Literary texts
2. Discuss writing from the subordinate or subservient Creators
3. Appreciate works by women for the theme, style and form
4. Examine the form and content of the male – defined concepts and women – oriented concepts
5. Evaluate the works by women for its political and social relevance

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	L	H	H	M	L	H
CO2	H	L	H	H	H	M
CO3	H	H	M	H	H	M
CO4	H	H	M	M	H	H
CO5	H	H	M	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	L	H	H	M	L	H
CO2	H	L	H	H	H	M
CO3	H	H	M	H	H	M
CO4	H	H	M	M	H	H
CO5	H	H	M	H	H	H

**Poetry (Detailed)**

**K1- K5**

**Unit I:**

**(10 Hours)**

- 1.1 Introduction to Women’s Writing
- 1.2 Emily Dickinson - I Felt A Funeral in My Brain

- 1.3 Sarojini Naidu - A Song in Spring
- 1.4 Anne Bradstreet - For Deliverance from a Fever
- 1.5 Phillis Wheatley - On Virtue
- 1.6 Maya Angelo - A Brave and Startling Truth

**Unit II: Poetry (Non – Detailed)                      K1- K5                      (10 Hours)**

- 2.1 Author’s Introduction
- 2.2 Elizabeth Barrett Browning - A Woman’s Shortcoming
- 2.3 Mary Elizabeth Coleridge - A Clever Woman
- 2.4 Emily Bronte - No Coward Soul is Mine
- 2.5 Christina Rossetti - When I Am Dead, My Dearest
- 2.6 Elizabeth Bishop - The Fish

**Unit III: Prose    K1- K5    (10 Hours)**

- 3.1 Introduction to Women Essayists
- 3.2 Seminal Works by Women Writers
- 3.3 Major themes
- 3.4 Author’s Introduction
- 3.5 Alice Walker - In Search of Our Mother’s Garden
- 3.6 Prose (Non – Detailed):Elaine Showalter’s Adventures in Womanhood

**Unit IV:Drama (Detailed)                      K1- K5    (10 Hours)**

- 4.1 Introduction &Key Playwrights
- 4.2 Major themes of the plays written by Women Writers
- 4.3 Analysis of the plays written by Dina Mehta
- 4.4 Dina Mehta - *Getting Away with Murder*
- 4.5 Analysis of different plays written by Marsha Norman
- 4.6 Marsha Norman - *‘night, Mother*

**Unit V: Fiction    K1- K5    (10 Hours)**

- 5.1 Introduction to Fiction by Women Writers
- 5.2 Major themes of the novels written by Women Writers
- 5.3 Author’s Introduction and analysis of their works
- 5.4 Jane Austen - *Emma*
- 5.5 Charlotte Bronte - *Jane Eyre*
- 5.6 Shashi Deshpande - *That Long Silence*

**Books for Study:**

- 1. Gilbert, Sandra M. The Norton Anthology of Literature by Women: The Tradition in English. London: W. W. Norton & Company, 2007. Print.
- 2. Showalter, Elaine. *Inventing Herself*. New York: Simon Schuster, 2001.

**Books for Reference:**

- 1. Collins, Patrica Hill. *Black Feminist Thought*. London: Routledge Classics, 2012.
- 2. Sengupta, Jayita. *Feminist Perspective in the Novels of Toni Morrison, Michele Roberts and Anita Desai*. New Delhi: Atlantic Publishers, 2006.

**SEMESTER – VI**  
**UEEND20 - PRACTICAL CRITICISM**

<b>Year :</b> III <b>SEM</b> :VI	<b>Course Code :</b> UEEND20	<b>Title Of The Course :</b> Practical Criticism	<b>Course Type</b> Theory	<b>Course Category :</b> Elective	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Remember historical, contextual, biographical and authorial details
2. Understand Criticism as theory and practice
3. Understand the relevance of history, context, biography and authorship to literary texts
4. Apply critical concepts to films and literary works.
5. Analyse various literary genres and Films

<b>CO/PSO</b>	<b>PSO</b>					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

<b>CO/PO</b>	<b>PO</b>					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I: Theory and Practice of Criticism**

K1-K4

**(18 hours)**

1.1 Proposition – (Pg 1 -10)

1.2 Proposition

- 1.3 Analysis and Evaluation –
- 1.4 Analysis and Evaluation –
- 1.5 Theories
- 1.6 Theories

[Hicks, Malcolm. and Hutchings, Bill. *Literary Criticism: A Practical Guide for Students*. New Delhi: Universal Book Stall. 2000.]

**Unit II: Structural Analysis** **K1-K4 (18 hours)**

- 2.1 Literary and Linguistic terms relevant to Structural Analysis (Pg 193 – 197)
  - 2.2 Literary and Linguistic terms relevant to Structural Analysis (Pg 198 – 201)
  - 2.3 Literary and Linguistic terms relevant to Structural Analysis (Pg 202 – 205)
  - 2.4 Literary and Linguistic terms relevant to Structural Analysis (Pg 206 – 209)
  - 2.5 Literary and Linguistic terms relevant to Structural Analysis (Pg 213 – 216)
  - 2.6 Literary and Linguistic terms relevant to Structural Analysis (Pg 217 – 218)
- [Singh, Vandana R. *The Written Word*. New Delhi: Oxford University. 2003.]

**Unit III: History and Contexts** **K1-K4 (18 hours)**

- 3.1 Types of Context
- 3.2 Genre
- 3.3 Literary History (Pg 81 -85)
- 3.4 Critical Analysis: Toni Morrison’s *Beloved* (Pg 99 -101)
- 3.5 Critical Analysis: Toni Morrison’s *Beloved*
- 3.6 Critical Analysis: Toni Morrison’s *Beloved*

[McCaw, Neil. *How to Read Texts: A Student Guide to Critical Approaches and Skills*. New York: Continuum International Publishing Group. 2008]

**Unit IV: Biography and Authorship** **K1-K4 (18 hours)**

- 4.1 The role of the Author –
- 4.2 Theories of the Author –
- 4.3 The Significance of Biography (Pg 65 – 69; 72 – 73)
- 4.4 Critical Analysis: Charlotte Bronte’s *Jane Eyre* (Pg 76 –79)
- 4.5 Critical Analysis: Charlotte Bronte’s *Jane Eyre*
- 4.6 Critical Analysis: Charlotte Bronte’s *Jane Eyre*

[McCaw, Neil. *How to Read Texts: A Student Guide to Critical Approaches and Skills*. New York: Continuum International Publishing Group. 2008]

**Unit V: Film Analysis** **K1-K4 (18 hours)**

- 5.1 The Audience and the Aims of Film Criticism
- 5.2 The Screening Report – The Movie Review – The Theoretical Essay – The Critical Essay Film Terms

[Corrigan, Timothy J. *A Short Guide to Write about Film*. New Delhi: Pearson Education. 2009.]

### **Practical Analysis:**

5.3 Fiction

5.4 Poetry

5.5 Drama

5.6 Essay

[Hicks, Malcolm. and Hutchings, Bill. *Literary Criticism: A Practical Guide for Students*. New Delhi: Universal Book Stall. 2000.]

### **Books for Study:**

1. Corrigan, Timothy J. *A Short Guide to Write about Film*. New Delhi: Pearson Education. 2009.
2. Hicks, Malcolm. and Hutchings, Bill. *Literary Criticism: A Practical Guide for Students*. New Delhi: Universal Book Stall. 2000.
3. McCaw, Neil. *How to Read Texts: A Student Guide to Critical Approaches and Skills*. New York: Continuum International Publishing Group. 2008.
4. Singh, Vandana R. *The Written Word*. New Delhi: Oxford University. 2003.

**SEMESTER – VI**  
**UEENE20 - NEW LITERATURES IN ENGLISH**

<b>Year :</b> III <b>SEM</b> :VI	<b>Course Code :</b> UEENE20	<b>Title Of The Course :</b> New Literatures in English	<b>Course Type</b> Theory	<b>Course Category :</b> Elective	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Identify the relationship between Great Britain and Nations that were once colonized.
2. Describe modes of writing and reading that interrogate histories and the presence of colonial mentalities and ways of life in a variety of postcolonial locations.
3. Discuss the problems of race, class, history and identity presented in the Postcolonial texts.
4. Analyze the problems of identity, subjugation and cultural identification
5. Appraise the complex maze of theoretical terms and concepts that characterize Postcolonial studies and savor the wonderful variety and richness of Literature.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## Course Syllabus

**Unit I:** **K1- K5** (15 hours)

1.1 Introduction – Common Wealth Literature, Postcolonialism, New Literatures

1.2 Countries and Writers (An Introduction)

### Poetry: Detailed

1.3. Faiz Ahmed Faiz (Pakistan)- Nowhere, No trace can I Discover

1.4 Gabriel Okara (Africa) - You laughed and laughed and laughed

1.5 Margaret Atwood (Canada) - Journey to the Interior

1.6 Edwin Thumboo (Malaysia) - Ulysses by the Merlion

[Ed. Narasimhaiah C D. *Anthology of Commonwealth Poetry*. Chennai: Macmillan Publishers. 1988]

**Unit II: Poetry : Non-Detailed** **K1-K5** (15 hours)

2.1. Themes of Postcolonial Literature/ New Literatures

2.2. Countries and Writers – An Introduction

2.3. Patrick Fernando (Sri Lanka)-Elegy for my son

2.4. Allen Curnow (New Zealand) – Time

2.5. E.E Tiang Hong (Malaysia) - On Writing a poem

2.6 David Diop (Africa) -Africa

[Ed. Narasimhaiah C D. *Anthology of Commonwealth Poetry*. Chennai: Macmillan Publishers. 1988]

**Unit III: Prose: Detailed** **K1- K5** (20 hours)

3.1 Introduction to Writers

3.2 Terms : Colonialism, Decolonisation, Racism, Imperialism, Negritude, Orientalism, Nationalism,

3.3 Chinua Achebe (Nigeria)- The Novelist as a

Teacher 3,4 Chinua Achebe (Nigeria)- The Novelist as a Teacher

3.5 Ngugi waThiong’O- From Decolonising the mind

I was born....in the lives of Kenyan Children

3.6 Ngugi waThiong’O- From Decolonising the mind

I was born....in the lives of Kenyan Children

[Ed. Welsh, William. *Readings in Commonwealth Literature*. Clarendon Press: Oxford. 1973]

**Unit IV: Drama** **K1- K5** (15 hours)

4.1 Drama – An Introduction : Themes, Issues

4.2 Introduction to Playwrights

- 4.3 Wole Soyinka (Nigeria)- The Lion and the Jewel
- 4.4 Wole Soyinka (Nigeria)- The Lion and the Jewel
- 4.5 Lorraine Hansberry (Afro-America)-A Raisin in the Sun
- 4.6 Lorraine Hansberry (Afro-America)-A Raisin in the Sun

**Unit V:**

**K1-K5**

**(20 hours)**

**Fiction**

- 5.1 Introduction Major Novelist and Short story writers, Themes, Genres
- 5.2 Amy Tan- The Joy Luck Club
- 5.3 Chimamanda Ngozi Adichie -*Half of a Yellow Sun*
- 5.4 Yann Martel -Life of Pi

**Short Story**

- 5.5 Vance Palmer (Australia)- The Birthday
  - 5.6 Alice Munro (Canadian)-Differently
- [*The World's Greatest Short Short Stories*. India: Jaico Publishing House. 2008]

**Books for Study and References:**

Ed. Nasta, Susheila. *Writing Across Worlds*. London: Routledge. 2004

Punter, David. *Postcolonial Imaginings: Fictions of a New World Order*. Atlantic: New Delhi. 2005.

**SEMESTER – VI**  
**UEENF20 -COMMUNICATIVE ENGLISH GRAMMAR**

<b>Year :III SEM :VI</b>	<b>Course Code : UEENF20</b>	<b>Title Of The Course : Communicative English in Grammar</b>	<b>Course Type Theory</b>	<b>Course Category : Elective</b>	<b>H/W 6</b>	<b>Credits 5</b>	<b>Marks 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Recall the underlying ‘rules’ of grammar
2. Develop insight into the structure of English Language
3. Demonstrate understanding of linguistic structures of language variety used
4. Analyze grammatical structure of sentences within English texts
5. Apply and make use of grammar in writing English

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Course Syllabus**

**Unit I: Grammar in Spoken and Written English      K2-K5      (10 Hours)**

1.1 Different Transmission systems

- 1.2. Transitory Speech and permanent writing
- 1.3. Interactive and non interactive uses of English Co-operation in Conversation
- 1.4 Grammatical Features of English
- 1.5. Spelling v. pronunciation
- 1.6. Intonation

**Unit II: Concepts**

**( 10 Hours)**

- 1.1 Time, Tense and aspect K1, K3
- 1.2 Present Time, Past Time, K2, K4
- 1.3. The Progressive aspect, Future Time K2, K3
- Place, direction and distance
- 1.4. Manner, reason and purpose K3, K4
- 1.5. Condition and Contrast K3, K4
- 1.6. Comparison, Addition, Expectation and Restriction K3, K4

**Unit III: Information, Reality and Belief**

**(15 Hours)**

- 2.1. Statements, questions and responses K1, K3
- 2.2. Omission of information, Reported statements and questions K2, K4
- 2.3. Denial and affirmation K2, K3
- 2.4. Agreement and Disagreement K3, K4
- 2.5. Mood, Emotion and Attitude K3, K4
- 2.6. Emotive emphasis in speech K3, K4

**Unit IV: English Grammar-I**

**(15 Hours)**

- 3.1. Adjectives, Adverbials, Articles, K2, K3
- 3.2. Auxiliary verbs and Clauses K2, K3
- 3.3. Comparison, Concord, Exclamations, K2, K4
- 3.4. Gender, Genitive K2, K4
- 3.5. Irregular verbs, K3, K4
- 3.6. Main verbs K3, K4

**Unit V: English Grammar II**

**( 20 Hours)**

- 4.1. Nationality words, Number, Numerals K1, K2
- 4.2. Passives, Personal and Reflexive pronouns K2, K3
- 4.3. Phrasal and prepositional verbs, Plurals K2, K3
- 4.4. Prepositions and Prepositional adverbs K2, K3
- 4.5. Questions, Sentences, Spelling changes, K3, K4
- 4.6. Verb phrases K3, K4

**Books for Study**

- 1. Geoffrey Leech and Jan Svartvik. *A Communicative Grammar for English*. Pearson Education Limited, 2002.

**Books for Reference**

1. Greenbaum, Randolph Quirk Sidney. *A University Grammar of English*. Copyright – R. Quir, S.
2. Greenbaum, G. Leech and J. Suartvik, 1973.
3. Murphy, Raymond. *Essential English Grammar*. Cambridge University Press. 26<sup>th</sup> Reprint, 2003.
4. Pearse. Smith T.L.H. *The English Errors of Indian Students*. Oxford University Press, 1968.
5. Tandon B.G., Loveena Tandon. *English Grammar and Composition*. Anne Books Pvt. Ltd. 2007.
6. Thompson, A.J, A.V.Martinet. *A Practical English Grammar*. Oxford University Press, 1980.
7. Turton, Nigel. *ABC of Common Grammatical Errors*. Copyright text – Niegel Turton, 1995.

**SEMESTER – VI**

**USEND620 – SBE:CRITICAL APPROACHES TO LITERATURE**

<b>Year :</b> III <b>SEM :</b> VI	<b>Course Code :</b> USEND620	<b>Title Of The Course :</b> Skill-Based Elective: Critical Approaches to Literature	<b>Course Type :</b> Theory & Practical	<b>Course Category :</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Remember seminal writers, works and ideas
2. Understand key concepts under various approaches
3. Apply critical theories for the interpretation of literary texts
4. Compare and Contrast various critical theories
5. Analyse the strength and drawbacks of various approaches

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I:** **K1- K5** **(18 hours)**

**The Pre-critical Response**

- 1.1 Setting,
- 1.2 Plot
- 1.3 Character,
- 1.4 Structure,
- 1.5 Style, Atmosphere, Theme (Pg 6 -15)

[Guerin, Wilfred L. & Labor, Earle. *A Handbook of Critical Approaches to Literature*. New York: Oxford University Press. 1999.]

- 1.6 *The Great Gatsby* - F. Scott Fitzgerald (Compulsory Reading)

**Unit II** **K1- K5** **(18 hours)**

- 2.1 Introduction to New Criticism
- 2.2 New Criticism Terms – Formalism, New Criticism
- 2.3 New Criticism (pg 136- 164)
- 2.4 Introduction to Structuralism
- 2.5 Structuralism Terms – Binary Opposition, Diachronic, Langue, Parole, Semiotics, Sign, Structuralism, Synchronic
- 2.6 Structuralism (212- 247)

**Unit III** **K1- K5** **(18 hours)**

- 3.1 Introduction to Poststructuralism/ Deconstruction
- 3.2 Poststructuralism/ Deconstruction Terms - Absence/ Presence, Center, Deconstruction, Differance, Logocentricism, Play, Poststructuralism
- 3.3 Poststructuralism/ Deconstruction (250 – 279)
- 3.4 Introduction to Psychoanalysis
- 3.5 Psychoanalysis Terms – Anxiety, Id, Libido, Oedipus Complex, Psychoanalysis, Superego, Unconscious
- 3.6 Psychoanalysis (12-15, 24-26, 34-50)

**Unit IV** **K1- K5** **(18 hours)**

- 4.1 Introduction to Feminism
- 4.2 Feminism Terms – Essentialism, Gender, L'écriture feminine
- 4.3 Feminism (91-105, 108-131)
- 4.4 Introduction to Marxism
- 4.5 Marxism Terms – Base/ Superstructure, Capitalism, Ideology, Marxism
- 4.6 Marxism (53-54, 56-61, 64-79)

**Unit V** **K1- K5** **(18 hours)**

- 5.1 Introduction to Reader Response Theory
- 5.2 Reader Response Theory Terms – Hermeneutics, Reader Response theory

5.3 Reader Response Theory (189-203)

5.4 Introduction to Postcolonialism

5.5 Postcolonialism Terms – Colonialism, Ethnicity, Orientalism, Other, Postcolonial, Race, Subaltern,

5.6 Postcolonial Theory ( 417 – 446)

Questions for further practice ( for all approaches stated above) for internal assessment (Assignment/ Seminar) only.

**Primary Sources:**

Guerin, Wilfred L. & Labor, Earle. *A Handbook of Critical Approaches to Literature*. New York: Oxford University Press. 1999.

Irena R. Makaryk. *Encyclopedia of Contemporary Literary Theory: Approaches, Scholars, Terms*. Canada: University of Toronto Press Incorporated. 2000. (**For Introduction to the approaches**)

Klages, Mary. *Key Terms in Literary Theory*. London: Continuum International Publishing Group, 2012.

Tyson, Lois. *Critical Theory Today*. New York: Routledge: 2006.

**References:**

Barry, Peter. *Beginning Theory: An Introduction to Literary and Cultural Theory*. India: Viva Books. 2010

Bertens, Hans. *Literary Theory: The Basics*. New York: Routledge, 2003.

Panja, Shomishtha. Ed. *Critical Theory: Textual Application*. New Delhi: Worldview Publications, 2002.

Lodge, David. Ed. *Twentieth Century Literary Criticism*. London: Longman, 1972

Lodge, David. Ed. *Modern Criticism and Theory*. London: Longman, 1982.

Sethuraman, VS. Ed *Contemporary Criticism*. Madras: Macmillan, 1989.

Panja, Shomishtha. Ed. *Critical Theory: Textual Application*. New Delhi: Worldview Publications, 2002.

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# Department of History (UG)

## SYLLABUS AND REGULATIONS

Under

### OUTCOME-BASED EDUCATION

2020

(Effective for the Batch of Students Admitted from 2020-2021)



### AUXILIUM COLLEGE (Autonomous)

*(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)*

**Gandhi Nagar, Vellore-632 006.**

**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)*

**Gandhi Nagar, Vellore-632 006.**

**Department of History (UG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**Structure of the Course and Scheme of Examination:**

**On completion of the UG program, students will be able to:**

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline

**PO2:** Acquire and apply analytical, critical and creative thinking and problem-solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and options

**PO4:** Appreciate Bio-diversity and enhance eco-consciousness for sustainable development

**PO5:** Emulate positive social values and exercise leadership qualities and teamwork

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

**After Completion of the B.A Programme in History, the student will be able to**

**PSO1.** Compare the events of History and apply its ideas, and principles to today's diverse culture and situations

**PSO2.** Widen their knowledge of History, Administration, Art, Architecture, political system, Religion, and culture and enhance their critical and creative skills to pursue career options to engage as educators and researchers in historical sites and Museums

**PSO3.** Develop a critical approach to the study of History and effectively communicate the values and ideas of the leaders to the Society and become the Agents of social change.

**PSO4.** Acquire the social values that indwell in History to become the leaders of politics and commit to work for social justice, peace, and sustainable development

**PSO5.** Prepare for various types of Competitive Examinations and acquire human values like equality, freedom, and Social Justice and contribute towards the needs of the society

**PSO6.** Develop an understanding of the past life of the people, their culture, their religion, and the social system to transform into responsible and honest citizens

<b>PO/PSO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>PSO 1</b>	H	H	H	M	M	M
<b>PSO2</b>	H	H	H	L	M	H
<b>PSO3</b>	M	H	H	L	H	H
<b>PSO4</b>	H	L	L	H	H	H
<b>PSO5</b>	H	M	L	L	H	H
<b>PSO6</b>	H	M	L	L	H	M

**H -High (3) M-Medium (2) L -Low (1)**

**List of course**

Sem	Part	Code	Title of Paper	Hours/ Week	Exam Hours		Credits	Marks	
					Th	Pr			
I	I	ULTAA20	Tamil Paper - I	6	3	-	3	40+60	
	II	UENGA20	English Paper - I	6	3	-	3	40+60	
	III	UCHIA20	Main Currents in Indian History from Early Times to 1526 A.D	5	3	-	4	40+60	
	III	UCHIB20	Main Currents in Indian History from 1526 A.D to 1707 A.D	5	3	-	4	40+60	
	III	UATMA20	Allied I-Tourism I	5	3	-	5	40+60	
	IV	-	Skill-Based Elective - I	2	-	2	2	40+60	
	IV	-	Value Education	1	-	-	-	-	
<b>Total</b>							<b>21</b>	<b>600</b>	
II	I	ULTAB20	Tamil Paper - II	6	3	-	3	40+60	
	II	UENGB20	English Paper - II	6	3	-	3	40+60	
	III	UCHIC20	History of India from 1707 to 1858 A.D	5	3	-	4	40+60	
	III	UCHID20	History of India from 1858 to 1950 A.D	5	-	-	4	40+60	
	III	UATMB20	Allied II-Tourism II	5	-	-	5	40+60	
	IV	-	Skill-Based Elective - II	2	-	2	2	40+60	
	IV	-	Value Education	1	-	-	-	-	
<b>Total</b>							<b>21</b>	<b>600</b>	
III	I	ULTAC20	Tamil Paper-III	6	3	-	3	40+60	
	II	UENGC20	English Paper –III	6	3	-	3	40+60	
	III	UCHIE20	An Outline History of Tamil Nadu up to 1565 A.D	5	3	-	4	40+60	
	III	III	UEHIA20	Elective I A: History of Modern Asia from 1900 A.D to 2000 A.D	5	-	-	4	40+60
			UEHIA20	Elective I B: International Relations (1945 to 2000 A.D)					
	III	UAMGA21	Allied III- Modern Government – I	5	-	-	5	40+60	
	IV	USHIA321	Skill-Based Elective –III Museology	2	2	-	2	40+60	
	IV	-	Value Education	1	-	-	-	-	

							<b>Total</b>	<b>23</b>	<b>600</b>
IV	I	ULTAD20	Tamil Paper-IV	6	3	-	3	40+60	
	II	UENGD20	English Paper-IV	6	3	-	3	40+60	
	III	UCHIF20	An Outline History of TamilNadu From 1565 to 1987 A.D	5	3	-	4	40+60	
	III	UCHIG20	Contemporary India from 1947 A.D to 2000 A.D	6	3	-	4	40+60	
	III	UAMGB20	Allied IV: Modern Government – II	5	3	-	5	40+60	
	IV	USHIB420	Skill Based Elective –IV: History of Vellore	2	2	-	2	40+60	
	IV	UNEVS20	Environment Studies	2	2	-	2	40+60	
	IV	-	Value Education	1	-	-	-	-	
<b>Total</b>							<b>23</b>	<b>700</b>	
V	III	UCHIH20	History of Europe from 1789 A.D to 1945 A.D	6	3	-	6	40+60	
	III	UCHII20	History of Ancient Civilization (Excluding India)	6	3	-	5	40+60	
	III	UCHIJ20	Indian Archaeology	6	3	-	5	40+60	
	III	UEHIC20	Elective II A: Women's Studies	6	3	-	5	40+60	
		UEHIC20	Elective II B: Intellectuals of India						
	IV	-	Non-Major Elective-I	3	2	-	2	40+60	
	IV	USHIB520	Skill-Based Elective-V – Introduction to Competitive Examinations	2	2	-	2	40+60	
	IV	-	Value Education	1	-	-	-	-	
<b>Total</b>							<b>25</b>	<b>600</b>	
VI	III	UCHIK20	History of Japan up to 1990 A.D	6	3	-	6	40+60	
	III	UCHIL20	History of United States of America from 1776 to 1965A.D	6	3	-	5	40+60	
	III	UCHIM20	Indian Polity and Constitution	6	3	-	5		
	III	UEHIE20	Elective III A: Geography of India	6	3	-	5	40+60	
		UEHIE20	Elective III B: Monuments	6	3	-	5		

			in India					
	IV	-	Non-Major Elective-II	3	2	-	2	40+60
	IV	USHIC620	Skill-Based Elective VI- Archives Keeping	2	2	-	2	
	IV	UVEDA15	Value Education	1	2	-	2	40+60
<b>Total</b>							<b>22</b>	<b>800</b>
	V	<b>Extension Activities (90 Hours)</b>					<b>1</b>	
<b>Grand Total</b>							<b>140</b>	<b>400</b>

## SEMESTER - I

### UCHIA20 - MAIN CURRENTS IN INDIAN HISTORY FROM EARLY TIMES TO 1526 A.D

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> UCHIA20	<b>Title of the Course:</b> Main currents in Indian History from early times to 1526 A.D	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 6	<b>Marks</b> 100 40+60
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#### Course Objectives:

1. To help the students to know the Sources that contributed to construct the History of India
2. To enable the students to comprehend the rise of various kingdoms and their impact in the History of India.
3. To enhance the students with the knowledge of the contribution of the dynasties to Art and Architecture through the ages.

#### Course Outcomes:

##### After completion of the course the student will able to:

1. Describe the Geographical features of India, the Indus, Vedic, and Later Vedic Civilization to appraise the values of multi-cultures in India.
2. Critically Estimate the cause for the rise of Buddhism and Jainism in India, understand the principles of the teaching of Buddha and Mahavira, and critically value their contribution to society to become the agents of social change
3. Discuss the origin of various Dynasties that ruled India and understand the concept of invasion and to exercise leadership qualities and Teamwork.
4. Explain the Arab conquests of Sind and the contribution of the Delhi sultanate to Art and Architecture to appreciate the positive contribution of the Sultanate period and critically evaluate their Administration
5. Critically analyze the impact of the Bhakti Movement in India and to understand the concept in the respective discipline and contribute to the needs of the society

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	M	L	L	M
<b>CO2</b>	H	H	H	L	H	M
<b>CO3</b>	H	M	H	L	H	M
<b>CO4</b>	H	H	M	L	H	M
<b>CO5</b>	H	H	H	L	M	H

**H-High (3) Medium -M (2) L - Low (1)**

CO /PSO	1	2	3	4	5	6
CO1	H	H	L	L	H	L
CO2	H	H	M	L	L	H
CO3	H	M	M	L	H	M
CO4	H	M	M	L	M	L
CO5	H	H	H	L	M	M

**H-High (3) Medium -M (2) L-Low (1)**

**Unit I:**

**(18 Hours)**

- 1.1 Geographical Features- The Northern Mountains- Gangetic Plain- Plateau – The Coastal Plains-Desert (K2, K4 )
- 1.2 Perennial – Non-perennial Rivers- People – Language - Religion (K2, K4 )
- 1.3 Source of the Study- Literary Sources – Foreign Sources- Archeological Sources (K2,K4)
- 1.4 Indus Civilization – Art- Social Life- Religion- Causes for the Destruction (K2,K4 )
- 1.5 Vedic Age- Home land-Political Organization- Social –Economic life- Religious Condition (K2,K4 )
- 1.6 Later Vedic Age- political Condition- Social Condition- Economic –Religious Condition (K2,K4 )

**Unit II:**

**(18 Hours)**

- 2.1 Causes for the Rise of Buddhism and Jainism- Mahavira- Principles of Jainism- decline of Jainism (K2,K4 )
- 2.2 Early life of Buddhism- The Four great Signs –The Teaching of Buddha- Causes for its Rise and Decline(K2,K4 )
- 2.3 Mahajanapadas –Magadha- Haryanga Dynasty- Sisunaga-Nanda Dynasty( K2,K4 )
- 2.4 Alexander Invasion – Impact of Alexander’s Invasion-Political-economic -Cultural(K2,K4 )
- 2.5 Mauriyas- Chandra Gupta Mauriya- Bindusara- Asoka the Great -Conquest( K2,K4 )
- 2.6 Asoka’s Dhamma- Inscriptions –Mauryan Administration( K2,K4 )

**Unit III:**

**(18 Hours)**

- 3.1 Sunga Dynasty- Pushyamitra Sunga- satavahanas- Gautamiputra satakarni - Decline(K2,K4)
- 3.2 Greek Rule- Menander I- Decline – Sakas- Source of Information-Rudradaman I- Decline ( K2,K4 )
- 3.3 The Kushans- Kadphises I - Kadphises II - Kanishka -Conquests( K2,K4 )
- 3.4 Extend of Kanishka Empire- Kanishka and Buddhism – Comparison Asoka & Kanishka(K2,K4 )
- 3.5 Gupta Period – Source of Information- Chandra Gupta I- SamudraGupta - Conquests(K2,K4 )
- 3.6 Chandragupta II- His Conquests- Administration- Golden Age of Gupta- Decline( K2,K4 )

**Unit IV:**

**(18 Hours)**

- 4.1 Pushyabhuti Dynasty- Harshavardhana – Conquest –Harsha and Buddhism( K2,K4 )
- 4.2 Rajput Period- The Pratiharas- The Palas of Bengal – The Chauhans- the Rathors – the Guhilas- ( K2,K4 )
- 4.3 The Chandellas- The Paramaras-The Senas- The Solankis –The Rashtrakutas - Chalukyas ( K2,K4 )

- 4.4 The Arab Conquest of Sindh – Muhammed –Bin Qasim- effects of Arab Conquest( K2,K4 )
- 4.5 Muhammad of Ghazini- Expeditions- Muhammed of Ghor Conquests –First Tarain war Second Battle of Train( K2,K4 )
- 4.6 Delhi Sultanate-Slave Dynasty- Qutub-Ud-din Aibak-Iltutmish- Razia -Balban( K2,K4 )

**Unit V:**

**(18 Hours)**

- 5.1 Khilji Dynasty- Jalal-ud-din- Firuz- Ala-ud-din Khilji- Conquests-Administration( K2,K4 )
- 5.2 Tughlaq Dynasty- Ghiasuddin Tughlaq- Foreign policy- Muhammad –Bin- Tughlaq – Reforms-Invasion of Timur( K2,K4 )
- 5.3 Sayyid Dynasty—Khizr Khan- Mubarak Shah- Aladdin Alam shah Downfall( K2,K4)
- 5.4 Lodi Dynasty- Bahlol Lodi- Sikandar Lodi- Ibrahim Lodi Causes for the Downfall of Lody Dynasty( K2,K4 )
- 5.5 Bhakti Movement- Prominent saints of Bhakti Movement-North Indian saints- Effects of Bhakthi Movement( K2,K4 )
- 5.6 Vijayanagar Empire—Sangama Dynasty-saluva Dynasty- Tuluva dynasty-Krishnadevaraya-administration( K2,K4 )

**MAPS:**

1. Physical Features of India
2. Indus Valley Civilization and its important sites
3. Asoka's Empire and the important places
4. Kanishka's Empire and the important places
5. Harsha's Empire and the important places

**Text Book**

1. N.Jayapalan – History of India up to 1526 Atlantic publishers and Distributers-Volume I & II-2001

**Books for Reference:**

1. V.D.Mahajan- Ancient India-S.Chand and Company Ltd., Ramnagar, New Delhi,1981
2. R.C. Majumdar-An Advanced History of India- H.C.Roy Choudhary &McMillan India
3. B.P.Chaudhary-History of India –Abhijeet Publications, New Delhi-2012
4. G.S Chhabra-Advance Study in the History of Modern India Vol I,II,III Lotus Press, New Delhi Reprint 2011
5. Agarwal. J.C –Ancient Indian History –S.Chand & Co.Ltd,O, Ramnagar, New Delhi,1988
6. R.S. Chaurasia- History of Ancient India, Atlantic Publishers & Distributors (P) Ltd. 2014

**Open Educational Resources (OER)**

1. [chem.rutgers.edu/~kyc/Teaching/Files/264/1115%20maria.pdf](http://chem.rutgers.edu/~kyc/Teaching/Files/264/1115%20maria.pdf)
2. [http://www.buddhanet.net/ebooks\\_g.htm](http://www.buddhanet.net/ebooks_g.htm)
3. <https://www.britannica.com/biography/Alexander-the-Great>
4. <https://www.youtube.com/watch?v=YS7ombBLzOo>
5. <https://courses.lumenlearning.com/boundless-worldhistory/chapter/the-gupta-empire/>  
<https://www.youtube.com/watch?v=dp8NiOIYTek>  
<https://www.britannica.com/place/India/The-Vijayanagar-empire-1336-1646>

## SEMESTER - I

### UCHIB20 - MAIN CURRENTS IN INDIAN HISTORY FROM 1526 A.D TO 1707 A.D

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> UCHIB20	<b>Title of the Course:</b> Main currents in Indian History 1526 A.D to 1707 A.D	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 6	<b>Marks</b> 100 40+60
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#### Course Objective:

- 1.To help the Students to Understand the Causes for the invasion of Babur and the of Mughal Dynasty in India
- 2.To help the Student to grasp the Administration and Reforms of the Mughals
- 3.Establishment To Enable the Students to Assimilate the Socio-Economic-Cultural Condition of India at the time of the Mughals and their contribution to Art and Architecture.

#### Course Outcome (CO):

**After completion of the course the student will able to:**

1. Explain the condition of India on the Eve of Babur's Invasion and analyze the development of Indian Culture,
2. Describe the Reforms of Akbar and its impact in today's Administration
3. Compare Mughal Art and Architecture with Modern Art.
4. Analyze the Socio-Economic Condition of the Mughal Period and its impact today.
5. Classify and criticize the factors that led to the Downfall of the Mughal dynasty

CO//PO	1	2	3	4	5	6
CO1	H	M	M	L	H	M
CO2	H	M	M	L	M	M
CO3	H	M	M	L	M	L
CO4	H	H	M	L	H	H
CO5	H	M	M	L	M	M

**H-High (3) M-Medium (2) L-Low (1)**

CO/PSO	CO					
	1	2	3	4	5	6
CO1	H	H	M	L	L	M
CO2	M	H	M	L	H	L
CO3	H	H	L	M	M	H
CO4	H	H	M	H	H	H
CO5	M	M	H	L	M	M

**H-High (3) M-Medium (2) L-Low (1)**

**Unit I:****(18 Hours)**

- 1.1 India on the eve of Babur's Invasion – Early life of Babur- Conquest of Samarkand- Babur Captured Kabul (K1)
- 1.2 Circumstances leading to the Battle of Panipat-Religious Fanaticism- Babur's Army - Wealth of India First Battle of Panipat (K2, K4)
- 1.3 Early life of Humayun- Difficulties of Humayun-war with Bahadur Shah-Causes of Humayun's failure (K2)
- 1.4 War with Sherkhan- Battle of Chausa- Battle of Kanauj- Causes of Humayun's Failure-Sher Shah and Humayun -Shershah's Success (K2)
- 1.5 Shershah's Administration-Central Administration- Council of Ministers- Provincial Government- Revenue- Currency System- (K2, K4)
- 1.6 Judicial Administration- Police System- Intelligence Department- Military Administration of Sher Shah -Means of Communication- Postal System (K2, K4)

**Unit II:****(18 Hours)**

- 2.1 Akbar- Early Difficulties-Second Battle of Panipat-Bairam Khan- Conquest of Akbar- Rana Pratap Singh-Shershah as a forerunner of Akbar– (K2)
- 2.2 Religious Policy- Din-i-Ilahi- Ibadatkhana-Failure of Din-i-Ilahi-Abolition of Jizya Tax- Matrimonial Alliances-Rajput Policy of Akbar – Posts given to Hindus- Infallibility Decree (K2, K4)
- 2.3 Deccan Policy of Akbar-Capture of Ahmed Nagpur- Capture of Khandesh- North - West Frontier Policy Akbar- (K2)
- 2.4 Central Administration- Vakil- Four Ministers-Provincial Administration- Land Revenue Patta System-Measurements of Lands- Ryotwari- Zamindari System- (K2, K4)
- 2.5 Military Administration of Akbar- Mansabdari System-Zat-Sawar-Demerits of System (K2, K4)
- 2.6 Jahangir-Revolt of Jahangir- Golden Chain of Justice- Twelve Edicts of Jahangir- Revolt of Prince Khusrau- Nurjahan (K1)

**Unit III:****(18 Hours)**

- 3.1 Early life of Shahjahan -Rebellion of Bundelas – Rebellion of Kanjaghan Lodi- War with Portuguese- War with Bijapur (K1)
- 3.2 Prince of Architecture - Art and Architecture- Mumtaz- Tajmahal- Peacock Throne- Pearl Masjid- Misery of Famine(K2)
- 3.3 Battle of Dharmat- War of Succession- Defeat of Shuja Murad and Aurangzeb Alliance- Battle of Dharmat -Lost Stage of Shahjahan (K1, K2)
- 3.4 Early life Aurangzeb- Imposition of Jizya tax- Aurangzeb as a Fanatic- Religious Policies of Aurangzeb-Destruction of Temples- Restriction on Hindus (K4)
- 3.5 Rajput Policy – Deccan Policy-Conquest of Bijapur and Golconda- War with Marathas- (K1)
- 3.6 Downfall of the Mughals- Weak Successors- Military inefficiency- Rebellion and Foreign invasions- Financial Bankruptcy(K4)

**Unit IV:****(18 Hours)**

- 4.1 Mughals Art and Literature- Prince of Autobiography-Abdul Fazal-Akbar nama- - Ain- I-Akbari- Thansen- Thulasidas (K1)
- 4.2 Mughal's Architecture-Jumma Masjid- Fatepursikri- Panch Mahal- Diwan-i-khas- Diwani-i-am-Taj Mahal- Red Fort-Moti Masjid -Peacock Throne- Mughal Gardens (K2, K4)

- 4.3 Administration of Mughals (Provincial and Central) (K4)
- 4.4 Deccan Policy of Mughals (K1)
- 4.5 North Western Frontier Policy of Mughals (K1)
- 4.6 Socio -Economic and Cultural Condition of Mughals- Marriages- Education- Position of Women- Festivals- Commerce and Trade(K1, K4)

**Unit V:**

**(18 Hours)**

- 5.1 Rise of Sikhs-Early life and Teachings of Guru Nanak-Babur and Guru Nanak(K1)
- 5.2 Growth of Sikhism-Guru Angad- Guru Ramdas- Guru Arjundev (K1)
- 5.3 Guru Teg Bahadur -Guru Govind Singh -Khalsa System - Battle at Patna and Naudan (K1)
- 5.4 Rise of Marathas-Shivaji's Early life of Shivaji- Shivaji's Conquest –Afzalkhan affair-War with Mughals-Jaisingh and Shivaji's Coronation - Conquest of South India (K1)
- 5.5 Shivaji's Administration- Provincial Administration- AshtaPradhan- Peshwas- Swarajya-Revenue- Administration-Sardeshmukhi-Chauth Tax- Military Administration- Artillery- Navy- Forts (K4)
- 5.6 Successors of Shivaji – Shambaji-Failures of Shambaji- Raja Ram- Tarabai(K1)

**Maps:**

- 1. India under Babur
- 2. India under Akbar
- 3. India under Aurangzeb
- 4. Maratha Empire under Shivaji

**Text Books:**

- 1. V.D. Mahajan – History of Medieval India – S. Chand and Company Ltd., Ram Nagar, New Delhi, 2004.

**Books for Study and Reference:**

- 1. L. Mukherjee – History of India – Prakashan Kendra, Lucknow, 1989.
- 2. L.P. Sharma – The Mughal Empire – Konark Publishers Pvt., Ltd., New Delhi, 1997.
- 3. M.P. Srivastava – Policies of The Great Mughals – Chauth Publications, Allahabad, 1998.
- 4. S.R. Sharma – The Crescent in India – Lakshmi Narain Agarwal, 1983.
- 5. J.L. Mehta – Advanced Study in the History of Medieval India – Sterling Publishers Pvt. Ltd., New Delhi, 1983.
- 6. B.P. Chaudhary – History of India – Abhijeet Publications, New Delhi, 2012.
- 7. R.C. Majumdar-An Advanced History of India- H.C. Roychowdhury &McMillan India.

**Open Educational Resources (OER):**

- 1. <https://www.historytoday.com>
- 2. <https://en.wikipedia.org/wiki/Mughal-Empire>
- 3. <https://www.britannica.com>akbar>
- 4. <https://artsculture.google.com>

**UATMA20– ALLIED: TOURISM - I**

<b>Year:</b> I <b>Sem:</b> I	<b>Course Code:</b> UATMA20	<b>Title of the Course:</b> Allied Tourism - I	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100 40+60
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**Course Objectives:**

1. This course acquaints the role and importance of tourism as an economic intervention and its impact on the economy of a nation;
2. It also helps the students to explore the evolution and development of tourism.
3. This course also seeks to enable students to understand the role and importance of transport and communication in the tourism sector.

**Course Learning Outcome:**

**After completion of the course the student will able to:**

1. Describe the evolution of travel and tourism in the historical context.
2. Analyze the socio, economic, political, and cultural aspects of society.
3. Develop professional and technical skills for effective work and integration and for sustainable development
4. Identify the networks and relationships for tourism capacity building
5. Explain the problem-solving skills and critical analysis within the multi-diverse context

CO/PO	1	2	3	4	5	6
CO1	H	L	M	L	M	H
CO2	H	H	M	M	M	H
CO3	H	L	H	H	H	H
CO4	H	H	H	M	M	H
CO5	M	H	M	H	M	H

**(H-High (3) Medium -M (2) L-Low (1)**

CO/PSO	1	2	3	4	5	6
CO1	H	H	L	M	M	M
CO2	H	H	H	M	L	M
CO3	L	L	H	H	M	L
CO4	H	M	M	L	M	L
CO5	M	M	H	H	M	H

**(H-High (3) Medium -M (2) L-Low (1)**

**Unit I:****(18 Hours)**

- 1.1 Origin and Development of Tourism (Ancient times, the Empire Era, Middle Ages And The Renaissance Era, Grand Tour and Modern Era) (K2).
- 1.2 Tourist: Meaning & Classifications (K1, K2).
- 1.3 Nature of Tourism, Need and Significance of Tourism (K2).
- 1.4 Dimensions of Tourism (Social, Cultural and Economic Dimensions) (K1, K2).
- 1.5 Forms of Tourism (Historical, Health Or Medical, Eco, Sports, Religious, Leisure & Business Tourism) (K1, K2).
- 1.6 Basic components of Tourism (K1, K2)

**Unit II:****(18 Hours)**

- 2.1 Elements of Tourism (K1, K2, K3).
- 2.2 Factors influencing in the growth of Tourism
- 2.3 Social Factors, Economic and Cultural Factors (K2).
- 2.4 Tourism as an agent of social change (K2).
- 2.5 Rural Tourism (K1, K2).
- 2.6 Urban Tourism (K1, K2).

**Unit III:****(18 Hours)**

- 3.1 Hospitality Industry: Meaning, Definition, Origin and Development of Hotels (K2).
- 3.2 Segments of Hospitality Industry (K1, K2).
- 3.3 Role of the Hospitality Industry in the tourism sector (K2).
- 3.4 Accommodation: Nature and Types of Accommodation (K2).
- 3.5 Departments and Functions of Accommodation (K2).
- 3.6 Supplementary Accommodation (K2).

**Unit IV:****(18 Hours)**

- 4.1 Emergence of Travel And Tourism (K2).
- 4.2 Evolution of Transport system in India (K2).
- 4.3 Role and Importance of Transport in Tourism Industry (K2)
- 4.4 Elements of Transport (the way, the unit of carrying, the motive power unit the terminal) (K2).
- 4.5 Transport: Air Transport-Road Transport-Rail Transport-Sea Transport (K2).
- 4.6 Ticketing System: Online Booking/E-booking-Tatkal Booking (K2).

**Unit V:****(18 Hours)**

- 5.1 Sustainable Tourism –Meaning and Definition (K2).
- 5.2 Principles of Sustainable Tourism (K2).
- 5.3 Sustainable Tourism Development (K2).
- 5.4 Social Impact of Sustainable (K2).
- 5.5 Economic Impact (K2).
- 5.6 Environmental Impact (K2).

## **Textbooks**

1. Arpita Mathur.(2011).Fundamentals of travel and Tourism. New Delhi: Ane Books Pvt.Limited.
2. KshitizSharma.(2014).IntroductiontoTourismManagement.NewDelhi:Mcgraw Hill Education(India).

## **Books for Study and Reference**

1. Bhatia,A.K.(2010).IntroductiontoTourismManagement.Revised editionNew Delhi: SterlingPublishers.
2. ChristopherHolloway.(1985).BusinessofTourism.Great Britain Macdonald and Evans.
3. Pran Nath Seth Sushma SethBhad.(2007).An Introduction To Travelandtourism. RevisedBook.NewDelhi: SterlingPublishersPrivateLimited.
4. Sinha,R.K.(2008).ModernTourism.NewDelhi: DominantPublishers.
5. SudeshLehri.(2004).India:TourismDestinationsforallseasons.NewDelhi: AdhyayanPublishers&Distributors.
6. AndrewHolden.(2005).Tourismstudiesandthesocialsciences.London: Routledge.

## **Open Educational Resources (OER):**

1. <http://egyankosh.ac.in/>
2. <http://www.uou.ac.in/sites/default/files/slm/BTTM-101.pdf>
3. <https://www.slideshare.net/angielynlaquian/sociology-of-tourism-23619173>
4. <http://www.jstor.org/stable/2083181>
5. <https://tourismnotes.com/tourism-transportation/>
6. <https://www.skylineuniversity.ac.ae/pdf/tourism/Tourism%20Impacts.pdf>

**SEMESTER - II**  
**UCHIC20 - HISTORY OF INDIA FROM 1707 TO 1858 A.D**

<b>Year:</b> I <b>Sem:</b> II	<b>Course Code:</b> UCHIC20	<b>Title of the Course:</b> History of India From 1707 to 1858 A.D	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100 40+60
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**Course Objective:**

1. To make the Students to Understand the various Causes for the Advent of Europeans to India
2. To help the Student to grasp the Administration and Reforms of British under East India Company
3. To enable the Students to Evaluate the Causes, Course and Results of the Revolt of 1857

**Course Outcomes (CO):**

**After completion of the course the student will able to**

1. Explain the advent of the Europeans and their Settlements in India and analyze their impact in Indian Culture.
2. Compare and Contrast the Administration and Reforms of Warren Hastings and Lord Cornwallis.
3. Examine the social reforms of Lord William Bentinck and to become the agents of social change
4. Classify the Reforms of Lord Dalhousie and its impact in the Indian administration for the betterment of the present
5. Describe the revolt of 1857 and explain the changes in the Indian Administration

CO/PO	1	2	3	4	5	6
<b>CO1</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>M</b>	<b>M</b>
<b>CO2</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>H</b>	<b>M</b>
<b>CO3</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>H</b>	<b>M</b>
<b>CO4</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>H</b>	<b>M</b>
<b>CO5</b>	<b>M</b>	<b>M</b>	<b>M</b>	<b>L</b>	<b>H</b>	<b>M</b>

**H-High (3) M-Medium (2) L-Low (1)**

CO/PO	1	2	3	4	5	6
<b>CO1</b>	<b>H</b>	<b>H</b>	<b>L</b>	<b>L</b>	<b>M</b>	<b>H</b>
<b>CO2</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>M</b>	<b>L</b>
<b>CO3</b>	<b>M</b>	<b>L</b>	<b>H</b>	<b>L</b>	<b>H</b>	<b>H</b>
<b>CO4</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>L</b>	<b>H</b>	<b>M</b>
<b>CO5</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>M</b>	<b>H</b>

**H-High (3) M-Medium (2) L-Low (1)**

**Unit-I:**

**(18 Hours)**

- 1.1 Reasons for the Advent of Europeans in India- Discovery of Sea Route in India - Portuguese (K1, K2, K4)
- 1.2 Vasco-da-Gama-Almeida -Alberque- Blue Water Policy- Rise and Decline of Portuguese (K2, K4)
- 1.3 The Dutch – The Dutch Settlements in India- French East India Company and his Settlements in India- Reasons for French Failures (K1, K2)

- 1.4 English East India Company- Rise and Power of Britishers-Austrian Succession War- Impact in India- First Carnatic War- Anwar-ud-din-Results of the War- Aix-la-Chapelle (K2, K4)
- 1.5 Second Carnatic War-Nasirjung- Musaffar Jung-Bussy- Chandasahib-Treaty Pondicherry (K2)
- 1.6 Third Carnatic War-Count-de-lally-Treaty of Paris-Impact of Carnatic Wars in India- Dupleix-Carrier and his Achievements (K2, K4)

**Unit- II:**

**(18 Hours)**

- 2.1 Robert Clive – Hero of Arcot- Achievements of Clive in Carnatic Wars- Military- - Diplomatic-Establishment of British rule in India (K2, K4)
- 2.2 Siraj-ud-Daula-Nawab’s Order- Black Hole Tragedy- Mir Jafar-Battle of Plassey- Course- Results of the War-Diwani right- Dual Government in Bengal (K2, K4)
- 2.3 Battle of Buxar-Mir Kasim- Course- Results of the War (K2)
- 2.4 Treaty of Allahabad- Shuja-ud-daula- Shah Allam-II (K2)
- 2.5 Robert Clive’s Achievements in Bengal (K4)

**Unit III:**

**(18 Hours)**

- 3.1 Warren Hastings-First Governor General of Bengal-Reforms -Administration- Muhammed Raza Khan- Raja Shitab Rai- Revenue Reforms-Bidding- Board of Revenue- Commercial Reforms- Chowkies- Judicial Reforms(K2, K4)
- 3.2 Regulating Act of 1773-Changes in England-Court of Directors- Changes in India- Criticism of the Act- Zamindars- Presidencies of India-Court of Properties- Trial of Nandakumar(K2)
- 3.3 Removal of Defects- Supreme Court-Pitt's India Act of 1784-Changes in England- Secretary of State- Changes in India- General Changes-Non- Intervention Policy- Impeachment of Warren Hastings (K1, K2)
- 3.4 Lord Cornwallis- Permanent Revenue Settlement -Zamindars- Zamindari System- Sir Johnshore- Revenue Board- Merits and Demerits of Permanent land revenue system(K4)
- 3.5 Administrative Reforms- High Posts for Indians-Criminal Court- Darogas- Sadr- Nizamat Adalat-(K2, K4)
- 3.6 Judicial Changes-Civil Courts- Munsif- Provincial Courts- Police - Imperialism- Nepotism- British Economic Impact in India- The ruin of India’s Agrarian Economy- Decline of India’s Trade and Commerce(K2, K4)

**Unit IV:**

**(18 Hours)**

- 4.1 Lord Wellesley-Origin of Subsidiary Alliance- Alfred Lyall- Provisions of the Subsidiary alliance- Merits and Demerits of the System (K2)
- 4.2 Rise and Fall of Tipu Sultan-Tiger of Mysore- Second- Anglo Mysore War- Treaty of Mangalore-Anti-Tipu Alliance- Third Anglo-Mysore War-Treaty of SriRangapatnam - Fourth Anglo Mysore War-Results of the War – Achievements of Tipu Sultan - Failures of Tipu( K2, K4)
- 4.3 Second -Anglo Maratha War-Treaty of Deogaon-Lord Hastings- Judicial Reforms- Sadr Amins- Provincial Diwani Adalat- Revenue Collectors(K2)
- 4.4 Revenue Reforms- Mahalwari System- Ryotwari -Bengal Tenancy Act- Educational Reforms-Vernacular School System- Liberty of Press (K2)
- 4.5 Gurka War- Sir George Barlow- Lord Minto- Treaty of Sagauli- Pindari War-Karmi Khan- ThirdAnglo Maratha War-Results of the War – Reforms of Lord William Bentinck--Social Reforms- Sati abolition - Raja Ram Mohan Roy-Suppression of Female Infanticide- Suppression of Human Sacrifice(K4)

4.6 Educational Reforms -Western System of Education – Macaulay’s Law Commission- Charter Act of 1813- Charter Act of 1833-Provisions of the Act (K2, K4)

**Unit V:**

**(18 Hours)**

- 5.1 Lord Auckland –Reforms-First Anglo-Afghan War –Criticism - Lord Ellenborough- Lord Hardinge- Reforms- First Anglo-Sikh War- Treaty of Lahore- Treaty of Bhairawal(K2)
- 5.2 Charter Act of 1853 – ICS Exams-Legislative Council- Veto Power- Merits and Demerits of the Act(K2)
- 5.3 Lord Dalhousie- Doctrine of Lapse-Methods of Annexation- Annexations of the Provinces- Criticism (K4)
- 5.4 Reforms of Dalhousie-Administrative Reforms- Railways- Posts & Telegraphs- Commercial- Public Works-Education- Charles Wood’s Despatch- Military (K2, K4)
- 5.5 Lord Canning -Sepoy Mutiny- Causes:- Political- Social and Economic- Religious- Psychological- Military- Immediate Cause- Mangal Pande (K2, K4) Events of the Revolt-Revolt of Kanpur-Delhi- Lucknow-Central India- Queen of Jhansi- Nana Sahib- Tantia Tope-Causes for the Failure of the Revolt- Results of the Revolt of 1857 (K2, K4)
- 5.6 Queen’s Proclamation of 1858-Provisions-First Viceroy (K2, K4)

**Maps:**

1. European Settlements in India
2. Carnatic Wars: Important Places.
3. India under Warren Hastings
4. India under Wellesley
5. Places connected with the event of 1857.

**Text Books:**

1. V.D. Mahajan – Modern Indian History – S. Chand and Company Ltd., New Delhi, 1983.

**Books for Study and Reference:**

1. V.D. Mahajan – Modern Indian History – S. Chand and Company Ltd., New Delhi, 1983.
2. Indian History – Krishna Reddy- S. Chand & Co. Pvt. Ltd. New Delhi, 2005. J.C. Agarwal – Modern Indian History – S. Chand and Company Ltd., New Delhi, 2000.
3. L.P. Sharma–History of Modern India–Konark Publishers Pvt. Ltd., Delhi 1989.
4. K.C. Chaudhuri – History of Modern India – New Central Book Agency, Calcutta, 1983.
5. Grover B.L. & Grover S. – A New Outlook on Modern Indian History – S. Chand & Co. Pvt. Ltd. New Delhi, 2005.
6. Rajkumar Pruthi – History of Modern India – Mohit Publications, New Delhi, 2005.

**Open Educational Resources (OER):**

1. <https://www.historypak.com>carnaticwars>
2. <https://www.heritage-history.com/britshers>
3. <https://www.britannica.com>lordwilliambentink>
4. <https://www.timemaps.com/history/south-asia-1857ad/>

## SEMESTER-II

### UCHID20- HISTORY OF INDIA FROM 1858 TO 1947 A.D

<b>Year:</b> I	<b>Course Code:</b> UCHID20	<b>Title of the Course:</b> History of India from 1858 to 1947 A.D	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100 40+60
<b>Sem:</b> II							

#### Course Objectives:

1. To Help the Students to interpret the Condition of India after Queen's Proclamation
2. To help the Students to know the Administrative System of Lord Ripon, Lord Curzon, and their Domestic and Foreign Policy
3. To enable the Students to Understand the various factors leading to the rise of the National Movement and the role of Mahatma Gandhi in the Freedom Struggle

#### Course Outcomes (COS):

After completion of the course the student will able to:

1. Explain the condition of India after the Queen Victoria's proclamation and State the reforms of the Viceroy and understand various concepts and ideas in their administration
2. Compare and contrast the administration of Lord Ripon with Lord Curzon and contribute to the society and become leaders to become change makers
3. Examine the causes for the emergence of social reform movements and discuss the contribution of various Social reform movements, to contribute towards the needs of the society.
4. Classify the various causes for the rise of National Movements in India and explain their sacrifice and list their positive social values
5. Explain the role of M.K. Gandhi in Freedom Struggle and understand the concepts in various Acts and to commit oneself for Social Justice and exercise leadership and Teamwork

CO/PO	1	2	3	4	5	6
CO1	H	L	L	L	M	L
CO2	H	H	L	L	H	H
CO3	H	H	H	L	M	H
CO4	H	H	L	L	H	M
CO5	H	H	L	L	H	H

(Low -L, (1) Medium -M, (2) High-H( 3)

CO/PSO	1	2	3	4	5	6
CO1	M	H	L	H	L	M
CO2	H	H	M	H	L	H
CO3	H	H	H	L	L	M
CO4	H	H	H	M	H	M
CO5	M	H	H	L	H	M

(Low -L, (1) Medium -M, (2) High-H (3)

**Unit I:**

**(18 Hours)**

- 1.1 India under the Crown- Queen Victoria's Proclamation – Significance of the Proclamation( K2,K4 )
- 1.2 Lord Canning – Administration – Reforms( K2, K4 )
- 1.3 Lord Elgin –Lord Lawrence- Lord Mayor – Lord NorthBrook( K2,K4)
- 1.4 Lord Lytton- Royal Titles Act-Financial reforms-Vernacular press Act-Civil Services ( K2, K4 )
- 1.5 Lord Lytton - Afghan Policy- Cause-Events-Treaty of Gandamak ( K2,K4 )
- 1.6 Estimation of Lord Lytton( K2,K4 )

**Unit II:**

**(18 Hours)**

- 2.1 Lord Ripon –Reforms in administrative structure- Financial Reforms-Educational Reforms-  
Judicial Reforms –Policy towards Indian states-Estimate( K2,K4 )
- 2.2 Lord Dufferin- Third Burmese War-Internal policy- Birth of Indian National Congress(  
K2,K4 )
- 2.3 Lord Lansdowne - Foreign policy- Financial Reforms( K2,K4 )
- 2.4 Lord Elgin- Chitral Expedition – The Tirah campaign- plagues and Famine( K2,K4
- 2.5 Lord Curzon- Administrative Reforms- Agricultural reforms- Archaeological reforms  
Educational reforms- political reforms ( K2,K4 )
- 2.6 Lord Curzon- foreign policy- North western Frontier- Afghanistan-Persia- Tibet( K2,K4 )

**Unit III:**

**(18 Hours)**

- 3.1 Causes for the Social Reforms Movements – Raja Ram Mohan Roy- Brahmo samaj- Keshab Chandra Sen( K2,K4 )
- 3.2 Jyotiba Phule –Satya Shodhak Samaj ( K2,K4 )
- 3.3 Swami Dayanandha saraswathi- Arya Samaj – Vevekanandha – Ramakrishna Mission( K2,K4 )Annie Beasant-Theosophical Societies - AligarhMovement( K2,K4 )
- 3.4 Minor Social Reform Movements- Anti-Untouchable Movements- Sikh Movements ( K2,K4)
- 3.5 Movements for Emancipation of Women-Peasants Movements – All India Trade Union Congress(  
K2,K4 )

**Unit IV:**

**(18 Hours)**

- 4.1 Factors promoting Nationalism( K2,K4 )
- 4.2 Origin of Indian National Congress –First Phase- Moderate Phase( K2,K4 )
- 4.3 Partition of Bengal – Swadeshi Movement -Period of extremist ( K2,K4 ) 4.4: Muslim League- Surat split- Minto –Morley Reforms( K2,K4 )
- 4.4 Home Rule Movement- Ghadar Party ( K2,K4 )

#### 4.5 Various Conspiracy- India and FirstWorld War( K2,K4 )

#### **Unit V:**

**(18 Hours)**

- 5.1 Montagu –Chelmsford reforms- Rowlatt Act- Jallianwala Bagh Tragedy( K2,K4 )
- 5.2 Mahatma Gandhi- Non –Cooperation Movement- Chauri Chaura incident( K2,K4 )
- 5.3 Swaraj Party –Simon Commission – Civil Disobedience Movement –Round Table Conferences( K2,K4 )
- 5.4 The Government of India Act 1935 – Quit India Movement- India and Second World War-August offer( K2,K4 )
- 5.5 Cripps plan- Wavell plan-Cabinet Mission( K2,K4 )
- 5.6 Mountbatten Plan- India Independence Act of 1947- Causes Leading for the Partition of India and Pakistan( K2,K4 )

#### **Maps:**

1. India under Lord Curzon
2. India under Lord Ripon
3. Important Places Related to National Movement
4. Partition of India – important places

#### **Text Book**

1. R.S. Chaurasia- History of Modern India 1707 A.D to upto 2000 A.D-Atlantic publishers

#### **Books for Study and Reference:**

1. V.D. Mahajan – Modern Indian History – S. Chand and Company Ltd., New Delhi 1983.
2. J.C. Aggarwal – Modern Indian History – S. Chand and Company Ltd., New Delhi 2000.
3. L.P. Sharma – History of Modern India – Konark Publishers Pvt. Ltd., Delhi 1989
4. K.C. Chaudhuri – History of Modern India – New Central Book Agency, Calcutta 1983.
5. R.C. Agarwal – Constitutional Development and National Movement of India –S. Chand & Co., Pvt. Ltd., New Delhi, 2005.
6. B.P. Chaudhary – History of India – Abhijeet publications, New Delhi, 2012.
7. Brij Kishore Sharma – Introduction to Constitution of India, Learning Pvt. Ltd., New Delhi, 2011.

#### **Open Educational Resources (OER):**

1. <https://www.gktoday.in/gk/arrival-of-lord-lytton-1876/>
2. <https://www.gktoday.in/gk/arrival-of-lord-ripon-1880/>
3. <https://iasmania.com/lord-ripon-lord-lansdowne-lord-curzon-partition-of-bengal/>
4. [nammakpsc.com/wp/wp-content/.../10.-Religion-reform-movement.pdf](http://nammakpsc.com/wp/wp-content/.../10.-Religion-reform-movement.pdf)
5. <https://www.youtube.com/watch?v=3QwMQJ6f11A>
6. <https://www.history.com/topics/india/mahatma-gandhi>

## SEMESTER- II

### UATMB20 -ALLIED-II - TOURISM II

<b>Year:</b> I <b>Sem:</b> II	<b>Course Code:</b> UATMB20	<b>Title of the Course:</b> Allied-II Tourism -II	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100 40+60
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#### Course Objectives:

1. This course emphasizes the importance and significance of travel agencies and explores the significant features of world tourist organizations.
2. This course will induce students to become an entrepreneur and enable them to develop communication.
3. This course also intends to enable students to understand the programs and policies of the tourism sector.

#### Course Learning Outcomes (COS):

**After completion of the course the student will able to:**

1. Describe and analyze the concepts of Service Organizations
2. Examine the contribution of the Service Organizations
3. Analyze Tourism as the Poverty Alleviation Program
4. Illustrate the Works of the Committee in Tourism Planning Process
5. Explain the contribution of Biodiversity and Tourism Development

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	H	L	H	H
<b>CO2</b>	H	M	L	L	H	H
<b>CO3</b>	H	H	M	L	H	H
<b>CO4</b>	H	M	H	L	H	M
<b>CO5</b>	H	M	M	H	M	H

**(H-High (3) Medium -M (2) L-Low (1))**

<b>CO/P SO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	H	H	M	M
<b>CO2</b>	M	H	M	H	L	M
<b>CO3</b>	H	M	H	H	L	H
<b>CO4</b>	H	M	H	H	H	M
<b>CO5</b>	H	H	M	H	M	H

**H-High (3) Medium -M (2) L- Low (1)**

**Unit I:** (18 Hours)

- 1.1 Introduction to Service Organization & Meaning and History of service organization. (K2)
- 1.2 Travel Agency – Types of travel agency – Rules and Regulations for Approval of travel agency. (K2)
- 1.3 Tour operators: Meaning - Nature & Importance of Tour operator (K2)
- 1.4 Types & Functions of Tour operator. (K2)
- 1.5 Passport: Significance, Types, Procedures & Documents (K2, K3)
- 1.6 VISA - Meaning – Importance and Types of VISA (K2)

**Unit II:** (18 Hours)

- 2.1 World Tourism Organization: Objectives, Structure & Functions of WTO (K2)
- 2.2 Pacific Asia Travel Association: Aims, Structure and Functions (PATA) (K2)
- 2.3 International Air Transport Association: Roles and Structures (IATA) (K2)
- 2.4 International Civil Aviation Organization: Organizational Structure, Roles & Responsibilities (ICAO) (K2)
- 2.5 World Travel and Tourism Council: Objectives of WTTC Functions (WTTC) (K2)
- 2.6 National Tourist Organization: Aims Roles of NATO. (K2).

**Unit III:** (18 Hours)

- 3.1 Tourism as Industry (K2).
- 3.2 Types of Tourism Sector (K2).
- 3.3 Tourism as an information management (K2).
- 3.4 Tourism and Poverty Alleviation (K2).
- 3.5 Tourism Publicity: Advertising Agency, Role of Social media in Tourism promotion (K2).
- 3.6 Problems and Challenges of the Tourism Industry (K2).

**Unit IV:** (18 Hours)

- 4.1 National Committee on Tourism (NCT) (K2).
- 4.2 Tourism National Action Plan 1992 (K2).
- 4.3 National Tourism Policy 2002 (K2).
- 4.4 Tourism Planning Process (K2).
- 4.5 Levels of Tourism Planning (K2).
- 4.6 Role of State Government in Tourism (K2).

**Unit V:** (18 Hours)

- 5.1 Seasonality: Geography of India (K1, K2).
- 5.2 Climate of India (K1, K2).
- 5.3 Seasonal Tourism (K1, K2).
- 5.4 Wildlife Tourism: Wildlife Sanctuaries and National Parks (K1, K2).
- 5.5 Impact of Climate conditions on tourism and destinations (K1, K2).
- 5.6 Safe and Security Issues of Tourism in India (K1, K2).

**Text Books**

1. Jayapalan, N. (2001). An Introduction to Tourism. New Delhi: Atlantic Publishers.
2. Prabhat Chaudhary. (2009). Tourism: Concepts and Principles, Policy and Planning. New Delhi:

AdelineBooksPublishers.

### **Books for Study and Reference**

1. Surinder Agarwal .(2008). Travel Agency and Management. New Delhi: Communication India.
2. Khan, M.A. (2006). A Tourist Paradise. New Delhi: Sterling Publishers.
3. Jayapalan, N. (2001). An introduction to Tourism. New Delhi: Atlantic Publishers.
4. Sharma, K.K. (2007). Tourism and Culture. New Delhi: Sarup & Sons.
5. Robinet Jacob., Sindhu Joseph., & Anoop Philip. (2007). Indian Tourism Products. New Delhi: Abhijeet Publications
6. Stephen J. Page. (2011). Tourism management: An introduction ( 4<sup>th</sup> Edt). London: Routledge –Taylor and Francis.
7. Prabhat Chaudhary. (2009). Tourism: Concepts and Principles, Policy and Planning. New Delhi: Adeline Books Publishers.
8. Manoj Das. (2006). A Tourist Paradise. New Delhi: Sterling Publishers.

### **Open Educational Resources(OER):**

1. <https://opentextbc.ca/introtourism/chapter/chapter-7-travel-services/>
2. [https://www.tutorialspoint.com/tourism\\_management/tourism\\_management\\_tutorial.pdf](https://www.tutorialspoint.com/tourism_management/tourism_management_tutorial.pdf)
3. [https://amity.edu/arjtah/pdf/Jeet\\_Dogra.pdf](https://amity.edu/arjtah/pdf/Jeet_Dogra.pdf)
4. <https://www.shareyouressays.com/knowledge/what-are-the-four-important-publicity-methods-used-by-tourism-organisation/111151>
5. <https://iasmania.com/geography/indian-geography/>
6. [https://scholarworks.umt.edu/cgi/viewcontent.cgi?article=1233&context=itr\\_pubs](https://scholarworks.umt.edu/cgi/viewcontent.cgi?article=1233&context=itr_pubs)

## SEMESTER- III

### UCHIE20 - AN OUTLINE HISTORY OF TAMIL NADU UPTO 1565 A.D

<b>Year:</b> II	<b>Course Code:</b> UCHIE20	<b>Title of the Course:</b> An Outline History of Tamil Nadu to 1565A.D	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100 40+60
<b>Sem:</b> III							

#### Course Objectives:

1. To help the Students to understand Physical Features, Sources and Political Division of Sangam Age.
2. To make the Students to know about the Military achievements of Pallavas, Cheras, Cholas and Pandyas.
3. To help the Students to understand their Contribution to Religion, Art and Architecture.

#### Course Outcomes (COS):

**After completion of the course the student will able to :**

1. Define the Sources for the Ancient History of Tamil Nadu and Topographical division of Sangam Age.
2. Describe the Chera, Chola and Pallava Kingdoms its Socio, Economic and Cultural Condition of the Sangam Age and its impact on the development of Tamil Culture
3. Explain the Contribution of the Pandyas and the Pallavas Religion, Art and Architecture to the betterment of present time.
4. Compare the Contribution of the Imperial Cholas and the Later Pandyas in the field of Local Administration.
5. Illustrate the travel accounts of Marco Polo and Abdul Wasuf and create respect for diversity

CO/PO	1	2	3	4	5	6
CO1	H	M	M	L	H	M
CO2	M	H	M	H	L	H
CO3	M	L	M	H	M	H
CO4	L	M	H	M	H	L
CO5	M	M	H	H	M	L

**High -(3), Medium (2), Low (1)**

CO/PSO	1	2	3	4	5	6
CO1	M	H	L	M	L	H
CO2	H	H	L	M	L	M
CO3	L	H	M	L	M	H
CO4	H	L	M	L	M	M
CO5	H	L	M	M	L	H

**High - (3), Medium (2), Low (1)**

**Unit –I**

**(18 Hours)**

- 1.1 Geographical features and Ethnography of TamilNadu
- 1.2 Literary Sources - Foreign Literary Sources (K2)
- 1.3 Literary Sources - Tamil & Non Tamil Literary Sources – Eight anthologies – Ten Idylls(K2)
- 1.4. Political History – Chera Senguttuvan – Karikal Cholan (K2)
- 1.5. Political history- Pandian Nedunchelian.(K2)
- 1.6. Social, Economic and Cultural condition of Sangam Tamilagam.(K2)

**Unit II:**

**(18 Hours)**

- 2.1 The Kalabhras – Literary and Epigraphical Sources – Effects of Kalabhra rule in the Tamil Country ( K2)
- 2.2 Political History of First Pandyan Empire (K2)
- 2.3 The Pallavas – Origin – Literary & Archaeological Sources (K1,K2)
- 2.4 Political History of Simhavishnu –MahendravarmanI- Narasimhavarma(K1,K2.)
- 2.5 Art and Architecture – Monolithic Rock cut temples- Structural temples of Pallavas.(K2)
- 2.6 Bhakti Movement- Saivism and Vaishnavism.(K1,K2)

**Unit III:**

**(18 Hours)**

- 3.1 Sources for Imperial Cholas, Archaeological – Literary (K2,)
- 3.2 Rajaraja Chola I- Conquest – Administrative Reforms (K1, K2,)
- 3.3 Rajendra Chola I, Military Conquest (K1, K2)
- 3.4 Political History of Cholas- Kulottunga I – Rajendra III (K2)
- 3.5 Local- Self Government –Ur, Nagaram , Mahasabha (K2)
- 3.6 Art and Architecture of Imperial Cholas.(K2)

**Unit IV:**

**(18 Hours)**

- 4.1 Archaeological – Literary Sources of Later Pandyas. (K2)
- 4.2 Political history of Jatavarman Sundarapandya I – Maravarman Sundarapandya I – Maravarman Kulasekara I – Jatavarman Kulasekara I (K1, K2.)
- 4.3 Social and Cultural Conditions of Later Pandyas.(K1, K2.)
- 4.4 Economic Condition –Internal Trade and Foreign Trade.(K2)
- 4.5 Art and Architecture of Pandyas(K1, K2)
- 4.6 Travel Accounts of Marco-Polo and Abdul Wasuf ( K1, K2)

**Unit V:****(18 Hours)**

- 5.1 Provincial administration under Vijayanagara Empire (K1,K2)
- 5.2 Madurai Nayaks-Visvanathanayak-Ariyanatha Mudaliyar-TirumalaiNayak- Meenakshi (K1, K2)
- 5.3 Senji Nayaks- Cuvaki Krishnappa-Surappa Nayak-Design (K
- 5.4 Tanjore Nayaks-Sevappa Nayak-Ragunathan Kayak(K2)
- 5.5 Salient Features of the Poligar System.(K2)
- 5.6 Battle of Talikota. (K2)

**Text Book:**

1. Dr.N. Jayapalan – History of TamilNadu – Atlantic Publishers, New Delhi.

**Books for Study and Reference:**

1. Nilakanda Sastri K.A. – History of South India – Oxford University Press, Amen House, London E.C.4.
2. Krishna Murthi V.M – History of Tamil Nadu – Vijayalakshmi Publications, Neyyor
3. Subramanian N. - History of Tamil Nadu 1336-1565 A.D. – Koodal Publications, Madurai
4. Subramanian N. – History of Tamil Nadu 1565-1956 A.D. – Ennes Publication, Udumalpet.
5. Sastri K.A.N. – The Cholas – Madras University, Madras, 1984

**Open Educational Resources (OER):**

1. [exampariksha.com](http://exampariksha.com) › Study Material › History
2. [www.jagranjosh.com](http://www.jagranjosh.com) › ... › GK for Exams
3. <https://pratiyogitaabhiyan.in/general-studies/history-general-studies/sangam-age-notesmcq-pdf-download/>

### SEMESTER-III

#### UEHIA20 - HISTORY OF MODERN ASIA (1900 A.D TO 2000 A.D)

(Excluding India, China, Bhutan, Japan and West Asia)

<b>Year:</b> II	<b>Course Code:</b> UEHIA20	<b>Title of the Course:</b> History of Modern Asia (1900 A.D to 2000 A.D)	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100 40+60
<b>Sem:</b> III							

#### Course Objectives:

1. To help the students to comprehend the Political History of Asian Countries and their formation.
2. To enable the students to assimilate the Knowledge of Internal and External problems.
3. To help the students to know the concept of Nationalism.

#### Course Learning Outcomes (CLOS):

**After completion of the course the student will able to:**

1. Explain the role of Nationalism in Sri Lanka and Pakistan and their development after Independence
2. Describe the formation of Bangladesh and Nepal Kingship
3. Illustrate the History of Malaysia and the Formation of Singapore
4. Examine the Independence of Indonesia and the Formation of new countries like Vietnam, Laos and Cambodia
5. Discuss the Independence of Philippines and Thailand and the Formation of Organizations for the Welfare of Asian Countries.

CO/PO	1	2	3	4	5	6
CO1	H	M	H	L	H	M
CO2	H	H	M	L	H	H
CO3	H	M	H	L	H	M
CO4	H	M	H	L	H	H
CO5	H	M	H	L	H	H

**(H-High (3) Medium -M (2) L-Low (1))**

CO/PO	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	H	H	H	M	M	H
CO3	H	M	H	M	H	H
CO4	H	M	H	M	H	H
CO5	H	H	H	H	M	H

**H-High (3) Medium -M (2) L-Low (1)**

**Unit I:****(18 Hours)**

- 1.1 Rise of Nationalism -Ceylon Independence- Ceylon National Congress (K2)
- 1.2 Prime Ministers of Sri Lanka: Senanayake – Bandaranayaka- Srimao Bandaranayaka- Jayavardene- First Presidential Election-Premadasa-Ranil Wickremasinghe- Chandrika Banadaranaike Kumaratunga (K2)
- 1.3 Ethnic Problem in Sri Lanka-Nehru Kotelawala Pact-Rajiv-Jayawardane Accord- Indian Peace Keeping Force (K2,K4)
- 1.4 Pakistan Independence-East Pakistan and West Pakistan (K2)
- 1.5 Prime Ministers of Pakistan: Iskantar Mirza- Ayubkhan- Yahyakhani- -Zulfikar Ali Bhutto-General Zia-ul-Haq-Muhammed Khan Juneja-Benazir Bhutto-Nawaz Sharif- General Pervez Musharaf (K2)
- 1.6 Pakistan and her Asian Neighbors: USA, USSR, Iran, Afghanistan, China(K2,K4)

**Unit II:****(18 Hours)**

- 2.1 Formation of Bangladesh -Urdu Agitation-Indo-Pakistan War (K4)
- 2.2 Problem between Bangladesh and India: Farakka Barrage- New Moore Island (K2)
- 2.3 Prime Ministers of Bangladesh: Mujibur Rahman- Zia-ur-Rahman-General Ershad- Khaladia Zia-Sheik Hassian (K2)
- 2.4 Nepal History-History of Nepal- Royal Massacre of Nepal (K2)
- 2.5 Rulers of Nepal: King Mahendra- New Constitution-King Mahendra (K2)
- 2.6 Foreign Policy of Nepal (K2)

**Unit III:****(18 Hours)**

- 3.1 History of Malaysia: Nationalism in Malaysia-United Malays National Organisation- Federation of Malaya-Malaysia Independence –Ejection of Singapore (K2)
- 3.2 Prime Ministers of Malaysia: Tunk Abdul Rahman- Datuk Seri Dr.Mahathir Muhammed (K2)
- 3.3 Government of Malaysia (K2)
- 3.4 Singapore: Rendel Constitution-Lee Kuan Yew – Singapore Federation- Singapore Independence (K2)
- 3.5 Republic of Singapore (K2)
- 3.6 Economic Growth of Singapore (K4)

**Unit IV:****(18 Hours)**

- 4.1 Nationalism in Indonesia-Indonesia Independence:- Rise of Nationalism- Budi- Utomo- Rise of Sarekat Islam-Indonesia Independence (K2)
- 4.2 Sukarno-Guided Democracy-Bandung Conference- Sukarto-Abdur Rahman Wahid (K2)
- 4.3 Vietnam- Republic of Vietnam-Geneva Conference-Ho-Chi-Minh-VietnamWar- Reunification of Vietnam (K2)
- 4.4 Laos- Early History-Independence of Laos-Laos and USA-Lao People's Democratic Republic (K2)
- 4.5 Cambodia-Sihanouk –Restoration of the Monarchy- US in South East Asia (K2)
- 4.6 Geneva Conference (K2)

**Unit V:****(18 Hour)**

- 5.1 Early History of Philippines-Relations with United States (K2)
- 5.2 Prime Ministers of Philippines: Akino-Tydings-Mc-Duffie Act-Ramon Magsaysay- Marcos- Aquino (K2)
- 5.3 Economy Growth of Philippines (K2)

5.4 Thailand Independence-Anglo-French Rivalry (K2)

5.5 Rulers of Thailand: King Chualongkorn-Phibun Songgram-Pridi Phanomyong-Sarit Thanarat (K2)

5.6 Organizations of South Asian Countries-SEATO-ASEAN-SAARC (K4)

### **Text Books**

1. N.Jayapalan-History of Modern Asia

### **Reference Books**

1. Clyde and Beers:-The Far East- Prentice Hall of India Ltd., NewDelhi-1976
2. Harlod M.Vinacke - A History of the Far East- Kalyani Publications, New Delhi,1982
3. K.M.De Silva-A History of Srilanka-Oxford University Press,1981
4. Smruthi Spattanaik (Editor)-Four Decades of India Bangladesh Relations, Historical Imperatives and Future Direction,-Institute for Defence Studies and Analysis, New Delhi,2012
5. Puran Chandra -Burma-Past and Present a Fact Book-ForwardBook Publications,New Delhi,2013

### **Open Educational Resources (OER):**

1. <https://www.britannica.com/place/Sri-Lanka/History>
2. [https://en.wikipedia.org/wiki/Sri\\_Lankan\\_Civil\\_War#:~:text=Since%20the%20end%20of%20the,Sri%20Lankan%](https://en.wikipedia.org/wiki/Sri_Lankan_Civil_War#:~:text=Since%20the%20end%20of%20the,Sri%20Lankan%20)
3. [https://www.britannica.com/topic/history-of-Bangladesh\\_20Tamil%20girls%20and](https://www.britannica.com/topic/history-of-Bangladesh_20Tamil%20girls%20and)
4. <https://www.britannica.com/place/Nepal/History>
5. <https://www.britannica.com/place/Malaysia>
6. <https://www.britannica.com/place/Singapore/History>
7. <https://www.britannica.com/place/Indochina>
8. <https://www.britannica.com/topic/history-of-Philippines>
9. <https://www.britannica.com/place/Thailand>

### SEMESTER- III

#### UEHIA20--ELECTIVE I B: INTERNATIONAL RELATIONS (1945 TO 2000 A.D)

Year: II Sem: III	Course Code: UEHIA20	Title of the Course: International Relations (1945 to 2000A.D)	Course Type: Theory	Course Category Core	H/W 6	Credits 6	Marks 100 40+60
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#### Course Objectives:

1. To help the Students to understand the ideals of International Relations.
2. To help to familiarize the developments of the Contemporary World.
3. To help the Students to understand the current international affairs.

#### Course Outcomes (COs):

##### After completion of the course the student will able to:

1. Describe the origin, function and the achievements of the UNO and become the agents of Social Change
2. Analyze the effects of the Cold War and its impact on the International relationship
3. Discuss the origin, structure and functions of SAARC, CommonWealth, European Union and WTO to become the builders of Peace.
4. Estimate the disintegration of the USSR and its impact on the Countries.
5. Examine the Middle East Countries and their role

CO/PO	1	2	3	4	5	6
CO1	H	H	H	L	H	H
CO2	H	M	M	L	H	H
CO3	H	H	M	L	H	H
CO4	H	H	H	L	M	M
CO5	H	H	M	L	M	H

**H-High (3) Medium -M (2) L-Low (1)**

CO/PSO	1	2	3	4	5	6
CO1	L	M	H	L	H	M
CO2	M	L	H	H	M	H
CO3	M	M	H	M	H	M
CO4	L	L	M	H	M	H
CO5	L	L	H	M	H	H

**H-High (3) Medium -M (2) L-Low (1)**

- Unit I:** (18 Hours)
- 1.1 Meaning and Definitions International Relations.(K2)
  - 1.2 Origin and Establishment- Structure of the UNO (K2)
  - 1.3 Functions-Achievements of the UNO (K4)
  - 1.4 Disarmament-Nuclear Test Ban Treaty (
  - 1.5 Non –Proliferation Treaty-(K2)
  - 1.6 SALT-CTBT. (Strategic Arms Limitation Talks, The Comprehensive Nuclear Test Ban Treaty.) (K2)

- Unit II:** (18 Hours)
- 2.1 Truman Doctrine (K2)
  - 2.2: Marshall Plan (K2)
  - 2.3.: NATO-CENTO- SEATO (K2)
  - 2.4.: Warsaw Pact – Anzus Pact (K2)
  - 2.5: Cold War in Korea, Vietnam, Cuba (K2)
  - 2.6: Berlin Crisis. (K2)

- Unit III:** (18 Hours)
- 3.1: SAARC- Origin- Aims- Structure and Functions (K2)
  - 3.2: Commonwealth (K2)
  - 3.3: European Economic Community (K2)
  - 3.4: European Common Market (K2)
  - 3.5: G8- WTO (Group of Eight, World Trade Organization.) (K2)
  - 3.6: ASEAN.(Association of Southeast Asian Nations.) (K2)

- Unit IV:** (18 Hours)
- 4.1.: Gorbachev (K2)
  - 4.2.: Glasnost (K)
  - 4.3.: Perestroika (K2)
  - 4.4: Soviet Disintegration (K4)
  - 4.5: Rise of African States (K2)
  - 4.6: Apartheid Policy.(K4)

- Unit V:** (18 Hours)
- 5.1 Middle East Crisis (K4)
  - 5.2 Arab Israel War (K2)
  - 5.3. Palestinian Liberation Organization (P.L.O) (K2)
  - 5.4. Oil Diplomacy (K2)
  - 5.5. Gulf War.(K4)

**Text Book:**

1. Khurana. K.L. The Twentieth Century World. Agra: Lakshmi Narain Agarwal, 2005

**Books for Reference:**

1. Burton J.W. International Relations, Bombay: George Allen and Unwin Pvt Ltd. 1971
2. Palmer and Perkins. . International Relations, New Delhi: AITBS Publishers & Distributors,

2000.

- 3 .Srivastava, L.N.- International Relations from 1914 to Present Day, SBDI, New Delhi, 1991.
- 4.Thiyagarajan, J.- International Relations, Pavai Pathippagam, Madurai, 2002.
- 5.Mahajan, V.D. – International Relations, S.Chand & Company, Delhi, 1993.
- 6.Holsti. International Politics, New Delhi: Prentice Hall of India Pvt Ltd, 1978.
- 7.Sen.A.K. International Relations since 1919. New Delhi: S.Chand & Co., Ltd, 1993.

**Open Educational Resources (OER):**

[https://www.researchgate.net/publication/340721068\\_International\\_Relations\\_Proficiency\\_Exam\\_Study\\_Notes](https://www.researchgate.net/publication/340721068_International_Relations_Proficiency_Exam_Study_Notes)

**UAMGA21 – ALLIED: MODERN GOVERNMENT – I**

<b>Year:</b> <b>II</b> <b>Sem:</b> <b>III</b>	<b>Course Code:</b> UAMGA21	<b>Title of the Course</b> Modern Government –I	<b>Course Type</b> Theory	<b>Course Category</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks (100)</b> 40+60
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**Course Objective:**

1. To enhance the Students to understand the basic concepts of the Constitution
2. To understand the Principles relating to Politics and working of the political Institution
3. To know the value of Democracy, Rights and the Duties of the Citizen

**Course Outcome:**

**After completion of the course the student will able to:**

1. Describe the basic concepts of the Constitution
2. Examine the nature of various types of the Government
3. Point out the working of the political institution
4. Define the organs and the functions of the Government
5. Estimate the political system of various forms of the Government

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	M	L	M	M
<b>CO2</b>	H	M	M	L	M	M
<b>CO3</b>	H	M	M	L	H	L
<b>CO4</b>	H	M	M	L	M	M
<b>CO5</b>	M	M	H	L	M	M

**H-High (3) M-Medium (2) L-Low (1)**

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	M	M	L	L	M	M
<b>CO2</b>	M	H	M	L	H	M
<b>CO3</b>	M	H	M	L	H	M
<b>CO4</b>	H	H	H	L	H	M
<b>CSO5</b>	M	H	M	L	H	M

**H-High (3)M-Medium (2) L-Low(1)**

## Course Syllabus

### **Unit I** **18 Hours**

- 1.1- Introduction to Constitution -Meaning and purpose of the Constitution (K2)
- 1.2-Classification of the Constitution(K1,K3)
- 1.3-Early Classification (K3)
- 1.4- Fundamental Rights (K2,K4)
- 1.5-Fundamental Duties(K2)
- 1.6-Citizenship(K2)

### **Unit II** **18 Hours**

- 2.1-Unitary State(K2,K3)(
- 2.2-Features of Unitary State (K3)
- 2.3- Federal state(K2,K3)
- 2.4-Characteristics of a federal state (K3)
- 2.5- Quasi-Federal(K3)

### **Unit III:** **18 Hours**

- 3.1-Separation of powers(K3)
- 3.2- Theory & Criticism(K3)
- 3.3- Executive and its Functions(K)
- 3.4- Parliamentary form of Government (K4)
- 3.5- Presidential form of Government (K4)
- 3.6- Plural Executive(K3)

### **Unit IV** **18 Hours**

- 4.1-Legislature(K4)
- 4.2-Powers and Functions of Legislature K3)
- 4.3- Unicameral Legislature(K3)
- 4.4-Bicameral Legislature (K3)
- 4.5- Process of Law Making(K3)
- 4.6- Methods of Solving DeadLock(K4)

### **Unit V** **18 Hours**

- 5.1- Judiciary – Composition of Judiciary(K4)
- 5.2- The Independence of Judiciary –Functions of Judiciary (K3)
- 5.3- Rule of Law(K4)
- 5.4- Administrative Law(K4)
- 5.5- Formation and Functions of Political Parties –Single Party –Bi-Party-Multi-Party System(K2,K4)
- 5.6- Interest Groups or Pressure Groups(K4)

## Books for Study and Reference:

1. Brij Mohan Sharma, Modern Governments, Asia Publishing House, Mumbai, 1969.
  2. Alan R. Ball, Modern Politics and Government, Macmillan, New Delhi, 1983.
  3. M.H. Syed, Encyclopedia of Modern Governments, Anmol Publisher, New Delhi.
  4. Pon. Thangamani, History of Indian Constitution (A.D. 1773 - 1950), Ponnaiah Pathipagam, Chennai, 2001.
  5. J.C. Johari, New Comparative Governments, Lotus Press, New Delhi, 2000.
  6. N. Jayapalan, Modern Governments, Atlantic Publishers and Distributors, New Delhi, 1999.
  7. Hoveyda Abbas, Ranjay Kumar and Mohammed Aftab Alam, Indian Government and Politics, Pearson, Chennai, 2011.
  8. S.R. Maheshwari, Comparative Government and Politics, Lakshmi Narain Agarwal Educational Publishers, Anupama Plaza, Agra, 2010
  9. Dr.J.Kasthuri, Modern Governments, Asian Printers, Podanur, 2006
  10. C.F. Strong, Modern Political Constitutions, Sidgwick & Jackson Limited, London, 1973
  11. J.C. Johari, Modern Constitutions, New Delhi, S Chand & Co, 1990
- Open Educational Recourses (OER):
1. [https://constitutionnet.org/sites/default/files/what\\_is\\_a\\_constitution\\_0.pdf](https://constitutionnet.org/sites/default/files/what_is_a_constitution_0.pdf)
  2. <https://epgp.inflibnet.ac.in/>
  3. <https://peo.gov.au/understand-our-parliament/how-parliament-works/system-of-government/separation-of-powers/>
  4. <https://www.politicalsciencenotes.com/articles/top-9-functions-of-legislature-discussed/332>
  5. <https://www.politicalsciencenotes.com/articles/8-major-functions-of-judiciary-discussed/350>
  6. <https://www.britannica.com/topic/political-system/The-functions-of-government>
  7. <https://www.msuniv.ac.in/Download/Pdf/8fff414a63fe4c6>
  8. <https://www.politicalscienceview.com/what-are-the-different-types-of-governments/>
  9. <https://constitutionnet.org/country/constitutional-history-united-states-america>

**SEMESTER - III**  
**USHIA321 – SBE: MUSEOLOGY**

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> USHIA321	<b>Title of the Course:</b> Museology	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Paper	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100 40 +60
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**Course Objectives:**

1. This course is aimed to introduce the learners about origin, emergence and concepts of Museology.

**Course Outcomes (COs)**

**After completion of the Museology course the student will able to**

1. Describe about evolution of Museum and Museology
2. Classify the Types and functions of the Major Museums in the world.
3. Define the Nature and scope of Museum
4. Explain the types of museums in Tamil Nadu.
5. Identify the job opportunities for the study of museology.

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	H	L	M	L
<b>CO2</b>	M	H	M	L	H	L
<b>CO3</b>	H	M	M	H	H	L
<b>CO4</b>	H	M	H	M	H	L
<b>CO5</b>	M	L	H	H	M	H

**High-(3), Medium (2), Low (1)**

<b>CO/PSO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	L	H	M	L	L	H
<b>CO2</b>	M	H	L	M	H	L
<b>CO3</b>	L	M	H	L	L	M
<b>CO4</b>	L	H	L	M	H	L
<b>CO5</b>	M	H	L	L	H	M

**High-(3), Medium (2) , Low (1)**

## **Unit I**

- 1.1 .Definitions of Museum and Museography, Museology.
- 1.2. Types of Museums
- 1.3. ICOM Museum's Definition
- 1.4. Classification of Museum
- 1.5. ICOM basis of Museum Classification

## **Unit II**

- 2.1. History of Museum
- 2.2. Museum Collection
- 2.3. Some Major Museums of the World (British Museum, Smithsonian),
- 2.4. Louvre, Hermitage, Topkapi
- 2.5. Role of UNESCO and ICOM in the Development of Museum

## **Unit III**

- 3.1. History of Museum in India
- 3.2. Nature and scope of Museum
- 3.3. Major Museum of India (Indian Museum Kolkata, National Museum, National Museum in Natural History,
- 3.4. Salarjung Museum, Indira Gandhi Rashtriya Manav Sangrahalaya
- 3.5. Challenges faced by Museum

## **Unit-IV**

- 4.1. State Museums of Tamil Nadu
- 4.2. Popular Museums of TamilNadu
- 4.3. Government Museum Chennai
- 4.4. Sections of the Chennai Museum
- 4.5. Functions of the Museum.

## **Unit-V**

- 5.1. New Museology , Concept of Eco Museums,
- 5.2. Para Museums,
- 5.3. Virtual Museum
- 5.4. Musicology as a profession – Works of the Curator
- 5.5. Employment opportunity

**Practical:** Visit to the Museums

## **Book for Study and References**

1. Dilip Kumar Roy, Museology Some Cute Points , Kalpaz Publications, Delhi
2. Usha Agarwal, Museums in India
3. New Museology –You Tube Lecture by Davis Peter
4. Notes from Pathshala , Production Courseware ,e.content.(MHRD)
5. Mandip Kumar Chaurasiya, e. content, Patna University

## Open Educational Resources:

1. <https://www.mindler.com/careerlibrary/social-sciences-humanities/career-in- museology- in-india>
2. <https://www.youtube.com/watch?v=CRsgPfe4JDs>
3. <https://www.youtube.com/watch?v=kXS8RtHILKM>
4. <https://www.youtube.com/watch?v=nszDIT4xv0Y>
5. <https://www.youtube.com/watch?v=B9zDceNSNBM>

## SEMESTER- IV

### UCHIF20-AN OUTLINE HISTORY OF TAMILNADU FROM 1565 TO 1987 A.D

<b>Year:</b> II	<b>Course Code:</b> UCHIF20	<b>Title of the Course:</b> An Outline History of Tamil Nadu From 1565 AD to 1987 A.D	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100 40+60
<b>Sem:</b> IV							

#### Course Objectives:

1. To help the students to understand the South Indian Rebellion.
2. To enable the students to know about the services of Christian Missionaries to Society and Education
3. To make the students to understand the role of Tamil Nadu in Freedom Movement

#### Course Outcomes (CO)

##### After completion of the course the student will able to:

1. Describe the administration of Sethupathis and Thondaiman in the Tamil Region.
2. Trace the events leading to the European settlements in Tamil Nadu and the impact of Colonial administration on the Tamil Society.
3. Analyze the contribution of Christian Missionaries to the Society and Education and its impact to present and visualize the future.
4. Compare the South Indian Rebellion with the Vellore Mutiny.
5. Evaluate the role of Tamil Nadu in the freedom struggle and create respect for freedom, diversity and other constitutional values

CO/PO	1	2	3	4	5	6
CO1	H	L	M	H	L	H
CO2	M	L	H	L	H	H
CO3	H	H	M	L	M	L
CO4	L	M	M	L	H	H
CO5	M	M	H	L	H	H

#### High-(3), Medium-(2), Low (1)

CO/PSO	1	2	3	4	5	6
CO1	L	H	M	L	M	H
CO2	H	M	L	L	L	H
CO3	L	L	M	H	M	H
CO4	H	L	M	L	M	H
CO5	L	M	M	H	H	H

#### High-(3), Medium-(2) , Low (1)

**Unit I:****(18 Hours)**

- 1.1.Sethupathi of Ramnad-- Kuttan Sethupati – Raghunatha Sethupati – hirumalaiSethupathi.(K2)
- 1.2.Raghunatha sethupathi (1671 to 1710 A.D) (K2)
- 1.3.Thondaiman of Pudukkottai.(K
- 1.4.RaghunathaTondaiman(1686-1730A.D)-VijayaRagunathTondaiman- Ramachandra(K2)
- 1.5.Rajas of Sivaganga. (K2) Velu Nachiyar. (K2)

**Unit II:****(18 Hours)**

- 2.1.PortugueseVasco Da Gama-Francisco De Almeida,Afonso-De- Albuquerque.(K1,K2)
- 2.2.Dutch and Danish East India Company.- Tranquebar- Masulipatnam.(K1,K2)
- 2.3.French Settlement in India- Pondicherry, Karaikal. (K2)
- 2.4.English East India Company – Surat- Madras (K1,K2,)
- 2.5.Navayets and Wallajah rule in Arcot. (K2)
- 2.6.Carnatic Wars (K1,K2)

**Unit III:****(18 Hours)**

- 3.1.Veera Pandya Kattabomman- Panchalankurichi-Colin Jackson-(K2)
- 3.2.Pulithevan-career-achievements- Nerkkattum cheval.(K2)
- 3.3.Maruthu Brothers-Kalayarkoil insurrection- SivaGanga.(K2)
- 3.4.South Indian Rebellion- Poligar Leagues.(K2)
- 3.5.Omaiadurai-Palayamkottai.(K2)
- 3.6.Vellore Mutiny-Causes-Course-Results (K2).

**Unit IV:****(18 Hours)**

- 4.1.Revenue administration of TamilNadu under British rule.(K2,K3,)
- 4.2.Social Condition of TamilNadu during British rule.(K2,K5)
- 4.3.Development of Education under British rule.(K2,K5)
- 4.4.Contribution of Christian Missionaries thedevelopmentofTamil Literature.(K2,K4,)
- 4.5.Social Reform Movements In Tamilnadu.(K2,K3)
- 4.6.Religious reform movement in TamilNadu.(K2)

**Unit V:****(18 Hours)**

- 5.1.National Societies. Madras Native Association – Madras Mahajana Sabha.(K2)
- 5.2.Role of TamilNadu in the Freedom Movement.(K2,K5)
- 5.3.Leaders of the Freedom Movement. V.O.Chidambaram- Subramania Bharathiar- Vanchinathan – Subramanian Siva- Satyamoorthy- Rajaji. (K2)
- 5.4.Dravida Kazhagam. – Justice party - EVR- Self Respect Movement. (K2,)
- 5.5.Rise of Dravida Munnetra Kazhagam. C.N. Annadurai – Anti-Hindi Agitation – DMK- ADMK ( K2, K4,)
- 5.6.Socio – Economic and Cultural developments of TamilNadu.(K1,K2,K5,)

**Text Books:**

- 1 Dr.N. Jayapalan – History of TamilNadu – Atlantic Publishers, New Delhi.Books for Study and Reference:

1. Chellam V.T- A. History of Tamil Nadu- Thirumalai Book House, Madras
2. Nilakanta Sastri K.A. – History of South India – Oxford University Press, Amen House, London E.C.4.
3. Krishna Murthi V.M – History of Tamil Nadu – Vijayalakshmi Publications, Neyyor
4. Subramanian N. - History of Tamil Nadu 1336-1565 A.D. – Koodal Publications, Madurai
5. Subramanian N. – History of Tamil Nadu 1956-1984. – Ennes Publication, Udumalpet.
6. Sastri K.A.N. – The Cholas – Madras University, Madras, 1984  
Dr. Meenakshi C. – Administration and Social Life under Pallavas

**Open Educational Resources (OER):**

1. <https://www.britannica.com/place/Tamil-Nadu>
2. <https://www.mapsofindia.com/tamilnadu/history.html>

**SEMESTER IV**  
**UCHIG20- CONTEMPORARY INDIA FROM 1947 TO 2000 A.D**

<b>Year:</b> II <b>Sem:</b> IV	<b>Course Code:</b> UCHIG20	<b>Title of the Course:</b> Contemporary India From 1947 to 2000 A.D	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100 40+60
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**Course Objective:**

1. To help the students to understand the role of Prime Ministers in Policy Making and their International Relations.
2. To help the students to understand the Administration of Indira Gandhi and the impact of Emergency India.
3. To enable the students to understand the various communal riots that arose during the period from 1947 to 2000 A.D.

**Course Outcomes (CO):**

**After completion of the course the student will able to:**

1. Describe the formation of Indian Polity System during the period of Nehru
2. Examine the contribution of Sastri and Indira Gandhi in the Indian political system
3. Analyze the internal development of India during Indira Gandhi and Janata Rule
4. Discuss the various internal development and issues in India during the period of Rajiv Gandhi and V.P Singh
5. Illustrate the role of politics during the period of P.V.Narasimma Rao and BJP Government.

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	H	L	H	M
<b>CO2</b>	H	M	H	L	H	M
<b>CO3</b>	H	M	H	L	H	M
<b>CO4</b>	H	M	H	L	H	M
<b>CO5</b>	H	M	H	L	H	M

**H-High (3) Medium -M (2) L-Low (1)**

<b>CO/PSO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	H	H	H	H
<b>CO2</b>	H	H	H	M	H	H
<b>CO3</b>	H	M	H	M	H	H
<b>CO4</b>	H	M	H	H	H	H
<b>CO5</b>	H	M	H	H	H	H

**H-High (3) Medium -M (2) L-Low (1)**

**Unit I: (18 Hours)**

- 1.1-Nehru Era: -Internal Policy: Refugee Problem-Radcliffe Line -Integration of Princely States Making of the Constitution- Linguistic Reorganization of States-Fazal Commission (K2)
- 1.2-Economic Reforms-Planning Commission- Five Year Plans-Social Legislation- Development of Education (K2)
- 1.3- Foreign Policy- NAM, Panchsheel, (K2)
- 1.4- Sino-Indian War (1962)(K4)
- 1.5- Relationship between India and USA, Pakistan, USSR (K2)
- 1.6- India contribution to World Peace (K2)

**Unit II: (18 Hours)**

- 2.1- Sastri –Food Crisis- Demand for Punjabi Suba-Anti-Hindi Agitation (K2)
- 2.2- Indo-Pakistan War 1965 (K4)
- 2.3- Indira Gandhi- The Economic and Political Developments: Unrest in North East – Demand for Punjabi Suba-Food Crisis- Devaluation of Rupee Demand for Punjabi Suba (K2)
- 2.4- Green Revolution-Foreign Relations:- U.K, U.S.A, U.S.S.R- Indo-Soviet Friendship Treaty of 1971 Indo-Soviet Friendship Treaty (K2)
- 2.5- Farakka Barrage- Katchatheevu Issue(K2)
- 2.6- Birth of Bangladesh (K4)

**Unit III: (18 Hours)**

- 3.1- Indira Gandhi's Second Term- Internal Developments: Pokhran Test-MISA Internal Developments (K2)
- 3.2: The Emergency: The Emergency- Twenty Point Program-Jaya Prakash Total Revolution (K4)
- 3.3- Janata Party-First non-Congress Party-Internal Developments (K2)
- 3.4- Third Term of Indira Gandhi
- 3.5- Third Term of Indira Gandhi –Internal issues (K2)
- 3.6-Punjab Problem and Assassination (K2)

**Unit IV: (18 Hours)**

- 4.1- Rajiv Gandhi- Internal Policy: Anti-Sikh Riots-Bhopal Gas Tragedy-Rajiv –Longowal Accord Internal Policy (K2)
- 4.2-Educational Policy 1986-Economic Policy-Babri Masjid Issue- Panchayat Raj (K3,K4)
- 4.3- Foreign Policy : USA, Pakistan, SriLanka (K4)
- 4.4- Science and Technology Developments (K4)
- 4.5- V.P Singh: Mandal Commission (K2)
- 4.6-Ayodhya Issue (K2)

**Unit V: (18 Hours)**

- 5.1- P.V.Narasimha Rao-Cauvery Water Dispute-Ayodhya Issue-Panchayat Raj-73<sup>rd</sup> Constitutional Act (K2)
- 5.2- 73<sup>rd</sup> Constitutional Act (K2)
- 5.3- P.V.Narasimha Rao-Foreign Policy China, Pakistan, Nepal, Bangladesh (K4)

- 5.4- United Front Internal Policy- BJP Government: Gowda Government –Gujral Government-Foreign Policy: USA, USSR, Pakistan, China,Bangladesh
- 5.5- BJP Government: Pokhran II (K2)
- 5.6- Kargil War (K4)

### **Text Books**

1. K.Venkatesan- History of Contemporary India(1947-2008)-V.C Publications, Rajapalayam-2009

### **Reference Books**

1. Ahulwalla Shashi and Ahluwalia Meenakshi- Profiles of Indian Prime Ministers (Nehru to Narasimaa Rao )-Mittal Publications,New Delhi-1991
2. Chandra Bipin- India Since 1947-Vikas Publishing House Pvt.Ltd., New Delhi
3. Mahajan V.D-History of Modern India (1919-1982), Vol.I and II,1<sup>st</sup> Edition-S.Chand and Company Ltd.,NewDelhi,1983
4. Vasudev Uma- Two Faces of Indira Gandhi- Vikas Publishing House Pvt. Ltd, New Delhi,1992
5. Muni- India's Foreign Policy- Cambridge Press India Pvt.Ltd,2009
6. BipinChandra- Essays on Contemporary India – Har-Anand Publications,edition 2012
7. Savitasingh- Decisive Indian Battles & Wars, Atlantic Publishers, New Delhi, 2015

### **Open Educational Resources (OER):**

1. <https://www.britannica.com/biography/Jawaharlal-Nehru>
2. [http://www.bbc.co.uk/history/historic\\_figures/nehru\\_jawaharlal.shtml](http://www.bbc.co.uk/history/historic_figures/nehru_jawaharlal.shtml)
3. <https://www.britannica.com/biography/Lal-Bahadur-Shastri>
4. <https://www.history.com/topics/india/indira-gandhi>
5. <https://www.britannica.com/biography/Rajiv-Gandhi>
6. <https://www.britannica.com/place/India/V-P-Singhs-coalition-its-brief-rise-and-fall>
7. [https://en.wikipedia.org/wiki/Atal\\_Bihari\\_Vajpayee](https://en.wikipedia.org/wiki/Atal_Bihari_Vajpayee)

**SEMESTER IV**  
**UAMGB20 – ALLIED: MODERN GOVERNMENTS - II**

<b>Year II</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks (100)</b>
Sem: IV	UAMGB20	Modern Government –II	Theory	Allied	5	5	40+60

**Course Objective:**

1. To Study the Principles relating to the Constitution
2. To Understand the Constitution of Various Countries
3. To know the importance of Constitution in day to day life

**Course Outcome:**

**After completion of the course the student will able to:**

1. Understand the Legal Structure of various Constitution
2. List out the principles relating to various Constitutions
3. Comparing and Contrast the Various Constitutions and its impact
4. State the evolution and development of Democracy through various Constitutions
5. Explain the salient features of the various Constitutions

CO/PO	1	2	3	4	5	6
CO1	H	M	M	L	M	M
CO2	H	M	M	L	M	M
CO3	H	M	M	L	M	M
CO4	M	M	M	L	M	M
CO5	M	M	H	L	M	M

**H-High (3) M-Medium (2) L-Low(1)**

CO/PO	1	2	3	4	5	6
CO1	H	H	L	H	M	L
CO2	H	H	M	L	H	M
CO3	M	H	M	L	H	M
CO4	M	H	M	L	H	M
CO5	M	H	M	L	H	M

**H-High (3) M-Medium (2) L-Low (1)**

**Unit I****18 Hours**

- 1.1- An introduction to Constitution of England -Salient features of the English Constitution((K1)
- 1.2- Powers and position of the Crown(K2)
- 1.3- Powers and functions of the House of Lords(K2)
- 1.4- Powers and functions of the House of Commons(K3)
- 1.5- Judicial System.(K4)
- 1.6- Political Party system.(K3)

**Unit II****18 Hours**

- 2.1- An introduction to the constitution of U.S.A -Salient features of the Constitution (K2)
- 2.2- Election of the American President - Powers and functions of the President(K3)
- 2.3- Powers and functions of the Congress –Senate.(K3)
- 2.4- House of Representatives(K2)
- 2.5- Judiciary –Powers of the Supreme Court(K3)
- 2.6- Procedure for amendment of the Constitution(K3)

**Unit III****18 Hours**

- 3.1- An introduction to the Constitution of Switzerland-Salient features of the Constitution (K1)
- 3.2- The Federal Executive (K3)
- 3.3- The Federal Legislature (K3)
- 3.4- The Federal Tribunal (K3)
- 3.5- Direct Democratic Devices (K3)
- 3.6- Purpose of the state. (K2)

**Unit IV****18 Hours**

- 4.1- Constitutions of USSR- Federation (K3)
- 4.2- Salient features of the Constitution (K2)
- 4.3- Presidium- Powers and Functions(K3)
- 4.4- Cabinet Ministry - Federation council.(K3)
- 4.5- State Duma – Powers and the Functions(K2)
- 4.6-Judiciary(K3)

**Unit V****18 Hours**

- 5.1- Constitution of Japan -Salient features of the Constitution(K3)
- 5.2- Mikado- Power and Functions(K3)
- 5.3- Cabinet(K2)
- 5.4- The Diet(K4)
- 5.5- Party System(K3)
- 5.6- Civil Service(K3).

**Text Book**

1. N.Jayapalan, Modern Governments, Atlantic Publishers and Distributors, New Delhi, 2002.

**Books for Reference:**

1. N. Jayapalan, Modern Governments, Atlantic Publishers and Distributors, New Delhi, 2002
2. Alan R. Ball, Modern Politics and Government, Macmillan, New Delhi, 1983.
3. M.H. Syed, Encyclopedia of Modern Governments, Anmol Publisher, New Delhi

4. Pon. Thangamani, History of Indian Constitution (A.D. 1773 - 1950), Ponnaiah Pathipagam, Chennai, 2001.
5. S.R. Maheshwri, Comparative Government and Politics, Lakshmi Narain Agarwal Educational Publishers, Anupama Plaza, Agra, 2010
6. Dr.J.Kasthuri, Modern Governments, Asian Printers, Podanur, 2006
7. C.F.Strong, Modern Political Constitutions, Sidgwick & Jackson Limited, London, 1973 J.C.Johari, Modern Constitutions, New Delhi, S Chand & Co, 1990

**Open Educational Resources (OER):**

2. <https://constitutionnet.org/country/constitutional-history-united-states-america>
3. <https://www.historic-uk.com/HistoryUK/HistoryofBritain/British-Constitution/>
4. <http://soviethistory.msu.edu/1936-2/stalin-constitution/>
5. <https://www.parlament.ch/en/%C3%BCber-das-parlament/how-does-the-swiss-parliament-work/Rules-governing-parliamentary-procedures/federal-constitution>
6. [https://japan.kantei.go.jp/constitution\\_and\\_government\\_of\\_japan/constitution\\_e.html](https://japan.kantei.go.jp/constitution_and_government_of_japan/constitution_e.html)

## SEMESTER IV

### USHIA420 - SKILL BASED ELECTIVE: HISTORY OF VELLORE

<b>Year:</b> II <b>Sem:</b> IV	<b>Course Code:</b> USHIA420	<b>Title of the Course:</b> History of Vellore	<b>Course Type:</b> Theory	<b>Course Category</b> SBE	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100 40+60
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#### Course Outcome (CO):

**After completion of the course the student will able to:**

1. Enumerate the Historical importance of Vellore District
2. Explain the Historical changes and the administration of Nayak and Nawabs to visualize the Future
3. Describe the Administration of British Rule and their impact on Indian Culture
4. Analyze the importance of archaeological research in the historical context
5. Describe the contribution of Christian Missionaries and their services for the upliftment of downtrodden people and to become the agents of social change.

CO/PO	1	2	3	4	5	6
CO1	H	H	M	L	M	L
CO2	H	L	M	L	H	H
CO3	M	M	L	L	H	H
CO4	H	M	M	L	M	H
CO5	H	M	H	L	H	H

**H-High (3) M-Medium (2) L-Low (1)**

CO/PSO	1	2	3	4	5	6
CO1	L	H	H	M	H	M
CO2	M	H	H	M	M	H
CO3	M	H	M	H	M	H
CO4	L	H	H	M	M	L
CO5	H	M	H	H	M	M

**H-High (3) M-Medium (2) L-Low (1)**

#### Unit-I

1.1.Physical Features of Vellore

1.2. Meaning of Vellore

- 1.3. -Stone Age habitat Sites
- 1.4. Stone tool workshop
- 1.5. Archaeological Sites of Vellore

**Unit-II:**

- 2.1. Historical Changes in Vellore
- 2.2. Vijayanagar Empire
- 2.3. Chinna bommi Nayak
- 2.4. Bijapur Sultans- Marathas
- 2.5. Nawab of Arcot

**Unit-III:**

- 3.1. Britishers- Carnatic Wars- Robert Clive
- 3.2. Vellore Revolt
- 3.3. Grievances of Indian Soldiers
- 3.4. Outbreak of the Revolt- Causes- Course
- 3.5. Gillespie's Brutality –Result

**Unit-IV:**

- 4.1. Art and Architecture of Vellore
- 4.2. Jain Caves-Vijayanagar-
- 4.3. Cholas- Pallavas- Arcot Nawabs- Europeans -
- 4.4. Archeological Survey of India Protected Monuments-
- 4.5. Department of Archaeology in Tamil Nadu Protected Monuments- Vellore Museum

**Unit- V**

- 5.1. Socio- Economic Condition of Vellore
- 5.2. Cultural Condition of Vellore
- 5.3. Contribution of Christian Missionaries
- 5.4. Health and Education in Vellore District
- 5.5. Development of Collegiate Education in the District

**Books for study and Reference:**

1. Subramanian N. - History of Tamil Nadu 1336-1565 A.D. – Koodal Publications, Madurai
2. District Statistical handbook-2016-2017
3. District Census handbook
4. Vellore Varalathu Chirappu -M. Gunasekaran, Bharathi Book House, Vellore,2016
5. Varalathil Vellore Kottai , A.K.Seshadri, Shekar Publications
6. Vellore Sepoy Puratchi 200m Andu Niraivu Vizha Malar,

**Open Educational Resources (OER):**

1. [https:// vellore.nic.in](https://vellore.nic.in)

## SEMESTER-V

### UCHIH20 - HISTORY OF EUROPE FROM 1789 TO 1945 A.D

<b>Year:</b> III	<b>Course Code:</b> UCHIH20	<b>Title of the Course:</b> History of Europe From 1789 to 1945 A.D	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 6	<b>Marks</b> 100 40+60
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#### Objectives:

- To help the students to know the causes for the outbreak of French Revolution and its impact in the History of Europe
- To help the students to analyze the various causes for the Outbreak of First and Second World War.
- To enable the students to know about the contribution of the United Nations Organization towards World Peace.

#### Course Learning Outcomes

##### After completion of the course the student will able to :

1. Analyze the results of the French revolution and evaluate its impact in Present day political system and various reforms introduced by Napoleon Bonaparte to become an effective leader
2. Evaluate the causes for the outbreak of Revolution in France and the Contribution of the Congress
3. Describe the Unification of Italy and Germany and the formation of the League of Nations to create respect for basic human values and freedom
4. Describe the role of Hitler and Mussolini in the World War to commit oneself for social Justice
5. Explain the Second World War and the formation of the UNO to create respect for basic human values and freedom

CO/PO	1	2	3	4	5	6
CO1	H	H	M	L	H	M
CO2	H	H	M	L	H	M
CO3	H	H	M	L	M	H
CO4	H	H	H	L	H	M
CO5	H	H	H	L	H	H

**H-High (3) Medium -M (2) L-Low (1)**

CO/PSO	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

**H-High (3) Medium -M (2) L-Low (1)**

**Unit I:****(18 Hours)**

- 1.1: Social Conditions of France –Causes of French Revolution- Social Cause- Contribution of the Intellectuals-political Cause-Economic Cause-American war of Independence (K2, K4)
- 1.2: Course of the French revolution-Convening of Estate General-Fall of Bastille- March of women to Versailles- Formation of national Assembly (K2, k4)
- 1.3.:Second Phase of the Revolution- Reign of terror- works of the national convention- Directory- Results of the French revolution (K2, K4)
- 1.4: Napoleon and First Consul–Early Expeditions-coronation of Napoleon- Continental System of Napoleon (K2, K4)
- 1:5: Napoleon’s Foreign policy- Civilian works (K1, K2)
- 1.6: Estimation and causes for the downfall of Napoleon (K2, K4)

**Unit II:****(18 Hours)**

- 2.1: Congress of Vienna –The purpose of the Congress- Main representatives –the aims -principles of the congress-important decisions of the congress (K2, K4,)
- 2.2: Holy Alliance – Application of the Holy Alliance - Causes for the Failure of the Holy Alliance (K2, K4,)
- 2.3: Concert of Europe- Quadruple Alliance- Congress of Aix-La-Chapelle – Congress of Trappau - Congress of Laibach – congress of Verona-Causes for the failure (K2, K4,)
- 2.4: Metternich- Home Policy- Foreign Policy (K5)
- 2.5: Causes for the outbreak of July Revolution- The importance of July revolution- the effects of July revolution (K2, K4)
- 2.6:The Revolution of 1848- Louis Philippe –course of Revolution-similarities and Dissimilarities of the Revolution of 1830 & 1848 (K2, K4,)

**Unit III:****(18 Hours)**

- 3.1:Unification of Italy-Italy and Vienna settlement- Rise of Mazzini-Young Italy (K2, K4)
- 3.2: Count Cavour- Alliance with Napoleon III-War with Austria-Giuseppe Garibaldi – Victor Immanuel (K2, K4)
- 3.3: Unification of Germany- National Movement-Carlsbad Degree-establishment of Zollverin (K2, K4)
- 3.4:War with Denmark-Austro-Prussian war – The Franco-Prussian War-The treaty of Frankfurt (K2, K4)
- 3.5: First world war- Causes-courses-results –Treaty of Versailles (K2, K4)
- 3.6: Formation of League of Nations – Organs of the League- Contributions of the league –Causes for its failure (K2, K4)

**Unit IV:****(18 Hours)**

- 4.1: Rise of Hitler-Nazi Germany-Home Policy of Hitler (K2)
- 4.2: The foreign Policy of Hitler – Hitler’s Polish Invasion- Spanish Civil war- Policy towards Czechoslovakia – Assault upon Poland (K2, K4)
- 4.3: Rise of Mussolini- Formation of Fascist Party- Achievements of fascist Government (K2, K4)
- 4.4: Mussolini’s pact with the pope -Foreign policies of Mussolini (K2, K4)
- .4.5: Kemal pasha – Social reforms (K2)
- 4.6: Locarno pact- Importance of the pact- Kellogg-Briand Pact ( K2, K4 )

**Unit V:****(18 Hours)**

- 5.1: Causes of Second World War (K2, K4)
- 5.2: Course of the Second World War (K2, K4)
- 5.3: The turn on the Tide- Results of the Second World War (K2.K4)
- 5.4: United Nations Organization- origin- Aims and Objects- Organs (K2.K4)
- 5.5: Special Agencies- Achievements of U.N.O (K2.K4)
- 5.6: Europe after Second world War- Cold war (K2)

**Text Book:**

1. Jayapalan- History of Europe (1789 -1970) – Atlantic Publishers and Distributors, New Delhi, 2000

**Books for study Reference**

1. B.V. Rao- History of Modern Europe (1789-1992) - Sterling Publishers Private Ltd., 2006
2. Charles Downer Hazen- Modern Europe- S.Chand and Company Ltd., 2005
3. David's Mason – A concise History of Modern Europe – Orient Black Swan, Noida,2005
4. K.L.Khurana – World History- Lakshmi Narain Agarwal, Agra, 2017.
5. Dr. Arvind Padhi- Modern World History – Orient Black Swan Private Limited, Hyderabad, 2017
6. Arjun Dev – History of the World – Orient Black Swan Private Limited, Hyderabad, 2017.

**Open Educational Resources(OER):**

1. <https://www.youtube.com/watch?v=VplKoglrPbI>
2. <https://www.youtube.com/watch?v=TizQvIyKAUI>
3. <https://drive.google.com/open?id=18lcN- OVXi1SiYcqr3eAyeHiXI9J0BaIa&authuser=04>
4. <https://www.britannica.com/event/World-War-I>
5. <https://www.britannica.com/event/World-War-II>
- [https://en.wikipedia.org/wiki/United\\_Nations](https://en.wikipedia.org/wiki/United_Nations)

**SEMESTER V**

**UCHII20- HISTORY OF ANCIENT CIVILIZATION (EXCLUDING INDIA)**

<b>Year:</b> III <b>Sem:</b> V	<b>Course Code:</b> UCHII20	<b>Title of the Course:</b> History of Civilization (Excluding India)	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 6	<b>Marks</b> 100 40+60
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**Course Objectives:**

1. To help the students to understand World Civilizations and its development
2. To enable the students to know the Origin and development of Art of Writing
3. To help the students to analyze the contributions of various Civilizations to Art, Religion, Literature and Architecture and Philosophy

**Course Outcomes (COS):**

**After completion of the course the student will able to :**

1. Explain the concepts of Civilizations and analyze critically the contribution of the Egyptian and Sumerian Civilization and their role in offering best to the world
2. Analyze and understand the legacy of Babylonian, Assyrian and Chinese Civilization to the World and enhance entrepreneurial skills and to contribute to the society assuming leadership
3. Compare the Early Civilizations with Modern Civilization and to become the Agents of the Social Change and communicate the ideas and principles of Hebrew, Persian civilization
4. Discuss the beautiful idea and principles in Greek Civilization and critically analyze the legacy of Greek Civilization and gain Knowledge on the contribution of the Philosophers to the World and to become effective leaders and communicators
5. Trace the Contribution of Prominent Kings of Rome to the world and to appreciate their Art and Architecture and to exercise leadership and Teamwork.

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	L	L	M	L
<b>CO2</b>	H	H	L	L	H	H
<b>CO3</b>	H	H	H	L	H	L
<b>CO4</b>	H	H	H	L	H	M
<b>CO5</b>	H	H	M	L	H	M

**H-High (3), M-Medium (2) L-Low (1)**

CO/PSO	1	2	3	4	5	6
CO1	H	H	L	L	M	L
CO2	H	H	H	L	M	H
CO3	H	M	H	H	M	L
CO4	H	H	M	H	H	L
CO5	H	M	H	L	H	L

**H-High (3), M-Medium (2) L-Low (1)**

**Unit I:**

**(18 Hours)**

- 1.1 : Introduction – Human Civilization – Civilization in River Valleys
- 1.2: Egyptian Civilization-River Nile-Socio Life: Society, Dress and Food, Position of Women, Amusements-Religion– Political Life:- Pyramid Age, Feudal Age, The New Empire- Economic life: Agriculture–Crafts-Commerce- (K2)
- 1.3: Art and Architecture of Egyptian- Literature and Hieroglyph (K4)
- 1.4: Sumerian Civilization- Social Life- Economic life- Religious life (K2)
- 1.5: Art and Architecture of Sumerian-Literature- Cuneiform Writing (K4)
- 1.6: Religion (K2)

**Unit II:**

**(18 Hours)**

- 2.1: Babylonian Civilization - Socio- Political, Economic and Religious life (K2)
- 2.2: Arts and Science – Law Code of Hammurabi (K1)
- 2.3:Assyrian Civilization- Society – Government – Religion – Art and Architecture- Military Organization (K2)
- 2.4: Chinese Civilization- Early History-Dynasties (K2)
- 2.5:Legacy of Chinese Civilization (K2)
- 2.6:-Philosophers of Chinese- Taoism-Confucianism (K3)

**Unit III:**

**(18 Hours)**

- 3.1: Phoenician Civilization- Land and People -Political Life-Traders-Alphabets (K2)
- 3.2: Hebrew Civilization -Government-Art and Architecture-Religion-Jehovah-Works of the Prophet (K2)
- 3.3: Literature of Hebrew - The Old Testament-The Talmud-The New Testament (K3)
- 3.4: Persian Civilization– Society- Politics (K2)
- 3.5: Administration of Persian-Government of Darius- Art, Architecture and Literature (K3)
- 3.6: Zoroastrianism and its Teaching (K3)

**Unit IV:**

**(18 Hours)**

- 4.1: Greek Civilization- Ancient Greece – History of Ancient Greece-Social and Economic Life of Greek (K2)
- 4.2: Legacy of Greek:-Art and Architecture, Literature, Science, Philosophers: Socrates- Plato- Aristotle (K4)
- 4.3: Democracy of Athens – The Code of Drace-Solon’s Reforms-Cleisthenes Reforms- Age of Pericles-Spartan Government (K3)
- 4.4:Legacy of Greek Arts – Religion, Literature, Architecture and Philosophy of Greek (K3)

4.5: Alexander and Hellenistic Civilization- Government and Society-Economy- Education-Philosophy- Science (K3)

4.6: Science (K3)

### **Unit V:**

**(18 Hours)**

5.1: Ancient Rome and Roman Government –Roman Republic and Carthage-Julius Caesar-Augustus Caesar-Constantine (K2)

5.2: Society-Economic and Religion and their contribution

5.3:Golden Age of Rome: Art, Architecture, Literature (K2)

5.4: Roman Law-Causes for the fall of Roman Empire (K1)

5.5: Rise and Spread of Christianity-Jesus Birth- Principles- Death of Christ (K2)

5.6: Rise of Papacy-Organisation of Churches (K4)

### **Text Books**

1. Dr. R.K. Jha – History of World Civilization – Bhasker Publications; Kanpur, 2012.

### **Reference Books**

1. Gokhale B.K. – Introduction to Western Civilization – S. Chand and Company,1984.
2. Swain J.K. – A History of World civilization – S. Chand and company, New Delhi 1947.
3. Wall Bank and Taylor – Civilization : Past and Present – Chicago company
4. Manoj Sharma – History of World civilization – Annual Publication, New Delhi 2005.
5. R.K. Majumdar & A.N. Srivastva - - History of world civilization- SBP Publisher and Distributors, Delhi – 1994
6. Dharam Singh - Ancient & Modern Civilization – Alfa Publication – 2008.

### **Open Educational Resources (OER):**

1. <https://www.history.com/topics/ancient-history/ancient-egypt>
2. <https://www.history.com/topics/ancient-middle-east/mesopotamia>
3. <https://www.ancient.eu/china>
4. <https://www.britannica.com/place/Phoenicia>
5. <https://www.britannica.com/topic/Hebrew>
6. <https://www.history.com/topics/ancient-middle-east/persian-empire>
7. <https://www.britannica.com/place/ancient-Greece>
8. <https://www.britannica.com/place/Roman-Empire>
9. <https://courses.lumenlearning.com/suny-hccc-worldhistory/chapter/the-rise-of-christianity/>

**SEMESTER- V**  
**UCHIJ20 - INDIAN ARCHAEOLOGY**

<b>Year:</b> III <b>Sem:</b> V	<b>Course Code:</b> UCHIJ20	<b>Title of the Course:</b> Indian Archaeology	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100 40+60
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**Course Objective:**

1. To help the students to understand the contribution of Western Archeologists to Archaeology.
2. To enable the students to assimilate the knowledge on Scientific Excavation Methodology.
3. To help the students to identify the major Archeological sites in Tamilnadu to develop interest in Archeological Research.

**Course Outcomes (COS)**

**After completion of the course the student will able to :**

1. Explain the contribution of Western Archaeologist in the field of Indian Archaeology
2. Apply the Scientific Techniques and Method of Excavation
3. Compare the Stone Age and Megalithic Culture in India and understand the past life of the people.
4. Trace the origin and development of Numismatics, Paleography and Epigraphy and enhance their historical research.
5. Possess the knowledge of the excavated sites in Tamil Nadu and growth of Museums

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	M	H	L	L
<b>CO2</b>	M	H	M	H	L	H
<b>CO3</b>	M	H	M	H	L	M
<b>CO4</b>	M	M	H	L	M	H
<b>CO5</b>	H	M	M	L	M	H

**H-High (3), M-Medium (2) L-Low (1)**

<b>CO/PSO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	L	M	H	H	M	L
<b>CO2</b>	L	H	H	M	M	L
<b>CO3</b>	H	M	M	L	M	H
<b>CO4</b>	M	H	M	M	H	H
<b>CO5</b>	L	H	M	H	M	H

**H-High (3), M-Medium (2) L-Low (1)**

**Unit I :**

**(18 Hours)**

- 1.1.Nature and Scope of Archaeology (K2)
- 1.2..History of Archaeology in India-Kalhana-Muslim Historiography (K2)
- 1.3.The Asiatic Society-Sir William Jones and Epigraphical Studies-Charles Wilkins

- 1.4.The Department of Archaeological Survey-James Prinsep-Alexander Cunningham (K2)
- 1.5.The Discovery of Indus Valley Civilization-Lord Curzon-Sir John Marshall (K2)
- 1.6..Arikamedu Excavation-Mortimer Wheeler (K2)

**Unit II: (18 Hours)**

- 2.1.Site Survey Methods-Locating the Site- Pre-requisite of Archaeologist-Selection of Site. (K2)
- 2.2.ExcavationMethods-Preparation-Mapping-DatumPoint-Stratification-Scientific Methods.(K2)
- 2.3.Recording Methods-Site notebook-Find tags-Artifact tag-Burial Report.(K2,K3)
- 2.4.Preservation Methods-Typology-Archaeological Culture.(K2,K3)
- 2.5.Site Survey Techniques-Site discovery- Dating Methods.(K2, K3,K4)
- 2.6.Dating Methods-Absolute-Relative Chronology. (K2, K3, K4)

**Unit III: (18 Hours)**

- 3.1.Geological Ages- Pleistocene Epoch- Holocene Epoch. (K2)
- 3.2.Old Stone Age-Core & Flake Tool technique- Handaxe Clever Industry. (K2)
- 3.3.Middle and Later Stone Age- Nevasian Culture.(K2)
- 3.4.The Harappa Civilization.- Uniformity-Town Planning-Seals- Religion- Burial Customs-(K2)
- 3.5.Neolithic Culture of India-Eastern Group- North Western Group- Southern Group. (K2)
- 3.6.The Megalithic Period of India- Development of Megalithic Culture in South India. (K2)

**Unit IV: (18 Hours)**

- 4.1.Numismatics -Evolution of Coinage- Techniques (K2)
- 4.2.Study of Pottery- Painted Grey Ware- Northern Black Polished Ware- Roman Pottery (K2)
- 4.3.Paleography Origin of writing- Hieroglyphics- Indus Script- Brahmi Script (K2)
- 4.4.Epigraphy- Asokan Inscriptions- Inscriptions of South India (K2)
- 4.5. Inscriptions of South India- Pallavas, Cholas, Pandyas and Vijayanagar Empire (K2)
- 4.6. Indus Script (K2)

**Unit V: (18 Hours)**

- 5.1.Arikamedu-Mortimer Wheeler- Roman pottery (K2)
- 5.2.Adichanallur-Dr.Jogar- UrnBurials- Prehistoric stone tools (K2)
- 5.3.Kodumanal- Megalithic Culture- Prehistoric stone row (K2)
- 5.4.Keeladi.- Sangam Period settlements (K2)
- 5.5.Growth of Museum in India- Musicology (K2)
- 5.6.Preservation of Artifacts- Treatment Methods-Chemical-Electrochemical Methods (K2)

**Text Books:**

1. Dr.K.Venkataraman - Indian Archaeology (A Survey)-Ennes Publications, Udumalpet- 2005

### **Books for Study and Reference:**

1. John Marshall- Indus Valley Civilization-Asian Educational Service, New Delhi Madras
2. Ray Himansha Prabha-Colonial Archaeology in South India- Oxford University Press India,2008  
K.V.Raman-Principles and Methods of Archaeology- Partharajan Publications Triplicane, Chennai
3. R.Venkatraman-Indian Archaeology(A Survey)-Ennes Publications,Udumalpet-2005
4. K.S.Ramachandran-Archaeology at South India(Tamil Nadu)- SundeepPrakashan,New Delhi
5. D.K.Roy- Museology- Kalpaz publication, Satyawathi Nagar, New Delhi
6. Sri Subrahmanya Smrti-Essays on Indian Pre-History, Proto- History, Archaeology, Iconography, Art, Architecture Epigraphy, Numismatics, Crafts and Conservation- Sundeep Prakashan, New Delhi
7. Mishra P.K- Research in Archeology and Conservation- Sundeep Prakashan, KarolBagh, New Delhi,1999

### **Open Educational Resources (OER):**

1. <https://archive.org/details/in.gov.ignca.53198>
2. [http://nmma.nic.in/nmma/nmma\\_doc/Indian%20Archaeology%20Review/Indian%20Archaology%201961-62%20A%20Review.pdf](http://nmma.nic.in/nmma/nmma_doc/Indian%20Archaeology%20Review/Indian%20Archaology%201961-62%20A%20Review.pdf)
3. [https://shodhganga.inflibnet.ac.in/bitstream/10603/155124/25/25\\_general%20bibliography.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/155124/25/25_general%20bibliography.pdf)
4. [http://www.digitalbookindex.org/\\_search/search010archaeologya](http://www.digitalbookindex.org/_search/search010archaeologya)

## UEHIC20-ELECTIVE: II A- WOMEN'S STUDIES

<b>Year:</b> III	<b>Course Code:</b> UEHIC20	<b>Title of the Course:</b> Women's Studies	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100 40+60
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### Course Objective:

1. To help the students to understand the status of women through the ages.
2. To make the students know the origin, growth of Feminism and their legal rights.
3. To enable the students to evaluate the contribution of Eco-Feminists and Environmentalists.

### Course Outcomes:

**After completion of the course the student will able to :**

1. Describe the status of Women through the ages
2. Criticize the evolution of Women's rights and its impact in the life of every woman
3. Explain the importance of the international Women's Conference and National Commission for Women in India.
4. List out the Central and State Government policies and schemes for women in India and make it known
5. Discuss the role of eco-feminist and Women Environmentalists in sustainable Development

CO/PO	1	2	3	4	5	6
CO1	H	M	M	L	M	M
CO2	H	M	M	L	M	L
CO3	H	M	M	L	H	M
CO4	H	M	M	L	M	M
CO5	H	H	M	L	H	M

H-High (3) M-Medium (2) L-Low (1)

CO/PO	1	2	3	4	5	6
<b>CO1</b>	M	M	L	L	H	H
<b>CO2</b>	M	M	H	L	H	H
<b>CO3</b>	M	M	H	L	H	H
<b>CO4</b>	M	M	H	L	H	M
<b>CO5</b>	M	L	L	H	H	M

H-High (3) M-Medium (2) L-Low (1)

**Unit-I****(18 Hours)**

- 1.1- Status of Women in Vedic Period- Grihapati- Education-Marriages- Aim and Significance of Marriage- Polygamy- Artangini (K2)
- 1.2-Epic Period - Manu Dharma- Kargi- Maiterye -Brahmmavadins -Types of Marriages- Approved Marriages- Unapproved Marriages- Swayambara- Polyandry- Widows Condition (K2, K4)
- 1.3-Sangam Age- Virtues of Women- Sports- Education- Avvaiyar- Kakkaiapadiniyar- Vellivithiyar- Noble qualities of Women- Worship- Husband and Wife Relationship- Chastity- Mudirmagalir- Kalamthoda Magalir- Urimai Magalir,
- 1.4- Position of Women in Medieval Period- Social Evils of the Society- Sati- Widows Condition- Devadasi system- Education- (K2, K4)
- 1.5-Modern Period- Post Independence Period- - Social Reforms- Raja Ram Mohan Roy- Eswar Chandra Vidyasagar- Abolition of Sati Act- Widows Remarriage Act- Sarada Act- Female Infanticide Act(K2)
- 1.6- Dowry Prohibition Act- Pre Independence Period- Women Education- Barriers of Women in India – Discrimination-Harassment- Humiliation- Exploitation (K2 , K4)

**Unit II:****(18 Hours)**

- 2.1- Feminism-Origin - Definition- Growth and Meaning- Big Fives-Theories of Feminism – Capitalist Theory- Socialist Theory- Right to Vote-Liberal Theory- Marxist Theory- Radical Theory (K2, K4)
- 2.2-Women's Liberation Movements- Bharat Mahila Parishad- Bharat Stree Mandal- Women's India Association- All India Women's Conference- Kasturba Gandhi National Memorial Trust (K2)
- 2.3-Women's Rights- Right to Property Act- The Hindu Succession Act -Right to Marriage Act - Right to Divorce- Right to Remarriage- Right to Education (K2, K4)
- 2.4- Marital Laws in India- Christian Marriage Act- Muslim Marriage Act- Divorce- Legal Rights – Legal Protection of Women-Family Courts- Prohibition of Domestic Violence Act- Child Marriage Prohibition Act- (K4)
- 2.5-Women and Law- Abolition of Sati Act-Widow Remarriage Act- The Special Marriage Act- Sharada Act- Hindu Women Right to Property Act- The Hindu Marriage Act- Dowry Prohibition Act (K2,K4)
- 2.6- Women and Occupation- Indecent Representation on Women (Media)- Labour Laws- Working hours- Equal Pay for Equal Work- Maternity Benefits- Sexual Harassment at Work place- Women in Public Life- Prohibition of Eve Teasing –POCSO Act (K4)

**Unit III:****(18 Hours)**

- 3.1-International Women's Conferences (Vienna Declaration, Beijing Conference,) - International Women's Year (IWY)-Recommendations of IWY (K2, K4)
- 3.2- Convention for Elimination for all forms of Discrimination (CEDAW) -UN Decade for Women in India- Social Welfare Department- Health-Primary Health Centre-(K2, K4)
- 3.3-Health Issues for Women- Communicable Disease-Malnutrition- Social Justice for Women- Millennium development Goals (K2)
- 3.4- Third International Women's Conference-Eradicate extreme Poverty and Hunger- Gender Equality- Control HIV/AIDS (K4)
- 3.5-National Commission for Women (NCW)-Awareness Programs- Legal Rights- Speedy Remedy-

Paravarik Mahila Lok Adalat- Suo Moto (K2)

3.6-NCW Library- Seminars, Workshops- Conference-Evaluate the Progress of Women's development in India and Plan of action- (K2)

**Unit IV:**

**(18 Hours)**

4.1-Governments' Policy on Women-National Policy for Women- Five Year Plan- Reservation- Judicial Legal System- Decision Making- Economic Policy-Social Empowerment of Women- Health – Education- Nutrition- Water and Sanitation (K2, K4)

4.2-Central Government Schemes for Women- Women and Education- Sukanya Samrdi Yojana- National Pension Scheme for destitute woman's and widows- Old Age Pension Scheme- Annapurna- Swadargarh(K4)

4.3-Peti Pacho Peti Podo- One Stop Centre Scheme-Women Helpline Number- Ujjwala- Support to Training and Employment Programme for Women (STEP)- Working Women Hostel (K2, K4)

4.4-State Government Policies- Marriage Assistance Scheme – Maternity Benefit Schemes

4.5-Educational Schemes and Scholarships- Mahalir Thittam- Self Help Groups (SHG)- Cradle baby Scheme- (K2, K4)

4.6-Girl Child Production Scheme- Working Women's Hostels- Vocational Training Program for Rural and Urban women's- Health Facilities- Primary Health Centers- (K2)

**Unit- V:**

**(18 Hours)**

5.1- Eco-Feminism- Definition- Eco- Feminism in Indian historical perspective-Religious customs and Festivals related to Eco -Feminism- Vriksha Devata- Temple of Peace(K2, K4)

5.2-Vanmaha Utsav-Ecological Movements initiated by women – Chippko Movement- Women Tree Huggers- Chandi Prasad Bhatt- Appiko Movement-Impact of Exploiting Forest (K2)

5.3- Green Belt Movement- Wangari Maathai- Nobel Peace Prize(K2)

5.4-Navdanya Movement- Vandhana Shiva- Training for Organic Agriculture- Freedom Zones- Biopiracy- Bija Vidyapeeth (K2)

5.5-Women Environmentalists- Mei Ng- Vandana Shiva- Wangari Mutta Mathai- Maria Cherkasova- Rachel Carson- Jane Goodall (K2)

5.6-Mehta Patkar- Sugata Kumari- Gauri Devi-Sunita Narain- Menaka Gandhi-Dr. Vanaja Ramprasad. (K2)

**Text Books:**

1. Mary E. John-Women's Studies in India-Penguin Books Ltd, London,2008

**Books for study and Reference:**

1. M.J. Antony-Women's Rights-Hind Pocket Books, New Delhi,1989
2. Dr. Anitha Arya-Indian Women –Gyan publishing House, New Delhi,2000
3. Mary E. John-Women's Studies in India-Penguin Books Ltd, London,2008
4. V. Janapathy- Indian Women Through the Ages -Gyan publishing House, New Delhi,2002
5. Geraldine Forbes-Women in Modern India-Cambridge University Press, 1999

**Open Educational Resources (OER):**

1. <https://edugeneral.org>
2. <https://www.legalserviceindia.com>

3. <https://www.unwomen.org>
4. <https://en.unesco.org><https://www.navdanya.org>
5. <https://wcd.nic.in>
6. <https://www.tnsocialwelfare.org>

**SEMESTER-V****UEHIC20- ELECTIVE II B: INTELLECTUALS OF INDIA**

<b>Year:</b> III <b>Sem:</b> VI	<b>Course Code:</b> UEHIC20	<b>Title of the Course:</b> Intellectuals of India.	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100 40+60
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**Course Objective:**

1. To help the students to create awareness among the role of leaders in the Nation formation.
2. To enable the students to understand their struggle and sacrifice in nation building.
3. To help the students to possess knowledge of their thoughts and values.

**Course Outcomes (COS)****After completion of the course the student will able to :**

1. Describe the contribution of social intellectuals in the field of social reformation.
2. Explain the political intellectuals and form to become effective leaders.
3. Compare the contribution of women intellectuals and analyze its impact to present and visualize the future.
4. Evaluate the scientific and Economic intellectuals and their contribution in nation building.
5. Possess the knowledge of the role played by the intellectuals in TamilNadu.

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	L	M	L	M	L
<b>CO2</b>	M	L	H	L	H	H
<b>CO3</b>	H	H	M	L	H	M
<b>CO4</b>	M	H	L	L	M	H
<b>CO5</b>	H	L	M	L	M	L

**H-High (3), M-Medium (2) L-Low (1)**

<b>CO/PSO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	L	M	H	M	M	H
<b>CO2</b>	L	L	M	H	H	M
<b>CO3</b>	H	M	M	H	M	M
<b>CO4</b>	L	M	H	H	M	M
<b>CO5</b>	L	L	M	H	H	M

**H-High (3), M-Medium (2) L-Low (1)****Unit I:****(18 Hours)**

- 1.1.Raja Ram Mohan Roy-Brahmo Samaj (K2)
- 1.2.Swami Dayananda Saraswathi- Arya Samaj (K2)

- 1.3.Ishwar Chandra Vidyasagar-Bengal Renaissance (K2)
- 1.4.Jyothibai Phule- Satyashodhak Samaj (K2)
- 1.5.Swami Vivekananda- Ramakrishna Mission-Sir Syed Ahmed Khan-Western- style Scientific Education (K2)
- 1.6.Mother Teresa- Missionaries of Charity Calcutta (K2)

**Unit II:**

**(18 Hours)**

- 2.1.Bal Gangadhar Tilak- Indian Independence Movement.(K2)
- 2.2.Gopal Krishna Gokhale- Servants of Indian Society (K2)
- 2.3.Gandhi-Indian National Congress.(K2)
- 2.4.Vallabhai Patel.-Contributions in Post Independence India (K2)
- 2.5.Nehru- Non-Aligned Movement.(K2)
- 2.6.B.R.Ambedkar- Indian Constitution- Subash ChandraBose- Indian National Army- (K2)

**Unit III:**

**(18 Hours)**

- 3.1.Begum Hazrat Mahal- Indian Rebellion of 1857-(K2)
- 3.2.Savitribai Phule- Women's Education. (K2)
- 3.3.Madam Cama- Mother of Indian Revolution- Kasturba Gandhi-Indian Freedom Struggle. (K2)
- 3.4.Sarojini Naidu- Indian National Congress- Muthulakshmi Reddy- Nationalist Feminism (K2)
- 3.5.Vijayalakshmi Pandit- Indian Diplomat- Sucheta Kriplani- Freedom Movement.( K2)
- 3.6.Durgabai Deshmukh- Women's Emancipation.(K2)

**Unit IV:**

**(18 Hours)**

- 4.1.Srinivasa Ramanujan-Substantial contribution to Maths.(K2)
- 4.2.C.V.Raman- Discovery and Invention-Homi Jehangir Bhabha- Indian Nuclear Programme.(K2)
- 4.3. Swaminathan- Green Revolution (K2)
- 4.4.APJ Kalam – Ballistic Missile and Launch Vehicle. (K2)
- 4.5.Man Mohan Singh – Indian Economist- Amartya Sen – Human Development Theory.(K2)
- 4.6.Raghuram Rajan- International Monetary Fund.(K2)

**Unit V:**

**(18 Hours)**

- 5.1.E.V.Ramaswamy- Self Respect Movement. (K2)
- 5.2.Rajagopalachari-Swatantra Party. (K2)
- 5.3.Kamaraj – K1 Plan- Kakkan- Indian National Congress.(K2)
- 5.4.C.N Annadurai- Social Reforms.(K2)
- 5.5.M.Karunanidhi- M.G.Ramachandran- Political Reforms.(K2)
- 5.6.J.Jayalithaa- Women Empowerment (K2)

**Text Books:**

K.S.Padhya- Indian Political Thought, PHI Learning Limited 2017

**Books for study and Reference:**

1..B.B.Majumdar -History of Political Thought from Ram Mohan to Dayanand. A History of Indian Social and political ideas,1971

2. Vishnoo Bhagwan- Indian political Thinkers, Atma Ram & Sons Delhi 1996
3. Dr. Anitha Arya-Indian Women –Gyan publishing House, New Delhi, 2000
4. V. Ganapathy- Indian Women Through the Ages -Gyan publishing House, New Delhi, 2002
5. Geraldine Forbes- Women in Modern India- Cambridge University Press, 1999
6. Naidu, B.N- Intellectual History of Colonial India, Rawat publication, New Delhi 1996
7. Bipin Chandra- Modern India, NCERT, New Delhi, 1976
8. Emerald Treasury of the Great Leaders of India, Vol-I
9. John Gilbert, G.-Contemporary History of India, Anmol Publications, New Delhi, 2003
10. Sumit Sarkar, Modern India, Macmillan, New Delhi, 2004.
11. Grover B.L., and Grover S., A New Outlook of Indian History, S. Chand & Co., New Delhi, 2004.
12. K.S. Padhya- Indian Political Thought, PHI Learning Limited 2017

**Open Educational Resources (OER):**

1. <https://www.jstor.org/stable/41854530?seq=1>
2. <https://www.classcentral.com/course/swayam-3.introduction-to-modern-indian-political-thought-17663>
4. <https://timesofindia.indiatimes.com/blogs/indic-positive/indian-intellectuals-the-new-rudalis-of-india/>

**USHIB520- SKILL BASED ELECTIVE V: INTRODUCTION TO  
COMPETITIVE EXAMINATION**

<b>Year:</b> III	<b>Course Code:</b> USHIB520	<b>Title of the Course:</b> Introduction To Competitive Examination	<b>Course Type:</b> Theory	<b>Course Category</b> SBE	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100 40+60
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**Course Objective:**

- History for Competitive Examinations Helps the Students to know the Intelligence and Assessment in Competitive Examinations

**Course Outcomes:**

**After completion of the course the student will able to:**

1. Define Ancient, Medieval and Modern India.
2. Discuss about the Geography, Economy of India and its impact in the development of India
3. List the role of students in preservation of Heritage Sites of India.
4. Evaluate the Basics of Computer and apply in day today career advancement
5. Discuss the Memory and Inductive Reasoning for Current Affairs and its significance for competitive exams.

CO/PO	1	2	3	4	5	6
CO1	H	M	M	L	M	L
CO2	H	M	M	H	L	M
CO3	H	L	M	M	L	M
CO4	H	M	M	L	L	M
CO5	H	L	M	L	M	L

**H-High (3) M-Medium (2) L-Low (1)**

CO/PO	1	2	3	4	5	6
<b>CO1</b>	H	H	M	L	H	H
<b>CO2</b>	L	M	M	H	H	M
<b>CO3</b>	M	M	L	L	H	H
<b>CO4</b>	L	M	L	L	H	L
<b>CO5</b>	M	H	M	L	H	M

**H-High (3) M-Medium(2) L-Low(1)**

## **Unit I**

Introduction to Competitive Examinations (Central Government and State Government Examinations)  
(K1.K4)

## **Unit II**

- 2.1-Indian Basic Economy-Planning
- 2.2 -Wildlife Sanctuaries in India and
- 2.3- National Parks in India
- 2.4 – Important Tourists Centers in India &
- 2.5 Tamil Nadu(K1,K2,K3)

## **Unit III**

- 3.1Inventions and Discoveries
- 3.2-UNESCO Heritage Sites in India
- 3.3- Important Days and Dates
- 3.4-Countries and their Capitals
- 3.5- Important Books and Authors(K2,K4)

## **Unit IV**

Basic information about Computer-Microsoft Word- Microsoft Power Point Presentation(K2,K4)

## **Unit V**

- 5.1:Current affairs- International, National and State
- 5.2 - Sports and Games
- 5.3-Awards
- 5,4 – Empowerment of Women
- 5.5- Welfare Oriented Government Schemes(K2,K4)

### **Text Books:**

1. Laxmikanth .,Indian Polity., Tata McGraw Hills Series., Third Edision,New Delhi.2013.
2. Majumdar .R.C., An Advanced History of India, Mac Millan
3. Bipin Chandra – India after Independence 1947-2000, Penguin Books, New Delhi ,1999
4. Krishna Reddy- History of India, M.C. Grow hill Education Pvt. Ltd. Chennai,2012
5. TNPSC Exams Group II – V.V.K. Suburasu –Sura’s Publications, Chennai,2016
6. Manorama Year book

### **Open Educational Resources (OER):**

1. <https://www.gktoday.in/>
2. <https://www.recruitmentresult.com>
3. <https://www.tnpscportal.com>
4. <https://www.kalvisolai.com> www.jagranjosh.com,

**SEMESTER VI**  
**UCHI20- HISTORY OF JAPAN UPTO 1990 A.D**

<b>Year:</b> III	<b>Course Code:</b> UCHI20	<b>Title of the Course:</b> History of Japan from 1853 to 1990 A.D	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100 40+60
<b>Sem:</b> VI							

**Course Objective:**

1. To help the students to know the Early History of Japan
2. To enable the students to understand the opening the Door to the west and its impact.
3. To help the students to evaluate the rise of Militarism and the role of Japan in First and Second World War.

**Course Outcomes (COS):**

**After completion of the course the student will able to :**

1. Describe the Early History of Japan for the betterment of Future
2. Discuss the contact of Japan with the European Countries to build relationship with diverse group
3. Analyze the Emergence of Japan as the World Powers and became the agents of Social Change.
4. Examine the Japanese identity during the World War I and II and its impact to present and to visualize the future
5. Illustrate the post war development of Japan and their relationship with diverse groups.

CO/PO	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	H	L	H	M
CO3	H	H	H	L	H	H
CO4	H	H	M	L	H	H
CO5	H	H	H	L	H	M

**H-High (3), M-Medium (2) L-Low (1)**

CO/PSO	1	2	3	4	5	6
CO1	H	M	H	H	M	M
CO2	H	H	H	M	M	M
CO3	H	M	H	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**H-High (3), M-Medium (2) L-Low (1)**

**Unit I:**

**(18 Hours)**

- 1.1: Early Japan- their History- Geographical Feature (K1)
- 1.2: Rise of Feudalism-Attempts at Reforms-Influence of Feudal (K2)

- 1.3: Fujiwara Family and their rule (K2)
- 1.4: Shogunate and Dual Government (K2)
- 1.5: Tokugawa Family and their rulers (K2)
- 1.6: Decline of Shogun (K1)

**Unit II:**

**(18 Hours)**

- 2.1: Opening of the Japan to the West- Perry Mission-Treaty of Kanagawa-Harris Treaty (K2)
- 2.2: Meiji Restoration--Five articles of Oath-End of Feudalism (K2)
- 2.3:Constitution of Japan 1889-Diet- Rights (K3)
- 2.4: Industrial and Economic Progress-Education Reforms -Military Reforms (K3)
- 2.5: Relation with Korea- Treaty of Kanghai (K2)
- 2.6:Treaties of Japan (K2)

**Unit III:**

**(18 Hours)**

- 3.1: Rise of Militarism (K2)
- 3.2:Sino-Japanese War-Causes and Course of the War (K2)
- 3.3:Treaty of Shimonoseki (K1)
- 3.4 :Anglo-Japanese Alliance-Circumstances- Alliance (K2)
- 3.5: Russo-Japanese War-Causes-Course (K2)
- 3.6: Treaty of Portsmouth (K1)

**Unit IV:**

**(18 Hours)**

- 4.1: Japan and First World War - Paris Peace Conference-Treaty of Versailles-Lansing Ishii Agreement (K4)
- 4.2: 21 Demands of Japan (K2)
- 4.3: Washington Conference-The Four Power Treaty-The Five Power Treaty-The Nine Power Treaty (K4)
- 4.4: Tanaka Memorial (K2)
- 4.5: Manchurian Crisis –Naamura incident-Manchurian Invasion-Sangai War-Creation of Manchuko-Development of Manchuko (K2)
- 4.6: Second Sino Japanese War-Ho-Umetzu Agreement-Lokouchiao Incident (K2)

**Unit V:**

**(18 Hours)**

- 5.1: Japan and Second World War-Rome-Berlin-Tokyo Axis (K4)
- 5.2: Pearl Harbour Attack-Hiroshima-Nagasaki-Surrender of Japan (K2)
- 5.3: Allied Occupation-Aims of the Occupation (K4)
- 5.4: New Constitution of 1947- Treaty of San Francisco (K2)
- 5.5: Reconstruction of Japan-Political, Economic and Social Changes (K2)
- 5.6: Japan and Post War Development (K4)

**Text Books**

1. ShivKumarJain-History of Far East in Modern Times-S.Chand and Company Ltd.,

**Reference Books**

1. S.L.Roy- Short History of the Far East
2. Clyde and Bears-The Far East- Prentice Hall of India Ltd.,
3. M.D.David-History of Modern Japan-Himalayan Publishing House
4. A.K.Singh-History of Japan in Modern Times, Surjeet Publications,2006
5. Kenneth Henshall-A History of Japan from Stone Age to Superpower-Palgrave Macmillan 2<sup>nd</sup> Edition ,2004

**Open Educational Resources (OER):**

1. <https://www.britannica.com/place/Japan/History>
2. <https://www.britannica.com/event/Tokugawa-period>
3. <https://www.britannica.com/place/Japan/The-fall-of-the-Tokugawa>
4. <https://www.britannica.com/event/First-Sino-Japanese-War-1894-1895>
5. <https://www.history.com/this-day-in-history/japan-gives-ultimatum-to-germany>
6. <https://www.britannica.com/place/Japan/World-War-II-and-defeat>  
<https://www.britannica.com/event/occupation-of-Japan>

## SEMESTER- VI

### UCHIL20 -THE HISTORY OF UNITED STATES OF AMERICA FROM 1776 TO 1965 A.D

<b>Year:</b> III	<b>Course Code:</b> UCHIL20	<b>Title of the Course:</b> The History of United States of America from 1776 to 1965	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100 40+60
<b>Sem:</b> VI							

#### Course Objectives:

1. To help the students to understand the Causes for the Discovery of America, the creation of new colonies and the American War of Independence.
2. To assimilate the knowledge of Westward Expansion, Manifest Destiny and Monroe Doctrine
3. To enable the students to understand the role of America in the First and the Second World War.

#### Course Outcome (CO)

##### After completion of the course the student will able to :

1. Explain the causes for the American War of Independence and understand the key concepts of American Constitution and to stand for Social Justice
2. Evaluate the various causes led for the outbreak of War of 1812 and effectively communicate the ideas of Monroe Doctrine ,Westward Expansion and Manifest Destiny and stand for the sustainable development of the society
3. Appraise the role played by Abraham Lincoln in Civil war to create respect for equality, freedom and respect for diversity and exercise leadership and Team Spirit
4. Analyze critically the foreign and domestic policy of Theodore Roosevelt, Woodrow Wilson, Calvin Coolidge and understand the key concepts of their administration and to emulate positive social values .
5. Assess the role of F.D Roosevelt with the implementation of New Deal during depression and commit oneself for Social justice, social values and sustainable development

CO/PO	1	2	3	4	5	6
CO1	H	H	L	L	H	M
CO2	H	H	H	H	L	M
CO3	H	H	M	L	H	M
CO4	H	H	M	L	H	M
CO5	M	H	M	H	H	H

**H-High (3), M-Medium (2) L-Low (1)**

CO /PSO	1	2	3	4	5	6
CO1	M	H	H	M	M	L
CO2	H	H	M	L	M	L
CO3	H	M	H	H	H	M
CO4	H	H	H	L	H	M
CO5	H	M	M	L	H	L

**H-High (3), M-Medium (2) L-Low (1)**

**Unit I****(18 Hours)**

- 1.1 Causes for Colonization -Christopher Columbus- Voyages of Columbus-Discovery of America (K1, K2,)
- 1.2 New England Colonies-Proprietary Colonies (K1, K2)
- 1.3. American war of Independence- Causes –Grenville Measures- Townshend Duties (K2, K4)
- 1.4Events of the War- Results of the War- Treaty of Versailles- Causes for the American Success ( K2,K4 )
- 1.5Federal Constitution of America- Virginia Plan- New Jersey plan – Salient Features of the Constitution (K2, K4)
- 1.6George Washington - Domestic Policies - Foreign policies - Thomas Jefferson- foreign Affairs ( K2,K4 )

**Unit II****(18 Hours)**

- 2.1 Causes for the war of 1812-Course of the war- Treaty of Ghent (K2, K4)
- 2.2 James Monroe- Monroe Doctrine- Results of the Doctrine (K2.K4)
- 2.3 Andrew Jackson- Internal policy –External policy (K1, K4)
- 2.4 West ward Expansion – Results of the West ward Expansion (K2, K4)
- 2.5. President Polk- Manifest Destiny-Results of the Manifest Destiny (K2.K4)

**Unit III****(18 Hours)**

- 3.1 Civil war – Causes- Economic Disparity-Slave System (K2, K4)
- 3.2 Separations of Southern states- Beginning of the Civil War- Course of the Civil war (K1, K2)
- 3.3 Reasons for the Victory of North- Results of the Civil war –Significance of the Civil war (K2, K4)
- 3.4 Abraham Lincoln-Achievements of Abraham Lincoln- Lincoln and Foreign Affairs (K2, K4)
- 3.5 Andrew Johnson – Reconstruction Problems (K2, K4)
- 3.6 Lincoln Plan- Johnson’s Plan- congressional Plan-Radical Reconstruction (K2, K4)

**Unit IV****(18 Hours)**

- 4.1 Theodore Roosevelt- Progressive Era –Foreign Policy (Big Stick policy) (K2, K4)
- 4.2 W.H .Taft - Dollar Diplomacy- Foreign Policy (K2, K4)
- 4.3 Woodrow Wilson- Domestic Policy- Foreign Policy- USA and Ist World War (K2, K4)
- 4.4 21 points of Woodrow Wilson - America and Paris Peace Conference (Treaty of Versailles) (K2, K4)
- 4.5 Calvin Coolidge’s Administration (K2, K4)
- 4.6 Causes for the Depression- Hoover’s effort towards Depression (K2, K4)

**Unit V****(18 Hours)**

- 5.1 F.D Roosevelt – Implementation of New Deal –New Deal legislation-Foreign Policy
- 5.2 USA and Second World War
- 5.3 Truman-Domestic - Foreign Policy
- 5.4 Eisenhower –Policy of Containment

5.5 John F.Kennedy – Domestic Policy – Foreign Policy

5.6 Martin Luther king Jr – Civil right Movement

**Text Book :**

1. .N. Jayapalan – History of United States of America – Atlantic Publishers, New Delhi, 1999
2. B.V .Rao – History of the Modern World, From AD 1500 to AD 2013, Sterling, New Delhi

**Books for Reference:**

1. Foster Rhea Dulles – The United States since 1986 – Surjeet Publications,
2. Dr. K. Rajayyan- A History of the United States-Rathna Publications, 1987, Madurai
3. R.K. Majumdar- History of United States of America, Surjeet Publication, Delhi
4. P.S. Joshi & S.V. Gholkar –History of the United States of America (1900-1945). S. Chand & Company Ltd, New Delhi
5. K.L.Khurana –World History (1453 – 1966 A.D) - Lakshimi Narain Agarwal , Agra,1997

**Open Educational Resources:**

- 1.<https://www.history.com/topics/exploration/christopher-columbus>
- 2.<https://www.nam.ac.uk/explore/american-war-independence-outbreak>
- 3.<https://www.britannica.com/event/Monroe-Doctrine>
- 4.<https://www.history.com/topics/us-presidents/abraham-lincoln>
- 5.<https://www.history.com/topics/great-depression/great-depression-history>
- 6.<https://www.history.com/topics/us-presidents/john-f->

**SEMESTER VI**  
**UCHIM20: INDIAN POLITY AND CONSTITUTION**

<b>Year:</b> III	<b>Course Code:</b> UCHIM20	<b>Title of the Course:</b> Indian Polity and Constitution	<b>Course Type:</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100 40+60
<b>Sem:</b> VI							

**Course Objectives:**

1. To help the students to understand the know the Basics of Indian Constitution and its Governance
2. To help the students to assimilate the powers and functions of the President, Vice- Prime Minister, Prime Minister and Central Council of Ministers.
3. To enable the students to know the functions of the Judiciary

**Course Outcome (CO):**

**After completion of the course the student will able to :**

1. Describe the Emergence and Evolution of Indian Constitution.
2. Analyze the historical background of the constitution and administration structure
3. Estimate the Indian Polity System.
4. Explain the salient features of Indian Constitution
5. Assess the social responsibilities for making a sustainable nation.

CO/PO	1	2	3	4	5	6
CO1	H	M	M	L	M	M
CO2	M	H	H	M	M	H
CO3	M	M	H	L	H	H
CO4	H	M	H	M	L	M
CO5	M	M	H	L	L	H

**H-High (3), M-Medium (2) L-Low (1)**

CO/PS O	1	2	3	4	5	6
CO1	L	L	M	H	H	M
CO2	M	L	M	M	H	L
CO3	L	M	H	L	H	H
CO4	L	L	H	M	H	H
CO5	M	L	M	H	H	H

**High (3), M-Medium (2) L-Low (1)**

**Unit I**

**(18 Hours)**

- 1.1.Introduction: Framing of the Indian Constitution & Preamble (K2)
- 1.2.Salient Features of the Constitution (K2)

- 1.3.Citizenship & Fundamental Rights (K1, K2)
- 1.4.Directive Principles of State Policy (K2)
- 1.5.Fundamental Duties (K1, K2)
- 1.6.Amendments & National Symbols (K1, K2)

## **Unit II**

**(18 Hours)**

- 2.1.The Union Government (K2)
- 2.2.The Powers and Functions of the President (K2)
- 2.3.The Vice President (K2)
- 2.4.The powers and functions of the Prime Minister (K2)
- 2..5.Central Council of Ministers & the Parliament (K2)
- 2.6.Rajya Sabha & Speaker.(K2)

## **Unit III**

**(18 Hours)**

- 3.1.The State Government (K2)
- 3.2.The State Council of Ministers (K2)
- 3.3.The State Legislative Assembly (K2)
- 3.4.Special Status of NorthEast and others States (K2)
- 3.5.Urban Government (K2)
- 3.6.Rural Government (K2)

## **Unit IV**

**(18 Hours)**

- 4.1.Judiciary (K2)
- 4.2.Apex Court of India (K2)
- 4.3.Functions of Supreme Court & Appointments (K2)
- 4.4.High Court & District Courts (K2)
- 4.5.Powers of Judiciary (K2)
- 4.6.Judicial Review (K2)

## **Unit V**

**(18 Hours)**

- 5.1.:Election Commission of India ( K2)
- 5.2.Chief Election Commissioner (K2)
- 5:3.State Election Commissioner (K2)
- 5.4.Central Information Commission (K2)
- 5.5.Central Vigilance Commission (K2)
- 5.6.Central Bureau of Investigation (K2)

## **Text book**

1. Durgadas Banu. (2015). Introduction to the constitution of India. Noida: LexisNexis.
2. Laxmikanth M. (2010). Indian Polity. Chennai : McGraw Hill Education.

## **References :**

1. Dash, Shreeram Chandra. (1986). The Constitution of India: A Comparative Study. India Chaitanya Pub. House.
2. Jayapalan N. (1998). Constitutional History of India. India : Atlantic Publishers

& Distributors.

3. Jojo Mathew. (2018). Indian Polity and Constitution –A complete handbook for IAS and IPS (13<sup>th</sup> Revised Edt) India : ALS Publication.
4. Hansraj. Indian Government and Politics. New Delhi: Surjeet Publications.
5. Karthikeyan. (2018). Governance in India –Basics and Beyond. Noida: Pearson Publication.
6. Subramanian S.G. Indian Constitution and Polity. New Delhi: Pearson Publications.

**Open Educational Resources (OER)**

1. <https://www.jagranjosh.com/general-knowledge/indian-polity-governance-a-complete-study-material-1465367884-1>
2. [www.istm.gov.in](http://www.istm.gov.in)
3. <https://www.jagranjosh.com/general-knowledge/indian-polity-governance-a-complete-study-material-1465367884-1>
4. [www.eci.gov.in](http://www.eci.gov.in)
5. [file:///C:/Users/user/Downloads/1372155919COI-ENG%20\(1\).pdf](file:///C:/Users/user/Downloads/1372155919COI-ENG%20(1).pdf)

**UEHIE20: ELECTIVE: III A- GEOGRAPHY OF INDIA**

<b>Year:</b> III	<b>Course Code:</b> UEHIE20	<b>Title of the Course:</b> Elective III A:Geography of India	<b>Course Type:</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100 40+60
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**Course Objective:**

1. To help the students to understand the concepts of Geography its foundation and its development through the ages
2. To help the students to know the physiographic of India
3. To help the students to acquire the knowledge of natural resources and the climatic changes.

**Course Outcomes:**

**After completion of the course the student will able to:**

1. Explain the foundation of Geography and its application in day today's context
2. Describe about the Themes, Traditions and types of Geography
3. State the evolution of the physical features of India
4. Estimate about the Natural Resources to commit oneself for Sustainable Development
5. Examine the prevention of Disaster and Relief measures available in India to create respect for Human Values

CO/PO	1	2	3	4	5	6
CO1	H	L	M	H	L	M
CO2	M	M	H	H	L	L
CO3	H	M	H	H	L	L
CO4	H	L	M	H	M	M
CO5	H	L	M	H	L	L

**H-High (3) M-Medium (2) L-Low (1)**

CO/PO	1	2	3	4	5	6
<b>CO1</b>	L	L	L	H	H	M
<b>CO2</b>	L	L	<b>L</b>	H	H	M
<b>CO3</b>	L	L	L	H	H	H
<b>CO4</b>	L	L	L	H	H	M
<b>CO5</b>	L	M	M	H	H	M

**H-High (3) M-Medium (2) L-Low (1)**

**Unit I:****(18 Hours)**

- 1.1- Meaning and Definition of Geography- Geography as a Science- Geography and its relations with Physical Science- Mathematics- Astronomy (K1, K2)
- 1.2- The Scope of Geography- Geography teaches the past - Values- Importance of Geography- Geographer, Geologist- Understand Places- teaches a skill- International Understanding – Better Citizen – Provides Clues to the Past(K1, K2, K4)
- 1.3- Foundation of Geography-Evolution of Geography- Ancient – Medieval- Modern (K2)
- 1.4- Contribution and Importance of Geography (K2)
- 1.5-Four Traditions of Geography-Spatial Tradition- Area Studies Tradition- Man Made Tradition- Earth Science Tradition (K1, K2, K4)
- 1.6-Branches of Geography- Physical Geography-Human Geography-Geographic Techniques- Mathematical Geography- Statistical Geography- Cartography(K1, K2, K4)

**Unit II:****(18 Hours)**

- 2.1- Theories of Earth Origin- Big Bang Theory- Galaxy - Milky Way- Solar System- History of Earth Creation-Geological History of India- Pangea- Tethys- Creation of Himalayas (K1,K2)
- 2.2- Basic Concepts of Geography in India(Islands- Peninsula- Strait- Gulf- Cape- Archipelago- Atoll- Census-Continental Drift-Equator-Estuary-Glacier- Global Positioning System(GPS) (K2, K4)
- 2.3- Major Physiographic Divisions-Mountains-The Northern Great Plains (K2)
- 2.4- Himalayan Mountain- Central Himalaya- Eastern- Western Himalaya- Significance of Himalayas (K2)
- 2.5-Northern Great Plains- Indus Basin- its Significance- Ganga Basin- its Significance- Sundarbans (K2)
- 2.6-Brahmaputra Basin- The Brahmaputra Delta – Significance of Northern Great Plains (K2)

**Unit III:****(18 Hours)**

- 3.1- Deccan Plateau – Peninsular Plateau- Malwa Plateau- Chotta Nagpur Plateau- Deccan trap- Western Ghats and Eastern Ghats (K2)
- 3.2-Rivers of India- Perennial Rivers- Non-Perennial Rivers- Water Resources- Rain Water Harvesting-Multi Purpose River Projects- Integrated Water Resource Management in India (K2, K4)
- 3.3- Deserts:- Thar Desert- Islands: – Andaman- Nicobar Islands - (K2, K4)
- 3.4-Natural Resources of India - Biodiversity- Flora and Fauna- Geographical classification of Forest (K2, K4)
- 3.5-National Forest Policy- Forest Products- Conservation of Forest-Problems of Indian Forestry(K4)
- 3.6-Wild life- Mammal Species- Carnivores- Herbivores- Conservation of Wildlife- Problems of Wild Life-Red Data Book (K2, K4)

**Unit IV:****(18 Hours)**

- 4.1-Land Resources- Land Utilization- Land Conservation Measures- Agricultural patterns of India (K2, K4)
- 4.2-Mineral Resources- Water Resources – Growth of Fisheries- Inland Fishing- (K2)
- 4.3- Development of Industries in India- Essential need for industries - Private and Public Sector- Manufacturing Industries- Agro-based Industries- Cottage Industries- (K4)
- 4.4-India – Climate of India-Indian Monsoon- North East Monsoon- SouthEast Monsoon-Seasons of

India:- Winter – Summer- Jet Streams- Reasons for Climate Changes (K2 )

4.5-EL- Nino- Tropical Cyclones- Thunderstorms- Rainfall distribution- Variability of Rainfall (K2)

4.6- Soil- Characteristics of Soils- Classification of soils- Soil Erosion- Importance of Soil Conservation-(K2, K4)

### **Unit V:**

**(18 Hours)**

5.1-Disaster-Natural Disaster- Man Made Disaster -Terrorism-War-Biological Disaster (K2, K4)

5.2-National Disaster Management of India National Disaster Management Policy – Prevention- Mitigation- Relief- Restoration (K4)

5.3-Energy Resources- Conventional Energy- Non- Conventional Energy(K2)

5.4-Major Developmental Projects- Atomic, Solar, Hydro, Wind, Dams – Energy Crisis- Importance of Energy Conservation (K2, K4)

5.5- Transport and Communication (Road, Railways, Water, Airways) (K2)

5.6- India’s Space Exploration and Geography- Satellite Geo-Location, Remote Sensing Satellite- (K2,K4)

### **Maps (India)**

1. Physical Features
2. Forest and Vegetation
3. Crops
4. Mineral Resources
5. Soil

### **Text Books:**

1. Majid Hussain-Geography of India-MCGraw Hill Education Pvt.Ltd, New Delhi,2018

### **Books for Study and Reference:**

1. S.A. Qazi-Geography of the World- S.N. Nagar, APH Publishing Corporation New Delhi, 2007
2. Dr. Satnam Singh- Indian Geography- Damini Garg, Murari Lal and Sons, New Delhi,2007
3. Majid Husain- World Geography-Satyam Apartment, Jawahar Nagar, Jaipur,2008
4. Prithvish Nag, Smita Sengupta Ashok Kumar Mittal- Geography of India- Concept Publishing, New Delhi, 2002
5. A.M. Bagulia- Indian Geography-Anmol Publications Pvt Ltd., New Delhi, 2006
6. Dr. Satnam Singh- Indian Geography- Damini Garg, Murari Lal and Sons, New Delhi,2007
7. Pradeep Sharma- Human Geography, the land-Discovery Publishing house, New Delhi-2007

### **Open Educational Resources (OER):**

- 1.<https://www.openstreetmap.com>
- 2.[www.mhhe.com/getis10e/](http://www.mhhe.com/getis10e/)
- 3.<https://www.imd.gov.in>
- 4.<https://www.glovis.usgs.gov>
- 5.[www.nasagov.com](http://www.nasagov.com)

**SEMESTER- VI**  
**UEHIE20–ELECTIVE III B - MONUMENTS IN INDIA**

<b>Year:</b> III	<b>Course Code:</b> UEHIE20	<b>Title of the Course:</b> Monuments in India.	<b>Course Type:</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 6	<b>Credits</b> 6	<b>Marks</b> 100 40+60
<b>Sem:</b> VI							

**Objectives:**

1. To help the Students to understand the Historical Monuments and its importance
2. To respect our Historical Monuments and its Heritage.
3. To appreciate the Pride of our Historical Monuments and to Preserve it.

**Course Outcomes (COS):**

**After completion of the course the student will able to :**

1. Describe the Significance of Preservation Acts and contribute to its Preservation
2. Analyze the influence of Religious Monuments and Significance of Indian Architecture
3. Explain the workmanship of Artisans
4. List out the methods to preserve Historical Monuments.
5. Assess the patronage of Kings to Indian Culture

CO/PO	1	2	3	4	5	6
CO1	L	M	H	M	M	H
CO2	M	H	M	H	M	H
CO3	L	M	M	H	M	H
CO4	L	H	M	L	M	H
CO5	L	M	H	H	M	M

**High (3), M-Medium (2) L-Low (1)**

CO/PSO	1	2	3	4	5	6
CO1	H	M	H	L	L	M
CO2	M	H	M	L	M	H
CO3	M	H	H	L	L	H
CO4	H	M	H	M	L	H
CO5	M	H	M	L	L	H

**High (3), M-Medium (2) L-Low (1)**

**Unit I:**

- 1.1. Definition (K2)
- 1.2. Types (K2)
- 1.3. Significance (K2)

- 1.4.The Ancient Monument Preservation Act 1904 (K2)
- 1.5.National Historic Preservation Act 1966 (K2)

**Unit II:**

- 2.1.Bhimbetka Rock Shelter and Cave Paintings.(K2)
- 2.2.Sanchi Stupa- Ajanta Caves.(K2)
- 2.3.Mamallapuram.(K2)
- 2.4.Ashoka Pillars.(K2)
- 2.5.Iron Pillars of Delhi,.Nalanda-Hampi.(K2)

**Unit III:**

- 3.1.Taj Mahal-Qutub Minar-Red Fort.(K2)
- 3.2.India Gate- Charminar- Golden Temple.(K2)
- 3.3.Victoria Memorial Hall-Sun Temple Konark. (K2)
- 3.4.GateWay of India-Basilica of Bom Jesus-(K2)
- 3.5.Victorian and Art Deco Ensemble of Mumbai,Cellular Jail. (K2)

**Unit IV:**

- 4.1.Brihadeshwara Temple.(K2)
- 4.2.Fort St.George .(K2)
- 4.3.Meenakshi Temple-Tirumalai Nayak Mahal.(K2)
- 4.4.Vivekananda Rock Memorial.(K2)
- 4.5.Vellore Fort,Gangaikonda Cholapuram.(K2)

**Unit V:**

- 5.1. Group of Monuments at Mahabalipuram.(K2)
- 5.2.Khajuraho Group of Monument
- 5.3.Group of Monuments at Hampi and Pattadakal.
- 5.4. Elephanta Caves- Great Living temples (K2)
- 5.5. Buddhist monuments.

**TextBook:**

1. Rao,Hanumantha. B. and Rao,Basaveswara.K., Indian History and Culture, Sri Vignana Manjusha, Guntur 1973

**Books for Reference:**

1. Anil Chandra Banerjee, New History of Medieval India, S.Chand & Company Pvt. Ltd., New Delhi 1983.
2. Anil Chandra Banerjee, New History of Medieval India, S.Chand & Company Pvt. Ltd., New Delhi 1983.
3. Khurana. K.L., History of India from Earliest to 1526, Lakshmi Narain Agarwal Agra, 1995
4. Khurana. K.L., History of India from 1526 to 1967 A.D Lakshmi Narain Agarwal

Agra, 1995

5. Percival Spear., Delhi –Its Monuments and History, Oxford University Press, New Delhi 1994

**Open Educational Resources (OER):**

1. <https://testbook.com/blog/temples-and-monuments-gk-notes-ssc-pdf/>
2. <https://exampundit.in/list-of-monuments-and-places-of-india-pdf/>
3. <https://cracku.in/blog/monuments-and-places-in-india-questions-for-rrb-ntpc-pdf/>

## SEMESTER VI

### USHIC620 -SKILL BASED ELECTIVE - ARCHIVES KEEPING IN INDIA

<b>Year:</b> III	<b>Course Code:</b> USHIC620	<b>Title of the Course:</b> Archives Keeping In India	<b>Course Type:</b> Theory	<b>Course Category</b> SBE	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100 40+60
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#### Course objective:

- An Archive keeping helps the Students to know the importance and maintenance of Historical Records.

#### Course Outcome:

##### After completion of the course the student will able to:

1. State the Definition, Scope and Types of Archives and appraise it.
2. compare and contrast with the Documentation Methods of Early Times with today's Documentation and its importance
3. Describe the Methods of Preservation of Records and enhance to Preserve Public and Personal Records
4. list out the importance of the History of Indian Archives Keeping, and its significance
5. Discuss about the Tamil Nadu Archives Keeping and its Functions

CO/PO	1	2	3	4	5	6
CO1	H	M	M	L	M	M
CO2	M	M	H	L	M	M
CO3	M	M	H	L	M	M
CO4	H	M	M	L	M	M
CO5	H	M	M	L	M	M

**H-High (3) M-Medium (2) L-Low (1)**

CO/PO	1	2	3	4	5	6
CO1	L	M	L	L	H	L
CO2	L	M	M	L	H	L
CO3	M	M	M	L	H	L
CO4	M	M	L	L	H	M
CO5	L	M	L	L	H	M

**H-High(3) M-Medium (2) L-Low (1)**

#### Unit I:

1.1-Archives Keeping – Origin(K2)

1.2- Definition(K2)

1.3- Scope(K3)

1.4- Meaning(K2)

1.5- Types of Archives Public Archives- Private Archives- Business Archives- Personal Archives(K2,K4)

**Unit II:**

2.1-Characteristics of Archives Keeping- Creating Agency(K2,K4)

2.2- Official Agencies(K2)

2.3- Government Orders(K2)

2.4- Nature of Modern Archives(K2)

2.5- Kinds of Modern Devices(K2,K4)

**Unit III:**

3.1-History of Indian Archives- Pre-Buddhist Period- Buddhist Period- Arthasastra

3.2-Age of Guptas – Cholas Period- Olai officer

3.3- Olai Nayakam- Sukraniti

3.4- Delhi Sultanate Period- Mughal Period- Modern Period

3.5- Organization of Archives- Court Archives- Public Department- Revenue Department- Secret Department(K1,K2,K4)

**Unit IV:**

4.1-Functions of Archives Keeping(K3)

4.2- National Archives of India(K3)

4.3- Custodian Records(K2)

4.4- Inestimable help to Scholars(K3)

4.5-Preservation of Archives-Airbrush- Bindery-Micro Film- Research Laboratory(K2,K4)

**Unit V:**

5.1-Tamil Nadu Archives Keeping(K3)

5.2- History of Tamil Nadu Archives(K2)

5.3- Henry Dodwell- J.J. Cotton(K2)

5.4- Dr.B.S.Baliga(K2)

5.5– Uses Of Archives Keeping(K3,K4)

**Books for Study and Reference:**

1. Dharmaraj J- Archives Keeping –Tensy Publications,2008

2. Saline Ghose- Archives in India-Orient Longman,

3. Dr. M. Sundara Raj- A Manual of Archival Systems and the world of Archives- Siva Publications- Chennai- 1999,

**Open Educational Resources (OER):**

1. national archives.nic.in

2. <https://www.gktoday.in>>national archives

3. [www. tanap.net](http://www.tanap.net)

4. [www.tnarchives.tn.gov.in](http://www.tnarchives.tn.gov.in)



# **Department of Business Administration (UG)**

## **SYLLABUS AND REGULATIONS**

Under

**OUTCOME-BASED**

**EDUCATION 2020**

**(Effective for the Batch of Students Admitted from 2020-2021 to  
2023-2024)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

# OUTCOME BASED EDUCATION

## AUXILIUM COLLEGE (Autonomous), Vellore

### Department of Business Administration - 2020-21

#### A) Institutional Level

- ✓ **Vision** – the vision of the college is to educate young women especially the poorest, to become empowered and efficient leaders of integrity for the society.
- ✓ **Mission** – to impart higher education to the economically weak, socially backwards and needy students of Vellore and neighbouring districts.
- ✓ **Framework of the Curriculum** –
  - Number of credits,
  - **Credit distribution -**  
**Undergraduate B.Com/B.B.A/B.C.A – 15 Week**

Part	Subject	Hours/Week						Total Credits
		Sem 1	Sem 2	Sem 3	Sem 4	Sem 5	Sem 6	Total
I	Language (Tamil/Hindi)	6	6	-	-	-	-	12
II	English	6	6	-	-	-	-	12
III	Core	10	10	17	20	19	19	95
	Allied	5	5	5	5	-	-	20
	Project/ Major Elective	-	-	5	-	5	5	15
IV	Non-Major Elective	-	-	-	-	3	3	06
	Skill Based Subjects	2	2	2	2	2	2	12
	Environmental Studies	-	-	-	2	-	-	02
	Value Education	1	1	1	1	1	1	06
	<b>Total</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>180 credits</b>

- **Assessment and evaluation methods** – each Undergraduate Programme consist of six Semester

There are two components in the Valuation and Assessment of the student – Internal Assessment (CA) and Semester Examination (SE)

## **Continuous Assessment (CA)**

- The maximum marks for CA is 40 and SE is 60, both for theory and practical papers
- Each CA written examination is of two hours duration for 50 marks. The test will be conducted centrally. The average of the two such CA is calculated for 35 marks.
- Other Innovative Component will be of 5 marks. The innovative component is of 5 marks, completed during the class hours by the Staff Member in charge of the subject, in the form of assignment/quiz/seminars/presentation/Online/Open book /viva-Voce/Group work/Mini projects/Exhibitions etc. the topic and the time for submission presentation will be announced by the Staff member in charge of the in advance. Each student should explain and defend her own presentation
- For SBE courses – 2 CA examination of one hour each for 25 each is converted into 40 marks. Other innovative component will be of 5 marks. The Semester examination will be of 2 hours duration for 60 marks.
- For Environmental Studies – one CA of one hour for 25 marks, projects for 25 marks is converted into 40 marks. The Semester Examination will be of 2 hours duration for 60 marks.
- For Major and Allied Papers, the Semester Examination will be of 3 hours with maximum of 100 marks which converted into 60 marks.
- Syllabus of not less two units shall be included for each CA
- A retest for CA will be conducted for the students who is absent due NSS/NCC/Sports on prior written permission obtain through the concerned member
- There is no provision for improvement in CA
- There is no minimum passing

## **Semester Examination**

- A student should register herself to appear for the semester examination by the payment of the prescribed fees.
- The Semester Examination will be in the form of a comprehensive examination covering the entire syllabus in the each subjects. It will be of 3 hours duration irrespective of the number off credits allotted to it.
- If the candidate fails to obtain the pass marks even after the third attempt due to less marks in the CA examinations, the marks of the next examination will be converted to be 40 out of 100

- The maximum marks for each paper shall be 100.

**B) Name of the program** - Bachelor of Business Administration

- ✓ **Vision of the program** - To produce young executives to meet the global needs of the business

**C) Eligibility criteria of the program** – candidates having 50% of marks in their HSC in ant stream are eligible except the candidates opted for the Group D and Vocational studies.

**D) List of courses**

Sem	Part	Code	Title	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper I	6	3	-	3	40+60
	II	UENGA20	English Paper I	6	3	-	3	40+60
	III	UCBAA20	Principles of Management	5	3	-	4	40+60
	III	UCBAB20	Business Mathematics and Statistics – I	5	3	-	4	40+60
	III	UABUA20	Allied I: Business Communication	5	3	-	5	40+60
	IV	-	Skill-based Elective – I	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
			<b>Total</b>				<b>21</b>	<b>600</b>
II	I	ULTAB20	Tamil Paper II	6	3	-	3	40+60
	II	UENGB20	English Paper II	6	3	-	3	40+60
	III	UCBAC20	Organizational Behavior	5	3	-	4	40+60
	III	UCBAD20	Business Mathematics and Statistics – II	5	3	-	4	40+60
	III	UABEA20	Allied II: Business Environment and Ethics	5	3	-	5	40+60
	IV	-	Skill-based Elective – II	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-		
			<b>Total</b>				<b>21</b>	<b>600</b>

Sem	Part	Code	Title	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
III	III	UCBAE20	Marketing Management	6	3	-	4	40+60
	III	UCBAF20	Financial Accounting	6	3	-	4	40+60
	III	UCBAG20	Operations Research – I	6	3	-	4	40+60
	III	UAEBA20	Allied – III: Economics for Business	5	3	-	5	40+60
	III	UEBAA20	Elective I A: International Business	5	3	-	5	40+60
	III	UEBAB20	Elective I B: Logistics and Supply Chain Management	-	-	-	-	-
	IV	USBAC320 / USBAD320	SBE: Hospital Planning and Administration/ Hotel Planning and Administration	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
			<b>Total</b>				<b>24</b>	<b>600</b>
IV	III	UCBAH20	Cost and Management Accounting	6	3	-	4	40+60
	III	UCBAI20	Operations Research – II	6	3	-	4	40+60
	III	UCBAJ20	Research Methodology	5	3	-	4	40+60
	III	UCBAK20	Human Resource Management and Development	6	3	-	4	40+60
	III	UAITR20	Allied IV - Institutional Training	5	-	3	5	40+60
	IV	USBAC420/ USBAD420	SBE: Hospital Planning and Administration /Hotel Planning and Administration	2	2	-	2	40+60
	IV	UNEVS20	Environmental Studies	2	3	-	2	60+40
	IV	UVEDA15	Value Education	1	-	-	-	-
			<b>Total</b>				<b>25</b>	<b>700</b>
V	III	UCBAL20	Financial Management	6	3	-	4	40+60
	III	UCBAM20	Industrial Relations	5	-	3	4	40+60

	III	UCBAN20	Banking and Insurance	6	3	-	4	40+60	
	III	UCBAP22	E- Commerce	3	-	3	2	40+60	
	III	UCBAQ20	Practical : Tally	2	3	-	2	40+60	
	III	UCBAR20	Project	2	-	3	5	40+60	
	IV	USBAE520 USBAF520	SBE: Campus to Corporate/ Applications of GST	2	2	-	2	40+60	
	IV	-	Non-Major Elective – I	3	3	-	2	40+60	
	IV	-	Value Education	1	-	-	-	-	
			<b>Total</b>				<b>25</b>	<b>800/900</b>	
VI	III	UCBAS20	Legal Aspects of Business	7	3	-	4	40+60	
	III	UCBAT20	Production and Materials Management	6	3	-	4	40+60	
		UCBAO20	Fundamentals of Information Technology	6	3	-	4	40+60	
	III	UEBAC20	Elective II A: Total Quality Management	5	3	-	5	40+60	
	III	UEBAD20	Elective II B: Entrepreneurial Development	-	-	-	-	-	
	IV	USBAE620/ USBAF620	SBE: Campus to Corporate/ Applications of GST	2	2	-	2	40+60	
	IV	-	Non-Major Elective – II	3	3	-	2	40+60	
	IV	UVEDA15	Value Education	1	2	-	2	40+60	
			<b>Total</b>				<b>23</b>	<b>800/900</b>	
	V	Extension Activities						1	
		<b>Total</b>						<b>140</b>	<b>4200</b>

## **Programme Objectives (PO)**

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:** Emulate positive social values and exercise leadership qualities and team work.

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

## **Programme Specific Outcome (PSOs)**

- ✓ **PSO 1** – To attain knowledge and understand the managerial principles and concepts of the course adopted. To formulate, to apply the theoretical knowledge into practice by carrying the institutional training and projects, to adopted sense of creative thinking and learn problem solving skills to take up challenges faced in today's modern world.
- ✓ **PSO 2** – To communicate the general ideas, opportunities and opinions and to become empowered and motivated citizens of the country. To be stimulated towards the change and to be conscious for sustainable development of the society.
- ✓ **PSO 3** – To adapt towards the positive thinking capacity, to adapt the social values, to exercise leadership qualities and bringing out their capabilities through team work.
- ✓ **PSO 4** – To pursue higher knowledge, acquire quality professional education, and to develop entrepreneurial skills and contribute towards the needs of the society.
- ✓ **PSO 5** – Prepare the students to be persistent enough to pull out their own ideas and opinions and to become a strong pillar to the family and society highlighting their feminine power. Mould the students to face the challenges in the global business environment and the society.
- ✓ **PSO 6** – To bring up the economically challenged, socially backward young women to be competent with today's expectation of the competitive world for their sustenance. To be passionate about multi-disciplinary approach for problem solving, critical analysis and decision making in their personal and professional life.

PSO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	L	M	L	H	L	H
PSO2	H	H	M	H	M	M
PSO3	L	M	H	L	H	L
PSO4	H	M	H	H	M	H
PSO5	L	M	H	L	H	M
PSO6	M	M	H	H	H	H

**H- High (3), M- Moderate (2), L- Low(1)**

## SEMESTER – I

### UCBAA20 – PRINCIPLES OF MANAGEMENT

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	UCBAA20	Principles of Management	Theory	Core	5	4	100

#### Objectives

1. To know the fundamental concepts of management and its principles
2. To acquire the knowledge of planning, decision making and its types
3. To have the knowledge about organising, authority and delegation
4. To acquire the knowledge about staffing and directing
5. To attain the knowledge related to coordination and controlling

#### Course Outcomes (CO)

The learners will be able to

1. Acquire the knowledge related to management concepts and its principles
2. Have the knowledge about planning, decision making and its types
3. Be able to know about planning, decision making and its types
4. Have knowledge regarding organising, authority and delegation
5. Acquire the knowledge related to coordination and controlling

CO	PO					
	1	2	3	4	5	6
CO1	L	M	M	M	L	H
CO2	M	M	L	L	M	H
CO3	L	M	L	M	M	H
CO4	L	L	H	L	H	H
CO5	M	M	H	M	H	M

H- High (3), M- Moderate (2), L-Low (1)

CO	PSO					
	1	2	3	4	5	6
CO1	L	H	M	M	L	H
CO2	M	M	L	L	M	H
CO3	H	M	L	M	M	H
CO4	H	L	H	H	H	H
CO5	M	M	H	M	H	M

H- High (3), M- Moderate (2), L-Low (1)

#### Course Syllabus

##### UNIT I: Introduction

(15 hours)

1.1: Introduction – Concept (K1, K2)

1.2: Nature – Scope (K1)

1.3: Management Functions (K2)

1.4: Management Roles (K2, K3)

1.5: Level of Management (K2, K3)

1.6: Contributions Given By Henri Fayol – F W Taylor – Peter Drucker (K3, K4)

**UNIT II Planning and Decision making**

**(15 hours)**

2.1: Planning – Concept – Features (K1, K2)

2.2: Nature – Process – Types (K1, K2)

2.3: SWOT Analysis to Formulate Strategy (K2, K3, K4)

2.4: Decision Making – Concept – Types (K2, K3)

2.5 : Process - Barriers (K3)

2.6 : Step to Overcome the Barriers (K2, K3,K4)

**UNIT III Organizing, Authority and Delegation**

**(15 hours)**

3.1 : Organizing – Concept (K1)

3.2 : Types of Structure – Difference between Formal and Informal Structure (K2, K3)

3.3: Span of Control (K2)

3.4 : Authority – Sources – Types (K2, K3)

3.5 Delegation – Concept – Principles – How to delegate effectively (K1, ,K2, K3)

3.6 Distinction between Centralisation and Decentralisation (K2)

**UNIT IV Staffing and Directing**

**(15 hours)**

4.1 Staffing – Meaning – Nature (K1)

4.2 Purpose – Importance – Functions (K2, K3)

4.3 Directing – Concept – Meaning – Significance (K2, K3)

4.4 Nature - Principles (K2, K3)

4.5 Techniques of Directing

4.6 Direction and Supervision

**UNIT V Coordination and Control**

**(15 hours)**

5.1 Coordination and Control – Concept (K1)

5.2 Needs - Types (K2, K3)

5.3 Principles of Coordination – Techniques of Coordination (K3)

5.4 Control – Nature – Purpose (K2, K3)

5.5 Control Process – Problems (K3, K4)

5.6 Controlling Techniques. (K3)

**Text Books**

1. C. B. Gupta, Business Management, Sultan Chand & Sons, New Delhi, 3<sup>rd</sup> Edition, 2012
2. L. M. Prasad, Principles of Management, Sultan Chand & Sons, New Delhi, 7<sup>th</sup> Edition, 2018

**Reference Books**

1. Stephens R. Robins and David A Decenzo, Fundamental of Management, Pearson Education, London, 7<sup>th</sup> Edition, 2016
2. V.S.P Rao, V Hari Krishna, Management Text & Cases, Excel Books Private Ltd, New Delhi, 5th Edition, 2012.
3. P.C. Tripathi& P.N Reddy; Principles of Management, Sultan Chand& Sons,6th Edition, 2017

4. Harold Koontz, Hienz Weihrich, A Ramachandra Aryasri; Principles of Management, McGraw Hill, 2nd edition, 2015

### **Web Resources**

<https://www.toolshero.com/management/14-principles-of-management/>

<https://open.umn.edu/opentextbooks/textbooks/693>

<https://open.umn.edu/opentextbooks/textbooks/34>

**SEMESTER – I**  
**UABUA20 – BUSINESS COMMUNICATION**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	UABUA20	Business Communication	Theory	Allied	5	5	100

**Objectives**

1. To impart the importance of Communication and to understand the concepts of Communication
2. To learn the components of a Business Letter and to draft various kinds of Business Letters
3. To understand the mechanism of writing Bank Correspondence and Government Correspondence
4. To impart knowledge on writing Business Reports and Internal communication
5. To familiarize students in the latest Technology in Communication

**Course Outcomes (CO)**

The learners will be able to

1. Obtain the basic knowledge and importance of Communication
2. Learn the components of a Business Letter and draft various kinds of Business Letters
3. Be able to draft Bank Correspondence and Government Correspondence
4. Write Business Reports and learns the internal communication systems
5. Familiarize in Technology aided Business Communication

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	M	M	M
CO2	M	H	H	L	H	L
CO3	H	H	H	M	M	L
CO4	M	H	H	L	H	M
CO5	H	H	H	L	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	H	M	M	M
CO2	M	H	H	L	H	L
CO3	H	M	H	M	M	L
CO4	M	H	H	L	H	M
CO5	H	H	H	L	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I: Introduction to Communication**

**(15 hours)**

- 1.1 Communication-Definition (K1,K2)
- 1.2 Nature-Need-Process (K1,K2,K3)
- 1.3 Principles-Types of Communication (K1,K2,K3,K4)
- 1.4 Barriers (K1,K2,K3)
- 1.5 Importance of effective Business Communication (K1,K2,K3)
- 1.6 Business Etiquette (K1,K2,K3,K4)

### **Unit II: Business Correspondence**

**(15 hours)**

- 2.1 Business Correspondence-Importance (K1,K2)
- 2.2 Characteristics- Business letter (K1,K2,K3)
- 2.3 Types- Enquiry- Offer (K1,K2,K3,K4)
- 2.4 Quotation-Tender (K1,K2,K3,K4)
- 2.5 Order-Complaints (K1,K2,K3,K4)
- 2.6 Collection-Sales-Circular (K1,K2,K3,K4)

### **Unit III: Bank and Government Correspondence**

**(15 hours)**

- 3.1 Bank Correspondence -Types—Characteristics (K1,K2)
- 3.2 Letters from Banker to Customer (K1,K2,K3,K4)
- 3.3 Letters from customer to Bank (K1,K2,K3,K4)
- 3.4 Letters between Banks (K1,K2,K3,K4)
- 3.5 Government Correspondence-Representation Letter (K1,K2,K3,K4)
- 3.6 Official Correspondence- Demi - Official Letters-Memorandum (K1,K2,K3,K4)

### **Unit IV: Reports and Internal Communication**

**(15 hours)**

- 4.1 Reports - Meaning - Types (K1,K2)
- 4.2 Structure - Characteristics (K1,K2,K3)
- 4.3 Classification of a Report (K1,K2,K3)
- 4.4 Internal Communication- Memos - Circular – Notes (K1,K2,K3,K4)
- 4.5 Meeting-Agenda- Minutes (K1,K2,K3,K4)
- 4.6 Application- Resume (K1,K2,K3,K4,K5)

### **Unit V: Technology in Communication**

**(15 hours)**

- 5.1 Technology aided Business communication - E-Mail- Characteristics- Mechanics of a E-Mail (K1,K2,K3)
- 5.2 Layout of E-Mail messages (K1,K2,K3)
- 5.3 E-Mail Ethics (K1,K2,K3,K4,K5)
- 5.4 Modern Communication devices- Internet (K1,K2)
- 5.5 Teleconferencing (K1,K2)
- 5.6 Recent trends in Communication Technology (K1,K2,K3,K4)

## **Text Books**

1. K. Sundar, A.Kumara Raj, Business Communication, Vijay Nicole Imprints Pvt. Ltd, India, 2<sup>nd</sup> Edition, 2012
2. Rajendra Pal and Korlahalli, Essentials of Business Communication, Sultan Chand & Sons, New Delhi, 13<sup>th</sup> Edition, 2012

## **Reference Books**

1. R.S.N. Pillai and Bagavathi, Commercial Correspondence and Office Management, Sultan Chand and Sons, New Delhi, 5<sup>th</sup> Edition, 2013
2. R. C Sharma and Krishan Mohan, Business Correspondence and Report Writing, Tata McGraw Hill, 3<sup>rd</sup> Edition, 2017
3. R C Bhatia, Business Communication, Ane Books Pvt Ltd., Delhi, 2015
4. Kevin Galaagher, Skills Development for Business and Management Students, Oxford University Press, Delhi, 2010

## **Web Resources**

[https://www.managementstudyguide.com/business\\_communication.html](https://www.managementstudyguide.com/business_communication.html)  
<https://studiousguy.com/business-communication/>  
<https://www.oercommons.org/curated-collections/469>

**SEMESTER – II**  
**UCBAC20 – ORGANIZATIONAL BEHAVIOUR**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: II</b>	UCBAC20	Organizational Behaviour	Theory	Core	5	4	100

**Objectives**

1. To know the fundamental concept of Organizational Behaviour
2. To understand the concept of individual dimensional behaviour of the individuals
3. To assess the attitudinal and motivational behaviour and group dynamics of an individual
4. To understand the concept of leadership, conflict and stress level of the individuals
5. To acquire the knowledge about the organizational Change, Climate and Culture & MBO

**Course Outcomes (CO)**

The learners will be able to

1. Equipped with the fundamental concept of Organizational Behaviour
2. Acquire the knowledge concept of individual dimensional behaviour of the individuals
3. Assess the attitudinal and motivational behaviour and group dynamics of an individual
4. Understand the concept of leadership, conflict and stress level of the individuals
5. Acquire the knowledge about the organizational Change, Climate and Culture & MBO

CO	PO					
	1	2	3	4	5	6
<b>CO1</b>	L	M	L	L	M	M
<b>CO2</b>	L	M	H	M	M	L
<b>CO3</b>	M	L	M	M	M	M
<b>CO4</b>	M	L	M	L	H	M
<b>CO5</b>	M	L	L	M	H	M

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	L	M	L	H	M	M
<b>CO2</b>	H	M	H	M	M	L
<b>CO3</b>	M	L	M	H	M	H
<b>CO4</b>	H	L	M	L	H	M
<b>CO5</b>	M	L	M	M	H	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I Introduction to OB**

**(15 hours)**

- 1.1 Introduction – Concept of OB - Definition (K1)
- 1.2 Challenges of OB – Role of OB (K1, K2)
- 1.3 OB Models (K2, K3)
- 1.4 Hawthorne Experiments (K2, K3)
- 1.5 Nature of Human Behaviour – Concept – Process (K1, K2, K3)
- 1.6 Models of Man (K2, K3)

### **UNIT II Individual level Concept**

**(15 hours)**

- 2.1 Perception – Concept – Process (K1, K2)
- 2.2 Interpersonal Perception – Developing Perpetual Skills (K2, K3)
- 2.3 Learning – Concept – Nature Components of Learning (K1, K2, K3)
- 2.4 Factors affecting Learning (K2, K3)
- 2.5 Personality – Concept – Determinants (K1, K2)
- 2.6 Theories – Measurements (K2, K3, K4)

### **UNIT III Group level concept**

**(15 hours)**

- 3.1 Attitude – Concept – Features (K1)
- 3.2 Factors in Attitude Formation – Attitudes Relevant for OB (K2, K3)
- 3.3 Motivation – Types of Needs – Theories: Maslow's – Herzberg (K2, K3, K4)
- 3.4 Motivational Theories - Vroom's – McClelland (K2, K3, K4)
- 3.5 Group Dynamics – Concept – Features (K1, K2)
- 3.6 Types – Difference between Formal and Informal Groups (K2, K3)

### **UNIT IV Concepts related to Leadership, Stress and Conflicts**

**(15 hours)**

- 4.1 Leadership – Concept – Importance (K1, K2)
- 4.2 Leadership Theories (K3, K4)
- 4.3 Organizational Conflict – Concept – Stages – Types (K1, K2, K3)
- 4.4 Conflict Resolution (K1, K2, K3)
- 4.5 Stress – Meaning – Causes – Effects (K2, K3)
- 4.6 Stress Coping Strategies (K2, K3, K4)

### **UNIT V Understanding the Organization – Climate and Culture**

**(15 hours)**

- 5.1 Organizational change – factors (K1, K2)
- 5.2 Planned change – process (K2, K3)
- 5.3 Resistance to change (K2, K3, K4)
- 5.4 MBO (K1, K2)
- 5.5 Organizational Climate (K2, K3)
- 5.6 Organizational Culture (K2, K3, K4)

**Text Books**

1. L. M Prasad, Organizational Behaviour, Sultan Chand & Sons, New Delhi, 5<sup>th</sup> Edition, 2016
2. Stephen P. Robbins & Timothy A Judge, Organizational Behaviour, Prentice Hall, India, 16<sup>th</sup> Edition, 2016

**Reference Books**

1. Jerald Greenberg and Robert A. Baron, Behavior in Organizations, Pearson Education, New Delhi, 10<sup>th</sup> Edition, 2015
2. Stephen P. Robbins and Seema Sanghi, Organizational Behaviour, Pearson Education, New Delhi, 10<sup>th</sup> Edition, 2012
3. S.S. Khanka, Organizational Behaviour, S. Chand & Co, New Delhi.
4. Uma Sekaran, Organizational Behaviour Text & cases, 2<sup>nd</sup> edition, Tata McGraw Hill Publishing CO. Ltd

**Web Resources**

<https://www.iedunote.com/organizational-behavior>

<https://www.london.edu/faculty-and-research/organisational-behaviour>

Journal of Organizational Behavior on JSTOR

## SEMESTER – II

### UABEA20 – BUSINESS ENVIRONMENT AND ETHICS

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: II</b>	UABEA20	Business Environment and Ethics	Theory	Elective	5	5	100

#### Objectives

1. To know about the environment and its impact on business
2. To understand the political environment and role of government in business
3. To understand the economic system, financial system and their implication in business
4. To know the impact of Privatization, Globalization and Liberalization on the business
5. To realize the importance of business ethics and social responsibility as an individual to the society

#### Course Outcomes (CO)

The learners will be able to

1. Understand the Business environment
2. Be able to inter-relate the political and legal environment in business
3. Relate the importance of economic and financial environment to business
4. Comprehend the vitality of Privatization, Globalization and Liberalization in the business
5. Recognize the importance of business ethics and social responsibility in today's business

CO	PO					
	1	2	3	4	5	6
CO1	L	M	L	M	H	H
CO2	H	H	M	L	L	H
CO3	H	M	L	H	H	H
CO4	H	L	M	M	M	M
CO5	M	H	H	M	L	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	L	M	L	M	H	H
CO2	H	H	M	L	H	M
CO3	M	M	L	H	H	H
CO4	H	L	H	M	M	M
CO5	M	H	H	M	L	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I Introduction (15 Hours)**

- 1.1 Business Environment – Definition (K1,K2)
- 1.2 Significance (K1,K2)
- 1.3 Political, Legal environment (K1,K2)
- 1.4 Economic and Social environment (K1,K2)
- 1.5 Cultural environment (K1,K2)
- 1.6 Cultural heritage (K1)

### **UNIT II Political and legal Environment (15 Hours)**

- 2.1 Political environment (K1,K2,K3)
- 2.2 Rights according to Indian constitution (K1,K2,K3)
- 2.3 Economic roles of Government in business (K1,K2,K3)
- 2.4 Legal environment- Classification of companies (K1,K2,K3)
- 2.5 Memorandum of Association- Articles of Association- Prospectus (K1,K2,K3)
- 2.6 Types of shares- Debentures -Winding up of companies. (K1,K2,K3)

### **UNIT III: Economic System and Financial Environment (15 Hours)**

- 3.1 Economic System and their impact of business (K1,K2)
- 3.2 Business Cycle (K1,K2)
- 3.3 Inflation and Deflation - Meaning – Causes - Effects - Control (K1,K2)
- 3.4 Measures to be adopted by business firms to reduce the evil effects of business cycle (K1,K2)
- 3.5 Financial Environment (K1,K2)
- 3.6 Financial system – Commercial Banks. (K1,K2)

### **UNIT IV: Privatization, Liberalization and Globalization (15 Hours)**

- 4.1 Privatization – Meaning (K1,K2)
- 4.2 Ways of privatization – Privatization in India (K1,K2)
- 4.3 Liberalization – Meaning (K1,K2)
- 4.4 Globalization – Meaning (K1,K2)
- 4.5 Merits and demerits of globalization (K1,K2)
- 4.6 Consumer Protection Act

### **UNIT V: Business ethics (15 Hours)**

- 5.1 Business ethics (K1,K2, K3)
- 5.2 Ethics in business and community (K1,K2)
- 5.3 Social responsibility towards customers and community (K1,K2)
- 5.4 Social responsibility towards and community (K1,K2)
- 5.5 Business Giving (K1,K2)
- 5.6 Social Audit (K1,K2)

## **Text Books**

1. Sankaran S, Business Environment, Margham Publications, Chennai, 5<sup>th</sup> Edition, 2013.
2. Francis Cherunilam, Business Environment: Text and Cases, Himalaya Publishing House Pvt. Ltd., Mumbai, 12<sup>th</sup> Edition, 2013

## **Reference Books**

1. R. Jayaprakash Reddy, Business Environment, APH Publishing Corporation, New Delhi, 4<sup>th</sup> Edition, 2004.
2. S.K. Bhatia, Business Ethics and Managerial Value, Deep and Deep Publication, New Delhi, 3<sup>rd</sup> Edition, 2010
3. Justin Paul, *Business Environment*, Tata McGraw Hill, New Delhi, 2006.
4. Dr.Amit Kumar, *Business Environment*, Sahitya Bhawan Publications; 2021st edition (1 January 2019).

## **Web Resources**

<https://pestleanalysis.com/political-factors-affecting-business/>  
[https://iimm.org/wp-content/uploads/2019/04/IIMM\\_BE\\_Book.pdf](https://iimm.org/wp-content/uploads/2019/04/IIMM_BE_Book.pdf)  
<https://www.marketingtutor.net/political-factors-affect-business/>

**SEMESTER – III****UCBAE20 – MARKETING MANAGEMENT**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: III</b>	UCBAE20	Marketing Management	Theory	Core	6	4	100

**Objectives**

1. To comprehend the principles, concepts and functions of marketing and to design a marketing strategies for a dynamic marketing and attain the knowledge of Marketing Mix
2. To learn the behavior of the consumers and to segment the consumers.
3. To acquire knowledge of market plan and product development cycle
4. To imbibe the awareness of advertising and its ethics to be followed
5. To learn the recent trends in marketing

**Course Outcomes (CO)**

The learners will be able to

1. Confident enough to demonstrate the bases of fundamentals of marketing and marketing mix
2. Potentially strong in segmenting the markets based on the behavior of consumers
3. Able to identify the various types of goods and gain knowledge about the product and its features
4. Attain the knowledge of the promotion and distribution strategies
5. Adopt the optimum marketing distribution channel and salesmanship criteria

<b>CO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	M	H	H	M
<b>CO2</b>	H	H	M	H	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	M	L	H	M
<b>CO5</b>	M	M	M	H	H	M

**H- High (3), M- Moderate (2), L- Low (1)**

<b>CO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	M	H	H	M
<b>CO2</b>	L	H	M	H	H	H
<b>CO3</b>	H	H	L	H	H	H
<b>CO4</b>	H	H	M	L	M	M
<b>CO5</b>	M	H	M	H	H	M

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I Introduction (18 Hours)**

- 1.1 Introduction – Meaning of Market, Marketing – Functions (K1, K2)
- 1.2 Relationship with other functional areas (K1, K2, K4)
- 1.3 Factors affecting marketing (K1, K2)
- 1.4 Marketing Environment (K2)
- 1.5 Need and Importance of environmental analysis (K1)
- 1.6 Marketing Mix (K1, K2)

### **Unit II Consumer Behaviour and Segmentation (18 Hours)**

- 2.1 Consumer Behaviour - Factors influencing consumer behaviour (K1, K2, K3)
- 2.2 Consumer decision making process (K1, K2, K3)
- 2.3 Segmentation – Levels of segmentation (K1, K2)
- 2.4 Bases for segmenting consumer markets - Criteria for segmentation (K1, K2)
- 2.5 Market Targeting (K2)
- 2.6 Market Positioning (K1, K2)

### **Unit III Product (18 Hours)**

- 3.1 Types of goods (K1, K2)
- 3.2 Product – Features (K1, K2)
- 3.3 Product Mix – New Product Development (K1, K2, K3)
- 3.4 Product Life Cycle (K1, K2, K3)
- 3.4 Pricing Strategies - Branding (K1, K2)
- 3.5 Trademark - Labeling (K1, K2, K3, K4)
- 3.6 Packaging (K1, K2, K3, K4)

### **Unit IV Promotion and Distribution (18 Hours)**

- 4.1 Promotion (K1, K2)
- 4.2 Advertising – Types of Media (K1, K2, K3)
- 4.3 Advertisement copy - Pros and Cons of advertising (K1, K2)
- 4.4 Ethics in advertising – Sales Promotion – Types (K1, K2, K3, K4)
- 4.5 Personal Selling- Salesmanship (K1, K2, K3)
- 4.6 Direct Selling – Marketing Channels (K1, K2, K3, K4)

### **Unit V Recent Trends in Marketing (18 Hours)**

- 5.1 Online Marketing (K1, K2, K3)
- 5.2 Virtual Marketing (K1, K2, K3)
- 5.3 E-commerce - E-marketing - E-Retailing (K1, K2)
- 5.4 Relationship marketing (K1, K2, K3)
- 5.5 Mobile marketing (K1, K2, K3)
- 5.6 Green marketing (K1, K2)

## **Text Books**

1. Philip Kotler and Gray Armstrong, Principles of Marketing, Prentice Hall, London, 16<sup>th</sup> Edition, 2015.
2. R. S. N. Pillai and Bagavathi, Modern Management, Sultan Chand and Sons, New Delhi, 14<sup>th</sup> Edition, 2010

## **Reference Books**

1. Douglas J. Darympia, Marketing Management, John Wiley and Sons, 15<sup>th</sup> Edition, 2017.
2. Paul Baines, Chris fill, Kelly Page, Marketing, Oxford University Press, 2<sup>nd</sup> Edition, 2011
3. J P Mahajan & Anupama Mahajan, *Principles of Marketing*, Vikas Publishing House, 2014.
4. K Karunakaran, *Marketing Management*, Himalaya Publishing House, 2017.

## **Web Resources**

<https://www.enotesmba.com/2013/01/marketing-management-notes.html>

<https://mrcet.com/downloads/MBA/digitalnotes/Marketing%20Management.pdf>

**SEMESTER III**  
**UCBAF20 - FINANCIAL ACCOUNTING**

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> UCBAF20	<b>Title of the Course:</b> Financial Accounting	<b>Course Type:</b> Problem	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To enable the learners understand the fundamentals of Accounting.
2. To give them a basic knowledge of Accounting principles and practices.
3. To facilitate them to prepare Final Accounts of Business.
4. To give them the basic knowledge of applying Accounting principles in the form of valuing assets.
5. To facilitate them to prepare Final accounts of Non Trading concerns.

**Course Outcomes (CO)**

The Learners will be able to

1. Acquire in-depth knowledge in Accounting
2. Absorb good conceptual knowledge in Accountancy
3. Be able to prepare accounts and trying out the final result of the business
4. Be capable of becoming accountant in any business organization.
5. Be capable of becoming accountant in any non trading concern

CO	PO					
	1	2	3	4	5	6
<b>CO1</b>	M	M	H	H	H	H
<b>CO2</b>	M	M	H	H	H	H
<b>CO3</b>	H	M	M	H	H	H
<b>CO4</b>	M	M	M	H	H	H
<b>CO5</b>	M	M	M	H	H	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	M	M	H	H	H	H
<b>CO2</b>	M	M	H	H	H	H
<b>CO3</b>	H	L	M	H	H	H
<b>CO4</b>	M	M	M	M	H	H
<b>CO5</b>	M	M	M	H	H	M

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I - Introduction to Accounting**

**(15 Hours)**

- 1.1: Meaning of Accounting - Definition of Accounting – Nature of Accounting (K1, K2, K3)
- 1.2: Financial Accounting- Objectives - Functions (K1, K2, K3)
- 1.3 : Principles of accounting - Concepts and Conventions (K1, K2, K3)
- 1.4 : System of book keeping - Double entry system -single entry system (K1, K2, K3)
- 1.5: advantages of double entry system of book keeping (K1, K2, K3)
- 1.6: Accounting Equations – rules of accounting equations (K1, K2, K3)

### **UNIT II Primary Accounting Records**

**(15 Hours)**

- 2.1 : Journal (K1, K2, K3)
- 2.2 : Ledger (K1, K2, K3)
- 2.3 : Subsidiary Books – different types of subsidiary books (K1, K2, K3)
- 2.4 : Preparation of purchase book – sales book – purchases return book – sales return book (K1, K2, K3)
- 2.5 : Preparation of Cash books (K1, K2, K3)
- 2.6: Trial Balance (K1, K2, K3)

### **UNIT III Financial Statements**

**(15 Hours)**

- 3.1: Introduction of Final Accounts (K1, K2, K3)
- 3.2: Manufacturing account (K2, K3, K4)
- 3.3 : Trading account (K2, K3, K4)
- 3.4 : Profit and Loss account (K2, K3, K4)
- 3.5 Balance Sheet (K2, K3, K4)
- 3.6 Balance sheet with simple adjustments (K2, K3, K4)

### **UNIT IV Depreciation Accounting**

**(15 Hours)**

- 4.1: Introduction of Depreciation (K1, K2, K3)
- 4.2: Methods of Depreciation (K2, K3)
- 4.3 : Straight Line Method (K1, K3)
- 4.4 : Written Down Value Method (K1, K3)
- 4.5: Annuity Method (K1, K3)
- 4.6: Insurance policy Method (K1, K3)

### **UNIT V Non – Trading Accounting**

**(15 Hours)**

- 5.1: Introduction of Non –trading organization (K1, K2, K3, K5)
- 5.2: Capital and Revenue (K3, K5)
- 5.3: Accounts of Non-trading organizations (K3, K5)
- 5.4: Income and Expenditure Account (K3, K5)
- 5.5 : Receipts and Payments Account (K3, K5)
- 5.6: Balance sheet (K3, K5)

**Note – Theory 20% and Problems 80%**

### **Text Books**

1. S. P. Jain & K. L. Narang, Advanced Accountancy, Kalyani Publisher, Delhi, 7<sup>th</sup> Revised Edition, 2008.
2. T.S. Reddy and Y. Hari Prasad Reddy, Cost and Management Accounting, Margham Publications, Chennai, 2017.

### **Reference Books**

1. M. C. Shukla, T. S. Grewal & S. C. Gupta, Advanced Accountancy, Sultan Chand & Sons, New Delhi, 19<sup>th</sup> Edition 2018
2. R. L. Gupta & Radhasamy, Advanced Accountancy, Sultan Chand & Sons, New Delhi, 6<sup>th</sup> Edition, 2009
3. M N Arora; Accounting for Management- Himalaya Publications House 2019.
4. SN Maheswari; Financial Accounting - Vikas Publishing House, Jan 2018.

### **Web Resources**

- [https://en.wikipedia.org/wiki/Single-entry\\_bookkeeping\\_system](https://en.wikipedia.org/wiki/Single-entry_bookkeeping_system)  
<https://www.profitbooks.net/what-is-depreciation>

**SEMESTER – III****UAEBA20 – ECONOMICS FOR BUSINESS**

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> UAEBA20	<b>Title of the Course:</b> Economics for Business	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Objectives**

1. To understand the economic concepts and techniques in evaluating business decisions
2. To learn demand analysis and see how it affects the growth of the business
3. To learn about supply side analysis and understand factors which affect the supply side of the business
4. To understand how tools of standard price theory can be employed to formulate a decision problem
5. To analyze the different types of competition in market

**Course Outcomes (CO)**

The learners will be able to

1. Have depth knowledge in the basics of Managerial Economics
2. Understand the choices made by a rational consumer with basic concepts of Demand and its Equilibrium
3. Attain proficiency in the Supply concepts and the cost function
4. Acquire knowledge in the production function and pricing strategies
5. Identify the key characteristics and consequences of different forms of market competition

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	L	M
CO2	M	L	M	M	M	M
CO3	H	L	M	H	M	L
CO4	H	L	L	M	L	L
CO5	H	L	M	M	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	M	M	H	M	L	M
CO2	M	L	M	M	M	M
CO3	H	L	H	H	M	L
CO4	H	L	L	M	L	L
CO5	H	H	M	H	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I: Introduction to Managerial Economics (12 Hours)**

- 1.1 Introduction to Managerial Economics and Definition (K1)
- 1.2 Characteristics (K1,K2)
- 1.3 Scope of Managerial Economics ( K1,K2,K3)
- 1.4 Uses of managerial Economics ( K1,K2,K3)
- 1.5 Role and responsibilities of Managerial Economist ( K1,K2,K3)
- 1.6 Econometrics – Meaning - Models ( K1,K2,K3)

### **Unit II: Demand Analysis (12 Hours)**

- 2.1 Demand Analysis - Meaning (K1)
- 2.2 Law of demand (K1,K2,K3)
- 2.3 Types of demand- Price, Income and Cross Demand (K1,K2,K3)
- 2.4 Elasticity of demand - Types of elasticity of demand (K1,K2,K3)
- 2.5 Indifference Curve Analysis (K1,K2,K3)
- 2.6 Demand Forecasting (K1,K2,K3)

### **Unit III: Supply and Cost Analysis (12 Hours)**

- 3.1 Supply Meaning – Supply schedule ( K1)
- 3.2 Law of supply – Supply curve – Determinants of supply( K1,K2,K3)
- 3.3 Contraction and Expansion of supply – Increase and decrease in supply (K1,K2,K3)
- 3.4 Elasticity of supply ( K1,K2,K3)
- 3.5 Break Even Analysis –Determination ,Assumptions ,Advantages ,Limitations ( K1,K2,K3)
- 3.6 Cost - Types – Cost Reduction and Cost Control ( K1,K2,K3)

### **Unit IV: Production Function and Pricing (12 Hours)**

- 4.1 Law of Returns – Law of Variable Returns (K1)
- 4.2 Production Function (K1,K2,K3)
- 4.3 Pricing Methods and Strategies – Objectives (K1,K2,K3)
- 4.4 Factors and Methods of pricing (K1,K2,K3)
- 4.5 Role of government – Dual Pricing (K1,K2,K3)
- 4.6 Price Discrimination (K1,K2,K3)

### **Unit V: Market Competitions (12 Hours)**

- 5.1 Market Competitions - Perfect Competition – Definition ( K1)
- 5.2 Features - Conditions ( K1,K2,K3)
- 5.3 Price Determination under perfect competition -Equilibrium Price ( K1,K2,K3)
- 5.4 Monopoly – Definition and Types ( K1,K2,K3)
- 5.5 Monopolistic Competition– Features ( K1,K2,K3)
- 5.6 Duopoly and Oligopoly ( K1,K2,K3)

## **Text Books**

1. P.L. Mehtha, Managerial Economics, Sultan Chand and Sons, New Delhi, 13<sup>th</sup> Edition, 2014.
2. R L Varshney and K L Maheswari, Managerial Economics, Sultan Chand & Sons, 2018.

## **Reference Books**

1. Sankaran S, Managerial Economics, Margham Publications, 2016.
2. Paul A. Samuelson and William D. Nordhaus, Economics, Tata McGraw Hill, 18th Edition, 2017.
3. Dr. V C Sinha and Dr. Ritika Sinha, Managerial Economics, SBPD Publishing House, 2017
4. N Gregory Mankiw, Principles of Economics, Cengage, 2012

## **Web Resources**

<https://pestleanalysis.com/political-factors-affecting-business/>

<https://opentext.wsu.edu/cpim/chapter/chapter-4-the-economic-and-political-environment/>

**SEMESTER – III****UEBAA20 – INTERNATIONAL BUSINESS**

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> UEBAA20	<b>Title of the Course:</b> International Business	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Objectives**

1. To familiarize the students to the basic concepts of Globalization, Domestic and International Trade
2. To implement a broad understanding of International Business Environment
3. To develop an understanding of Multi-national corporation and the nuances in it
4. To enable the students to understand the concept of FDI and international support to International Business
5. To understand the activities of international economic institutions and social responsibility and ethical issues in International Business

**Course Outcomes (CO)**

The learners will be able to

1. Aware of concepts of globalization, domestic & international trade
2. Attain knowledge in the various types of International Business Environment
3. Gain in-depth knowledge about Multi-national Corporation
4. Acquire knowledge about FDI and also about Institutional support to International Business
5. Familiarize in various International Economic Institutions and social responsibility and ethical issues in international business

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	M	M	M
CO2	H	M	M	H	H	M
CO3	H	H	H	H	H	M
CO4	H	M	H	H	M	H
CO5	M	H	H	H	M	M

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	M	M	M	M	M	M
CO2	H	M	H	H	H	M
CO3	L	H	M	M	H	M
CO4	H	M	H	H	M	H
CO5	H	H	M	H	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

- Unit I: Introduction to International Business** (18 hours)
- 1.1 International Business - Meaning- Definition (K1,K2)
  - 1.2 Globalization - Meaning (K1,K2)
  - 1.3 Stages in Globalization (K1,K2,K3)
  - 1.4 Drivers of Globalization (K1,K2)
  - 1.5 Difference between Domestic and International trade (K1,K2,K3)
  - 1.6 Entry Strategies (K1,K2,K3,K4)
- Unit II: International Business Environment** (18 hours)
- 2.1 International business environment (K1,K2,K3)
  - 2.2 Cultural aspects (K1,K2,K3)
  - 2.3 Social structure (K1,K2,K3)
  - 2.4 Political, Legal and Economic factors (K1,K2,K3)
  - 2.5 General agreement on trade and tariffs (K1,K2,K3)
  - 2.6 World Trade Organization – Functions (K1,K2,K3)
- Unit III: Multinational Corporation** (18 hours)
- 3.1 Multinational corporation – Definition – Meaning (K1,K2,)
  - 3.2 Trans nationality index – Network spread index (K1,K2,K3)
  - 3.3 Organizational models (K1,K2,K3)
  - 3.4 Dominance of MNCs – MNC’s and International Trade (K1,K2,K3)
  - 3.5 Merits – Demerits of MNC’s (K1,K2,K3)
  - 3.6 Perspective – code of conduct – Multinationals in India (K1,K2,K3)
- Unit IV: Foreign Direct Investment** (18 hours)
- 4.1 Foreign direct investment (K1,K2,K3)
  - 4.2 Need for FDI (K1,K2,K3)
  - 4.3 Factors influencing FDI (K1,K2,K3)
  - 4.4 Problems in patent laws in international scenario (K1,K2,K3)
  - 4.5 IMF (K1,K2,K3)
  - 4.6 World Bank and ADB (K1,K2,K3)
- Unit V: Foreign Exchange Market** (18 hours)
- 5.1 Foreign exchange market – Functions – Nature (K1,K2,K3)
  - 5.2 Exchange rate determination (K1,K2,K3)
  - 5.3 Financial factors and balance of payments: disequilibrium and correction (K1,K2,K3)
  - 5.4 Currency convertibility (K1,K2,K3)
  - 5.5 General principles of CSR (K1,K2,K3)
  - 5.6 Social responsibility & Ethics in International Business (K1,K2,K3)

### **Text Books**

1. P Subba Rao, International Business: Texts and Cases, Himalaya Publishing House, 5<sup>th</sup> Edition, 2019
2. Justin Paul, International Business, Prentice Hall of India, 2<sup>nd</sup> Edition, 2007

### **Reference Books**

1. Francis Cherunilam, International Business: Texts and Cases, Prentice Hall, India, 11<sup>th</sup> Edition, 2017
2. Aswathappa K, International Business, Tata McGraw Hill Education Private Limited, New Delhi, 5<sup>th</sup> Edition, 2014
3. V K Bhalla and S Shiva Ramu, International Business – Environment and management, Anmol Publications Private Ltd. New Delhi 110002 (India), 12th revised and enlarged edition, 2009
4. Anant K Sundaram and J Stewart Black, The International Business Environment, PHI New Delhi, Eastern Economy Edition, 2012

### **Web Resources**

[www.imf.org/external/pubs/ft/fund/basics/trade.html](http://www.imf.org/external/pubs/ft/fund/basics/trade.html)  
<https://www.britannica.com/topic/international-trade>  
<https://www.wto.org>

**SEMESTER – III****UEBAB20 – LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: III</b>	UEBAB20	Logistics and Supply Chain Management	Theory	Elective	5	5	100

**Objectives**

1. To familiarize the students with the basic concepts of logistics and its types
2. To implement a broad understanding of logistics decision, planning and cost
3. To develop an understanding of Supply Chain Management, Supply Chain Software
4. To enable the students to understand the concept of inventory, warehousing and Supply Chain Interface
5. To understand the activities involved in distribution network planning and Integrated Supply Chain Management

**Course Outcomes (CO)**

The learners will be able to

1. Aware of the basic concepts of logistics and its types
2. Learn about the logistics decision, logistics planning and logistics cost
3. Develop an understanding of Supply Chain Management, Supply Chain Software
4. Gain knowledge about inventory, warehousing and Supply Chain Interface
5. Be enriched about the activities involved in distribution network planning and Integrated Supply Chain Management

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	M	M	M
CO2	M	H	H	H	H	M
CO3	H	H	H	H	M	H
CO4	M	L	H	M	H	M
CO5	M	H	H	M	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	M	M	H	M	M	M
CO2	M	H	H	H	L	M
CO3	H	H	H	H	M	H
CO4	H	L	H	M	M	M
CO5	M	H	L	M	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I Introduction (15 Hours)**

- 1.1 Logistics management – Definition – Meaning (K1, K2)
- 1.2 Types of logistics organization structure (K1)
- 1.3 JIT (K2)
- 1.4 Measures of logistics (K1, K2)
- 1.5 Qualitative measures (K1)
- 1.6 Quantitative measures (K1, K2)

### **UNIT II Logistics Planning (15 Hours)**

- 2.1 Logistics planning (K1)
- 2.2 Goal of logistics planning (K1, K2)
- 2.3 Key Factors in logistics planning (K1, K2)
- 2.4 Logistics Decision (K2)
- 2.4 Logistics Cost (K1)
- 2.6 Strategies (K1, K2)

### **UNIT III Supply Chain Management (15 Hours)**

- 3.1 Supply Chain Management (K1, K2)
- 3.2 Definition – Objectives (K1, K2)
- 3.3 Types of Supply Chain Management (K1, K2, K3)
- 3.4 Supply Chain Performance (K1, K2, K3)
- 3.5 Supply Chain Software (K1, K2)
- 3.6 Pitfalls in Supply Chain Management (K1, K2)

### **UNIT IV Inventory Management (15 Hours)**

- 4.1 Inventory – Order Processing (K1, K2, K3)
- 4.2 Purchasing – Warehousing (K1, K2)
- 4.3 Material Handling – Packaging (K1, K2, K3)
- 4.4 Customer Service Management (K1, K2, K3)
- 4.5 Marketing and Supply Chain Interface (K1, K2, K3)
- 4.6 Finance and Supply Chain Interface (K1, K2, K3)

### **UNIT V Decision Support System (15 Hours)**

- 5.1 Distribution and Network Planning and Warehouse Location (K1, K2)
- 5.2 Integrated supply (K1)
- 5.3 Decision Support Models of Supply Chain Management (K1, K2)
- 5.4 Transportation System (K1)
- 5.5 Warehouse Design (K1, K2)
- 5.6 Transshipment (K1, K2, K3)

## **Text Books**

1. Donald J Bowersox and David J Closs, Logistical Management, Tata McGraw Hill Education Private Limited, New Delhi, 2012.
2. Jeremy F Shapiro, Modelling and Supply Chain, Cenage Learning India Private Ltd, 2<sup>nd</sup> Edition, 2013

## **Reference Books**

1. Chopra S and P Mendall, Supply Chain Management: Strategy, Planning, Pearson Education, London, 6<sup>th</sup> Edition, 2016
2. David Simchi and Levi, designing and Managing Supply Chain, Tata McGraw Hill Education Private Limited, New Delhi, 3<sup>rd</sup> Edition, 2007
3. Bowersox, D.J., D.J. Closs, M.B. Cooper, and J.C. Bowersox, Supply Chain Logistics Management. 4th ed. New York, NY: McGraw-Hill, 2013
4. Coyle, J.C., C.J. Langley, Jr., R.A. Novack, and B.J. Gibson, Supply Chain Management: A Logistics Perspective. 10th ed. Boston, 2017

## **Web Resources**

<https://www.techtarget.com/searcherp/definition/logistics-management>

<https://www.bigcommerce.com/articles/ecommerce/inventory-management/>

**SEMESTER – III/IV****USBAC320/USBAC420 – HOSPITAL PLANNING AND ADMINISTRATION**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem:</b>	USBAC320	Hospital Planning and Administration	Theory	Skill Based Elective	2	2	100
III/IV	/USBAC420						

**Objectives**

1. To enable the students to understand the planning of Modern Hospital
2. To familiarize the students with Organization Structure and Medical Records of a Hospital
3. To make the students understand the importance of Hospital Waste Management
4. To assimilate the concept of Customer Experience Management to students in hospitals
5. To provide adequate knowledge about Clinical Support Services in Hospital

**Course Outcomes (CO)**

The learners will be able to

1. Understand and attain knowledge in the planning of Modern Hospital
2. Be familiarized with Organization Structure and Medical Records of a Hospital
3. Identify the importance of Hospital Waste Management
4. Understand the Customer Experience Management
5. Acquire adequate knowledge about Clinical Support Services in Hospitals

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	M	H	L
CO4	L	H	M	H	M	M
CO5	H	H	M	M	H	L

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	H
CO2	M	H	H	H	M	M
CO3	H	M	H	M	H	L
CO4	L	H	L	H	M	M
CO5	M	H	M	M	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I: Introduction to Hospital**

**(6 Hours)**

- 1.1 Hospital – Introduction (K1,K2)
- 1.2 Classification of Hospitals (K1,K2)
- 1.3 Some important considerations in Hospitals (K1,K2,K3)
- 1.4 Planning of Modern Hospital (K1,K2,K3,K4)
- 1.5 Basic requirements of a Hospital (K1,K2)
- 1.6 Computer aided Diagnosis - Expert Systems-Structure (K1,K2,K3)

### **Unit II: Organization Structure and Medical Records**

**(6 Hours)**

- 2.1 Organization Structure- Unique features of a Hospital (K1,K2,K3)
- 2.2 Structure and Context factors -Organizational structure – Structural dimensions of an organization (K1,K2,K3)
- 2.3 Organizational designs (K1,K2,K3)
- 2.4 Medical Records- Responsibilities (K1,K2,K3)
- 2.5 Computerization (K1,K2,K3)
- 2.6 Legal Aspects- Retention (K1,K2,K3)

### **Unit III: Hospital Waste Management**

**(6 Hours)**

- 3.1 Hospital Waste Management (K1,K2)
- 3.2 Waste Group- Infectious waste management- Categories (K1,K2,K3)
- 3.3 Waste collection (K1,K2,K3)
- 3.4 Waste disposal (K1,K2,K3)
- 3.5 Waste treatment (K1,K2,K3)
- 3.6 Waste minimization options (K1,K2,K3)

### **Unit IV: Customer Experience Management**

**(6 Hours)**

- 4.1 Customer Experience Management-Types (K1,K2,K3)
- 4.2 Customer Based factors - Meaning-Characteristics (K1,K2,K3)
- 4.3 Profitability of loyal customers (K1,K2,K3)
- 4.4 Environmental based factors (K1,K2,K3)
- 4.5 Customer Experience Management Framework (K1,K2,K3)
- 4.6 Design of customer experience (K1,K2,K3)

### **Unit V: Clinical Support Services**

**(6 Hours)**

- 5.1 Chaplain and counseling - Pharmacy – Laboratories (K1,K2,K3)
- 5.2 Blood Bank – Radiology -Diagnostic service – Nuclear medicine (K1,K2,K3)
- 5.3 Patient Relations in Hospital- Process and practice of Patient Relations (K1,K2,K3)
- 5.4 Patient Relations applied to Support Services (K1,K2,K3)
- 5.5 Paradigm shift to Quality-TQM- ISO 9000 series (K1,K2,K3,K4)
- 5.6 Benefits of ISO Certification (K1,K2,K3)

## **Text Books**

1. A.V. Srinivasan, Managing Modern Hospital, Sage Publication, 2<sup>nd</sup> Edition, 2018
2. Harris M G & Assoc, Managing Health Service: concept & practices, McLennan and Petty: Sydney, 2013

## **Reference Books**

1. S L. Goel and R.Kumar, Management of Hospital, Deep and Deep Publishers, 2017
2. G.P. Mogli, Medical Records, Organization and Management, Jaypee Brothers, New Delhi

## **Web Resources**

<https://ncert.nic.in/vocational/pdf/keda101.pdf>

[https://www.dca.org.sa/downloads/dca/quality\\_gate/04\\_E-Library/Healthcare%20Management/Principles-of-Hospital-Administration-and-Planning.pdf](https://www.dca.org.sa/downloads/dca/quality_gate/04_E-Library/Healthcare%20Management/Principles-of-Hospital-Administration-and-Planning.pdf)

**SEMESTER – IV****UCBAH20 – COST AND MANAGEMENT ACCOUNTING**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: IV</b>	UCBAH20	Cost and Management Accounting	Problem	Core	6	4	100

**Objectives**

1. To enable the students understand the concept of Management and Cost Accounting
2. To make the learners understand the elements of Cost and methods of Costing
3. To enable the students understand and prepare Financial Statement Analysis
4. To give practical knowledge over the most important tools of analysis and interpretation of Financial Statements
5. To make understand the learners and to give practical knowledge over the most important techniques of Management Accounting

**Course Outcomes (CO)**

The learners will be able to

1. Gain knowledge on the concepts of management and cost accounting techniques
2. Be equipped with the knowledge for preparation of cost sheet ,valuation of stock, pricing of material issues and prepare accounting for stage wise production under different process
3. Be capable of preparing, analysis and interpreting financial statements using various tools
4. Gain knowledge how to prepare fund flow statement and cash flow statement and using the same for decision making in business
5. Be able to make decisions in the form of preparing budgets and price fixation

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	H	M	H	M	M	H
CO3	H	M	H	M	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	M	H	M	M	H
CO3	H	M	H	M	M	M
CO4	H	L	H	H	M	H
CO5	H	H	L	H	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

## Course Syllabus

### UNIT-I Introduction to Cost and Management Accounting

(15 Hours)

- 1.1: Meaning – Definition – Scope (K1, K2)
- 1.2: Objectives – Functions (K1, K2, K3)
- 1.3: Merits and Demerits of cost and management accounting (K1, K2, K4)
- 1.4: Distinction between cost and management accounting (K1, K2, K4)
- 1.5: Tools of cost and management accounting (K1, K2, K3)
- 1.6: Techniques of cost and management accounting (K1, K2, K3)

### UNIT II Methods of Costing (15 Hours)

- 2.1: Cost sheet – meaning – definition – objectives (K1, K2, K3, K4)
- 2.2: Classification of cost (K1, K2, K3)
- 2.3: preparation of cost sheet (K1, K2)
- 2.4: Materials FIFO (K1, K2, K3)
- 2.5: LIFO (K1, K2, K3)
- 2.6: Process costing (K1,K2,K3,K4)

### UNIT- III -Financial Statement Analysis

(15 Hours)

- 3.1: Financial statement analysis – preparation of comparative statement (K1, K2, K3, K4)
- 3.2: Common size statement (K1, K2, K3)
- 3.3: Trend analysis (K1, K2, K3)
- 3.4: Ratio analysis – calculation of various ratios – profitability ratios (K1, K2, K3, K4)
- 3.5: Liquidity ratios, solvency ratios (K1, K2, K3, K4)
- 3.6: Turn over ratios and capital structure ratios (K1, K2, K3, K4)

### UNIT-IV -Fund Flow Statement and Cash Flow Statement

(15 Hours)

- 4.1: Fund flow analysis – meaning – working capital –current assets – current liabilities (K1, K2, K3, K4)
- 4.2: Preparation of fund flow statement (without adjustments) (K1, K2, K3)
- 4.3: Preparation of fund flow statement (simple problems with sale of fixed assets under indirect method) (K1, K2, K3, K4)
- 4.4: Cash flow analysis – meaning – importance – difference between fund flow and cash flow statement (K1, K2, K3, K4)
- 4.5: Cash flow statement – preparation of cash flow statement (without adjustments) (K1, K2, K3)
- 4.6: Preparation of cash flow statement (simple problems with sale of fixed assets under indirect method) (K2,K3,K4)

### UNIT-V- Marginal Costing and Budgetary Control

(15 Hours)

- 5.1: Marginal costing –definition – meaning – profit volume ratio (K1, K2, K3, K4)
- 5.2: Break even analysis (K1, K3, K4)
- 5.3: Cost volume profit analysis excluding managerial decision making problems (K1, K2, K3, K4)
- 5.4: Budget and budgetary control – meaning –types of budgets (K1, K2, K3, K4)
- 5.5: Cash budget, flexible budget (K1, K2, K3, K4)
- 5.6: Production budget and sales budget (K3, K4)

**Note: Theory 20% and Problems 80%**

## **Text Books**

1. Khan and Jain, Management Accounting, Tata McGraw Hill., New Delhi, 7<sup>th</sup> Edition, 2012
2. T.S. Reddy and Y. Hari Prasad Reddy, Cost and Management Accounting, Margham Publications, Chennai, 2018

## **Reference Books**

1. S.P. Iyengar, Cost and Management Accounting, Sultan Chand & Sons, New Delhi, 5<sup>th</sup> Edition, 2015
2. R S N Pillai and V Bhagavathi, Cost Accounting, Sultan Chand and Sons, New Delhi, 5<sup>th</sup> Edition, 2014
3. Maheshwari S.N, Advanced Accountancy (Part1I). Vikas, 2007.
4. Gupta, R.L and M. Radhaswamy. Advanced Accountancy, Sultan Chand & Sons, 2016.

## **Web Resources**

<https://www.wallstreetmojo.com/ratio-analysis/>

<https://efinancemanagement.com/financial-accounting/management-accounting>

<https://www.toppr.com/guides/fundamentals-of-accounting/fundamentals-of-cost-accounting/meaning-of-management-accounting>

## SEMESTER – IV

### UCBAJ20 – RESEARCH METHODOLOGY

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> UCBAJ20	<b>Title of the Course:</b> Research Methodology	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objectives

1. To understand the basic concepts of research
2. To familiarize with research design and hypothesis testing
3. To acquire knowledge in sampling techniques
4. To gain knowledge about data collection methods
5. To acquire knowledge in writing a report

#### Course Outcomes (CO)

The learners will be able to

1. Know the general definition of research and qualities of research
2. Be able to distinguish the research design and to conduct statistical test of a hypothesis
3. Define the sampling design on the basis of the data
4. Understand the types of data collection and to use it for their study based on the requirement
5. Be able to write report and do statistical analysis using software packages

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	M	H
CO2	H	L	L	H	H	M
CO3	H	L	H	M	M	M
CO4	H	M	L	M	M	H
CO5	H	M	M	H	H	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	H	M	M
CO2	H	L	M	H	H	M
CO3	M	L	H	M	M	M
CO4	H	M	H	M	H	H
CO5	H	M	M	H	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I Introduction to Research**

**(15 Hours)**

- 1.1 Definition of Research – Meaning (K1,K2)
- 1.2 Objectives (K1,K2)
- 1.3 Types of research (K1,K2)
- 1.4 Research process (K1,K2)
- 1.5 Qualities of a researcher (K1,K2)
- 1.6 Criteria of good research – Problems encountered in research. (K1,K2)

### **UNIT II Research Design and Hypothesis Testing**

**(15 Hours)**

- 2.1 Definition of research problem (K1,K2)
- 2.2 Research design - Features of good research design (K1,K2)
- 2.3 Types of research design (K1,K2,K3)
- 2.4 Factors affecting research design (K1,K2,K3)
- 2.5 Hypothesis – Meaning – Definition – Need for hypothesis – Formulation of hypothesis (K1,K2,K3)
- 2.6 Types of hypothesis – Test of hypothesis – Type I and Type II error (K1,K2,K3)

### **UNIT III Sampling Techniques**

**(15 Hours)**

- 3.1 Sampling techniques – Need for sampling techniques (K1,K2)
- 3.2 Types of sampling (K1,K2,K3)
- 3.3 Merits and demerits of sampling (K1,K2)
- 3.4 Sampling and Non-sampling errors-Sampling distribution (K1,K2,K3)
- 3.5 Essential quality of good sampling (K1,K2,K3)
- 3.6 Requisites in determining the Sample size (K1,K2,K3)

### **UNIT IV Methods of Data Collection**

**(15 Hours)**

- 4.1 Collection of primary and secondary data (K1,K2,K3)
- 4.2 Interview techniques - Survey and interview method – Merits and Demerits (K1,K2,K3)
- 4.3 Questionnaire – Pre requisites of using questionnaire (K1,K2,K3)
- 4.4 Structured and unstructured questionnaire (K1,K2,K3)
- 4.5 Types of secondary data (K1,K2,K3)
- 4.6 Measurement of scaling techniques (K1,K2,K3)

### **UNIT V Report Writing**

**(15 Hours)**

- 5.1 Meaning and techniques of Interpretation (K1,K2,K3)
- 5.2 Data preparation process (K1,K2,K3)
- 5.3 Types of analysis (K1,K2,K3)
- 5.4 Significance of Report writing (K1,K2,K3)
- 5.5 Layout of research report (K1,K2,K3)
- 5.6 Types of report- Statistical Packages. (K1,K2,K3)

## **Text Books**

1. C.R. Kothari, Research Methodology Methods and Techniques, New Age International, 3<sup>rd</sup> Edition, 2014.
2. P. Ravilochanan, Research Methodology, Margham Publication, Chennai, 2<sup>nd</sup> Edition, 2012.

## **Reference Books**

1. B.N. Ghosh, Scientific Methods and Social Research, Streling Publishers Pvt. Ltd., New Delhi, 4th Edition, 2015.
2. Ranjith Kumar, Research Methodology, Sage Publishing, New Delhi, 4<sup>th</sup> Edition, 2017.
3. Donald R.Cooper, Pamela S. Schindler, Business Research Methods, 12th edition, Tata McGraw Hill,2018.
4. Richard L.Levin, Davis S.Rubin, Sanjay Rastogi, Masood H. Siddiqui, Statistics for Management, Pearson Education, 8th edition, 2017.

## **Web Resources**

[https://ebooks.lpude.in/commerce/mcom/term\\_2/DCOM408\\_DMGT404\\_RESEARCH\\_METHODODOLOGY.pdf](https://ebooks.lpude.in/commerce/mcom/term_2/DCOM408_DMGT404_RESEARCH_METHODODOLOGY.pdf)

[https://gurukpo.com/Content/BBA/ResearchMethod\\_in\\_Mngg.pdf](https://gurukpo.com/Content/BBA/ResearchMethod_in_Mngg.pdf)

[https://mrcet.com/downloads/digital\\_notes/CSE/Mtech/I%20Year/RESEARCH%20METHODODOLOGY.pdf](https://mrcet.com/downloads/digital_notes/CSE/Mtech/I%20Year/RESEARCH%20METHODODOLOGY.pdf)

## SEMESTER – IV

### UCBAK20 – HUMAN RESOURCE MANAGEMENT AND DEVELOPMENT

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> UCBAK20	<b>Title of the Course:</b> Human Resource Management and Development	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objectives

1. To understand the various HR Concepts and about Human Resource Planning
2. To have a good understanding of the various HR functions like Recruitment, selection and training process and also about the performance appraisal
3. To acquire knowledge in the management of talents in the organisation
4. To enable the students to understand the types of welfare and safety measures
5. To provide an overview of HR audit, ethics and about the challenges in HR

#### Course Outcomes (CO)

The learners will be able to

1. Integrate the knowledge of HR concepts and role of HR in the organisation
2. Attain the knowledge of the various HR functions and its importance
3. Develop deep insight into the concepts of managing talents in the organisation
4. Understand welfare and safety measures and its importance for the employees
5. Understand the importance of HR audit, HR ethics and challenges ahead of HRM

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	M
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	M
CO5	M	M	M	H	H	L

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	M
CO2	H	H	M	H	H	H
CO3	M	H	H	L	H	H
CO4	H	H	M	H	M	M
CO5	M	H	M	M	H	L

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I Introduction to HRM (18 hours)**

- 1.1: Introduction to HRM – Meaning – Nature (K1, K2, K3, K4)
- 1.2: Functions of HRM (K1, K2, K4)
- 1.3: Objectives of HRM (K1, K2, K4)
- 1.4: Difference between HRM and Personnel Management (K1, K2, K4)
- 1.5: HRP – Meaning – Importance (K1, K2, K3, K4)
- 1.6: HRIS (Human Resource Information System) (K1, K2, K4)

### **UNIT II Functions of HRM (18 hours)**

- 2.1: Recruitment – Meaning – Factors – Process (K1, K2, K3)
- 2.2: Selection – Meaning – Process (K1, K2, K3, K4)
- 2.3: Induction and orientation – Meaning - Strategic choices – Problems (K1, K2, K3)
- 2.4: Performance appraisal – Meaning – Objectives – Problems (K1, K2, K4)
- 2.5: Methods of Performance appraisal (K1, K2)
- 2.6: Training – Process – Methods (K1, K2, K3, K4)

### **UNIT III Talent Management (18 hours)**

- 3.1 : Career Development – Roles – Initiatives (K1, K2)
- 3.2 : Talent Management – Lifecycle – Initiatives - QWL (Quality of work life) – Factors (K1, K2, K3, K4)
- 3.3 : Job Analysis – Meaning – Process – Methods (K1, K2, K3, K4)
- 3.4: Job Design – Meaning – Approaches (K1, K2, K3, K4)
- 3.5: Participative Management- Meaning – Methods (K1, K2, K4)
- 3.6: Separation – Meaning – Types – Causes (K1, K2, K3, K4)

### **UNIT IV Employee Welfare and Safety (18 hours)**

- 4.1 : Employee Welfare – Meaning - Merits and demerits – Types (K1, K2)
- 4.2: Approaches to Employee Welfare – Safety – Meaning – Need (K1, K2, K3)
- 4.3: Health - Physical health - Health services – Mental health (K1, K2, K3, K4)
- 4.4: Work stress - Coping strategies (K1, K2, K3, K4)
- 4.5: Trade unions – Meaning – Reasons - Strategic choices (K1, K2, K3, K4)
- 4.6: Disputes - Causes and settlement. (K1, K2, K3, K4)

### **UNIT V HR Audit and Challenges (18 hours)**

- 5.1 : HR Audit - Meaning- Need – Approaches (K1, K2)
- 5.2 : HR Ethics - Meaning - Sources- Importance (K1, K2, K3, K4) 5.3: HR Ethical Issues (K1, K2, K3)
- 5.4 : Managing ethics (K1, K2, K3, K4)
- 5.5: Challenges in HR (K1, K2)
- 5.6: E-HR (K1, K2, K4)

## **Text Books**

1. K Aswathappa, Human Resource Management (Text and Cases), Tata McGraw Hill Education Private Limited, New Delhi, 8<sup>th</sup> Edition, 2018
2. V S P Rao, Human Resource Management (Text and Cases), Excel Books, New Delhi, 2<sup>nd</sup> Edition, 2012

## **Reference Books**

1. P C Tripathi, Human Resource Development, Sultan Chand & Sons, New Delhi, 6<sup>th</sup> Edition, 2015
2. Biswajeet, Pattanayak & Harish C Varma, A Textbook on Human Resource Management, Wheelers Publishing Inc, 4<sup>th</sup> Edition, 2015.
3. L M Prasad , Human Resource Management , Sultan Chand and Sons 3<sup>rd</sup> Edition , 2014
4. Garry Deseler, Human Resource Management, Pearson, 15<sup>th</sup> Edition, 2017

## **Web Resources**

<https://mrcet.com/downloads/MBA/digitalnotes/Human%20Resource%20Management.pdf>  
<https://backup.pondiuni.edu.in/sites/default/files/HR%20Management-230113.pdf>

## UAITR20 - INSTITUTIONAL TRAINING

Each student shall be required to prepare on the basis of the training undergone by her in a business or industrial organization. The report should demonstrate the capability of the student in studying the organization and its process in totality.

### EVALUATION PATTERN

- ✓ Each student should undergo the training separately.
- ✓ The mode of evaluating the student will consist of two parts. One on the basis of the report writing and the other will be through Viva-Voce.
- ✓ The valuation of the report writing will be done by the Internal Examiner while for the oral i.e. Viva-Voce Examination an External Examiner will be called for.
- ✓ 60 marks will be awarded for the report writing and 40 marks for the Oral (Viva-Voce) Examination.
- ✓ Training will be for a period of 25 days which will be during the month of December of every academic year.
- ✓ Each student should find a reputed organization which carries out the important functions like Production, Human Resource, Finance and Marketing to carry out her investigation with the approval of the department
- ✓ Records should be maintained for the daily activities signed by the concerned authorities in the organization.
- ✓ After completion of the training, the students should get the Completed Certificate and the Attendance Certificate from the company when she comes to the College.
- ✓ Any change of the organization during the course of the Training should be done only after getting the consent from the Head of the Department of the College in a written format
- ✓ The following are the components for Report Writing (60 Marks)

Content	40 Marks
Layout	10 Marks
Grammar	10 Marks

- ✓ For the Viva-Voce Examinations (Semester – 40 Marks)

Oral Presentation	30 Marks
Question and Answer	10 Marks

**SEMESTER – III/IV**

**USBAD320/USBAD420 – HOTEL PLANNING AND ADMINISTRATION**

<b>Year: II</b>	<b>Course Code:</b> USBAD320/ USBAD420	<b>Title of the Course:</b> Hotel Planning and Administration	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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**Objectives**

1. To develop a conceptual understanding of the Hotel Planning and Administration
2. To procure knowledge on Front Office and its Operations
3. To obtain comprehensive understanding House Keeping and its Operations
4. To understand the importance of Housekeeping Management
5. To accustom the learners with the planning of landscaping and its maintenance in hotel

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concepts in Hotel Planning and Administration
2. Acquire the acquaintance of Front Office and its operations
3. Gain knowledge on Housekeeping department and its operations
4. Understand the functions of control Desk and cleaning routines in hotel
5. Obtain knowledge on Horticulture and landscaping in the hotel management

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	M	H	H	M
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	H	H	M	M
CO2	H	H	M	H	H	M
CO3	H	H	H	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	M	L	H	L

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I Introduction (15 hours)**

- 1.1 Origin (K1, K2)
- 1.2 Introduction- (K1, K2)
- 1.3 Types of Hotel and their Categorisation (K1,K2,K3, K4)
- 1.4 Hotel Chain Associations- (K1, K2, K3)
- 1.5 Organisational structure of a Hotel (K1, K2, K3)
- 1.6 Hotel Management and Operations (K1, K2, K3)

### **Unit II Front office (15 hours)**

- 2.1 Front office (K1, K2)
- 2.2 Definition (K1, K2)
- 2.3 Qualities of Front Office and salesmanship (K1, K2, K3)
- 2.4 Duties and Responsibilities of Front Office Personnel (K1, K2, K3, K4)
- 2.5 Organization Chart (K1, K2, K3)
- 2.6 Guest Cycle Stage (K1, K2, K3)

### **Unit III Housekeeping (15 hours)**

- 3.1 Housekeeping (K1, K2)
- 3.2 Definition (K1, K2)
- 3.3 Types of Rooms (K1, K2, K3)
- 3.4 Competencies of Housekeeping Personnel (K1, K2, K3)
- 3.5 Duties and Responsibilities of Housekeeping Professional. (K1, K2, K3,K4)
- 3.6 Organization Chart (K1, K2, K3)

### **Unit IV Control Desk (15 hours)**

- 4.1 Control Desk – Files and Registers (K1, K2)
- 4.2 Co-ordination and Control (K1, K2,)
- 4.3 Handling guest Priorities and request (K1, K2, K3)
- 4.4 Cleaning of Rooms and Bathroom (K1, K2, K3)
- 4.5 Bed Making Process – Turndown or Evening Service –
- 4.6 Inspection. (K1, K2,K3,K4)

### **UNIT V Landscaping (15 hours)**

- 5.1 Horticulture (K1, K2, K3)
- 5.2 Landscaping (K1, K2)
- 5.3 Facilities and Equipment (K1, K2, K3)
- 5.4 Types of Garden (K1, K2, K3)
- 5.5 Safety (K1, K2, K3, K4)
- 5.6 Security (K1, K2,K3)

### **Text Books**

1. Sudhir Andrews, Hotel Front Office, Tata McGraw Hill Publication, New Delhi, 2<sup>nd</sup> Edition, 2008.
2. Sudhir Andrews, Hotel Housekeeping, Tata McGraw Hill Publication, New Delhi, 1986.

### **Reference Books**

1. Hotel Housekeeping and Management Operations, Sudhir Andrews, Tata McGraw Hill Publication, New Delhi, 5<sup>th</sup> Edition Reprint, 2008.

### **Web Resources**

<https://hmhub.in/design-consideration-hotel-design/>

[https://www.mlsu.ac.in/econtents/1186\\_e-book%20of%20Hotel\\_management\\_and\\_operations.pdf](https://www.mlsu.ac.in/econtents/1186_e-book%20of%20Hotel_management_and_operations.pdf)

**SEMESTER – V**  
**UCBAL20 – FINANCIAL MANAGEMENT**

<b>Year: III</b> <b>Sem: V</b>	<b>Course Code:</b> UCBAL20	<b>Title of the Course:</b> Financial Management	<b>Course Type:</b> Problem	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To enable the learners understand the concept of financial management, scope, objectives and time value of money
2. To help the learners to acquire knowledge over evaluation of capital investment
3. To make the learners understand the classification of cost of capital, its features and importance
4. To make the learner understand the capital structure theories and practical. Also dividend theory and policy
5. To enable the students understand the working capital and enable then to estimate working capital requirements

**Course Outcomes (CO)**

The learners will be able to

1. Be well-versed in the financial decision, functions and organisation of financial managements
2. Come out with the practical knowledge of evaluating capital investment using traditional and modern capital budgeting methods
3. Gain practical knowledge in calculating cost of different capitals
4. Acquire knowledge over capital structure and work out capital structure under different approaches
5. Gain both theoretical and practical knowledge on working capital management and Inventory management

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	H	L	H	M
CO3	H	H	H	M	M	M
CO4	H	M	M	L	M	L
CO5	H	M	M	L	L	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	H	M
CO2	H	M	H	L	H	M
CO3	M	H	H	M	H	M
CO4	H	M	H	L	M	L
CO5	H	L	M	H	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

## Course Syllabus

### **Unit I – Foundations of Finance (15 Hours)**

- 1.1 : Financial Management –Scope –Objectives– Profit Maximization – Wealth Maximization (K1,K2,K3)
- 1.2 : Financial Decisions (K1,K2,K3)
- 1.3 : Functions of Financial Management (K1,K2,K3)
- 1.4: Organization of Financial Management (K1,K2,K3)
- 1.5: Functions of Treasurer and Controller (K1,K2,K3)
- 1.6: Time Value of Money –Concept–Reasons for time preferences of money (K1,K2,K4,K5)

### **Unit II: Capital budgeting (15 Hours)**

- 2.1: Capital budgeting – Concept – Need of capital budgeting (K1,K2,K3)
- 2.2: Pay back (K1,K2,K3)
- 2.3: ARR (K1,K2,K3)
- 2.4: NPV (K1,K2,K3)
- 2.5: IRR (K1,K2,K3)
- 2.6: PI (K1,K2,K3)

### **Unit III: Cost of capital (15 Hours)**

- 3.1: Cost of capital – Features – Importance (K1,K2, K3)
- 3.2: Classification of cost (K1,K2, K3)
- 3.3: Cost of Debt (K1,K2, K3)
- 3.4: Cost of Preference share capital (K1,K2, K3)
- 3.5: Cost of Equity share capital (K1,K2, K3)
- 3.6:– Retained Earnings – CAPM – WACC. (K1,K2, K3)

### **Unit IV: Financial and Dividend Decision (15 Hours)**

- 4.1 : Leverage – Meaning – Types – Financial – Operating leverage and combined leverage (K1,K2,K3,K4)
- 4.2 : Capital structure – Designing capital structure (K1,K2,K3,K4)
- 4.3 : Theories of Capital structure – Net Income approach- Net operating income approach (K1,K2,K3,K4)
- 4.4 : Traditional approach - Modigliani Miller approach (K1,K2, K3,K4)
- 4.5 : Dividend policy – Determinant of dividend policy – forms of dividend policy – form of dividends – Dividend theory (K1,K2,K3,K4)
- 4.6 : Walter model, Gordon model (K1,K2,K3,K4)

### **Unit V: Working Capital Management (15 Hours)**

- 5.1: Principle of Working capital – Concept (K1,K2,K3,)
- 5.2: Need – Determinants (K1,K2,K3)
- 5.3: Issues and estimation of working capital (K1,K2,K3)
- 5.4: Inventory management - EOQ (K1,K2,K3,K4)
- 5.5 : Stock levels (K1,K2,K3,K4)
- 5.6: Cash management (K1,K2,K3)

**Note: 60% problems and 40% theory**

**Text Books**

1. Dr. S. N. Maheswari, Financial Management, Principle and Practice, Sultan Chand & Sons, New Delhi, 15<sup>th</sup> Edition, 2013.
2. M.Y. Khan and P.K. Jain, Financial Management, Text, Problem and Cases, Tata McGraw Hill Education Private Limited, New Delhi, 8<sup>th</sup> Edition, 2018.

**Reference Books**

1. M. Pandey, Financial Management, Vikas Publishing House, New Delhi, 11<sup>th</sup> Edition, 2015.
2. Chandra Prasanna, Financial Management: Theory and Practice, Tata McGraw Hill Education Private Limited, New Delhi, 9<sup>th</sup> Edition, 2015.
3. M.Y. Khan and P.K. Jain, Financial Management, Text, Problem and Cases, Tata McGraw Hill Education Private Limited, New Delhi, 8<sup>th</sup> Edition, 2018
4. Dr Kulkarni and Dr. SathyaPrasad, Financial Management, 13<sup>th</sup> Edition 2011

**Web Resources**

<https://mycbseguide.com/blog/financial-management-class-12-notes-business-studies/>

[Financial Management on JSTOR](#)

Financial Management Wiley online library

**SEMESTER – V****UCBAM20 – INDUSTRIAL RELATIONS**

<b>Year: III</b> <b>Sem: V</b>	<b>Course Code:</b> UCBAM20	<b>Title of the Course:</b> Industrial Relations	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand the concept and the meaning of Industrial Relations and The Payment of Wages Act, 1936
2. To acquire knowledge about The Factories Act, 1947
3. To understand the concept of The Maternity Benefit Act, 1936
4. To understand the concept of The Industrial Dispute Act, 1947
5. To enable the learners absorb the concept of The Employees State Insurance Act, 1948 and The Minimum Wages Act 1948

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concept & meaning of Industrial Relations and The Payment of Wages Act, 1936
2. Acquire knowledge about The Factories Act, 1947
3. Analyse and understand the concept of The Maternity Benefit Act, 1961
4. Attain knowledge of The Industrial Dispute Act, 1947
5. Be able to absorb the concept of The Employees State Insurance Act, 1948 & The Minimum Wages Act 1948

<b>CO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	M	L	L	M	L	M
<b>CO2</b>	L	L	L	M	M	M
<b>CO3</b>	L	M	L	M	L	L
<b>CO4</b>	M	L	L	M	H	L
<b>CO5</b>	M	L	L	M	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

<b>CO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	M	L	L	M	L	M
<b>CO2</b>	L	H	L	M	M	M
<b>CO3</b>	H	M	L	H	L	H
<b>CO4</b>	M	L	H	M	H	L
<b>CO5</b>	M	HL	L	M	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I Introduction**

**(18 hours)**

- 1.1 Introduction to IR – meaning – importance (K1)
- 1.2 Participation and Empowerment – definition – objectives – advantages (K1, K2)
- 1.3 The Payment of Wages Act, 1936 – rules for the payment of wages (K1, K2, K3)
- 1.4 Deduction of wages – enforcement of the Act (K2, K3)
- 1.5 Roles and functions of the inspectors (K2, K3)
- 1.6 Powers of the inspectors (K1, K2, K3)

### **UNIT II The Factories Act, 1948**

**(18 hours)**

- 2.1 The Factories Act, 1948 – definition – Factory – Manufacturing process – Worker (K1, K2)
- 2.2 Approval, licensing and registration – notice by occupier (K1, K2, K3)
- 2.3 The Inspecting staff (K2, K3)
- 2.4 Health of the worker (K2, K3)
- 2.5 Safety of the worker (K2, K3)
- 2.6 Welfare of the worker – the working hours of adults – employment of adults – employment of young person – holidays and leave – overtime. (K2, K3, K4)

### **UNIT III The Maternity Benefit Act, 1961 & The Employee State Insurance Act, 1948 (18 hours)**

- 3.1 The Maternity Benefit Act, 1961 – definition – child – employer – circumstances and period (K1, K2)
- 3.2 Prohibition of Employment – right to the payment to Maternity Benefit – leave and nursing breaks – appointment of inspectors - penalties and offences (K2, K3, K4)
- 3.3 The Employee State Insurance Act, 1948 – definition – Principal Employer – Insurable Workman (K1, K2)
- 3.4 ESI Corporation – powers and duties of the corporation – the Standing Committee – medical benefit council (K2, K3, K4)
- 3.5 ESI fund – inspectors – contributions – benefits – rules regarding benefits – employee's insurance court – penalties (K2, K3, K4)
- 3.6 Obligations and rights of the employees and employers. (K2, K3)

### **UNIT IV The Industrial Dispute Act, 1947**

**(18 hours)**

- 4.1 The Industrial Dispute Act, 1947 – scope and objectives (K1, K2)
- 4.2 Features – definition of Industry (K1, K2, K3)
- 4.3 Industrial dispute – industrial establishment of undertaking (K1)
- 4.4 Layoff, lockout (K2, K3)
- 4.5 Retrenchment – strike (K2, K3)
- 4.6 Unfair labour practices. (K2, K3)

### **UNIT V The Minimum Wages Act, 1948**

**(18 hours)**

- 5.1 The Minimum Wages Act, 1948 – definition – fixation and revision of wages – minimum rates of wages (K1, K2)
- 5.2 Procedure for fixing and revision minimum wages – advisory board – central advisory board (K2, K3)
- 5.3 Safeguard in the payment of minimum wages (K2, K3)
- 5.4 Power of inspectors – claims (K2, K3)
- 5.5 Offences and penalties (K2, K3)
- 5.6 Obligation and rights of the employees (K2, K3, K4)

**Text Books**

1. Saravanavel & Sumathi, Legal Aspects of Business, Eswar Press, New Delhi, 2<sup>nd</sup> Edition, 2012
2. S C Srivastava, Industrial Relations and Labour Laws, Vikas Publishing House, New Delhi, 6<sup>th</sup> Edition, 2017

**Reference Books**

1. Martand T Telsang, Industrial and Business Management, Sultan Chand & Sons, New Delhi, 3<sup>rd</sup> Edition, 2014
2. M R Sreenivasan, Industrial Relations and labour Legislations, Margham Publications, Chennai, 6<sup>th</sup> Edition, 2014
3. Pradeep Kumar; Personnel Management and Industrial Relations, Kedarnath Ramnath and Company, 2018
4. Gupta CB (Dr), Kapoor N.D., Tripathi PC; Industrial Relations and Labour Laws, Sultan Chand and Sons, 2020.

**Web Resources**

<https://labour.gov.in/industrial-relations>

[https://www.srcc.edu/e-resources?field\\_e\\_resources\\_tid=447](https://www.srcc.edu/e-resources?field_e_resources_tid=447)

<https://theintactone.com/2022/08/17/joint-management-councils/>

**SEMESTER – V**

**UCBAN20 – BANKING AND INSURANCE**

<b>Year: III</b> <b>Sem: V</b>	<b>Course Code:</b> UCBAN20	<b>Title of the Course:</b> Banking and Insurance	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To impart knowledge to learners on banking system and its evolution
2. To make the learners understand the functions of RBI and Negotiable instruments including cheque
3. To enable the learners to understand procedures of opening of accounts in bank, bank customer relationship and e - banking services
4. To provide knowledge over insurance and its need principles etc., to the learners
5. To impart knowledge over different types of insurance to the learners

**Course Outcomes (CO)**

The learners will be able to

1. Gain knowledge on banking system and its services
2. Equip with the knowledge of RBI and its functions and importance of negotiable instruments
3. Gain the knowledge as to how to open and operate accounts in bank and also maintaining relationship with bankers
4. Understand the meaning of the insurance and its necessary principles
5. Gain knowledge over different types of insurance, their applicability and benefits

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	M	H

**(Low - L, Medium – M, High - H)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	M
CO2	M	H	H	H	M	H
CO3	H	M	H	H	M	H
CO4	H	H	M	H	H	H
CO5	H	H	M	H	M	M

**(Low - L, Medium – M, High - H)**

## **Course Syllabus**

### **UNIT I - Banks and their modern services**

**(15 Hours)**

- 1.1: Definition of Banking – Classification of Banks (K1, K2)
- 1.2: RBI – objectives – functions (K1,K2,K3)
- 1.3 : Commercial Banking - functions (K1,K3)
- 1.4 : Opening of accounts – meaning – types of accounts – steps in opening account- bank customer – meaning – relationship – types (K1,K2,K3)
- 1.5 : E-banking – meaning – services – benefits (K1,K2,K3)
- 1.6: Internet banking – meaning – services (K1,K2,K3)

### **UNIT II - Negotiable instruments**

**(15 Hours)**

- 2.1: Negotiable Instrument – Meaning – characteristics (K1,K2,K3)
- 2.2: Cheques –types (K1,K3)
- 2.3 : Promissory notes – features (K1,K2,K3)
- 2.4 : Bill of exchange – features – types (K1,K2,K3)
- 2.5 : Endorsements – meaning – components – types – effects of endorsement (K1,K2,K3)
- 2.6: Crossing of cheques – meaning – objectives – need – types (K1,K2,K3)

### **UNIT III - Paying and Collecting bankers**

**(15 Hours)**

- 3.1: Paying banker – meaning – Banker’s duty (K1,K2,K3)
- 3.2: Refusal of cheques payment (K1,K2,K3)
- 3.3 : Collecting banker –meaning (K1,K2,)
- 3.4 : Collecting banker’s role- duty (K1,K2,K3)
- 3.5 : Bank lending – meaning – significance of bank (K1,K2,K3)
- 3.6: Lending – forms of lending – securities of lending (K1,K2,K4)

### **UNIT IV Introduction to Insurance**

**(15 Hours)**

- 4.1: Introduction – Meaning of insurance (K1,K2,K3)
- 4.2: Evolution of insurance (K1, K4)
- 4.3 : Features of insurance (K1, K2)
- 4.4 : Functions and importance of insurance (K1,K2,K3)
- 4.5: Principles of insurance (K1,K2,K3)
- 4.6: Role of IRDA (K1,K2,K3)

### **UNIT V Types of Insurance**

**(15 Hours)**

- 5.1 : Life insurance – Introduction – Meaning of Life Insurance – Definition of Life Insurance – (K1, K2, K3)
- 5.2 : Characteristic of life insurance – Advantages of life insurance (K1,K2,K3)
- 5.3 : Fire insurance – Meaning of life insurance – definition of life insurance (K1,K2,K3)
- 5.4 : Functions of life insurance- kinds of fire policies - Meaning of Marine insurance (K1,K2,K3)
- 5.5: Types of Marine insurance - Procedure involved in taking a marine policy (K1,K2,K3,K4)
- 5.6: Marine losses- types of marine losses (K1,K2,K3)

### **Text Books**

1. Dr. S. Gurusamy, Banking Theory Law and Practice, Vijay Nicole Imprints Private Ltd, Chennai, 4<sup>th</sup> Edition, 2017
2. Varshney P. N, Banking Law and Practice, Sultan Chand and Sons, New Delhi, 25<sup>th</sup> Reprint Edition, 2019

### **Reference Books**

1. Sundaram K.P.M, Banking Law and Practice, Sultan Chand & Sons, New Delhi, 2<sup>nd</sup> Edition, 2015.
2. D. Muraleedharan, Modern Banking Theory and Practice, PHL Learning Private Limited, New Delhi, 2<sup>nd</sup> Edition, 2018
3. O P Agarwal, Banking and Insurance, Himalaya Publishing House, 5<sup>th</sup> Edition, 2022
4. Sunil Kumar, Banking and Insurance, Galgotia Publishing House, 2017

### **Web Resources**

<https://www.studocu.com/in/document/university-of-calicut/bcom/banking-and-insurance-short-notes-by-juraz/20962641>

<https://gdcboysang.ac.in/About/droid/uploads/BI5thSemBcom.pdf>

**SEMESTER – V****UCBAP22– E-COMMERCE**

<b>Year: III Sem: V</b>	<b>Course Code: UCBAP22</b>	<b>Title of the Course: E-COMMERCE</b>	<b>Course Type: Theory</b>	<b>Course Category: Elective</b>	<b>H/W 3</b>	<b>Credits 3</b>	<b>Marks 100</b>
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**Course Objectives:**

1. To understand key business concepts and strategies applicable to e-commerce
2. To acquire the knowledge of Business models
3. To study the electronic system for payment
4. To familiarise with the trends and growth of M-commerce in India
5. To gain deep knowledge on tally

**Course Outcomes (CO)**

The learners will be able to

1. Understand the basic concepts of e-commerce.
2. Apply the gained knowledge on purchasing through platforms
3. Gain knowledge about the benefits of e-payment
4. Apply the gained knowledge of mobile commerce in the day to day life.
5. Get well versed in tally and can become an accountant in any concern.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	H	L	H	M
CO3	M	M	H	M	H	M
CO4	L	M	M	L	M	L
CO5	L	M	M	L	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	M	M	H	M	H	M
CO2	H	M	H	L	M	H
CO3	M	H	H	H	H	M
CO4	L	M	M	L	M	H
CO5	L	M	M	L	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I: Introduction to Electronic Commerce and E Procurement system (15 Hours)**

- 1.1 Meaning and Definition of E- commerce- Perspectives of Electronic Commerce
- 1.2 E- Commerce, E- Business and E- Transaction
- 1.3 Drivers of E-commerce
- 1.4 Myths about E-Commerce
- 1.5 Advantages and limitations of e-commerce.
- 1.6 E Procurement system – Definition – E Procurement Process – Benefits and Challenges

### **Unit II: Inter-Organizational Transactions and Business Models (15 Hours)**

- 2.1 Introduction - Inter-organisational transactions
- 2.2 Trade cycle and credit transactions
- 2.3 Various kinds of transactions -Electronic markets
- 2.4 E commerce Business Models – Amazon, India Mart, Social commerce (Microsoft)
- 2.5 ONDC Platform (Open Network for Digital commerce)
- 2.6. GEM portal (Government E Market Place)

### **Unit III: E-Payment (15 Hours)**

- 3.1 E-Payment - Benefits of Electronic payment- Components of electronic systems
- 3.2 Electronic fund transfer - Crptocurrency
- 3.3 Credit card system on the internet - Components of Online credit processing
- 3.4 Players in the credit card system -Popular Electronic Payment Methods
- 3.5 Security schemes in Electronic Payment System
- 3.6 Online transaction protocols

### **Unit IV: Mobile commerce (15 Hours)**

- 4.1 Introduction- factors that drive M-Commerce
- 4.2 Difference between E-Commerce and M-Commerce
- 4.3 Growth of M-Commerce in India
- 4.4 Advantages- Technology behind M-Commerce
- 4.5 Applications- Types of mobile payment
- 4.6 Future of mobile commerce.

### **Unit V: Introduction to Tally, Accounting and Inventory an Outline (15 Hours)**

- 5.1 Fundamentals of Accounting- Accounting terms Definition- Ledger and ledger accounts
- 5.2 Trial balance- Trading and Profit &Loss accounts- Balance sheet
- 5.3 Accounting Masters Creation: Accounts information - Groups (Create, Display, Delete)
- 5.4 Ledgers (Create, Display, Alter)
- 5.5 Stock Group- Entering Vouchers: Voucher types- How to enter vouchers - Different types of Accounting voucher- (Payment Bar Receipt, Journal, Sales and Purchase)
- 5.6 Reports in Tally: Display Balance Sheet- Profit and Loss Account- Display Trial Balance.

**Text Books:**

1. T.N. Chhabra, R.K. Suri and Sanjiv Verma – E-Commerce New Vistas for Business, Dhanpat Rai & Co, Latest Edition.
2. Ravi Kalakota, Andrew B Whinston – Frontiers of Electronic Commerce, Pearson, 2011.

**Reference Books:**

1. Dr. K. Abirami Devi, Dr. M. Alagammai-E-Commerce, Margham Publications 2016.
2. Puja Walia Mann, Nidhi -E-Commerce, MJP Publishers, 2011.
3. Diwan, Prag and Sunil Sharma - E-Commerce - Managers guide to E-Business
4. Garry P Schneider and James T Perry – Electronic Commerce, Course technology, Thomson Learning, 2000

**Web Resources**

- <https://www.tutorialspoint.com/e-commerce/e-commerce-tutorial.pdf>  
<https://www.techtarget.com/searchcio/definition/e-business>

**SEMESTER – V**

**UCBAQ20– PRACTICAL: TALLY**

<b>Year: III Sem: V</b>	<b>Course Code: UCBAQ20–</b>	<b>Title of the Course: Practical Tally</b>	<b>Course Type: Practical</b>	<b>Course Category: Elective</b>	<b>H/W 2</b>	<b>Credits 2</b>	<b>Marks 100</b>
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1. Trading, Profit and Loss Account of the Company
2. Balance Sheet
3. Cost Categories and Cost Centers
4. Inventory and Stock
5. Ratio Analysis

## UCBAR20 – PROJECT

Each student shall be required to do a project and prepare the report on the basis of the investigation carried out by her in an institution or industrial organization. The student is expected to identify a problem in the organization based on her area of specialization and provide solutions and suggestions to the management. The report should demonstrate the capability of the students in analysing and evaluating the problem and to create original approach in providing solutions to the problem.

The project should include field studies, surveys, interpretation, planning and designing of the Research Methodology presented in a comprehensive manner with recommendations for solutions based on scientifically worked out data and Viva-Voce Examinations will be conducted on the basis of the report and presentation.

### EVALUATION PATTERN

- ✓ Each student should undergo the training separately.
- ✓ The mode of evaluating the student will consist of two parts. One on the basis of the report writing and the other will be through Viva-Voce.
- ✓ The valuation of the report writing will be done by the Internal Examiner while for the oral i.e. Viva-Voce Examination an External Examiner will be called for.
- ✓ 60 marks will be awarded for the report writing and 40 marks for the Oral (Viva-Voce) Examination.
- ✓ Training will be for a period of 30 days (One Month) which will be during the month May – June of every academic year.
- ✓ Each student should find a reputed organization which carries out the important functions like Production, Human Resource, Finance and Marketing to carry out her investigation with the approval of the department
- ✓ Records should be maintained for the daily activities signed by the concerned authorities in the organization.
- ✓ After completion of the training, the students should get the Completed Certificate and the Attendance Certificate from the company when she comes to the College.
- ✓ Any change of the organization during the course of the Training should be done only after getting the consent from the Head of the Department of the College in a written format
- ✓ The following are the components for Report Writing (60 Marks)

Content	40 Marks
Layout	10 Marks
Grammar	10 Marks

- ✓ For the Viva-Voce Examinations (Semester – 40 Marks)

Oral Presentation	30 Marks
Question and Answer	10 Marks

**SEMESTER – V/VI****USBAE520/USBAE620 – CAMPUS TO CORPORATE**

<b>Year: III Sem: V/VI</b>	<b>Course Code: USBAE520/ USBAE620</b>	<b>Title of the Course: Campus to Corporate</b>	<b>Course Type: Theory</b>	<b>Course Category: Skill Based Elective</b>	<b>H/W 2</b>	<b>Credits 2</b>	<b>Marks 100</b>
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**Objectives**

1. To build confidence, develop self-esteem, and to bring positive changes in the attitude & behaviour of the students
2. To give inputs to write their resumes, to face interviews and to learn corporate etiquette
3. To enable the students to identify, discuss and implement key job interview skills
4. To familiarize students with the interview skills and techniques
5. To develop the students skill in group discussion

**Course Outcomes (CO)**

The learners will be able to

1. Gain understanding and practice of attitude, behaviour and skills required in the corporate environment
2. Complete a professional resume that highlights their skills specific to their career field
3. Build a solid foundation to face interviews
4. Proactively manage the transition from being the student to the employee
5. Deliver best at group discussions

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	M	H	H	H	H	H
CO3	L	H	H	H	H	L
CO4	M	H	H	H	H	H
CO5	M	H	H	H	H	M

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	H	H	H
CO2	M	H	H	H	H	H
CO3	L	M	H	M	H	L
CO4	M	H	H	H	M	H
CO5	M	H	H	H	H	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I Personality Development (6 hours)**

- 1.1: Developing Workplace Skills (K1, K2, K3, K4)
- 1.2: Personal Skills Development - Career Planning (K1, K2, K3, K4)
- 1.3: Self – Assessment Tools- SWOT Analysis (K1, K2, K3, K4)
- 1.4: AMBIVERT Personality- Personality Types - Setting SMART Targets (K1, K2, K3, K4)
- 1.5: Corporate Expectation - Public Speaking – How to overcome nervousness (Stage fear v/s audience fear) (K1, K2, K3)
- 1.6: Etiquettes: Telephone - Email – Dining (K1, K2, K3, K4)

### **UNIT II Resume (6 hours)**

- 2.1: Resume (K1, K2, K3, K4)
- 2.2: About writing your resume (K1, K2, K3)
- 2.3: Drafting Application for various situations (K1, K2, K3, K4)
- 2.4: Cover letter – Types (K1, K2, K3)
- 2.5: Sample cover letter format (K1, K2, K3, K4)
- 2.6: Preparing a Scannable Resume (K1, K2, K3)

### **UNIT III Interview (6 hours)**

- 3.1: Interview – Meaning – Purpose – Types (K1, K2, K3)
- 3.2: First impression – Appearance (K1, K2, K3, K4)
- 3.3: Grooming – Attire - Body Language (K1, K2, K3, K4)
- 3.4: Posture – Gestures (K1, K2, K3, K4)
- 3.5: Eye contact – Greeting – Smile (K1, K2, K3)
- 3.6: Parts of an interview (K1, K2, K3)

### **UNIT IV Preparing for an Interview (6 hours)**

- 4.1: When to prepare – Steps (K1, K2, K3, K4)
- 4.2: Factors (Managing your image at the interview) (K1, K2, K3, K4)
- 4.3: Principles (Basic tenets) - Tips on what to wear for interviews (K1, K2, K3, K4)
- 4.4: Grooming Men and Women (K1, K2, K3, K4)
- 4.5: Preparing for the interview (K1, K2, K3, K4)
- 4.6: Online Interview – Etiquette (K1, K2, K3)

### **UNIT V Group Discussion (6 hours)**

- 5.1: Group Discussion (K1, K2, K3)
- 5.2: Difference between Discussion and Debate (K1, K2, K3)
- 5.3: Reasons for Conducting GD (K1, K2, K3, K4)
- 5.4: Ways to equip oneself for GD (K1, K2, K3, K4)
- 5.5: Different phases of GD (K1, K2, K3, K4)
- 5.6: Parameters – Exercise (K1, K2, K3, K4)

**Text Books**

1. K K Ramachandran and K K Karthick, From Campus to Corporate, Pearson, 2016

**Reference Books**

1. Rajendra Pal & Korlahalli, Essentials of Business Communication, Sultan Chand & Sons, 2018
2. S K Mandal, Effective Communication and Public Speaking, Jaico Publishing, 2011

**Web Resources**

<http://www.jau.in/attachments/downloads/DSWC2C.pdf>

[http://becbapatla.ac.in:8080/placements\\_ttc\\_downloads/4year/1\\_Campus2Corporate\\_4year.pdf](http://becbapatla.ac.in:8080/placements_ttc_downloads/4year/1_Campus2Corporate_4year.pdf)

**SEMESTER – V**

**USBAF520 / USBAF620– SKILL BASED ELECTIVE: APPLICATIONS OF GST**

<b>Year: III</b> <b>Sem: V</b>	<b>Course Code:</b> USBAF520	<b>Title of the Course:</b> Applications of GST	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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**Objectives**

1. To enable the students to learn the concepts of GST from the pre-GST period to post-GST period
2. To Attain knowledge in formalities and registration
3. To study the procedure of filing GST returns
4. To comprehend the principles of taxations, objectives of taxes and its impact, shifting and incidence process of indirect taxes in the market orientated economy
5. To understand the implications of GST on the taxable capacity consumers, dealers and of the society at large and its changes
6. To make them to be a tax consultant in preparing the tax planning, tax management, Payment of tax and filing of tax returns

**Course Outcomes (CO)**

The learners will be able to

1. Study the basic concepts of GST
2. Learn the registration of tax filling
3. Understand the GST returns
4. Learn the composition scheme
5. Know the input tax credit

CO	PO					
	1	2	3	4	5	6
CO1	M	M	H	M	H	M
CO2	M	M	H	L	H	M
CO3	M	M	H	M	H	M
CO4	L	M	M	L	M	L
CO5	L	M	M	L	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	H
CO2	M	H	H	L	H	M
CO3	M	M	M	M	H	M
CO4	L	M	M	L	M	H
CO5	L	M	M	M	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I - Introduction to Goods and Services Tax (12 Hours)**

- 1.1 Introduction - Stages of Evolution of Goods and Services Tax (K1)
- 1.2 Methodology of GST (K1, K2, K3)
- 1.3 Constitutional background (K1, K2, K3)
- 1.4 Benefits of implementing GST (K1, K2, K3)
- 1.5 Structure of GST- Central Goods and Services Tax - State Goods and Services Tax (K1, K2, K3)
- 1.6 UTGST - Integrated Goods and Services Tax (K1, K2, K3)

### **Unit II: Levy, Tax Collection and Reverse Charge Mechanism (12 Hours)**

- 2.1 Levy and Collection of Tax (K1)
- 2.2 Rates of GST- Scope of Supply (K1, K2, K3)
- 2.3 Composite and Mixed Supplies (K1, K2, K3)
- 2.4 E-commerce under GST regime (K1, K2, K3)
- 2.5 Composition Scheme of Levy-Value of taxable supply (K1, K2, K3)
- 2.6 Interstate supply-Intra state supply (K1, K2, K3)

### **Unit III-Concept of time and place of supply & Import and Export (12 Hours)**

- 3.1 Time of supply (K1)
- 3.2 Place of supply (K1, K2, K3)
- 3.3 Significance (K1, K2,K3)
- 3.4 Time and place of supply in case of intra state supply (K1, K2, K3)
- 3.5 Interstate supply (K1, K2,K3)
- 3.6 Import and export of goods and services (K1, K2, K3)

### **Unit IV- Input Tax Credit & Payment of GST (12 Hours)**

- 4.1 Cascading Effect of Taxation- Benefits of Input Tax Credit (K1)
- 4.2 Computation - Input service distribution (K1,K2,K3)
- 4.3 Recovery of Credit -Reversal of credit-Utilization of Input tax credit (K1,K2,K3)
- 4.4 Cases in which input tax credit is not available (K1,K2,K3)
- 4.5 Tax Invoice - Unauthorized Collection of Tax - Credit Notes - Debit Notes (K1,K2,K3)
- 4.6 Electronic Cash Ledger - Electronic Credit Ledger - Electronic liability ledger (K1,K2,K3)

### **Unit V – Registration, Returns and Accounts and Assessment (12 Hours)**

- 5.1 Registration - Persons Liable for Registration (K1,K2,K3)
- 5.2 Compulsory Registration - Deemed Registration (K1,K2,K3)
- 5.3 Procedure For Registration - GSTIN (K1,K2,K3)
- 5.4 Amendment of Registration - Cancellation of Registration (K1,K2,K3)
- 5.5 Revocation of cancellation (K1,K2,K3)
- 5.6 Furnishing Details of Supplies - Returns - Accounts and Records(K1,K2,K3)

## **Text Books**

1. Goods and service taxes (GST) by Dr.M.C Mehotra and Prof.V.P.Agarwal - Sahitya Bhawan publication, 5<sup>th</sup> Edition, 2019.
2. Goods and Services Tax (GST) in India B. Viswanathan, 1st Edition, 2016.

## **Reference Books**

1. GST Guidebook - ClearTax - Reckitt Benckinser

### **Web Resources**

[https://cleartax.in/s/gst-guide-introduction.](https://cleartax.in/s/gst-guide-introduction)

**SEMESTER – VI****UCBAS20 – LEGAL ASPECTS OF BUSINESS**

<b>Year: III Sem: VI</b>	<b>Course Code: UCBAS20</b>	<b>Title of the Course: Legal Aspects of Business</b>	<b>Course Type: Theory</b>	<b>Course Category: Core</b>	<b>H/W 7</b>	<b>Credits 4</b>	<b>Marks 100</b>
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**Objectives**

1. To learn the fundamental principles underlying in the law of contract, offer and acceptance
2. To develop an understanding of the free consent, discharge and breach of contract
3. To understand the concept of sale as a contract and its essential conditions
4. To inculcate the knowledge of formation of company
5. To acquire the knowledge on elements of Partnership, Registration and Reconstitution of the firm

**Course Outcomes (CO)**

The learners will be able to

1. Be thorough in the contractual relationships in business
2. Understand the Indian contract act, 1872 and discuss legal remedies in case of breach of a certain contract
3. Apply basic legal knowledge to business transaction especially in sale and resale agreement
4. Gain knowledge in the regulatory framework of companies in India
5. Acquire knowledge on partnership and registration of firms.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	H
CO4	H	H	H	M	H	H
CO5	H	M	H	L	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	L
CO2	H	H	H	H	H	H
CO3	M	H	H	L	M	M
CO4	H	M	H	M	H	H
CO5	H	M	M	L	M	M

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I Indian Contract Act 1872 (18 Hours)**

- 1.1 : Law of contract - Offer and Acceptance (K1, K2)
- 1.2 : Consent, Consideration and capacity of contract (K1, K2, K3)
- 1.3: Free consent - Discharge of contract (K1, K2)
- 1.4 : Breach of contract (K1, K2)
- 1.5: Void Agreements – Quasi Contract – Contract of Indemnity (K1, K2)
- 1.6: Contract of Guarantee – Kinds of Guarantee (K1, K2, K3, K4)

### **UNIT II Sale of goods act 1930 (18 Hours)**

- 2.1 : Definition of sale - Actual sale - Agreement to sell (K1, K2)
- 2.2 : Distinction between sale and agreement to sell - Conditions and warranties (K1, K2)
- 2.3: Doctrine of caveat emptor (K1, K2)
- 2.4 : Delivery of goods (K1, K2, K3, K4)
- 2.5 : Transfer of property - Transfer of title by non-owners (K1, K2)
- 2.6: Resale - Auction sale (K1, K2)

### **UNIT III The Companies Act 2013 (18 Hours)**

- 3.1: Company and its formation: Definition – Characteristics – Kinds (K1, K2, K3, K4)
- 3.2: Memorandum of Association - Articles of association (K1, K2, K3, K4)
- 3.3: Prospectus – Definition – Contents - Statement in lieu of prospectus (K1, K2)
- 3.4: Shares and Debentures - Definition and kinds (K1, K2)
- 3.5: Meetings - Classification of meetings (K1, K2)
- 3.6: Modes of winding up (K1, K2)
- 3.7: Dissolution of a company (K1, K2, K3, K4)

### **UNIT IV Indian Partnership Act 1932 (18 Hours)**

- 4.1: Definition - Elements of partnership - Classification of partnership (K1, K2, K3)
- 4.2: Partners and their liability (K1, K2, K3)
- 4.3: Registration of firms and effects for non-registration (K1, K2)
- 4.4: Reconstitution of the firm (K1, K2)
- 4.5: IPR (Intellectual Property Rights) – Patents – Filing of Patents (K1, K2)
- 4.6: Copyrights (K1, K2, K3)

### **UNIT V Law of Negotiable Instrument and Consumer Protection Act (18 Hours)**

- 5.1: Negotiable Instruments – Promissory notes (K1, K2, K3)
- 5.2: Bill of Exchange - Cheques of Exchange (K1, K2, K3)
- 5.3: Cheques – Presentment (K1, K2, K3)
- 5.4: Dishonour – Crossing of Cheques (K1, K2, K3, K4)
- 5.5: Paying Banker – Rights of Consumers (K1, K2, K3)
- 5.6: Nature and scope of Complaints (K1, K2)
- 5.7 : Remedies available to consumers (K1, K2, K3)

**Text Books**

1. N. D. Kapoor, Business Law, Sultan Chand & Sons, New Delhi, 5<sup>th</sup> Edition, 2019
2. Saravanavel P and Sumathi S, Legal Systems in Business, Himalaya Publishing House, New Delhi, 7<sup>th</sup> Edition, 2013

**Reference Books**

1. M C Kuchhal, Business Law, Vikas Publications House, New Delhi, 7<sup>th</sup> Edition, 2018
2. Akhileshwar Pathak, Legal Aspects of Business, Tata McGraw Hill Education Private Limited, New Delhi, 7<sup>th</sup> Edition, 2018
3. K.S. Anantharaman, 2003 Business and Corporate Laws, Sitaraman& co. Pvt. Ltd.
4. Acharya -2004, Intellectual Property Rights Asia Law House Publication,

**Web Resources**

<https://www.gkpad.com/sachin/06-22/bcom-Business-Regulatory-Framework---1.html>  
<http://www.simplynotes.in/e-notes/mcomb-com/business-regulatory-framework/>  
International Journal of Law (lawjournals.org)

## SEMESTER – VI

### UCBAT20 – PRODUCTION & MATERIALS MANAGEMENT

<b>Year: III</b>	<b>Course Code:</b> UCBAT20	<b>Title of the Course:</b> Production & Materials Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem: VI</b>							

#### Objectives

1. To enable the students to understand the concept of production management, plant location and plant layout
2. To impart knowledge on production planning and control, Production scheduling and maintenance management
3. To imbibe the concepts of how to maintain quality of products, to familiarize student with Six Sigma, Method study, Work study and work measurement
4. To enrich students about Materials management, Purchase management, Stores management, Materials handling and Codification of materials
5. To teach students on various inventory control techniques and the importance of ISO certification

#### Course Outcomes (CO)

The learners will be able to

1. Understand the concepts of production management, plant location and plant layout
2. Acquire knowledge on production planning and control, production scheduling and Maintenance management
3. Be aware of maintaining quality of products, six sigma, work study, method study and work measurement
4. Understand the concepts and techniques in materials management, purchase management, stores management, materials handling and codification of materials
5. Be familiarized about inventory control techniques and ISO certification

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	M
CO2	H	H	M	H	M	M
CO3	H	H	M	M	L	L
CO4	H	H	M	H	L	L
CO5	H	H	L	M	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	M	M	M
CO2	H	H	M	H	M	M
CO3	H	H	M	M	L	L
CO4	H	M	M	H	H	L
CO5	H	H	L	M	L	M

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I: Production Management (18 hours)**

- 1.1 Introduction to Production – Definition- Objectives of Production Management (K1, K2)
- 1.2 Production process (K1, K2, K3)
- 1.3 Functions and Responsibility of Production Manager (K1,K2,K3)
- 1.4 Plant location – Objectives – Factors influencing Plant location (K1,K2,K3)
- 1.5 Plant layout – Definition – Objectives – Factors (K1,K2,K3)
- 1.6 Types of Plant layout – Advantages and disadvantages (K1,K2,K3)

### **Unit II: Production planning and control (18 hours)**

- 2.1 Production planning and control – Objectives – Functions of PPC (K1,K2,K3)
- 2.2 Stages – Organization for PPC- Comparison of Production planning and Production control (K1,K2,K3)
- 2.3 Production Schedule - Factors affecting Schedule (K1,K2,K3)
- 2.4 Scheduling Procedure and Techniques (K1,K2,K3)
- 2.5 Maintenance Management – Areas – Objectives (K1,K2,K3)
- 2.6 Functional elements of Maintenance program – Types of maintenance and their advantages and disadvantages (K1,K2,K3)

### **Unit III: Quality control (18 hours)**

- 3.1 Quality control – Definition – Objectives – Principles (K1,K2,K3)
- 3.2 Quality circles – Definition – Characteristics (K1,K2,K3)
- 3.3 TQM – Meaning- Principles of TQM- Deming’s Principles- Six Sigma (K1,K2,K3)
- 3.4 Work Study – Definition – Objectives – Procedure (K1,K2,K3)
- 3.5 Method study – Definition - levels – Objectives – Procedure – Analytical approach of Method Study (K1,K2,K3)
- 3.6 Work Measurement- Techniques (K1,K2,K3)

### **Unit IV: Materials Management (18 hours)**

- 4.1 Materials management – Definition - Scope - Advantages – Codification and Standardization (K1,K2,K3)
- 4.2 Purchasing management – Purchase parameters - Purchase systems – Classification – Methods –
- 4.3 Special purchasing system (K1,K2,K3)
- 4.4 Stores management – Purpose – Factors in design of stores (K1,K2,K3)
- 4.5 Stores accounting – Costing issues – Stock verification (K1,K2,K3)
- 4.6 Material handling – Equipment – Guidelines- Inventory Management - Coding (K1,K2,K3)

### **Unit V: Inventory control (18 hours)**

- 5.1 Concepts of ABC, EOQ, MRP – Objectives (K1,K2,K3)
- 5.2 JIT – Elements – Benefits (K1,K2,K3)
- 5.3 Selective inventory control Techniques (K1,K2,K3)
- 5.4 Value analysis – Types – Phases/Stages – Advantages (K1,K2,K3,K4)
- 5.5 ISO 9000 – Process of obtaining ISO certification (K1,K2,K3,K4)
- 5.6 Advantages of ISO certification (K1,K2,K3)

## **Text Books**

1. P. Saravanel and S. Sumathi, Production and Materials Management, Margham Publications, Chennai, 2<sup>nd</sup> Edition, 2012
2. Gopalakrishnan and Sundaresan, Materials Management: An Integrated Approach, Prentice Hall, India, 4<sup>th</sup> Edition, 2011

## **Reference Books**

1. Dr. B. S. Goel, Production Operation Management, Pragati Prakasham, India, 27<sup>th</sup> Edition , 2017
2. Arnold & Chapman, Introduction to Materials Management, Pearson Education, New Delhi, 8<sup>th</sup> Edition, 2012
3. P. Ramamurthy; Production and Operations Management, JBA publishers, 2nd edition 2013.
4. R.B.Khana; Production and Operations Management, Prentice hall publications, 2007.

## **Web Resources**

- [https://mrcet.com/downloads/digital\\_notes/ME/III%20year/POM%20NOTES.pdf](https://mrcet.com/downloads/digital_notes/ME/III%20year/POM%20NOTES.pdf)  
[https://www.iare.ac.in/sites/default/files/lecture\\_notes/IARE\\_OM\\_NOTES.pdf](https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_OM_NOTES.pdf)  
[https://www.vssut.ac.in/lecture\\_notes/lecture1429900757.pdf](https://www.vssut.ac.in/lecture_notes/lecture1429900757.pdf)

## SEMESTER – VI

### UCBAO20 – FUNDAMENTALS OF INFORMATION TECHNOLOGY AND SYSTEM

<b>Year: III</b> <b>Sem: VI</b>	<b>Course Code:</b> UCBAO20	<b>Title of the Course:</b> Fundamentals of Information Technology and System	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objectives

1. To understand and gain knowledge in information systems and technology
2. To acquire the managerial skills using information systems and to coordinate the operative and management functions
3. To acquire the basic mailing and web skills to gain professionalism
4. To enable the students acquire the ability to be a future leader, manager in IT organisations
5. To attain the ability to be self- directed towards their career and contribute to the society

#### Course Outcomes (CO)

The learners will be able to

1. Well-versed in the basics of information system and technology
2. Understand programming languages to coordinate the operative and management functions
3. Equip with the practical knowledge of information technologies and implement in their organisation
4. Acquire knowledge over the basic concepts of information systems and can implement in their organisation
5. Gain knowledge on all the management functions inculcating with IS and IT

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	M	H	H	M
CO3	M	H	H	H	H	M
CO4	H	M	H	M	M	H
CO5	H	M	H	H	L	M

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	M	H	H	H	M	H
CO3	H	M	M	H	H	M
CO4	H	H	M	M	M	M
CO5	M	M	H	H	L	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I Introduction to Computer systems (15 Hours)**

- 1.1 Introduction – Classification of digital computers (K1, K2, K3)
- 1.2 Computer architecture: The first electronic computer (K1, K2, K3)
- 1.3 Low level languages – High level language (K1, K2, K3)
- 1.4 The first commercial computers – Inside a typical computer system (K1, K2, K3)
- 1.5 Peripheral devices, Auxiliary storage devices (K1, K2, K3)
- 1.6 Input devices – Output devices (K1, K2, K3)

### **Unit II Computer programming Languages (15 Hours)**

- 2.1 Algorithms (K1, K2, K3)
- 2.2 Flowcharts (K1, K2, K3)
- 2.3 Control structure – Programming paradigm (K1, K2, K3)
- 2.4 Programming languages – Generations of programming language (K1, K2, K3)
- 2.5 Introduction to computer software – Definition – Categories (K1, K2, K3)
- 2.6 Software piracy – Software terminologies.(K1, K2, K3)

### **Unit III Introduction to Information Technologies (15 Hours)**

- 3.1 Computers in business and industry (K1, K2, K3, K4)
- 3.2 Computers in home (K1, K2, K3)
- 3.3 Computers in education and training (K1, K2, K3, K4)
- 3.4 Computers in entertainment, science, medical and engineering(K1, K2, K3, K4)
- 3.5 Internet and Wide World Web- Electronic Mail: Mail Basics (K1, K2, K3)
- 3.6 E-Mail Ethics E-mail - Advantages and Disadvantages – Mailing lists(K1, K2, K3,K4)

### **Unit IV Management information systems (15 Hours)**

- 4.1 Introduction (K1, K2, K3)
- 4.2 Basic concepts of management information system (K1, K2, K3)
- 4.3 Scope of management information system (K1, K2, K3 , K4)
- 4.4 Classification of information system (K1, K2, K3, K4)
- 4.5 Characteristics of management information systems (K1, K2, K3, K4)
- 4.6 Functions of management information system (K1, K2, K3, K4)

### **Unit V Functional information system (15 Hours)**

- 5.1 Introduction - Functional information system (K1, K2, K3, K4)
- 5.2 Marketing management information system (K1, K2, K3, K4)
- 5.3 Human resource information system (K1, K2, K3, K4)
- 5.4 Financial management information system (K1, K2, K3, K4)
- 5.5 Production and inventory information system (K1, K2, K3, K4)
- 5.6 CRM and SCM using information system (K1, K2, K3, K4)

## **Text Books**

1. Alexis Leon, Mathew Leon, Fundamentals of Information Technology, Vikas Publishing House Pvt. Ltd., 1999. (Unit I, II, IV, V)
2. Sahil Raj, Management Information Systems, Pearson, 2<sup>nd</sup> Edition, 2018

## **Reference Books**

1. ITL Education Solutions Limited, Introduction to Information Technology, Pearson's Education, 2007 (Unit III)
2. V Rajaraman, Information Technology, Prentice Hall of India, 2003.

## **Web Resources**

[https://imed.bharativedyapeeth.edu/media/pdf/bca\\_sem\\_i.pdf](https://imed.bharativedyapeeth.edu/media/pdf/bca_sem_i.pdf)

## SEMESTER – VI

### UEBAC20 – TOTAL QUALITY MANAGEMENT

<b>Year: III</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: VI</b>	UEBAC20	Total Quality Management	Theory	Elective	5	5	100

#### Objectives

1. To understand the concepts of total quality management
2. To acquire knowledge about the customers and to have continuous improvement
3. To analyze the supplier partnering and the performance measure for improvement
4. To create an awareness regarding quality challenges and benchmarking
5. To analyze critically the strategic issues in quality management and standardization

#### Course Outcomes (CO)

The learners will be able to

1. Evaluate the principles of quality management and to explain how these principles can be applied within quality management systems
2. Identify the key aspects of the quality improvement cycle and to select and use appropriate tools and techniques for controlling, improving and measuring quality
3. Critically appraise the organizational, communication and teamwork requirements for effective quality management
4. Know the concept of benchmarking and total productive maintenance in the organization
5. Identify key challenges in implementing TQM and maintain standardization

CO	PO					
	1	2	3	4	5	6
<b>CO1</b>	L	M	M	H	M	H
<b>CO2</b>	H	H	H	H	M	H
<b>CO3</b>	H	H	M	M	H	H
<b>CO4</b>	H	M	H	H	H	H
<b>CO5</b>	H	M	H	M	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	L	M	M	H	M	H
<b>CO2</b>	H	M	H	H	M	H
<b>CO3</b>	H	H	M	H	H	M
<b>CO4</b>	M	M	H	H	H	H
<b>CO5</b>	H	M	M	H	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I Introduction**

**(15 Hours)**

- 1.1 Definition of Quality – Need for quality - Dimensions of product and service quality – Quality planning (K1,K2)
- 1.2 Quality costs – Analysis techniques for quality costs - TQM - Introduction – Definition (K1,K2)
- 1.3 Principles of TQM (K1,K2)
- 1.4 Quality council – Quality Statements (K1,K2)
- 1.5 Deming Philosophy (K1,K2)
- 1.6 Barriers to TQM Implementation. (K1,K2)

### **UNIT II Customer Satisfaction**

**(15 Hours)**

- 2.1 Customer Satisfaction – Customer perception of quality (K1,K2)
- 2.2 Customer complaints, Service quality (K1,K2)
- 2.3 Customer retention, Employee involvement (K1,K2)
- 2.4 Continuous process improvement (K1,K2)
- 2.5 Juran Trilogy, PDCA Cycle (K1,K2,K3)
- 2.6 5S, Kaizen (K1,K2,K3)

### **UNIT III Supplier Partnering and Performance Measure**

**(15 Hours)**

- 3.1 Supplier Partnership – Partnering, Sourcing (K1,K2,K3)
- 3.2 Supplier selection, Supplier rating, Relationship development (K1,K2,K3)
- 3.3 Performance Measures – Basic concepts – Strategy (K1,K2,K3)
- 3.4 Performance measure - Process capability (K1,K2,K3)
- 3.5 Concept of six- sigma (K1,K2,K3)
- 3.6 Control charts (K1,K2,K3)

### **UNIT IV Benchmarking and Failure Mode and Effect Analysis (FMEA)**

**(15 Hours)**

- 4.1 Benchmarking – Reasons to Benchmark (K1,K2,K3)
- 4.2 Benchmarking process (K1,K2)
- 4.3 Quality Function Development (QFD) – House of Quality, QFD process – Benefits (K1,K2,K3)
- 4.4 Taguchi Quality Loss Function (K1,K2)
- 4.5 Total Productive Maintenance (TPM) – Concept - Improvement – Needs (K1,K2,K3)
- 4.6 FMEA – Stages of FMEA – Types (K1,K2)

### **UNIT V Standardization**

**(15 Hours)**

- 5.1 ISO - Origin – Introduction (K1,K2)
- 5.2 Need for ISO 9000 and other Quality Systems (K1, K2)
- 5.3 ISO 9000: 2000 Quality System – Elements (K1,K2)
- 5.4 Implementation of Quality System (K1,K2)
- 5.5 Documentation (K1)
- 5.6 Quality Auditing (K1)

### **Text Books**

1. Dale H. Besterfield, et al., Total Quality Management, Pearson Education, New Delhi, 3<sup>rd</sup> Edition Reprint, 2012.
2. V. Jayakumar, Total Quality Management, Lakshmi Publication, Chennai, 7<sup>th</sup> Edition, 2014.

### **Reference Books**

1. James R. Evans & William M. Lindsay, The Management and Control of Quality, South Western Cengage Learning, London, 8<sup>th</sup> Edition, 2011
2. Narayana V. & Sreenivasan N.S., Quality Management: Concept and Tasks, New Age International, Chennai, 4<sup>th</sup> Edition, 2012.
3. Sunil Luthra, Dixit Garg, Ashish Agarwal, Sachin K. Mangla; Total Quality Management, Principles, Methods, and Applications, *1<sup>st</sup> Edition, CRC Press*
4. P.N. Mukherji; Total Quality Management, PHI, 2016

### **Web Resources**

<https://www.techtargt.com/searchcio/definition/Total-Quality-Management>

<https://www.studocu.com/row/document/iqra-university/strategic-management/total-quality-management-notes/12596571>

**SEMESTER – VI****UEBAD20 – ENTREPRENEURIAL DEVELOPMENT**

<b>Year: III</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: VI</b>	UEBAD20	Entrepreneurial Development	Theory	Elective	5	5	100

**Objectives**

1. To develop entrepreneurial way of thinking
2. To understand to design the business plan for getting institutional support
3. To understand the different level of entrepreneur and their roles in the economy
4. To know the strategies for entering into new market to be successful in business
5. To nurture the entrepreneurial skills and help to identify the new business opportunity

**Course Outcomes (CO)**

The learners will be able to

1. Have the ability to discern entrepreneurial traits
2. Know the different entrepreneur and supporting institution and Write a business plan
3. Know the parameters to assess opportunities for new business ideas
4. Identify the various forms of entrepreneur and to correlate which form of business will suit their need
5. Understand the environment and to apply the strategies to enter into new market

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	L	H	H
CO3	H	M	M	L	M	H
CO4	L	L	H	H	H	M
CO5	H	H	H	H	H	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	H	M	H	M
CO2	H	H	H	L	H	H
CO3	H	H	M	L	M	H
CO4	L	L	H	M	H	M
CO5	H	M	H	M	H	H

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **UNIT I: Introduction**

**(15 Hours)**

- 1.1 Introduction – Definition- Understanding the meaning of entrepreneurship (K1)
- 1.2 Importance of entrepreneurship (K1, K2)
- 1.3 Characteristics of an entrepreneur (K1, K2)
- 1.4 Classification of the entrepreneurs (K1, K2)
- 1.5 Factors influencing entrepreneurship (K1, K2)
- 1.6 Role played by Government and non- government agencies (K1, K2)

### **UNIT II: Entrepreneurial growth, Project appraisal**

**(15 Hours)**

- 2.1 Project Appraisal – Techniques (K1, K2)
- 2.2 Business plan - Content of business plan (K1, K2, K3)
- 2.3 EDP's (K, K2)
- 2.4 SIDBI (K1, K2)
- 2.5 DIC– MSME (K1, K2)
- 2.6 Industrial policy of Government of India (K1, K2)

### **UNIT III: Business Idea generation technique**

**(15 Hours)**

- 3.1 Starting an enterprise (K1)
- 3.2 Business Generation Techniques (K1)
- 3.3 Marketing feasibility (K1)
- 3.4 Financial feasibility (K1)
- 3.5 Technical feasibility – Legal feasibility (K1)
- 3.6 Managerial and Location feasibility (K1)

### **UNIT IV: Forms of Entrepreneur**

**(15 Hours)**

- 4.1 Rural entrepreneurs (K1, K2)
- 4.2 Small scale entrepreneurs (K1, K2)
- 4.3 Export entrepreneur-Export procedure (K1, K2, K3)
- 4.4 Family Business - Importance of family business - Responsibilities and rights of shareholders of a family business Pitfalls of the family business (K1, K2)
- 4.5 Women entrepreneurship – Meaning - Definition- Problems of women entrepreneur (K1, K2)
- 4.6 Prospects of women entrepreneur – Success stories of women entrepreneurs (K1, K2)

### **UNIT V: Entering the Market**

**(15 Hours)**

- 5.1 Michael porter's five force model (K1, K2)
- 5.2 Acquisition (K1, K2, K3)
- 5.3 Joint ventures (K1, K2, K3)
- 5.4 Franchising (K1, K2, K3)
- 5.5 Licensing (K1, K2, K3)
- 5.6 Piggybacking (K1, K2)

## **Text Books**

1. Jayshree Suresh, *Entrepreneurial Development*, Margham Publication, Chennai, 5<sup>th</sup> Edition, 2012.
2. S S Khanka, *Entrepreneurial Development*, Sultan Chand & Sons, New Delhi, 5<sup>th</sup> Edition, 2013.

## **Reference Books**

2. Robert, Michael, Dean A. Shepherd, *Entrepreneurship*, Tata McGraw Hill, New Delhi, 10<sup>th</sup> Edition, 2017
3. Poornima M. Charanntimath, *Entrepreneurship Development: Small Business Enterprises*, Pearson Education, New Delhi, 2<sup>nd</sup> Edition, 2013.
4. David H Holt, *Entrepreneurship: New Venture Creation*, John Wiley & Sons, 2016.
5. S.S.Khanka, *Entrepreneurial Development*, S.Chand & Company Ltd, 2017.

## **Web Resources**

<https://core.ac.uk/download/pdf/98660713.pdf>

<https://ugcmoocs.inflibnet.ac.in/download/course/curriculum/nptel/noc18-mg36.pdf>

[https://www.tutorialspoint.com/entrepreneurship\\_development/starting\\_a\\_business.htm](https://www.tutorialspoint.com/entrepreneurship_development/starting_a_business.htm)

**SEMESTER – V/VI****USBAF520/USBAF620– APPLICATIONS OF GST**

<b>Year: III</b>	<b>Course Code:</b> USBAF520/ USBAF620	<b>Title of the Course:</b> Applications of GST	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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**Objectives**

1. To enable the students to learn the concepts of GST from the pre-GST period to post- GST period
2. To Attain knowledge in formalities and registration
3. To study the procedure of filing GST returns
4. To comprehend the principles of taxations, objectives of taxes and its impact, shifting and incidence process of indirect taxes in the market orientated economy
5. To understand the implications of GST on the taxable capacity consumers, dealers and of the society at large and its changes
6. To make them to be a tax consultant in preparing the tax planning, tax management, Payment of tax and filing of tax returns

**Course Outcomes (CO)**

The learners will be able to

1. Study the basic concepts of GST
2. Learn the registration of tax filling
3. Understand the GST returns
4. Learn the composition scheme
5. Know the input tax credit

CO	PO					
	1	2	3	4	5	6
CO1	M	M	H	M	H	M
CO2	M	M	H	L	H	M
CO3	M	M	H	M	H	M
CO4	L	M	M	L	M	L
CO5	L	M	M	L	M	L

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	M
CO2	M	M	H	L	H	M
CO3	M	H	H	M	H	M
CO4	L	M	M	L	M	L
CO5	L	M	H	L	H	L

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I - Introduction to Goods and Services Tax (12 Hours)**

- 1.1 Introduction - Stages of Evolution of Goods and Services Tax (K1)
- 1.2 Methodology of GST (K1, K2, K3)
- 1.3 Constitutional background (K1, K2, K3)
- 1.4 Benefits of implementing GST (K1, K2, K3)
- 1.5 Structure of GST- Central Goods and Services Tax - State Goods and Services Tax (K1, K2, K3)
- 1.6 UTGST - Integrated Goods and Services Tax (K1, K2, K3)

### **Unit II: Levy, Tax Collection and Reverse Charge Mechanism (12 Hours)**

- 2.1 Levy and Collection of Tax (K1)
- 2.2 Rates of GST- Scope of Supply (K1, K2, K3)
- 2.3 Composite and Mixed Supplies (K1, K2, K3)
- 2.4 E-commerce under GST regime (K1, K2, K3)
- 2.5 Composition Scheme of Levy-Value of taxable supply (K1, K2, K3)
- 2.6 Interstate supply-Intra state supply (K1, K2, K3)

### **Unit III-Concept of time and place of supply & Import and Export (12 Hours)**

- 3.1 Time of supply (K1)
- 3.2 Place of supply (K1, K2, K3)
- 3.3 Significance (K1, K2, K3)
- 3.4 Time and place of supply in case of intra state supply (K1, K2, K3)
- 3.5 Interstate supply (K1, K2, K3)
- 3.6 Import and export of goods and services (K1, K2, K3)

### **Unit IV- Input Tax Credit & Payment of GST (12 Hours)**

- 4.1 Cascading Effect of Taxation- Benefits of Input Tax Credit (K1)
- 4.2 Computation - Input service distribution (K1, K2, K3)
- 4.3 Recovery of Credit -Reversal of credit-Utilization of Input tax credit (K1, K2, K3)
- 4.4 Cases in which input tax credit is not available (K1, K2, K3)
- 4.5 Tax Invoice - Unauthorized Collection of Tax - Credit Notes - Debit Notes (K1, K2, K3)
- 4.6 Electronic Cash Ledger - Electronic Credit Ledger - Electronic liability ledger (K1, K2, K3)

### **Unit V – Registration, Returns and Accounts and Assessment (12 Hours)**

- 5.1 Registration - Persons Liable for Registration (K1, K2, K3)
- 5.2 Compulsory Registration - Deemed Registration (K1, K2, K3)
- 5.3 Procedure For Registration - GSTIN (K1, K2, K3)
- 5.4 Amendment of Registration - Cancellation of Registration (K1, K2, K3)
- 5.5 Revocation of cancellation (K1, K2, K3)
- 5.6 Furnishing Details of Supplies - Returns - Accounts and Records (K1, K2, K3)

## **Text Books**

1. Goods and service taxes (GST) by Dr.M.C Mehotra and Prof.V.P.Agarwal - Sahitya Bhawan publication, 5<sup>th</sup> Edition, 2019.
2. Goods and Services Tax (GST) in India B. Viswanathan, 1st Edition, 2016.

## **Reference Books**

1. GST Guidebook - ClearTax - Reckitt Benckinser

### **Web Resources**

[https://cleartax.in/s/gst-guide-introduction.](https://cleartax.in/s/gst-guide-introduction)

**SEMESTER – V/VI****UGBAA520/ UGBAA620 – NON MAJOR ELECTIVE: HUMAN RESOURCE MANAGEMENT**

<b>Year: III Sem: V/VI</b>	<b>Course Code: UGBAA520/ UGBAA620</b>	<b>Title of the Course: Human Resource Management</b>	<b>Course Type: Theory</b>	<b>Course Category: Non Major Elective</b>	<b>H/W 3</b>	<b>Credits 2</b>	<b>Marks 100</b>
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**Objectives**

1. To understand the basic concepts of HRM
2. To have a good understanding on Recruitment, Selection and Training process
3. To gain knowledge on the performance appraisal and training of the employees
4. To familiarize the students with the provisions of welfare and safety measures
5. To develop deep insight about the challenges in HRM

**Course Outcomes (CO)**

The learners will be able to

1. Integrate the knowledge of HR concepts
2. Apply the gained knowledge of Recruitment, Selection and Training in their career
3. Be able to implement and evaluate the requirements of performance appraisal and training of the employees
4. Gain knowledge over welfare measures and safety measures of the employees
5. Equip with the knowledge of the challenges of HR and talent management

<b>CO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	H	M	M	H
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	M	H
<b>CO4</b>	H	H	H	M	H	H
<b>CO5</b>	H	M	H	L	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

<b>CO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	H	M	M	H
<b>CO2</b>	M	H	H	H	H	H
<b>CO3</b>	H	M	H	H	M	H
<b>CO4</b>	H	H	M	M	L	H
<b>CO5</b>	H	M	H	L	M	M

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I Introduction to Human Resource Management (9 Hours)**

- 1.1: Definition - Scope of HRM (K1, K2, K3, K4)
- 1.2: Objectives of HRM (K1, K2, K3, K4)
- 1.3: Qualities of a HR manager (K1, K2, K4)
- 1.4: Difference between HRM and Personnel management (K1, K2)
- 1.5: HR Planning – Need – Process – Requisites and barriers (K1, K2)
- 1.6: HRIS – E-HR (K1, K2)

### **Unit II Recruitment and Selection (9 Hours)**

- 2.1: Recruitment – Factors (K1, K2, K3)
- 2.2: Process of Recruitment (K1, K2, K3)
- 2.3: Sources of Recruitment (K1, K2, k3)
- 2.4: Selection – Process (K1, K2, K4)
- 2.5: Induction and Orientation – Purpose – Strategic Choices – Problems (K1, K2, K4)
- 2.6: Placement (K1, K2, K4)

### **Unit III Performance Appraisal and Training (9 Hours)**

- 3.1: Performance appraisal – Meaning – Objectives (K1, K2, K4)
- 3.2: Process and Problems of Performance Appraisal (K1, K2, K4)
- 3.3: Methods of Performance Appraisal (K1, K2, K3)
- 3.4: Training – Inputs – Process (K1, K2, K3)
- 3.5: Techniques of Training (K1, K2, K3, K4)
- 3.6: Career Planning and Development (K1, K2, K3)

### **Unit IV Employee Welfare and Safety Measures (9 Hours)**

- 4.1: Participative management – Types (K1, K2, K3)
- 4.2: Employee welfare – Measures (K1, K2, K3)
- 4.3: Approaches to Employee Welfare (K1, K2)
- 4.4: Safety - Need – Health (K1, K2, K3)
- 4.5: Industrial Relations (K1, K2, K4)
- 4.6: Trade unions (K1, K2, K4)
- 4.7: Work Stress – Reasons (K1, K2, K4)
- 4.8: Coping strategies of stress (K1, K2, K3, K4)

### **Unit V Talent Management (9 Hours)**

- 5.1: Talent acquisition and retention (K1, K2, K4)
- 5.2: Quality of Work Life – Factors (K1, K2, K3)
- 5.3: Job Enlargement – Reasons (K1, K2, K3, K4)
- 5.4: Job enrichment – Features (K1, K2, K4)
- 5.5: Job Rotation – Job Analysis – Job Specification (K1, K2, K3)
- 5.6: HR Audit – Approaches (K1, K2)
- 5.7: Challenges in HR (K1, K2)

### **Text Books**

1. V. S. P Rao, Human Resource Management: Text and Cases, Excel Books, New Delhi, 3<sup>rd</sup> Edition, 2010
2. K Aswathappa, Human Resource Management and Personnel Management, Tata McGraw Hill, New Delhi, 8<sup>th</sup> Edition, 2015

### **Reference Books**

1. P.L Rao, Human Resource Management - Excel Books, 2008
2. P.C. Tripathi, Human Resource Development, Sultan Chand and Sons, New Delhi, 6<sup>th</sup> Edition, 2010

### **Web Resources**

<https://backup.pondiuni.edu.in/sites/default/files/HR%20Management-230113.pdf>

<https://mrcet.com/downloads/MBA/digitalnotes/Human%20Resource%20Management.pdf>

**SEMESTER – I/II**

**USBAA120/USBAA220 – LIFE STYLE MANAGEMENT**

<b>Year: I Sem: I/II</b>	<b>Course Code:</b> USBAA120/ USBAA220	<b>Title of the Course:</b> Life Style Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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**Objectives**

1. To know the fundamental concepts of self management
2. To acquire the knowledge of Stress management
3. To have the knowledge about time management
4. To assess the knowledge about situations management
5. To study the knowledge related to Career Management

**Course Outcomes (CO)**

The learners will be able to

1. Be equipped with the talent of self management
2. Acquire the skills of Stress management
3. Be able to manage time
4. Be able to tackle and manage various situations
5. Familiarized in the skills of Career Management

CO	PO					
	1	2	3	4	5	6
<b>CO1</b>	H	M	H	M	M	H
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	M	H
<b>CO4</b>	H	H	H	M	H	H
<b>CO5</b>	H	M	H	L	M	H

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	M	M	H	M	M	H
<b>CO2</b>	H	H	H	H	H	M
<b>CO3</b>	H	M	H	H	M	H
<b>CO4</b>	H	H	M	M	M	H
<b>CO5</b>	H	M	H	L	M	M

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I Self-Management**

**(6 hours)**

- 1.1 Meaning – Self Awareness (K1,K2)
- 1.2 Dimensions of Personality Development (K1,K2,K3)
- 1.3 Interpersonal Relations – Types of Complexes (K1,K2,K3)
- 1.4 Emotional Intelligence – Emotional Management (K1,K2,K3)
- 1.5 Components of EI – SWOT Analysis (K1,K2,K3,K4)
- 1.6 Health and Nutrition Management (K1,K2,K3)

**(6 hours)**

- 2.1 Meaning - Definition of stress (K1,K2,)
- 2.2 Life style stressors (K1,K2,K3)
- 2.3 Major sources of stress (K1,K2,K3)
- 2.4 Work Stress (K1,K2,K3)
- 2.5 Symptoms – Guidelines to reduce stress (K1,K2,K3)
- 2.6 Workplace humor (K1,K2,)

### **Unit III Time Management**

**(6 hours)**

- 3.1 Definition (K1,K2)
- 3.2 Tips for Time Management (K1,K2,K3)
- 3.3 Advantages (K1,K2,K3)
- 3.4 Common mistakes students make in Time Management (K1,K2,K3,K4)
- 3.5 Goals of Time Management (K1,K2,K3,K4)
- 3.6 Technology and Media Management (K1, K2, K3)

### **Unit IV Situations Management**

**(6 hours)**

- 4.1 Conflict management (K1,K2,K3)
- 4.2 Styles of managing Conflict (K1,K2,K3)
- 4.3 Anger management (K1,K2,K3)
- 4.4 Crisis management (K1,K2,K3)
- 4.5 Event management (K1,K2,K3)
- 4.6 Components of a successful Event (K1, K2, K3)

### **Unit V Career Management**

**(6 hours)**

- 5.1 Career Planning (K1,K2,K3)
- 5.2 Elements of Career management in Business (K1,K2,K3)
- 5.3 Team building (K1,K2,K3)
- 5.4 Change management (K1,K2,K3)
- 5.5 Creativity management (K1,K2,K3)
- 5.6 Work Life Balance (K1, K2, K3)

**Text Books**

1. Richard Regis, Stress Management, National HRD Net Work Publication, 2008
2. Materials will be provided

**Reference Books**

1. P.C. Tripathi, Human Resource Development, Sultan Chand & Sons, 2010

**Web Resources**

<https://www.studocu.com/en-us/document/university-of-central-florida/fitness-and-weight-management/healthy-lifestyle-lecture-notes-1/2161351>

**SEMESTER – I/II**

**USBAB120/USBAB220 – WINNING THROUGH COMMUNICATION**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> USBAB120/ USBAB220	<b>Title of the Course:</b> Winning Through Communication	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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**Objectives**

1. To understand the role of communication in Personal and Professional success
2. To impart the correct practices and strategies of effective letter writing and drafting of resume
3. To provide an overview of prerequisites to business correspondence
4. To understand and evaluate key approaches used in report writing
5. To develop skills in report writing

**Course Outcomes (CO)**

The learners will be able to

1. Be able to understand the concepts in communication
2. Attain skill in writing letters and resume
3. Be trained in drafting business correspondence
4. Able to draft effective business report with brevity and clarity
5. Gain confidence in various career development initiatives like Group Discussion, Role play and interviewing techniques

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	M	H	H	H	H	H
CO3	L	H	H	H	H	L
CO4	M	H	H	H	H	H
CO5	M	H	H	H	H	M

**H- High (3), M- Moderate (2), L- Low (1)**

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	M	M	H	H	H	H
CO3	L	H	M	H	H	L
CO4	M	H	H	M	H	H
CO5	M	H	H	H	M	M

**H- High (3), M- Moderate (2), L- Low (1)**

## **Course Syllabus**

### **Unit I - Introduction to Communication**

**(6 Hours)**

- 1.1 : Definition of communication – Elements (K1, K2, K3)
- 1.2 : Guidelines for effective business communication (K1, K2, K3, K4)
- 1.3: Steps in communication process (K1, K2, K3, K4)
- 1.4: Types and media of communication (K1, K2)
- 1.5: Barriers in communication (K1, K2, K3)
- 1.6: Technology in Communication (K1, K2)

### **Unit II Letter writing skills**

**(6 Hours)**

- 2.1: Business Letter – Meaning (K1, K2, K3, K4)
- 2.2: Structure of business letter (K1, K2, K3)
- 2.3: Leave letter (K1, K2, K3, K4)
- 2.4: Complaint letter (K1, K2, K3)
- 2.5: Letter of application (K1, K2, K3)
- 2.6: Preparation of resume/CV (K1, K2, K3, K4)

### **Unit III Business Letter**

**(6 Hours)**

- 3.1 : Types of Business Letter (K1, K2, K3)
- 3.2 : Sales letter - Enquiry – Quotations (K1, K2, K3, K4)
- 3.3: Order – Adjustment Letter (K1, K2, K3, K4)
- 3.4: Follow up Letter - Reference letter (K1, K2, K3, K4)
- 3.5: Acknowledge Letter – Cover Letter (K1, K2, K3, K4)
- 3.6: Resignation Letter (K1, K2, K3, K4)
- 3.7: Banking Correspondence (K1, K2)

### **Unit IV Report Writing**

**(6 Hours)**

- 4.1 : Report – Meaning (K1, K2)
- 4.2: Features of a good Report (K1, K2, K3)
- 4.3 : Essentials Elements of the Research Report (K1, K2)
- 4.4: Classification of Reports (K1, K2, K3)
- 4.5 : Types of Business Report: Periodic Reports – Proposals (K1, K2, K3, K4)
- 4.6 : Types of Business Report: Policies and Procedures – Situational Reports (K1, K2, K3, K4)

### **Unit V Practical Session**

**(6 Hours)**

- 5.1: Group discussion – Importance (K1, K2, K3,
- 5.2: Criteria for group discussion (K1, K2, K3, K4)
- 5.3: Process – Do's and Don'ts of group discussion (K1, K2, K3)
- 5.4: Creation of Gmail Account (K1, K2, K3)
- 5.5 : Role - Play (K1, K2, K3)
- 5.6 : Interviewing Techniques (K1, K2, K3)
- 5.7: Presentation Techniques (K1, K2, K3)

## **Text Books**

1. Rajendra Pal & Korlahalli, Essentials of Business Communication, Sultan Chand & Sons, 2017

## **Reference Books**

1. R. C Sharma and Krishan Mohan, Business Correspondence and Report Writing, Tata McGraw Hill, 3<sup>rd</sup> Edition, 2017

## **Web Resources**

<https://www.manage.gov.in/studymaterial/ec.pdf>

**AUXILIUM COLLEGE (Autonomous)**  
*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*  
**Gandhi Nagar, Vellore-632 006**

**Department of Computer Applications (B.C.A.) - (UG)**

**OUTCOME BASED EDUCATION - 2020**

(Effective for the Batch of Students Admitted from 2020-2021)

**A) INSTITUTION LEVEL**

**Vision**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighboring districts.

**B) NAME OF THE PROGRAMME: B.C.A.**

**VISION OF THE PROGRAMME**

- To provide a intellectual environment that fosters the search for new knowledge in a highly dynamic computing world
- To be a leading, contemporary, innovative programme in inculcating professional competencies in the field of Computing and related interdisciplinary technologies to achieve academic excellence and to facilitate research activities as a timely response to dynamic needs and challenges of industry and society.

**C) ELIGIBILITY CRITERIA OF THE PROGRAMME**

The basic BCA eligibility is to possess an aggregate of 50% or above in Class 12 in any stream (Arts, Science, Commerce) with English as a compulsory subject.

**D) List of Courses:**

Sem	Part	Code	Title of Paper	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper - I	6	3	-	3	40+60
	II	UENGA20	English Paper - I	6	3	-	3	40+60
	III	UCCAA20	Programming in C	4	3	-	5	40+60
	III	UCCAB20	Fundamentals of Information Technology	4	3	-	5	40+60
	III	UAAFA20	Allied - I : Accounting Fundamentals - I	5	3	-	5	40+60
	III	UCCAC20	Practical - I: C	2	-	3	2	40+60
	IV	-	Skill-Based Elective - I	2	-	2	2	40+60
	IV	-	Value Education	1	-	-	-	-

Total							25	600
II	I	ULTAB20	Tamil Paper - II	6	3	-	3	40+60
	II	UENGB20	English Paper - II	6	3	-	3	40+60
	III	UCCAD20	Python	4	3	-	4	40+60
		UCCAE20	Computer Organization and Architecture	4	3	-	5	40+60
	III	UAAF20	Allied - II : Accounting Fundamentals - II	5	3	-	5	40+60
	III	UCCAF20	Practical - II: Python	2	-	3	2	40+60
	IV	-	Skill-Based Elective - II	2	-	2	2	40+60
	IV	-	Value Education	1	-	-	-	-
Total							24	600
III	III	UCCAG20	Data Structures	5	3	-	4	40+60
	III	UCCAH20	Java Programming	5	3	-	4	40+60
	III	UCCAI20	Design and Analysis of Algorithms	5	3	-	4	40+60
	III	UACAA20	Allied: Mathematical Foundations	6	3	-	5	40+60
	III	UCCAJ20	Practical - III: Java	3	-	3	2	40+60
	III	UCCAK20	Practical - IV: Data Structures and Algorithms	3	-	3	2	40+60
	IV	USCSA320	SBE: Accounting Software	2	-	2	2	40+60
	IV	-	Value Education	1	-	-	-	-
Total							23	600
IV	III	UCCAL20	Data Communications and Networking	5	3	-	4	40+60
	III	UCCAM20	Operating Systems	5	3	-	4	40+60
	III	UCCAN20	.NET Programming	5	3	-	4	40+60
	III	UCCAB20	Allied - Statistical Methods	6	3	-	5	40+60
	III	UCCAO20	Practical V: Linux	2	-	3	2	40+60
	III	UCCAP20	Practical - VI: .NET	2	-	3	2	40+60
	IV	USCSB420	SBE: Design and Animation	2	-	2	2	40+60
	IV	UNEVS20	Environment Studies	2	2	-	2	40+60
	IV	-	Value Education	1	-	-	-	-
Total							25	700
V	III	UCCAQ20	Relational Database Management Systems	5	3	-	3	40+60

	III	UCCAR20	Software Engineering	5	3	-	3	40+60
	III	UCCAS20	Mobile Application Development	4	3	-	3	40+60
	III	UECAA20	Elective - I A: Resource Management Techniques	5	3	-	3	40+60
		UECAB20	Elective - I B: Cloud Computing					
		UECAC20	Elective - I C: Object Oriented Analysis and Design					
	III	UCCAT20	Practical - VII: RDBMS	3	-	3	2	40+60
	III	UCCAU20	Practical - VIII: Mobile Application Development	2	-	3	2	40+60
	IV	-	Non-Major Elective - I	3	2	-	2	40+60
	IV	USCSG520	Skill-Based Elective – V: R Programming	2	2	-	2	40+60
	IV	-	Value Education	1	-	-	-	-
Total							20	700
VI	III	UCCAV20	Internet and Web Programming	5	3	-	3	40+60
	III	UCCAW20	Data Mining	4	3	-	3	40+60
	III	UECAD20	Elective - II A: Cryptography	5	3	-	3	40+60
		UECAE20	Elective - II B: Computer Graphics					
	III	UECAF20	Elective - III A: Mobile Computing	5	3	-	3	40+60
	III	UECAG20	Elective - III B: Artificial Intelligence					
	III	UCCAX20	Practical IX: Internet and Web Programming	3	-	3	2	40+60
		UCCAY20	Project Work	2	-	3	2	
IV	-		Non-Major Elective - I	3	-	2	2	40+60
IV		USCSG620	Skill-Based Elective - VI: Data Analytics Using Data Visualization Tools	2	-	2	2	40+60
IV		UVEDA15	Value Education	1	2	-	2	40+60
Total							22	800
V	Extension Activities (90 Hours)						1	
Grand Total							140	400

## **E) Programme Objectives (PO)**

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:** Emulate positive social values and exercise leadership qualities and team work.

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

## **F) Programme Specific Outcomes (PSO)**

**PSO1:** Equip the students with requisite knowledge, skills and right attitude necessary to provide effective software development skills in a global environment and also focus on preparing students for roles pertaining to computer applications and IT industry.

**PSO2:** Acquire skills in computer and information technology and also be competent in the field of Commerce, Mathematics and Management.

**PSO3:** Introduce and update knowledge relevant to IT like networking, computer graphics, web development, trouble shooting, and hardware and software skills. Also to develop software solutions to problems across a broad range of application domains through analysis and design.

**PSO4:** Become proficient and ensure job in the key areas of computer science like Web designing and development, Mobile applications, Network and communication technologies, undertaking government organizations, faculty for computer science and applications in educating institutions.

**PSO5:** Ability to analyze social and environmental aspects with professional values, ethics and equity to transform the knowledge, skills and expertise to the community.

**PSO6:** Ability to work as a member or leader in diverse teams in multidisciplinary environment. And identify opportunities, entrepreneurship vision and use of innovative ideas to create value and wealth for the betterment of the individual and society.

<b>PSO</b>	<b>PO</b>
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	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>PSO1</b>	<b>3</b>	1	2	2	2	<b>3</b>
<b>PSO2</b>	<b>2</b>	3	2	3	2	<b>2</b>
<b>PSO3</b>	<b>3</b>	2	1	3	2	<b>3</b>
<b>PSO4</b>	<b>1</b>	3	2	1	2	<b>2</b>
<b>PSO5</b>	<b>1</b>	2	1	1	1	<b>1</b>
<b>PSO6</b>	<b>3</b>	2	2	3	2	<b>3</b>

**STRONGLY CORRELATED - 3, MODERATELY CORRELATED – 2, WEAKLY CORRELATED - 1**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / I	UCCAA20	Programming in C	Theory	Core	4	5	40+60

### COURSE OBJECTIVES

1. To introduce students to the concept of basic programming- thereby reducing the design complexity and increasing the reusability of a component.
2. The course is designed to provide complete knowledge of C language.
3. Students will be able to develop logics which will help them to create programs, applications in C.
4. Also by learning the basic programming constructs they can easily switch over to any other language in future.
5. To create a program that measures or simulates performance and use it to analyze behavior.

### COURSE LEARNING OUTCOMES

The Learners will be able to

1. Introduce the students to understand the concept of basic programming- thereby reducing the design complexity and increasing the reusability of a component.
2. Construct the basic structure of C-programming, declaration and usage of variable.
3. Understand and develop conditional and iterative statements to write programs.
4. Exercise C programs that uses array and string.
5. Develop user defined functions to solve real time problems

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	H	L	L	M	M
CO2	M	L	M	H	L	M
CO3	L	H	L	M	M	L
CO4	M	M	M	L	H	M
CO5	M	L	M	L	L	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	H	M	H
CO2	L	H	L	H	M	L
CO3	M	H	M	L	H	M
CO4	H	L	H	H	L	M
CO5	H	H	L	H	M	H

Low - L, Medium - M, High - H

### COURSE SYLLABUS

Unit I

Hours: 12

- 1.1 Algorithm and Flowchart (K1,K2,K3,K4)
- 1.2 Overview of C (K2)
- 1.3 Basic Techniques: Sum of Two Given Numbers- Swapping Two Numbers - Simple Interest Calculation (K1,K2,K3,K4)
- 1.4 Constants (K2,K3)
- 1.5 Variables (K2, K3)
- 1.6 Data Types. (K2 K3)

## **Unit II**

**Hours: 12**

- 2.1 Operators (K1, K2)
- 2.2 Expressions (K1, K2)
- 2.3 Managing Input Operations (K1, K2, K3, K4)
- 2.4 Managing Output Operations (K1, K2, K3, K4)
- 2.5 Decision Making and Branching (K1, K2, K3, K4)
- 2.6 Decision Making and Looping (K1, K2, K3, K4)

## **Unit III**

**Hours: 12**

- 3.1 Arrays (K1, K2, K3)
- 3.2 One Dimensional Array (K1, K2, K3)
- 3.3 Two Dimensional Array (K1, K2, K3)
- 3.4 Multi-Dimensional Array (K1, K2)
- 3.5 Dynamic Array (K1, K2)
- 3.6 Predefined Streams (K1)

## **Unit IV**

**Hours: 12**

- 4.1 Character Arrays and Strings (K1, K2, K3)
- 4.2 Reading and Writing String (K1, K2, K3)
- 4.3 Arithmetic Operation on Characters (K1, K2, K3)
- 4.4 Putting String Together and Comparison of Two Strings (K1, K2, K3)
- 4.5 String Handling Functions (K1, K2, K3)
- 4.6 Other Features of Strings (K1, K2)

## **Unit V**

**Hours: 12**

- 5.1 User-Defined Functions (K1, K2, K3)
- 5.2 Categories of functions (K1, K2, K3)
- 5.3 Recursions (K1, K2, K3)
- 5.4 Passing Array to Functions and Passing Strings to Functions (K1, K2, K3)
- 5.5 Scope- Visibility and Lifetime of Variables (K1, K2, K3)
- 5.6 Structures and Unions. (K1, K2, K3)

### **Book for Study:**

1. Balagurusamy, “Programming in C”, 6<sup>th</sup> Edition, Tata McGraw Hill Publication, 2012.
2. M. G. Venkateshmurthy, “Programming Techniques through C: A Beginner's Companion”, 1<sup>st</sup> Edition, Pearson India, 2006.

### **Books for Reference:**

1. Ashok N. Kamathane - “Programming with C”, Third Edition, Pearson Publication, 2011.

### **OER:**

1. [https://www.freebookcentre.net/programming-books-download/C-Language-Tutorial-\(PDF-124P\).html](https://www.freebookcentre.net/programming-books-download/C-Language-Tutorial-(PDF-124P).html)
2. <http://www2.cs.uregina.ca/~hilder/cs833/Other%20Reference%20Materials/The%20>

**SEMESTER I**

**UCCAB20- FUNDAMENTALS OF INFORMATION TECHNOLOGY**

<b>Year/ Sem</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
I / I	UCCAB20	Fundamentals of Information Technology	Theory	Core	4	5	40+60

**COURSE OBJECTIVES**

1. The main objective is to introduce Information Technology in a Simple Language to all undergraduate students regardless of their specialization.
2. To have the knowledge about communication networks and various types of network.
3. It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry.
4. To understand operating system and Evolution and development of operating system.
5. To know the difference between windows and DOS.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand the fundamental concepts of computers with the present level of knowledge of the students.
2. Identify the basic terminology used in computer programming.
3. Understand the basic taxonomy and terminology of the data communication networking.
4. Acquire the knowledge of Internet and its applications
5. Analyze the difference between an operating system and an application program.

<b>CO/PO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	M	L	M	L	L	H
<b>CO2</b>	L	M	L	H	L	H
<b>CO3</b>	H	L	L	M	M	M
<b>CO4</b>	M	L	M	M	L	M
<b>CO5</b>	M	M	L	M	M	H

<b>CO/PSO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	L	H	H	M	H
<b>CO2</b>	M	H	L	M	M	H
<b>CO3</b>	H	L	M	H	L	M
<b>CO4</b>	L	H	H	L	M	M
<b>CO5</b>	H	M	M	H	L	H

**Low - L, Medium - M, High - H**

## **COURSE SYLLABUS**

### **Unit I**

**Hours: 12**

- 1.1 Definition and Technological Trends in IT (K1,K2,K3)
- 1.2 Applications of Information Technology (K1,K2)
- 1.3 Introduction to Computers: Definition - Characteristics of a Computer (K1,K2)
- 1.4 Classification of Computers (K1,K2)
- 1.5 Basic Anatomy of the Computer (K1,K2)
- 1.6 Applications / Uses of Computers in Different Fields (K1,K2)

### **Unit II**

**Hours: 12**

- 2.1 Input Devices (K1,K2)
- 2.2 Output Devices (K1,K2)
- 2.3 Data Representation (K1,K2)
- 2.4 Programming Languages / Computer Languages (K1,K2)
- 2.5 System Software and Application Software (K1,K2)
- 2.6 Difference between System Software and Application Software (K1, K2, K3)

### **Unit III**

**Hours: 12**

- 3.1 Computer Networks : Overview of Networks (K1)
- 3.2 Intranet and Extranet (K2)
- 3.3 Communication Processor (K2)
- 3.4 Communication Media (K2)
- 3.5 Types of Networks: LAN, MAN, WAN (K2)
- 3.6 Network Topologies (K2)

### **Unit IV**

**Hours: 12**

- 4.1 Internet and its Applications : History of Internet - Uses of Internet - Advantages of Internet (K1)
- 4.2 Internet Access: Types of Internet Connections (K2)
- 4.3 Internet Protocols and Services (K2)
- 4.4 Internet Addressing: IP Address – URL – DNS (K2)
- 4.5 Web Browser and Search Engine (K3)
- 4.6 E-mail (K3)

### **Unit V**

**Hours: 12**

- 5.1 Operating System: Evolution of Operating Systems (K1)
- 5.2 Function of Operating System (K2)
- 5.3 Classification of Operating System (K2)
- 5.4 Example of Operating System – DOS –Windows – UNIX - Linux (K2)
- 5.5 Difference between Windows and DOS (K2)
- 5.6 Difference between Linux and Windows (K2)

### **Book for Study:**

1. Pelin Aksoy, Laura DeNardis, “Introduction to Information Technology”, 1st Edition, Cengage Learning India Private Limited, 2009.
2. Alexis Leon and Mathews Leon, “Fundamentals of Information Technology”, Second

**Books for Reference:**

1. Dr. P.Rizwan Ahmed, “Introduction to Information Technology”, Second Edition, Margham Publications, Chennai, 2016
2. Alexis Leon and Mathew Leon, “Internet for Everyone”, Second Edition, Vikas Publishing, 201

**OER:**

1. <http://bookboon.com/en/it-programming-ebooks>
2. [http://www.engineering108.com/pages/IT-Programming/IT\\_Programming\\_ebooks\\_free\\_download.html](http://www.engineering108.com/pages/IT-Programming/IT_Programming_ebooks_free_download.html)

**SEMESTER I**  
**UCCAC20- Practical I: C**

Year / Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / I	UCCAC20	Practical I: C	Practical	Core	2	2	40+60

**COURSE OBJECTIVES**

1. To introduce students to the concept of basic programming- thereby reducing the design complexity and increasing the reusability of a component.
2. To learn data types and control structures in C.
3. To improve upon a solution to a problem.
4. Analyze a given problem and develop an algorithm to solve the problem.
5. To design, develop and test programs written in C.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Exercise with basic structure of the C program, declaration and usage of variable.
2. Resolve mathematical and scientific problem.
3. Develop the programs using conditional and iterative statements.
4. Implement array and string concept in C program.
5. Write real time problems using user defined functions

CO/PO	PO					
	1	2	3	4	5	6
CO1	L	H	M	M	L	H
CO2	M	L	L	L	H	M
CO3	M	H	M	L	M	M
CO4	L	M	L	M	L	L
CO5	H	M	L	M	L	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	L
CO2	L	L	M	L	L	H
CO3	H	M	M	H	H	M
CO4	L	H	L	M	M	H
CO5	M	H	H	H	M	L

**Low - L, Medium - M, High - H**

**Practical Program:**

**(Hours: 30)**

1. Input and Output Operations.
2. Decision Making Statements.
3. Arrays and Looping Statements.
4. Two Dimensional Arrays.
5. The Concept of Functions.
6. Recursion.
7. Character Arrays
8. Structures and Unions

**SEMESTER II**  
**UCCAD20 – PYTHON**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / II	UCCAD20	Python	Theory	Core	4	4	40+60

**COURSE OBJECTIVES**

1. To describe the core syntax and semantics of Python programming language.
2. To discover the need for working with the strings and functions.
3. To illustrate the process of structuring the data using lists, dictionaries, tuples and sets.
4. To design real life situational problems and think creatively about solutions of them.
5. To apply a solution clearly and accurately in a program using Python

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
2. Express different Decision Making statements and Functions
3. Interpret Object oriented programming in Python
4. Explain how to design GUI Applications in Python and evaluate different database operations
5. Design and develop Client Server network applications using python

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	M	M	M	M
CO2	M	M	M	M	H	H
CO3	M	M	M	L	L	M
CO4	H	M	L	M	H	H
CO5	M	L	M	H	M	H

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	L	M	H
CO2	L	M	L	H	M	L
CO3	M	H	M	L	H	M
CO4	H	L	H	M	L	M
CO5	L	M	L	H	M	H

## **COURSE SYLLABUS**

### **Unit I**

**(Hours: 12)**

- 1.1 Computer Systems - Python Programming Language (K1,K2)
- 1.2 Computational Thinking Python Data Types(K1,K2)
- 1.3 Expressions, Variables, and Assignments(K2,K3)
- 1.4 Strings - Lists (K2,K3)
- 1.5 Objects & Classes (K1, K2, K3,K4)
- 1.6 Python standard library. (K5, K6)

### **Unit II**

**(Hours: 12)**

- 2.1 Imperative Programming(K3)
- 2.2 Python Modules - Print() (K3,K4)
- 2.3 Function - Functional Eval() Execution Control Structures (K2,K3,K4)
- 2.4 User Defined Functions (K2,K3)
- 2.5 Python Variables(K3)
- 2.6 Assignments Parameter Passing.(K3)

### **Unit III**

**(Hours: 12)**

- 2.1 Text Data (K2,K3,K4)
- 2.2 Exceptions (k4)
- 2.3 Strings Revisited - Formatted Output(K3,K4)
- 2.4 Files(K2,K3)
- 2.5 Errors &Exceptions Execution Control Structures(K2,K3)
- 2.6 Decision Control & The IF Statement(K3,K4)

### **Unit IV**

**(Hours : 12)**

- 4.1 Container And Randomness (K2, K3)
- 4.2 Dictionaries (K3, K4)
- 4.3 Other Built-in Container Types (K2, K3)
- 4.4 Character Encodings (K2)
- 4.5 Strings (K2,K3)
- 4.6 Module Random (K3)

### **Unit V**

**(Hours: 12)**

- 5.1 FOR Loop & Iteration Patterns (K2, K3)
- 5.2 Two dimensional Lists While Loop (k2,K3)
- 5.3 More Loop Patterns - Additional Iteration (K1,K2,K3)
- 5.4 Control Statements Namespaces - Encapsulation in Functions(K3)
- 5.5 Global Vs. Local Namespaces (K2,K3,K5)
- 5.6 Exceptional Flow Control - Modules as Namespaces(K2,K4)

**Book for Study:**

1. LjubomirPerkovic, "Introduction to Computing Using Python: An Application Development Focus", 2<sup>nd</sup> Edition, John Wiley & Sons, 2012

**Books for Reference:**

1. Martin C. Brown, "Python: The Complete Reference", McGraw Hill Education; Fourth Edition, March 2018.
2. N. Ryan Marvin, Amos Omondi - "Python Fundamentals", 1<sup>st</sup> Edition, Packt Publishing, 2018.
3. Magnus Lie Hetland - "Beginning Python - From Novice to professional", 3<sup>rd</sup> Edition A Press Publishers, 2008.

**OER:**

1. [www.freebookcentre.net/programming.../Python-Language-Reference.html](http://www.freebookcentre.net/programming.../Python-Language-Reference.html)
2. [www.freebookcentre.net/.../Introduction-to-Python-Programming-Course-Notes.html](http://www.freebookcentre.net/.../Introduction-to-Python-Programming-Course-Notes.html)

**SEMESTER II**  
**UCCAЕ20 - COMPUTER ORGANIZATION AND ARCHITECTURE**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / II	UCCAЕ20	Computer Organization and Architecture	Theory	Core	4	5	40+60

**COURSE OBJECTIVES**

1. To make students understand the basic structure and operation of digital computer.
2. To understand the hardware-software interface.
3. To familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
4. To expose the students with different ways of communicating with I/O devices and standard I/O interfaces.
5. To familiarize the students with hierarchical memory system including cache memories and virtual memory.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Explain the organization of basic computer, its design and the design of control Unit.
2. Elaborate advanced concepts of computer architecture, Parallel Processing, Inter-processor communication and synchronization.
3. Demonstrate the working of central processing unit and RISC and CISC Architecture.
4. Describe the operations and language the register transfer, micro operations and input-output organization.
5. Understand the organization of memory and memory management hardware.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	H	M	M	M	L
CO2	H	M	M	M	H	L
CO3	M	H	H	M	L	H
CO4	H	L	M	M	L	M
CO5	M	L	M	L	M	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	H	M	L
CO2	L	M	L	H	M	L
CO3	M	L	M	L	M	M
CO4	H	L	H	L	L	M
CO5	H	M	L	M	M	H

**Low - L, Medium - M, High – H**

## **COURSE SYLLABUS**

### **Unit I**

**Hours: 13**

- 1.1 Digital Computers-Logic Gates-Boolean Algebra (K1, K2)
- 1.2 Map Simplification – Combinational Circuits – Sequential Circuits (K3)
- 1.3 Flip-Flops (SR D JK T) (K3, K4)
- 1.4 Digital Components: Decoders – Multiplexers (K2, K3)
- 1.5 Register – Shift Register (K3)
- 1.6 Data Representation: Data Types - Complements - Other Binary Codes. (K1, K2, K4)

### **Unit II**

**Hours: 11**

- 2.1 Basic Computer Organization and Design: Instruction Codes (K2, K3)
- 2.2 Computer Registers (K4)
- 2.3 Computer Instructions (K3, K4)
- 2.4 Timing and Control (K2)
- 2.5 Instruction Cycle (K3, K4)
- 2.6 Memory Reference Instructions. (K3, K4)

### **Unit III**

**Hours: 12**

- 3.1 Programming the Basic Computer: Introduction - Machine Language (K2)
- 3.2 Assembly Language (K3, K6)
- 3.3 The Assembler (K3, K4)
- 3.4 Central Processing Units: Introduction - General Register Organization (K2, K3)
- 3.5 Instruction Formats - Addressing Modes (K3, K4)
- 3.6 RISC and CISC Characteristics. (K4)

### **Unit IV**

**Hours: 12**

- 4.1 Input Output Organization: Peripheral Devices (K1, K2)
- 4.2 Input/output Interface (K3, K4)
- 4.3 Asynchronous Data Transfer (K3)
- 4.4 Modes of Transfer (K3, K4)
- 4.5 Priority Interrupt (K3)
- 4.6 Direct Memory Access. (K3)

- 5.1 Memory Organization: Memory Hierarchy (K1, K2)
- 5.2 Main Memory (K1, K2)
- 5.3 Auxiliary Memory (K2, K3)
- 5.4 Cache Memory (K3, K4)
- 5.5 Virtual Memory: Address Space and Memory Space – Address Mapping using Pages (K3, K6)
- 5.6 Associative Memory Page Table – Page Replacement (K3, K6)

**Book for Study:**

1. M.Morris Mano, “Computer System Architecture”, Edition 3, Prentice Hall of India Pvt. Ltd., 2013.
2. Miles Murdocca and Vincent Heuring, “Computer Architecture and Organization: An Integrated Approach”, Second Edition, Wiley Publication, 2015.

**Books for Reference:**

1. Vincent P.Heuring and Harry F. Jordan, “Computer System Design and Architecture, Edition 2, Pearson Education, 2012.
2. William Stallings, “Computer Organization and Architecture Designing for Performance”, Eighth Edition, Pearson Education, 2013.

**OER:**

1. [https://www.academia.edu/31003870/Computer\\_System\\_Architecture\\_3rd\\_Ed\\_by\\_M\\_Morris\\_Mano\\_text\\_pdf](https://www.academia.edu/31003870/Computer_System_Architecture_3rd_Ed_by_M_Morris_Mano_text_pdf)
2. <https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/>

**SEMESTER II**  
**UCCAF20 – PRACTICAL V: PYTHON**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / II	UCCAF20	Practical V: Python	Practical	Core	2	2	40+60

**COURSE OBJECTIVES**

1. To describe the core syntax and semantics of Python programming
2. Python programming is intended for software engineers, system analysts, program managers and user support personnel who wish to learn the Python programming language.
3. To understand why Python is a useful scripting language for developers.
4. To learn how to design and program Python applications.
5. To learn how to use lists, tuples, and dictionaries in Python programs.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. To Understand the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python
2. Express different Decision Making statements and Functions
3. Interpret Object oriented programming in Python
4. Explain how to design GUI Applications in Python and evaluate different database operations
5. Design and develop Client Server network applications using python

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	L	M	L	M	H
CO2	M	M	M	M	H	H
CO3	M	M	M	L	M	H
CO4	H	M	L	M	H	M
CO5	H	L	M	H	M	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	H	M	H
CO2	L	H	L	L	M	L
CO3	M	L	M	L	H	M
CO4	M	L	H	M	L	M
CO5	H	H	L	H	M	M

**Low - L, Medium - M, High - H**

1. Program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. Program to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria:
  - i. Grade A: Percentage  $\geq 80$
  - ii. Grade B: Percentage  $\geq 70$  and  $< 80$
  - iii. Grade C: Percentage  $\geq 60$  and  $< 70$
  - iv. Grade D: Percentage  $\geq 40$  and  $< 60$
  - v. Grade E: Percentage  $< 40$
3. Program, using user defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. Program to display the first n terms of Fibonacci series
5. Program to find factorial of the given number.
6. Program to find sum of the following series for n terms:  $1 - 2/2! + 3/3! - \dots + n/n!$
7. Program to calculate the sum and product of two compatible matrices.

**SEMESTER III**  
**UCCAG20-Data Structures**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	UCCAG20	Data Structures	Theory	Core	5	4	40+60

**COURSE OBJECTIVES**

1. On learning this paper students will gain the knowledge on different types of data along with the structures and its algorithm.
2. To impart the basic concepts of data structures and algorithms
3. To understand concepts about searching and sorting techniques
4. To Understand basic concepts about stacks, queues, lists, trees and graphs
5. To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Discuss the concept of complexity of algorithms, data types, algorithms, Big O notation.
2. Apply basic data structures such as arrays, linked lists, stacks and queues.
3. Identify problem involving trees and binary search trees.
4. Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data using linked list.
5. Analyze graphs and describe the hash function and concepts of collision and its resolution methods.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	M	M	L	M
CO2	L	M	L	M	L	H
CO3	M	M	H	H	M	L
CO4	H	M	L	M	L	M
CO5	M	L	M	L	L	H

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	M
CO2	L	M	H	H	M	L
CO3	H	M	M	H	M	H
CO4	L	H	M	H	L	H
CO5	H	H	H	L	M	M

**Low - L, Medium - M, High - H**

# COURSE SYLLABUS

## Unit I

**Hours: 15**

- 1.1 Introduction - Data structure operations (K1)
- 1.2 Complexity and Time Space of Algorithms (K2)
- 1.3 Mathematical Notation and Functions - Algorithmic Notation K2)
- 1.4 Control Structures - Complexity of Algorithms - Sub Algorithms - Variables - Data Types (K2)
- 1.5 String Processing: Basic Terminology - Storing Strings (K3)
- 1.6 Character Data Type - String Operations (K2)

## Unit II

**Hours: 15**

- 2.1 Linear Arrays Representation in Memory (Cognitive Level: K1)
- 2.2 Traversals (Cognitive Level: K2)
- 2.3 Inserting and Deleting (Cognitive Level: K3)
- 2.4 Sorting – Searching (Cognitive Level: K3)
- 2.5 Multidimensional Arrays (Cognitive Level: K1)
- 2.6 Pointer Arrays. (Cognitive Level: K1)

## Unit III

**Hours: 15**

- 3.1 Linked Lists: Representation in Memory - Traversing a Linked List (K1)
- 3.2 Searching – Garbage Collection (K1)
- 3.3 Insertion and Deletion - Headers – Two Way Lists (K3)
- 3.4 Array Representation - Arithmetic Expressions- Recursion (K1)
- 3.5 Queues - Application Circular queues - Priority Queues. (K1.K3)

## Unit IV

**Hours: 15**

- 4.1 Trees - Binary Trees - Representation in Memory (K1)
- 4.2 Tree Traversals (K2)
- 4.3 Binary Search Trees (K2)
- 4.4 Searching (K3)
- 4.5 Inserting and Deleting (K2)
- 4.6 Path Lengths - General Trees (K1)

## Unit V

**Hours: 15**

- 5.1 Graphs - Sequential Representation (K1)
- 5.2 Adjacency Matrix - Path Matrix (K2)
- 5.3 Heap Sort (K1)
- 5.4 Warshall's Algorithm for Shortest Path (K2)
- 5.5 Linked Representation - Graph Traversals (K1)
- 5.6 Hashing (K1)

## Book for Study:

1. Seymour Lipschutz, "Data Structures: Schaum's Outline Series", Revised Edition, McGraw Hill Publication, 2011.

## Reference Books :

1. Ellis Horowitz, Sartaj Sahni, Susan Anderson Freed, "Fundamentals of Data Structures in C", 2<sup>nd</sup> Edition, Universities Press Pvt Ltd, 2018
2. Yashavant P. Kanetkar, "Data Structures through C", 2<sup>nd</sup> Edition, BPB Publications,

2003. Alfred V.Aho, John E.Hopcroft, Jeffrey D.Ullman , “Data Structures and Algorithms” , 1<sup>st</sup> Edition, Pearson Education.

**OER:**

1. <http://www.freebookcentre.net/ComputerScience-Books-Download/Fundamentals-of-Algorithms-with-Applications.html>
2. <http://www.freebookcentre.net/ComputerScience-Books-Download/Algorithms-and-Data-Structures-Lecture-Materials.html>

**SEMESTER III**  
**UCCA20 - Java Programming**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	UCCA20	Java Programming	Theory	Core	5	4	40+60

**COURSE OBJECTIVES**

1. This course provides an introduction to object oriented programming (OOP) using the Java programming language.
2. Its main objective is to teach the basic concepts and techniques which form the object oriented programming paradigm
3. Concepts of object oriented programming in java are needed.
4. To provide sufficient knowledge about developing real world projects with object oriented concept.
5. To have the knowledge of Exception handling and Event handling and applets.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Able to understand the use of OOPs concepts.
2. Able to solve real world problems using OOP techniques. To understand the use of polymorphism and Inheritance.
3. Able to understand the use of Packages and Interface in java.
4. Able to develop and understand exception handling, multithreaded applications with synchronization.
5. Able to design GUI based applications and develop AWT and applets for web applications.

CO/ PO	PO					
	1	2	3	4	5	6
CO1	M	H	L	M	L	H
CO2	M	L	H	L	M	M
CO3	L	M	M	M	H	M
CO4	M	M	L	L	M	L
CO5	H	M	H	M	H	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	L
CO2	L	M	H	M	H	H
CO3	M	H	H	M	L	H
CO4	H	M	M	H	H	L
CO5	M	H	M	L	H	M

**Low - L, Medium - M, High - H**

# COURSE SYLLABUS

## Unit I

Hours: 15

- 1.1 Introduction to Java (K1)
- 1.2 Features of Java (K1)
- 1.3 Lexical issues & Data types (K1)
- 1.4 Variables - Operators (K1)
- 1.5 Type conversion and casting (K2)
- 1.6 Control Statements (K2)

## Unit II

Hours: 15

- 2.1 Arrays – Strings (K1)
- 2.2 Classes - Objects-Constructors - Overloading method (K2)
- 2.3 Access Control - Static and Fixed method (K2)
- 2.4 Inner Class –String class (K2)
- 2.5 Inheritance - Overriding Method (K3)
- 2.6 Using Super Class. (K2)

## Unit III

Hours: 15

- 3.1 Input/output: Exploring Java i/o: The Java I/O classes (K1)
- 3.2 Interfaces (K2)
- 3.3 File Stream Classes (K2)
- 3.4 Packages (K3)
- 3.5 Access Protection - Importing Packages (K3)
- 3.6 Interfaces (K2)

## Unit IV

Hours: 15

- 4.1 Exception Handling: try, catch (K1)
- 4.2 Throw and Throws - Finally (K2)
- 4.3 Thread - Creating a Thread (K4)
- 4.4 Multithreading (K2)
- 4.5 Synchronization (K3)
- 4.6 Deadlock. (K2)

## Unit V

Hours: 15

- 5.1 The Java Applet and (K4)
- 5.2 HTML APPLET tag (K4)
- 5.3 getDocumentBase() and getCodeBase() (K5)
- 5.4 Event Handling (K3)
- 5.5 Working with Windows (K4)
- 5.6 AWT Classes. (K2)

## Book for Study:

1. Herbert Schildt - “The Complete Reference: Java 2”, 10<sup>th</sup> Edition Tata McGraw Hill Publication, 2018.

## Books for Reference:

1. C. Muthu, “Programming with Java”, 2<sup>nd</sup> Edition, Tata McGraw Hill Publishing, 2015.
2. E. Balagurusamy, “Programming with Java: A Primer”, 4<sup>th</sup> Edition, Tata McGraw Hill Publication, 2015.

**OER:**

1. <https://www.tutorialspoint.com/java/index.htm>[https://www.tutorialspoint.com/php/php\\_tutorial.pdf](https://www.tutorialspoint.com/php/php_tutorial.pdf)
2. <http://www.freebookcentre.net/JavaTech/javaCategory.html>
3. <http://freecomputerbooks.com/javaCategory.html>

**SEMESTER III**  
**UCCAI20 - Design and Analysis of Algorithms**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	UCCAI20	Design and Analysis of Algorithms	Theory	Core	5	4	40+60

**COURSE OBJECTIVES**

1. To demonstrate a familiarity with major algorithms and data structures.
2. To apply important algorithmic design paradigms and methods.
3. To synthesize efficient algorithms in problem solving situations.
4. To apply important algorithmic design paradigms and methods of analysis.
5. To apply important algorithmic design paradigms and methods of analysis.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Define the basic concepts of algorithms and analyze the performance of algorithms.
2. Discuss various algorithm design techniques for developing algorithms
3. Identify the usage of set of rules design methods including the greedy approach, divide and overcome, dynamic programming, and certain.
4. Understand the variations among backtracking, graph coloring and 8 Queens problems
5. Understand NP completeness and identify different NP complete problems

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	H	L	L	M	M
CO2	M	L	M	H	L	M
CO3	L	H	L	M	M	L
CO4	M	M	M	L	H	M
CO5	M	L	M	L	L	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	H	M	H
CO2	L	H	L	H	M	L
CO3	M	H	M	L	H	M
CO4	H	L	H	H	L	M
CO5	H	H	L	H	M	H

**Low - L, Medium - M, High - H**

# COURSE SYLLABUS

## Unit I

Hours: 15

- 1.1 Basic Concepts: Overview - System Life Cycle (K1)
- 1.2 PseudoCode for Expressing Algorithms (K1)
- 1.3 Algorithm Specification (K1)
- 1.4 Performance Analysis (K2)
- 1.5 Performance Measurement Space Complexity, Time Complexity (K2)
- 1.6 Asymptotic Notation - Big Oh Notation, Omega Notation, Theta Notation and Little Oh Notation. (K2)

## Unit II

Hours: 15

- 2.1 Divide and Conquer: General Method (K2)
- 2.2 Finding the Maximum and Minimum (K3)
- 2.3 Merge Sort (K3)
- 2.4 Quick Sort (K3)
- 2.5 Selection (K2)
- 2.6 Optimal Binary Search Trees (K2)

## Unit III

Hours: 15

- 3.1 Greedy method: General method - Knapsack Problem (K2)
- 3.2 Minimum Cost Spanning Trees (K2)
- 3.3 Single Source Shortest Path Problem (K2).
- 3.4 Dynamic Programming: General method (K2)
- 3.5 All Pairs Shortest Path Problem (K2)
- 3.6 Travelling Sales Person Problem (K2,K3,K4)

## Unit IV

Hours: 15

- 4.1 Backtracking: General Method (K1)
- 4.2 8 Queens Problem (K2,K3)
- 4.3 Sum of Subsets (K2)
- 4.4 Graph Coloring (K2)
- 4.5 Hamiltonian Cycles (K2,K3)
- 4.6 Knapsack Problem (K2,K3)

## Unit V

Hours: 15

- 5.1 Branch and Bound: General method (K2)
- 5.2 Least Cost (LC) Search (K2,K3)
- 5.3 FIFO Branch and Bound (K2,K4)
- 5.4 LC Branch and Bound Solution (K2,K3)
- 5.5 NP Hard and NP Complete Problems- basic concepts (K2,K3)
- 5.6 Non deterministic algorithms (K2,K3)

### Book for Study:

1. Ellis Horowitz, Sartaj Sahni, SanguthevarRajasekaran, "Fundamentals of Computer Algorithms", 2<sup>nd</sup> Edition, Galgotia Publication Pvt.Ltd., 2009.

### Books for Reference:

1. Yashavant P. Kanetkar, "Data Structure through C", 2<sup>nd</sup> Edition, BPB Publications, 2003.
2. Thomas H Corman, Charles Eleiserson, RonaldL. Rivest,Clifford Stein, "Introduction

to Algorithms”, 3rd Edition, PHI Learning Pvt. Ltd, 2010.

3. Seymour Lipschutz, “Data Structures with C”, Revised Edition, Schaum’s Outline Series, 2009

**OER:**

1. <http://freecomputerbooks.com/compscAlgorithmBooks.html>
2. <http://www.freebookcentre.net/ComputerScience-Books-Download/Introduction-to-the-Design-and-Analysis-of-Algorithms.html>
3. <http://www.freebookcentre.net/ComputerScience-Books-Download/Analysis-and-Design-of-Computer-Algorithms-by-Ganesh-Kumar.html>

**SEMESTER III**  
**UCCAJ20 - Practical - III: Java**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	UCCAJ20	Practical - III: Java	Practical	Core	3	2	40+60

**COURSE OBJECTIVES**

1. To introduce the object oriented programming concepts.
2. To understand object oriented programming concepts, and apply them in solving problems.
3. To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes
4. To introduce the concepts of exception handling and multithreading.
5. To introduce the design of Graphical User Interface using applets and swing controls.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and I/O Streams.
2. Establish exception handling is used to minimize the errors in Java programming.
3. Demonstrate the concepts of Packages and Interface.
4. Evaluate the Java programs to implement error handling techniques using exception handling.
5. Design GUI based applications and develop applets for web applications.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	M	L	M	H
CO2	H	H	L	M	L	L
CO3	L	M	M	H	M	M
CO4	M	L	L	M	H	M
CO5	H	M	M	L	M	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	H	L	H
CO2	L	H	M	H	H	M
CO3	M	H	H	L	M	H
CO4	H	L	H	L	H	M
CO5	L	M	H	H	H	H

**Low -L, Medium -M, High-H**

1. Implementing String manipulation using character Array.
2. Implementing Input and Output Stream.
3. Implementing Packages and Interface.
4. Implementing Exception handling.
5. Implementing Real time application using multithread.
6. Implementing Applet using Graphics class.
7. Implementing AWT controls.
8. Implementing Colors and fonts.
9. To create any applications using Applets and AWT.

**SEMESTER III**  
**UCCA20 - Practical: Data Structures and Algorithms**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	UCCA20	Practical - IV: Data Structures and Algorithms	Practical	Core	3	2	40+60

**COURSE OBJECTIVES:**

1. Analyze the asymptotic performance of algorithms.
2. Write rigorous correctness proofs for algorithms.
3. Demonstrate a familiarity with major algorithms and data structures.
4. Apply important algorithmic design paradigms and methods of analysis.
5. Simplify efficient algorithms in common engineering design situations.
6. Analyze the asymptotic performance of algorithms.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Implement PUSH, POP and Add and delete operations of Stack using Arrays.
2. Explore the Infix to postfix conversion and binary tree traversals and its algorithms like depth first and breadth first traversal
3. Understanding polynomial addition and merge sort using Divide and Conquer Technique.
4. Implement travelling Salesman problem using Dynamic programming and Hashing with two collision techniques.
5. Implement PUSH, POP and Add and delete operations of Stack using Arrays.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	M	M	L	M
CO2	L	M	L	M	L	H
CO3	M	M	H	H	M	L
CO4	H	M	L	M	L	M
CO5	M	L	M	L	L	H

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	M
CO2	L	M	H	H	M	L
CO3	H	M	M	H	M	H
CO4	L	H	M	H	L	H
CO5	H	H	H	L	M	M

**Low -L, Medium -M, High-H**

1. Implementing PUSH, POP operations of Stack using Arrays.
2. Implementing add, delete operations of a Queue using Arrays.
3. Implementing Infix to postfix conversion of an expression using Stack.
4. Implementing Binary tree traversals (inorder, preorder, postorder).
5. Implementing Polynomial addition using linked list.
6. Implementing the following graph traversal algorithms:
  - a) Depth first traversal
  - b) Breadth first traversal
7. Implementing Merge sort using Divide and Conquer Technique.
8. Implementing Travelling Salesman problem using Dynamic Programming technique.
9. Implementing Hashing - any two Collision techniques.
10. Implementing Knapsack problem

**II Year – SKILL BASED ELECTIVE  
USCAA320 - SBE: ACCOUNTING SOFTWARE**

<b>Year /Sem</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
II / III	USCAA320	SBE: Accounting Software	Theory with Practical	Skill Based Elective	2	2	40+60

**COURSE OBJECTIVE**

1. To seamlessly combine the activities of accounting, inventory, payroll, finance and more.
2. To maintain a record of all monetary transactions.
3. To apply the knowledge of quantitative tools & techniques in the interpretation of data for managerial decision – making.
4. To develop computer skills of recording financial transactions, preparation of annual accounts and reports using Tally.
5. To acquaint with the accounting concept, tools and techniques influencing business organization.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand the basics in Tally and company creations
2. Creating vouchers, ledgers accounts, Balance Sheet
3. Demonstrate Profit And Loss Account and Reconciliation of the bank account.
4. Create company accounts that use various functions like Cost Category and Cost Centre
5. Learn to apply the tools & techniques in the interpretation of data for managerial decision – making.

<b>CO/PO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	M	M	M	H	H	L
<b>CO2</b>	L	M	L	M	L	H
<b>CO3</b>	L	M	H	M	M	M
<b>CO4</b>	H	L	M	M	H	M
<b>CO5</b>	L	M	M	L	M	L

<b>CO/PSO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	H	M	H	L
<b>CO2</b>	L	H	M	H	H	L
<b>CO3</b>	H	L	H	H	M	M
<b>CO4</b>	M	M	H	H	L	H
<b>CO5</b>	H	H	L	M	M	H

**Low - L, Medium - M, High - H**

# COURSE SYLLABUS

## Unit I

**Hours: 5**

- 1.1 Company Creation and Configuration : Creation for New Company(K1,k2)
- 1.2 Company Features Accounting Features (K1,k2)
- 1.3 Inventory Features – Configuring Tally (K1,k2,k6)
- 1.4 Configuring Voucher Entry (k5,k6)
- 1.5 Configuring Invoice/Orders Entry – Shut A Company(k4,k5)
- 1.6 Alter a Company – Delete a Company(K4,k5)

## Unit II

**Hours: 5**

- 2.1 Accounting and Inventory an Outline : Fundamentals of Accounting – Accounting Terms Definitions – Ledger and Ledger Accounts (K2,K3)
- 2.2 Trial Balance – Trading and Profit and Loss Account (K1,K2)
- 2.3 Profit and Loss Account – Balance Sheet – Fundamentals of Inventory (K1, K2)
- 2.4 Accounts Masters Creation: Accounts Information – Group (Create, Display, Delete) Multiple Groups (K1,K2)
- 2.5 Ledgers (Create, Display, Alter) – Multiple Ledgers (K2, K4, K5)
- 2.6 Cost Categories – Cost Centres. (K5, K6)

## Unit III

**Hours: 6**

- 3.1 Inventory Master Creation: Stock Groups – Entering Vouchers (K1,K2,K4)
- 3.2 Voucher Types –Voucher Entry (K3, K4)
- 3.3 Different Types of Accounting Vouchers(Payment/Receipt, Journal, Sales , Purchase) (K2,K3,K4)
- 3.4 Reports In Tally: Display Balance Sheet – Profit And Loss Account (K3,K4,K5)
- 3.5 Display Trial Balance – Day Book (K2,K3,K4)
- 3.6 Reconciliation of Bank Accounts. (K5,K6)

## Unit IV

**Hours: 6**

1. Trading , Profit and Loss Account of a Company
2. Balance Sheet of a Company
3. Cost Category and Cost Centre

## Unit V

**Hours: 6**

4. Bank Reconciliation Statement
5. Inventory and Stock
6. Display and Reporting

### Books for Study:

1. LP Computer Series - Guide To Tally 9 - Law Point, Kolkata, First Edition, 2007.

### Books for Reference:

1. Tally for Beginners - Tally Press.

**SEMESTER IV**  
**UCCAL20 -DATA COMMUNICATIONS AND NETWORKING**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	UCCAL20	Data Communications and Networking	Theory	Core	5	4	40+60

**COURSE OBJECTIVES**

1. To discuss and explain about basics of data communication and networking concepts.
2. To introduce analysis and design of computer and communication networks.
3. Understand the network layered architecture and the protocol stack.
4. Design the basic configuration of routers and switches.
5. Resource sharing in the computer network to provide high Reliability.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Describe the Functions of each layer in OSI and TCP/IP Model.
2. Explain the types of Transmission Media with Real-Time Applications.
3. Apply Time and Frequency concept of analysis.
4. Manage Network functions for an Organization.
5. Analyze various Routing Algorithms and Protocols.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	H	M	M	H
CO2	H	M	M	L	M	M
CO3	M	L	M	H	M	L
CO4	H	M	L	M	M	H
CO5	L	M	L	M	L	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	H	M	H
CO2	L	H	L	L	M	L
CO3	M	L	M	L	H	M
CO4	H	L	H	H	L	M
CO5	H	M	L	H	M	M

**Low - L, Medium - M, High – H**

# COURSE SYLLABUS

## Unit I

**Hours: 14**

- 1.1 Data Communications, Data Networking, and the Internet: Data Communications and Networking for Today's Enterprise - Communications Model.(K1, K2)
- 1.2 Data Communications - Networks - The Internet. (K2, K3)
- 1.3 Protocol Architecture, TCP/IP, and Internet - Based Applications: The Need for Protocol Architecture. (K2, K3)
- 1.4 The TCP/IP Protocol Architecture –The OSI Model. (K3, K4)
- 1.5 Standardization within a Protocol Architecture - Traditional Internet (K2, K3)
- 1.6 Data Transmission: Concepts and Terminology - Analog and Digital Data Transmission - Transmission Impairments (K2, K3)

## Unit II

**Hours: 16**

- 2.1 Transmission Media: Guided Transmission Media. (K3)
- 2.2 Wireless Transmission - Wireless Propagation (K3)
- 2.3 Signal Encoding Techniques: Digital Data, Digital Signals - Digital Data, Analog Signals. (K3, K4)
- 2.4 Analog Data, Digital Signals - Analog Data, Analog Signals. (K3)
- 2.5 Digital Data Communication Techniques: Asynchronous and Synchronous Transmission - Types of Errors (K2, K3, K4)
- 2.6 Error Detection. Error Correction (K2,K3)

## Unit III

**Hours: 14**

- 3.1 Data Link Control Protocols: Flow Control - Error Control. (K2)
- 3.2 High Level Data Link Control (HDLC). (K3)
- 3.3 Multiplexing: Frequency Division Multiplexing - Synchronous Time Division Multiplexing - Statistical Time Division Multiplexing. (K3, K4)
- 3.4 Asymmetric Digital Subscriber Line –xDSL.(Cognitive Level: K2, K3)
- 3.5 Spread Spectrum: The Concept of Spread Spectrum - Frequency Hopping Spread Spectrum. (K3, K4, K5)
- 3.6 Direct Sequence Spread Spectrum – Code Division Multiple Access. (K3, K4, K5)

## Unit IV

**Hours: 16**

- 4.1 Circuit Switching and Packet Switching: Switched Communications Networks - Circuit Switching Networks. (K2, K4)
- 4.2 Circuit Switching Concepts - Softswitch Architecture. (K2, K4)
- 4.3 Packet Switching Principles - X.25 - Frame Relay. (K4, K5)
- 4.4 Asynchronous Transfer Mode: Protocol Architecture. (K4)
- 4.5 ATM Logical Connections - ATM Cells - Transmission of ATM Cells. (K5)
- 4.6 ATM Service Categories. (K4, K5)

## Unit V

**Hours: 15**

- 5.1 Routing in Switched Networks: Routing in Packet Switching Networks - Examples: Routing in ARPANET. (K2, K3)
- 5.2 Least Cost Algorithms. (K3, K4)
- 5.3 Effects of Congestion - Congestion Control.( K4)
- 5.4 Traffic Management - Congestion Control in Packet Switching Networks.(K4, K5, K6)
- 5.5 Frame Relay Congestion Control - ATM Traffic Management. (K5, K6)
- 5.6 ATMGFR Traffic Management. (K5, K6)

**Book for Study:**

1. William Stallings, “Data and Computer Communications”, 8<sup>th</sup> Edition , Pearson Education, Inc., 2016.

**Books for Reference:**

1. Andrews S. Tanenbaum, “Computer Networks”, 4<sup>th</sup> Edition , Prentice Hall of India Private Limited, 2011
2. Leon Garcia and Widjaja, “Communication Networks, Fundamental Concepts and Key Architecture “, 2<sup>nd</sup> Edition, Tata McGraw Hill, 2001.
3. Behrouz A. Forouzan, “Data Communications and Networking”, Fourth Edition, Tata McGraw Hill, 2017.

**OER:**

1. <http://www.freebookcentre.net/Networking/networkCategory.html>
2. <http://freecomputerbooks.com/networkCategory.html>

**SEMESTER IV**  
**UCCAM20 – OPERATING SYSTEM**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	UCCAM20	Operating System	Theory	Core	5	4	40+60

**COURSE OBJECTIVES**

1. To describe basic components of operating system.
2. To understand basic principles used in the design of modern operating systems.
3. To illustrate the general architecture of computers.
4. To Understand and analyze theory.
5. To analyze: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Acquire the important computer system resources and the role of operating system in their management policies and algorithms
2. Understand the process management policies and scheduling of processes by CPU.
3. Evaluate the requirement for process synchronization and coordination handled by operating system
4. Describe and analyze the memory management and its allocation policies
5. Entity use and evaluate the storage management policies with respect to different storage management technologies

CO/PO	PO					
	1	2	3	4	5	6
CO1	L	M	L	M	M	L
CO2	H	M	M	L	L	M
CO3	M	H	M	M	L	M
CO4	L	M	L	M	M	L
CO5	L	L	H	M	M	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	H	M	H
CO2	L	H	L	L	M	L
CO3	M	H	M	L	L	M
CO4	H	L	H	H	L	M
CO5	H	M	L	H	M	M

**Low - L, Medium - M, High - H**

# COURSE SYLLABUS

## Unit I

Hours: 12

- 1.1 LINUX: Introduction, Brief history. Unix Components/Architecture (K1)
- 1.2 Features of Unix. (K1)
- 1.3 Basic Commands: Directory and File Commands: pwd, ls, cd, cp, mv, rm, mkdir, rmdir, chmod. (K2)
- 1.4 Full and Relative Pathnames (K2)
- 1.5 File and Directory Naming Conventions. (K1,K2)
- 1.6 Wildcard Characters? - Ownership and Permission: chmod, chgrp, chown. (K1,K2)

## Unit II

Hours: 12

- 2.1 Shell Programming Language (K2)
- 2.2 Naming Shell Programs. (K2)
- 2.3 Shell Variables and Arguments. (K2,K3)
- 2.4 Command Line Arguments. (K2,K3)
- 2.5 Looping and Conditional Execution: if..then..else..elseif..fi.(K1,K2,K3)
- 2.6 While ..do, for..do..done, for, while, until and case statements, break and continue, true and false commands. (K3)

## Unit III

Hours: 12

- 3.1 System calls - Types of System calls (K3)
- 3.2 Process Management: Process Concepts (K2,K3,K5)
- 3.3 Inter Process Communication (K2,K3,K5)
- 3.4 Multithreaded Programming: Multithreading Models. (K5)
- 3.5 Process Scheduling: Basic Concepts - Scheduling Criteria - Scheduling Algorithms. (K3,K4)
- 3.6 Deadlock: Deadlock Characterization - Deadlock Avoidance. (K3,K4)

## Unit IV

Hours: 12

- 4.1 Memory Management: Background – Swapping. (K3, K4)
- 4.2 Contiguous Memory Allocation – Paging. (K3, K4)
- 4.3 Structure of the Page Table (K3, K4)
- 4.4 Segmentation. (K3, K4)
- 4.5 Virtual Memory Management: Demand Paging (K3, K4)
- 4.6 Page Replacement - Thrashing. (K4)

## Unit V

Hours: 12

- 5.1 File System: File Concept - Access methods (K1, K2, K3)
- 5.2 Directory Structure. (K1, K2, K3)
- 5.3 Implementing File Systems: File System Structure and Implementation. (K1, K2, K4)
- 5.4 Allocation Methods - Free Space Management. (K1, K2, K4)
- 5.5 Secondary Storage Structure Disk Structure (K1, K2, K3)
- 5.6 Disk Scheduling. (K1, K2, K4)

### Book for Study:

1. Behrouz A. Forouzan, Richard F. Gilberg.Thomson, “Unix and shell Programming”, 2005.
2. Meeta, Tilak & Rajiv, “The ‘C’ Odyssey UNIX - The Open, Boundless C”, First Edition, BPB Publication 1992.

3. Silberschatz Galvin Gagne, “Operating System Principles”, 7 th Edition, Prentice Hall, 2011.

**Books for Reference:**

1. Your UNIX the ultimate guide, Sumitabha Das, 2nd Edition, TMH, 2007.
2. UNIX for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson Education.
2. Richard Rosinski, Douglas Host, Kenneth Rosen, Rachel Klee, “UNIX: The Complete Reference”, Second Edition, 2007.
3. Andrew S. Tanenbaum, “Operating Systems, Design and Implementation”, 2nd Edition, Prentice Hall of India, 2012.

**OER:**

1. <http://www.freebookcentre.net/UnixCategory/unixCategory.html>
2. <http://freecomputerbooks.com/unixCategory.html>

**SEMESTER IV**  
**UCCAN20 - .NET PROGRAMMING**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	UCCAN20	.Net Programming	Theory	Core	5	4	40+60

**COURSE OBJECTIVES**

1. Understand code solutions and compile C# projects within the .NET framework.
2. Design and develop professional Console and Window based .NET application.
3. Demonstrate knowledge of object-oriented concepts design user experience and functional requirements C#.NET application.
4. Understand and implement string manipulation, events and exception handling within .NET application environment.
5. Identify and resolve problems in C#.NET window based application.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand the concepts of .NET Framework and C#.
2. Apply the usage of Methods, Arrays and Strings.
3. Interpret the concepts of Constructors, Inheritance and Interfaces.
4. Analyze Operator Overloading, Delegates, Events and Exceptions.
5. Create Windows Applications and Web - based Applications.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	M	M	L	M
CO2	L	M	L	M	L	H
CO3	M	M	H	M	H	L
CO4	H	M	L	M	L	M
CO5	M	L	M	L	L	H

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	M
CO2	L	M	H	H	M	L
CO3	H	M	M	H	M	H
CO4	L	H	M	H	L	H
CO5	H	H	H	L	M	M

**Low - L, Medium -M, High-H**

# COURSE SYLLABUS

## Unit I

**Hours: 13**

- 1.1 Introduction – Evolution of C# – Characteristics of C# – Applications of C# (K1, K2)
- 1.2 Origins of .NET Technology – .NET Framework (K1, K2)
- 1.3 Common Language Runtime–User and Program Interfaces – .NET Languages (K2, K3)
- 1.4 Benefits of the .NET Approach – Simple C# Program – Namespaces (K3, K4)
- 1.5 Providing Interactive Input – Literals, Variables and Data Types (K5,K2)
- 1.6 Decision Making and Branching Statements. (K3, K5)

## Unit II

**Hours: 14**

- 2.1 Decision Making and Looping Statements – Methods in C# (K3, K4)
- 2.2 Declaring Methods – Invoking Methods – Nesting of Methods (K2, K3)
- 2.3 Method Parameters – Pass by Value – Pass by Reference – Output Parameters (K2)
- 2.4 Method Overloading – One Dimensional Array – Creating an Array – Two Dimensional Arrays (K3, K4)
- 2.5 Array List Class – Manipulating Strings – Creating Strings – String Methods (K5, K6)
- 2.6 Inserting strings – Comparing Strings – Finding Substrings – Array of Strings. (K5)

## Unit III

**Hours: 11**

- 3.1 Classes and Objects – Defining a Class – Adding variables and methods (K1, K3)
- 3.2 Creating objects – Constructors – Member Initialization – this Reference (K2, K4)
- 3.3 Nesting of Classes–Indexers –Classical Inheritance –Containment Inheritance (K4, K5)
- 3.4 Defining a subclass – Defining Subclass Constructors – Multilevel Inheritance – Hierarchical Inheritance (K3)
- 3.5 Overriding Methods – Defining an interface – Implementing interfaces (K4, K5)
- 3.6 Interface and Inheritance – Explicit interface implementation. (K6)

## Unit IV

**Hours: 12**

- 4.1 Need for Operator Overloading – Defining Operator Overloading (K3, K4)
- 4.2 Overloading Binary Operators – Overloading Comparison Operators (K5)
- 4.3 Delegate Declaration – Delegate Methods – Delegate Instantiation (K2, K4)
- 4.4 Delegate Invocation – Using Delegate – Events – Exceptions (K2, K3)
- 4.5 Types of errors – Multiple Catch Statements – Exception Hierarchy (K3)
- 4.6 General Catch Handler – Using Finally Statement. (K3, K4)

## Unit V

**Hours: 10**

- 5.1 Creating Window Forms (K3, K4)
- 5.2 Customizing a Form (K2, K3)
- 5.3 Creating a Windows Application (K5)
- 5.4 Running a Windows Application (K3, K4)
- 5.5 Creating Web based Application on .NET (K3, K4)
- 5.6 Creating a .NET application to send SMS to mobile phones. (K2, K3)

## Books for Study:

1. E. Balagurusamy, “Programming in C#”, Fourth Edition, Tata McGraw Hill Education, 2017.

## Books for Reference:

1. Herbert Schildt, "Complete Reference C#", Tata McGraw-Hill, 2010.
2. John Sharp, “Microsoft Visual C# Step by Step”, Eighth Edition, PHI Publications, 2016.
3. Harsh Bhasin, “Programming in C#”, First Edition, Oxford University Press, 2014.

**OER:**

1. <https://www.w3schools.com/cs/>
2. <https://docs.microsoft.com/en-us/dotnet/csharp/getting-started/introduction-to-the-csharp-language-and-the-net-framework>
3. <https://www.homeandlearn.co.uk/csharp/csharp.html>
4. <https://dotnet.microsoft.com/languages>

**SEMESTER IV**  
**UCCAO20 – PRACTICAL V: LINUX**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	UCCAO20	Practical V: Linux	Practical	Practical	3	2	40+60

**COURSE OBJECTIVES**

1. To Provides the skills in Linux Shell Script
2. To learn programmatically to implement simple OS mechanisms.
3. To understand shell script in files
4. To learn about standard I/O and system calls.
5. To learn suspending and resuming process.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Become familiar with the C language, gcc compiler, and make files to understand the high-level structure of the Linux kernel.
2. Understand the high-level structure of the Linux kernel both in concept and source code.
3. Acquire a detailed understanding of one aspect (the scheduler) of the Linux kernel
4. To learn to develop software for Linux systems.
5. To obtain a foundation for an advanced course in operating systems.

CO/PO	PO					
	1	2	3	4	5	6
CO1	L	M	L	M	M	L
CO2	H	M	M	L	L	M
CO3	M	H	M	M	L	M
CO4	L	M	L	M	M	L
CO5	L	L	H	M	M	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	H	M	H
CO2	L	H	L	L	M	L
CO3	M	H	M	L	L	M
CO4	H	L	H	H	L	M
CO5	H	M	L	H	M	M

**Practical Programs:****Hours: 40**

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions.
3. Write a shell script to find the factorial of a given number.
4. Write a C program that makes a copy of a file using standard I/O and system calls.
5. Implement in C the following Linux commands using system calls:
  - a. (a) cat (b) ls (c) mv .
6. Write a C program to list every file in a directory, its inode number and file name.
7. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: `ls -l | sort`.
8. Write a C program that illustrates suspending and resuming processes using signals.
9. Write a C program that implements a producer-consumer system with two processes (using semaphores).
10. Write a C program that illustrates two processes communicating using shared memory.

**SEMESTER IV**  
**UCCAP20 - PRACTICAL VI: .NET**

<b>Year /Sem</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
II / IV	UCCAP20	Practical VI: .NET	Practical	Practical	3	2	40+60

**COURSE OBJECTIVES**

1. Understand code solutions and compile C# projects within the .NET framework.
2. Design and develop professional Console and Window based .NET application.
3. Demonstrate knowledge of object-oriented concepts design user experience and functional requirements C#.NET application.
4. Understand and implement string manipulation, events and exception handling within .NET application environment.
5. Identify and resolve problems in C#.NET window based application.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand code solutions and compile C# projects within the .NET framework.
2. Create user interactive web pages using .NET.
3. To develop, implement and creating Applications with C#.
4. Debug, compile, and run a simple application.
5. Create Mobile Application using .NET compact Framework

<b>CO/PO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	M	L	M	M	L	M
<b>CO2</b>	L	M	L	M	L	H
<b>CO3</b>	M	M	H	H	M	L
<b>CO4</b>	H	M	L	M	L	M
<b>CO5</b>	M	L	M	L	L	H

<b>CO/PSO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	M	H	H	M
<b>CO2</b>	L	M	H	H	M	L
<b>CO3</b>	H	M	M	H	M	H
<b>CO4</b>	L	H	M	H	L	H
<b>CO5</b>	H	H	H	L	M	M

**Low - L, Medium - M, High – H**

**Practical Programs:****Hours: 40**

1. Program using Decision Statements.
2. Program using Iteration Statements.
2. Program using Method Overloading.
3. Program using One Dimensional and Two Dimensional Arrays.
4. Program using Strings.
5. Program using Classes and Objects.
6. Program using Constructors.
7. Program using Inheritance.
8. Program using Binary Operator Overloading.
9. Program using Exception Handling with Multiple Catch Statements.
10. Designing a Windows Application using Window Forms.
11. Creating a .NET application to send SMS to Mobile Phones using Web.

**II YEAR - SKILL BASED ELECTIVE  
USCSB420 - DESIGN AND ANIMATION**

<b>Year/ Sem</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/ W</b>	<b>Credits</b>	<b>Marks</b>
II/IV	USCSB420	Design and Animation	Practical	Skill Based Elective	2	2	25+35

**COURSE OBJECTIVES**

1. To provide knowledge about the latest computer animations like Photoshop and Flash.
2. Enables the students to develop and manage pictures, changing the colors, animation and different Tweening options.
3. Identify the categories of Tools and Identify each tools corresponding keyboard shortcut.
4. Design, Manipulate and customize palettes.
5. To create animated graphics, add sound and interactivity.

**COURSE SYLLABUS**

**Unit I**

**Hours: 6**

- 1.1 Introduction to Multimedia (K1)
- 1.2 The Elements of Multimedia System (K2)
- 1.3 Benefits of using Multimedia (K2)
- 1.4 Multimedia Platforms: Multimedia Hardware (K2)
- 1.5 System Software - Future Directions. (K1,K2)
- 1.6 Storage for Multimedia: Choice of Storage - Magnetic Media - Optical Media (K3)

**Unit II**

**Hours: 5**

- 2.1 Introduction - Bitmaps and Vectors (K1)
- 2.2 Toolbox: Selection tools - Painting tools - Editing tools - Retouching Tools (K2)
- 2.3 Colours setting (K3)
- 2.4 Layers: Working with Layers - Layer Styles - Locking Layers - Merging Layers (K2)
- 2.5 Managing Layers Components (K2)
- 2.6 Palettes(K1)

**Unit III**

**Hours :5**

- 3.1 Introduction flash (K1)
- 3.2 Basics - Creating objects - Editing objects - Color and text (K2)
- 3.3 Symbols and instances - Library (K2)
- 3.4 Text Animation – Motion Tweening- Shape (K2)
- 3.5 Tweening - Motion Guide - Movie Clip (K2)
- 3.6 Working with ActionScript (K3)

**Unit IV**

**Hours :7**

1. Create an Action in Photoshop.
2. Color Transformation Using Photoshop.
3. Design a Book Cover in Photoshop.
4. Create an Animation using Photoshop.

**Unit V****Hours :7**

5. Traffic Light Control Using ActionScript in Flash.
6. Create a Slide Show Presentation in Flash.
7. Design a Greeting Card Using Button in Flash.
8. Create a Public Service Awareness Using ActionScript in Flash.

**Books for Study:**

1. Jeffcoate Judith – Multimedia in Practice – Pearson Education, 2009.
2. Photoshop CS6 in Simple Steps Paperback – Kogent Learning Solutions Inc , 2012.
3. Flash CS5 in Simple Steps – Kogent Learning Solutions Inc., Dreamtech Press Publication, 2011.
4. Chris Grover with E.A.Vander Veer-Flash CS4-Pogue Press O'Reilly,2008.

**OER:**

1. <https://www.geeksforgeeks.org/introduction-to-macromedia-flash-8/>
2. <https://www.photoshopessentials.com>
3. <https://www.javatpoint.com/photoshop>

**SEMESTER V**  
**UCCAQ20 -Relational Database Management Systems**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UCCAQ20	Relational Database Management Systems	Theory	Core	5	3	40+60

**COURSE OBJECTIVES**

1. The objective of this course is to expose the students to the fundamentals & basic concepts in relational Data Base Management Systems.
2. This course discusses architecture of Database Systems with concept of relational model & ER model.
3. This course explains techniques for database design, Normalization and database recovery and protection.
4. To understand and apply database normalization principles.
5. To analyze the database transaction management, database recovery, security.

**COURSE LEARNING OUTCOMES (CLOS)**

The Learners will be able to

1. Demonstrate an understanding of the elementary & advanced features of DBMS & RDBMS
2. Write the SQL commands to create tables and Triggers, insert/update/delete data, and query data in a relational DBMS.
3. Analyze and Design a database based on a data model considering the normalization to a specified level.
4. Apply the storage size of the database and design appropriate storage techniques.
5. Analyze the requirements of transaction processing, concurrency control Analyze and XML Structure

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	M	L	H	H
CO2	L	H	L	M	L	M
CO3	L	M	M	H	L	M
CO4	L	H	L	M	H	M
CO5	M	L	M	H	M	H

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	L	H	L
CO2	L	M	L	H	M	H
CO3	M	H	L	H	L	H
CO4	L	M	H	H	M	L
CO5	M	H	M	H	H	M

## COURSE SYLLABUS

**Unit I:** **Hours: 15**

- 1.1 File System vs. DBMS Database System Applications (K1)
- 1.2 View of Data Database language - Data Storage & Querying (K1)
- 1.3 Data Architecture - Database Users and Administrators (K1, K2)
- 1.4 Relational Model - Structure of Relational Databases (K3)
- 1.5 Database Schemas -Relational Query Languages (K2)
- 1.6 Relational Operations. (K3)

**Unit II:** **Hours: 15**

- 2.1 Introduction to SQL:SQL Data Definition Basic Structure (K1)
- 2.2 Additional Basic Operations - Set Operations (K3)
- 2.3 Aggregate Functions - Null Values - Nested Sub queries (K1)
- 2.4 Modification of the Database; Intermediate SQL Join Expressions (K4)
- 2.5 Views Transactions - Integrity Constraints (K3)
- 2.6 SQL Data Types and Schemas -Advanced SQL Triggers.( K1)

**Unit III:** **Hours: 15**

- 3.1 Database Design and the E\_R Model :Entity Relationship Model (K1)
- 3.2 Constraints Removing - Redundant Attributes ER Diagrams (K2)
- 3.3 Reduction to Relational Schemas - ER Design Issues - Extended ER Features (K1)
- 3.4 Alternative Notations for Modeling Data; (K1)
- 3.5 Functional Dependencies (K2)
- 3.6 Normalization using Functional Dependencies (K4)

**Unit IV:** **Hours: 15**

- 4.1 Storage and File Structure: Overview of Physical Storage Media (K1)
- 4.2 Magnetic disks - File Organization (K2)
- 4.3 Organization of records in Files (K3)
- 4.4 Data Dictionary (K2)
- 4.5 Storage Ordered Indices (K3)
- 4.6 B+ Tree Index Files. (K2)

**Unit V:** **Hours: 15**

- 5.1 Distributed Databases : Homogeneous and Heterogeneous Databases (K2)
- 5.2 Distributed Data Storage (K1)
- 5.3 Distributed Transactions - Commit - Protocols -Concurrency Control (K3)
- 5.4 Object Based Databases (K1)
- 5.5 Complex Data types - Structured Types and Inheritance in SQL (K3)
- 5.6 Object identity and ReferenceTypes in SQL (K2)

**Book for Study:**

1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan “Database System Concepts”, Sixth Edition, McGraw Hill, 2010.

**Books for Reference:**

1. R Elmasri, S.B. Navathe - “Fundamentals of Database Systems”, Seventh Edition - Pearson Education/Addison Wesley, 2011.

2. C.J.Date, A. Kannan and S.Swamynathan - “An Introduction to Database System”, Eighth Edition - Pearson Education, 2006

**OER:**

1. <http://freecomputerbooks.com/dbCategory.html>
2. <http://www.freebookcentre.net/Database/dbCategory.html>

**SEMESTER V**  
**UCCAR20 - Software Engineering**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UCCAR20	Software Engineering	Theory	Core	5	3	40+60

**COURSE OBJECTIVES**

1. On learning this paper students will gain the knowledge of developing software with its techniques.
2. To identify the minimum requirements for the development of application.
3. To develop, maintain efficient, reliable and cost effective software solutions.
4. Ability to critically thinking and evaluate assumptions and arguments.
5. To analyze the test case design and test automation.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.
2. Discuss the function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
3. Manage the time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain.
4. Understand architectural design in order to minimize the risks and errors.
5. Test the techniques for ensuring high quality software and Understand the capabilities of cost estimation.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	L	M
CO2	L	M	M	L	M	L
CO3	L	M	L	H	M	M
CO4	M	L	M	L	H	M
CO5	L	H	L	M	L	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	L
CO2	M	H	L	M	H	M
CO3	L	M	H	H	L	M
CO4	H	L	H	H	M	L
CO5	L	H	M	H	L	M

**Low - L, Medium - M, High - H**

# COURSE SYLLABUS

## Unit I

Hours: 15

- 1.1 Introduction: Professional Software Development (K2)
- 1.2 Software Engineering Ethics (K1)
- 1.3 Software Process Model (K2)
- 1.4 Process Activities (K2)
- 1.5 Coping with Changes (K2)
- 1.6 Process Improvement (K2)

## Unit II

Hours: 15

- 2.1 Agile Software Development: Methods – Development Techniques (K2)
- 2.2 Scaling Agile Methods (K2)
- 2.3 Requirement Engineering: Functional and Non Functional Requirements (K2)
- 2.4 Requirement Engineering Processes – Requirements Elicitation (K2)
- 2.5 Requirements Specification (K2)
- 2.6 Requirements Validation and Changes (K2)

## Unit III

Hours :15

- 3.1 System Model: Context Models – Interaction Models (K2)
- 3.2 Structural Models (K2)
- 3.3 Behavioural Models (K2)
- 3.4 Architectural Design: Decisions - Views (K2)
- 3.5 Architectural Patterns (K2)
- 3.6 Application Architecture (K2)

## Unit IV

Hours: 15

- 4.1 Design and Implementation: Object-Oriented Design using the UML (K2)
- 4.2 Design Patterns – Implementation Issues (K2)
- 4.3 Software Testing: Development Testing (K2)
- 4.4 Test-Driven Development (K2)
- 4.5 Release Testing (K2)
- 4.6 User Testing (K2)

## Unit V

Hours:15

- 5.1 Software Evolution: Evolution Process (K1)
- 5.2 Legacy Systems (K2)
- 5.3 Software Maintenance (K2)
- 5.4 Dependable Systems (K2)
- 5.5 Dependability Properties (K2)
- 5.6 Sociotechnical Systems (K2)

### Book for Study:

1. Ian Sommerville, “Software Engineering”, Edition 10, Pearson Education, 2016.

### Books for Reference:

1. Roger S.Pressman, “Software Engineering: A Practitioner’s Approach”, Edition 7, McGraw Hill, New York, 2016.
2. Pankaj Jalote, “An Integrated Approach to Software Engineering”, Edition 3, Narosa Publication, 2018.

**OER:**

1. [www.freebookcentre.net/SoftwareEng/Free-Software-Engineering-Books-Download.html](http://www.freebookcentre.net/SoftwareEng/Free-Software-Engineering-Books-Download.html)
2. <http://freecomputerbooks.com/softwareCategory.html>

**SEMESTER V**  
**UCCAS20 - Mobile Application Development**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UCCAS20	Mobile Application Development	Theory	Core	4	3	40+60

**COURSE OBJECTIVES**

1. To study about the android architecture and the tools for developing android applications.
2. To create an android application.
3. To learn about the user interfaces used in android applications.
4. To learn about how to handle and share android data.
5. To learn about how to develop an android services and to publish android application for use.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understanding of Android and Android SDK and know about its development environment. Recognize the architecture of Android and its tools. Analyze Eclipse and Android Development Tools(ADT).
2. Understanding of the specific requirements, possibilities and challenges when developing for a mobile context.
3. Understanding of the interaction between user interface and underlying application infrastructure.
4. Define to plan and carry out a design work including developing a prototype that can be evaluated with a specified user group.
5. Develop practical skills and knowledge to construct software for a mobile application and the ability to reflect over possibilities and demands in collaborative software development.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	M	M	L	H	M
CO2	H	L	L	M	M	L
CO3	L	M	L	H	M	H
CO4	M	H	M	M	L	M
CO5	L	M	L	L	H	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	H
CO2	L	H	M	H	H	H
CO3	H	L	M	H	L	M
CO4	H	M	L	M	H	H
CO5	M	H	H	L	H	H

**Low - L, Medium - M, High – H**

# COURSE SYLLABUS

## Unit I

**Hours: 15**

- 1.1 Introduction- Android-Android Versions - Features of Android (K1)
- 1.2 Architecture of Android Obtaining the Required Tools-Android SDK (K2)
- 1.3 Installing the Android SDK Tools Configuring the Android SDK Manager –Eclipse (K2)
- 1.4 Android Development Tools (ADT)-Creating Android Virtual Devices (AVDs)- Creating Your First Android Application (K5)
- 1.5 Types of Android Application (K2)
- 1.6 Anatomy of an Android Application.(K2)

## Unit II

**Hours: 15**

- 2.1 Activities, Fragments and Intents-Understanding Activities (K2)
- 2.2 Linking Activities Using Intents (K1)
- 2.3 Fragments-Adding Fragments Dynamically-Life Cycle of a Fragment (K1, K2)
- 2.4 Interactions between Fragments-Calling Built-In Applications Using Intents (K1)
- 2.5 Understanding the Intent Object-Using Intent Filters (K2)
- 2.6 Adding Categories-Displaying Notifications.(K3)

## Unit III

**Hours: 15**

- 3.1 Android User Interface-Understanding the Components of a Screen(K1, K3)
- 3.2 Adapting to Display Orientation (K2)
- 3.3 Managing Changes to Screen Orientation(K2)
- 3.4 Utilizing the Action Bar (K3)
- 3.5 Creating the User Interface Programmatically (K5)
- 3.6 Listening for UI Notifications. (K4)

## Unit IV

**Hours: 15**

- 4.1 Databases-Content Providers and Messaging-Saving and Loading User Preferences (K1, K3)
- 4.2 Persisting Data to Files(K2)
- 4.3 Creating and Using Databases-Content Providers (K2)
- 4.4 Sharing Data in Android-Using a Content Provider-Creating Your Own Content (K2, K3)
- 4.5 Providers-Using the Content Provider (K4)
- 4.6 Messaging-SMS Messaging-Sending E-mail. (K2)

## Unit V

**Hours: 15**

- 5.1 Android-lifecycle:activity-lifecycle (K1, K2)
- 5.2 Life cycle concepts (K2)
- 5.3 lifecycle callbacks-onCreate()-onStart()-onResume()-onRestart()(K1, K2)
- 5.4 onPause()-onStop()-onDestroy()(K1, K2)
- 5.5 ios lifecycle – (K5)
- 5.6 Deployment methodologies (K5)

### Book for Study:

1. Wei Meng Lee, “Beginning Android 4 Application Development”, John Wiley & Sons Inc,1<sup>st</sup> Edition Inc, 2012.
2. Reto Meier, “Professional Android 4 Application Development”, John Wiley & Sons Inc, 1<sup>st</sup> Edition, 2012.

### Books for Reference:

1. ZigurdMednieks, Laird Dornin, Blake Meike G, and Masumi Nakamura, “Programming Android”, O’Reilly Inc, 2<sup>nd</sup> Edition, 2012.
2. OnurCinar, “Android Apps with Eclipse”, Apress, Springer (India) Private Limited, 2<sup>nd</sup> Edition, 2012.

**OER:**

1. <http://developer.android.com/training/basics/firstapp/index.html>
2. [www.vogella.com/articles/Android/article.html](http://www.vogella.com/articles/Android/article.html)
3. <https://hackernoon.com/applicationlifecycleinios12b6ba6af78b>
4. <https://www.tutlane.com/tutorial/ios/ioslifecyclearchitecture>
5. <https://developer.android.com/guide/components/activities/activitylifecycle>

**SEMESTER V**  
**UECAA20 - Resource Management Techniques**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UECAA20	Resource Management Techniques	Theory	Core Elective	5	3	40+60

**COURSE OBJECTIVES**

1. It will enable the students to learn various research techniques and to find out the solution for the critical problems.
2. To acquiring, allocating and managing the resources.
3. To ensure that internal and external resources are used effectively on time and to budget.
4. To process preplanning, scheduling and allocating the resources to maximize efficiency.
5. To aim smoothing problems using PERT and CPM model.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Identify the role of computer in Operational Research techniques.
2. Apply linear programming to solve real-life applications.
3. Analyze Transportation Model and Solve optimization problems using dual simplex method.
4. Describe Assignment Model and Travelling Salesman Problem, Sequencing problem
5. Use PERT and CPM for problems in project management

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	H	L	H	L	H
CO2	L	M	M	L	M	M
CO3	H	M	L	H	M	L
CO4	M	M	L	M	L	L
CO5	L	L	M	M	M	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	H	M	H
CO2	M	H	H	L	H	M
CO3	H	M	L	M	H	M
CO4	H	L	H	M	H	H
CO5	L	M	H	H	L	H

**Low - L, Medium - M, High – H**

# COURSE SYLLABUS

## Unit I: Introduction and Mathematical Formulation

Hours: 15

- 1.1 Operations research: Definition (K1, K2, K3, K4)
- 1.2 Scope, Characteristics (K1, K2, K3, K4)
- 1.3 Models of operations research: Iconic (K1, K2, K3, K4)
- 1.4 Analogue, Symbolic model (K1, K2, K3, K4)
- 1.5 Linear programming (K1, K2, K3, K4)
- 1.6 Formulation. (K1, K2, K3, K4)

## Unit II: Linear Programming

Hours: 15

- 2.1 Linear Programming: Graphical method (problems: part I) (K1, K2, K3, K4)
- 2.2 Graphical method (problems: part II) (K1, K2, K3, K4)
- 2.3 Graphical method (problems: part III) (K1, K2, K3, K4)
- 2.4 Regular simplex Method (problems: part I) (K1, K2, K3, K4)
- 2.5 Regular simplex Method (problems: part II) (K1, K2, K3, K4)
- 2.6 Regular simplex Method (problems: part III) (K1, K2, K3, K4)

## Unit III: Linear Programming

Hours: 15

- 3.1 Linear programming: Big 'M' method (problems part I) (K1, K2, K3, K4)
- 3.2 Big 'M' method (problems part II) (K1, K2, K3, K4)
- 3.3 Big 'M' method (problems part III) (K1, K2, K3, K4)
- 3.4 Duality (problems part I) (K1, K2, K3, K4)
- 3.5 Duality (problems part II) (K1, K2, K3, K4)
- 3.6 Duality (problems part III) (K1, K2, K3, K4)

## Unit IV: Transportation Model

Hours: 15

- 4.1 Transportation Problem (K1, K2, K3, K4)
- 4.2 Initial basic feasible solution using North West Corner rule(K1, K2, K3, K4)
- 4.3 Initial basic feasible solution using least cost method and Vogel's approximation method (K1, K2, K3, K4)
- 4.4 Degeneracy, Unbalanced Transportation problem (K1, K2, K3, K4)
- 4.5 Maximization problem(K1, K2, K3, K4)
- 4.6 Test of Optimality using MODI method (K1, K2, K3, K4)

## Unit V: Assignment Model

Hours: 15

- 5.1 Assignment problems (K1, K2, K3, K4)
- 5.2 Minimal assignment problems (K1, K2, K3, K4)
- 5.3 Unbalanced Assignment problems (K1, K2, K3, K4)
- 5.4 Restricted Assignment problems (K1, K2, K3, K4)
- 5.5 Maximization problem in Assignment (K1, K2, K3, K4)
- 5.6 Maximization problems in Assignment Problems (K1, K2, K3, K4)

## Book for Study:

1. Prem Kumar Gupta and D.S. Hira, "Operations Research", Sixth Edition, S. Chand, 2014.
2. Vittal P. R - Introduction to Operations Research, 1<sup>st</sup> Edition - Margham Publishers – 1999.
3. Prof. V. Sundharesan, "Resource Management Techniques", 7<sup>th</sup> Edition, AR Publications, 2015.

## Books for Reference:

1. Hamdy A. Taha, "Operation Research - An Introduction", 9<sup>th</sup> Edition, Pearson, 2014.
2. Charnes A. Cooper W. and A. Henderson A., "Introduction to Linear Programming", John Wiley and Sons, 1953.

**OER:**

1. [https://www.brainkart.com/subject/Resource-Management-Techniques\\_176/](https://www.brainkart.com/subject/Resource-Management-Techniques_176/)
2. [https://books.google.co.in/books?id=OtUxEAAAQBAJ&printsec=copyright&redir\\_esc=y#v=onepage&q&f=false](https://books.google.co.in/books?id=OtUxEAAAQBAJ&printsec=copyright&redir_esc=y#v=onepage&q&f=false)

**SEMESTER V**  
**UECAB20 - Elective I B: Cloud Computing**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UECAB20	Elective I B: Cloud Computing	Theory	Elective	5	3	40+60

**COURSE OBJECTIVES**

1. Discuss the fundamental concepts in cloud computing technologies.
2. Understand the various technologies.
3. Explain the architecture and concept of different cloud models: IaaS, PaaS, SaaS
4. Analyze the fundamental and Cloud Deployment Models Course Outcomes.
5. Understand the concepts of Challenges in Cloud security.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand the fundamental concepts in cloud computing technologies.
2. Analyze and integrate the cloud enabling services.
3. Analyze the architecture and concept of different cloud models: IaaS, PaaS, SaaS.
4. Understand and familiar with the deployment models.
5. Comprehend the Cloud Data Security concepts and how they are addressed with the security mechanisms.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	M	M	H	M	L
CO2	H	L	L	M	L	L
CO3	M	M	L	M	L	L
CO4	M	M	H	L	L	L
CO5	L	M	L	M	M	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	L	M
CO2	M	H	H	M	L	M
CO3	H	M	H	M	H	H
CO4	L	H	H	M	H	L
CO5	H	H	M	L	M	H

**Low – L, Medium – M, High – H**

# **COURSE SYLLABUS**

## **Unit I**

**Hours:15**

- 1.1 Introduction to Cloud Computing: Cloud Computing in Nutt shell (K2, K4)
- 1.2 Roots of Cloud Computing- Types of Clouds (K4, K6)
- 1.3 Features of a Cloud (K5)
- 1.4 Cloud Infrastructure Management (K4, K6)
- 1.5 Challenges and Risks (K4, K6)
- 1.6 Migrating in to a Cloud. (K4)

## **Unit II**

**Hours: 15**

- 1.1 Integration as a Service-Introduction (K2)
- 1.2 Onset of Knowledge Era- Evolution of SaaS (K4, K5)
- 1.3 Challenges (K4, K5)
- 1.4 Approaching the SaaS Integration- New Integration Scenarios (K4)
- 1.5 Integration Methodologies-SaaS Integration Services (K4, K5)
- 1.6 B2B Services. (K4, K6)

## **Unit III**

**Hours: 15**

- 3.1 Cloud Service Models: Infrastructure as a Service (IaaS): Introduction to IaaS, Resource Virtualization (K2, K4)
- 3.2 Server, Storage, Network. (K2, K4)
- 3.3 Case studies (K4, K5)
- 3.4 Platform as a Service (PaaS): Introduction to PaaS (K2, K4)
- 3.5 Cloud platform & Management (K2, K3)
- 3.6 Computation, Storage. (K3, K4)

## **Unit IV**

**Hours: 15**

- 4.1 Cloud Deployment Models: Introduction (K2)
- 4.2 Public Deployment Model (K2, K4, K5)
- 4.3 Private Deployment Model (K2, K4, K5)
- 4.4 Virtual Private Deployment Model (K4, K5)
- 4.5 Hybrid Deployment Model (K4, K5)
- 4.6 Community Deployment Model. (K4, K5)

## **Unit V**

**Hours: 15**

- 5.1 Scientific Applications for Cloud Environments (K2, K4, K5)
- 5.2 Building Content Delivery Networks Using Clouds (K2, K3, K4)
- 5.3 Cloud Challenges: Organizational Readiness and Change management in cloud (K2, K4)
- 5.4 Data Security in the Cloud (K4, K5)
- 5.5 Legal Issues in Cloud Computing (K4)
- 5.6 Production Readiness for Cloud Services. (K4, K5)

### **Book for Study:**

1. Rajkumar Buyya, James Broberg and Andrzej M.goscinski, "Cloud Computing: Principles and Paradigms", John Wiley & Sons,2010.

### **Books for Reference:**

1. Antony T. Velte, Toby J.Velte, Robert Elsenpeter, "Cloud Computing: A Practical Approach", Tata McGraw- Hill Pub, 2010.

2. Haley beard, “Cloud Computing best practices for managing and measuring processes for on-demand computing, applications and Data centers in the cloud with SLAs”, Emereo Pvt. Limited,2009.

**OER:**

1. <http://www.mb.net/resources/cloud-computing-resources.aspx>.
2. [https://www.tutorialspoint.com/cloud\\_computing/cloud\\_computing\\_tutorial.pdf](https://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf)

**SEMESTER V**  
**UECAC20 - Elective I C: Object Oriented Analysis and Design**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UECAC20	Elective I C: Object Oriented Analysis and Design	Theory	Core	5	3	40+60

**COURSE OBJECTIVES**

1. Understand the importance and basic concepts and of object oriented modeling.
2. To understand the Object-based view of Systems
3. To develop robust object-based models for Systems
4. Specify, analyze and design the use case driven requirements for a particular system.
5. Identify, Analyze the subsystems, various components and collaborate them interchangeably Model the event driven state of object and transform them into implementation specific layouts.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Analyse, design, document the requirements through use case driven approach.
2. Identify, analyse, and model structural and behavioural concepts of the system.
3. Develop, explore the conceptual model into various scenarios and applications.
4. Apply the concepts of architectural design for deploying the code for software.
5. Apply the Testing Strategies and Debugging Principles for measuring the User Satisfaction

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	M	L	M	H
CO2	L	H	M	M	L	M
CO3	H	M	M	L	M	L
CO4	M	H	M	L	H	L
CO5	M	L	L	H	L	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	L	M
CO2	H	H	M	L	H	H
CO3	M	L	M	H	H	M
CO4	M	H	H	M	H	L
CO5	L	M	H	M	H	H

**Low - L, Medium - M, High – H**

# **COURSE SYLLABUS**

## **Unit I**

**Hours: 15**

- 1.1 System Development (K1, K2)
- 1.2 Object Basics (K1, K2)
- 1.3 Development Life Cycle (K1, K2, K3)
- 1.4 Methodologies - Patterns (K1, K2, K3, K4)
- 1.5 Frameworks (K1, K2, K3, K4)
- 1.6 Unified Approach - UML. (K1, K2, K3, K4)

## **Unit II**

**Hours: 15**

- 2.1 Use-Case Models (K1, K2, K3)
- 2.2 Object Analysis (K1, K2, K3, K4)
- 2.3 Object relations (K1, K2, K3, K4)
- 2.4 Attributes - Methods (K1, K2, K3)
- 2.5 Class and Object responsibilities (K1, K2)
- 2.6 Case Studies (K1, K2, K3, K4)

## **Unit III**

**Hours: 15**

- 3.1 Design Processes (K1, K2, K3)
- 3.2 Design Axioms (K1, K2)
- 3.3 Class Design (K1, K2, K3)
- 3.4 Object Storage (K1, K2)
- 3.5 Object Interoperability (K1, K2, K3)
- 3.6 Case Studies. (K1, K2, K3, K4)

## **Unit IV**

**Hours: 15**

- 4.1 User Interface Design (K1, K2, K3)
- 4.2 View layer Classes (K1, K2, K3)
- 4.3 Micro-Level Processes (K1, K2, K3)
- 4.4 Micro-Level Processes (K1, K2, K3)
- 4.5 View Layer Interface (K1, K2)
- 4.6 Case Studies (K1, K2, K3, K4)

## **Unit V**

**Hours: 15**

- 5.1 Quality Assurance Tests (K1, K2)
- 5.2 Testing Strategies - Object orientation on testing (K1, K2, K3, K4)
- 5.3 Test Cases – Test Plans - Continuous testing (K1, K2, K3, K4)
- 5.4 Debugging Principles (K1, K2)
- 5.5 System Usability - Measuring User Satisfaction (K1, K2, K3, K4)
- 5.6 Case Studies (K1, K2, K3, K4)

### **Book for Study:**

1. Ali Bahrami, Reprint 2009, Object Oriented Systems Development, Tata McGraw Hill International Edition.

### **Book for Reference:**

1. Roger S.Pressman, 2010, Software Engineering A Practitioner's approach, Seventh Edition, Tata McGraw Hill, New Delhi.
2. Rumbaugh, Blaha, Premerlani , Eddy, Lorensen, 2003, Object Oriented Modeling and design , Pearson education, Delhi.

**OER:**

1. [https://www.tutorialspoint.com/object\\_oriented\\_analysis\\_design/ooad\\_object\\_oriented\\_system.htm](https://www.tutorialspoint.com/object_oriented_analysis_design/ooad_object_oriented_system.htm)
2. [https://warin.ca/ressources/books/2015\\_Book\\_Object-OrientedAnalysisDesignA.pdf](https://warin.ca/ressources/books/2015_Book_Object-OrientedAnalysisDesignA.pdf)
3. <https://zjnu2017.github.io/OOAD/reading/Object.Oriented.Analysis.and.Design.with.Applications.3rd.Edition.by.Booch.pdf>

**SEMESTER V**  
**UCCAT20 - Practical - VII: RDBMS**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UCCAT20	Practical - VII: RDBMS	Practical	Core	3	2	40+60

**COURSE OBJECTIVES**

1. The objective of this course is to expose the students to the fundamentals & basic concepts in relational Data Base Management Systems.
2. To identify the basic concepts and various data model used in database design
3. To analyze various aggregate functions using SQL commands.
4. To use an SQL interface of a relational DBMS package to create, populate, maintain, and query a database.
5. To apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression from queries.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand, Appreciate and effectively explain the underlying concepts of Database technologies. Programming PL/SQL including stored procedures, stored functions, cursors, packages.
2. Attain a good practical understanding of the Oracle.
3. Design and implement a database schema for a given problem-domain.
4. Construct a query using SQL DDL, DML, and DCL Commands.
5. Prepare various database tables and joins them using SQL commands. Analyze various aggregate functions using SQL commands
6. Design and develop front end tool VB .NET to design forms, and select, insert, delete, update using Data Source Binding.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	H	L	M	M	M
CO2	L	H	M	M	M	L
CO3	L	L	M	L	M	M
CO4	M	H	M	M	H	L
CO5	M	L	M	H	M	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	L
CO2	M	M	H	H	M	M
CO3	H	L	H	L	H	H
CO4	M	H	H	H	L	M
CO5	M	H	L	H	H	L

**Low -L, Medium -M, High-H**

1. Creating data base tables and using data types. Create table Modify table Drop table
2. Practical Based on Data Manipulation Adding data with Insert Modify data with Update Deleting records with Delete
3. Practical Based on Implementing the Constraints NULL and NOT NULL Primary Key and Foreign Key Constraint Unique, Check and Default Constraint
4. Practical for Retrieving Data Using following clauses Simple select clause Accessing specific data with Where Ordered By Distinct and Group By
5. Practical Based on Aggregate Functions AVG -COUNT - MAX -MIN -SUM – CUBE
6. Practical Based on implementing all String functions and Date and Time Functions, union, intersection, set difference.
7. Implement Nested Queries & JOIN operation.
8. Practical Based on implementing use of triggers, cursors & procedures.
9. Make Database connectivity with front end tool VB and Oracle as back end perform Insertion, Deletion and Updation for the following:
  - Staff Information System
  - Electricity Bill Processing System

**SEMESTER V**  
**UCCA20 - Practical VIII: Mobile Application Development**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UCCA20	Practical IX: Mobile Application Development	Practical	Core	2	2	40+60

**COURSE OBJECTIVES**

1. To introduce students to the concept of basic programming- thereby reducing the design complexity and reusability of a component.
2. To understand the components and structure of mobile application development frameworks for Android and windows OS based mobiles.
3. To understand how to work with various mobile application development frameworks.
4. To learn the basic and important design concepts and issues of development of mobile applications.
5. To understand the capabilities and limitations of mobile devices.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Establishing the development environment
2. Implementing the layout to add action bar
3. Understanding the interfaces using views , menus and notification
4. Apply and learn multiple screens to emulate android application
5. Perform basic interaction with application.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	M	L	H	H	L
CO2	M	H	L	M	M	M
CO3	L	M	M	H	M	M
CO4	M	L	M	M	H	L
CO5	M	L	M	H	H	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	L	L	M	H
CO2	H	M	H	H	M	L
CO3	H	M	H	H	L	M
CO4	M	L	H	L	H	H
CO5	H	H	M	L	H	H

**Low -L, Medium -M, High-H**

**Practical Program:****Hours: 40**

1. Creating a simple “Hello World” application
2. Adding an action bar to android app to make application interactive
3. Build user interfaces using Views, Menus and Notifications
4. Handle file operations in Android application program.
5. Build an android application with multiple screens.
6. Learning Android Emulator to emulate android apps on various devices.
7. Use of Intents to perform basic interaction with apps.
8. Using Android styles and themes to make application.

**SEMESTER VI**  
**UCCA20 - INTERNET AND WEB PROGRAMMING**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	UCCA20	Internet and Web Programming	Theory	Core	4	3	40+60

**COURSE OBJECTIVES**

1. Enhance the programming experience with the help of tools like editors and debuggers that makes JavaScript coding easier and more interactive.
2. Understand the concepts commonly used in dynamic language programming such as higher-order functions and closures.
3. Understand the server-side programming works on the web.
4. Develop dynamic and interactive web pages using the powerful tool and server scripting language like PHP.
5. Understanding File handling concepts to connect, access, and update a MySQL database.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Acquire the basic concept of JavaScript.
2. Use operators, variables, arrays, control structures, functions and objects in JavaScript.
3. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
4. Design a responsive web site using HTML, PHP, MySQL and Apache.
5. Students will be able to build dynamic web pages using JavaScript (Client Side Programming) and apply their knowledge to create interactive websites.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	H	M	M	L
CO2	L	M	M	L	M	L
CO3	M	M	M	M	L	H
CO4	L	M	M	H	M	L
CO5	M	M	M	L	H	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	M	M	H
CO2	L	H	L	H	M	L
CO3	M	H	M	L	L	M
CO4	H	L	H	L	L	M
CO5	M	H	L	H	M	M

**Low - L, Medium - M, High – H**

# COURSE SYLLABUS

## Unit I: JAVA SCRIPT

Hours: 15

- 1.1 Introduction - Values - Numbers - Strings - Unary Operators. (K1, K2)
- 1.2 Boolean Values - Empty Values - Automatic Type Conversion. (K2)
- 1.3 Program Structure: Expressions and Statements- Bindings - Binding Names - The Environment. (K2, K3)
- 1.4 Functions - The Console Log Function - Return Values - Control Flow - Conditional Execution - While and Do Loops. (K2, K3)
- 1.5 Indenting Code - For Loops - Breaking out of a Loop - Updating Bindings Succinctly. (K2, K3)
- 1.6 Dispatching on a Value with Switch – Capitalization – Comments. (K3)

## Unit II

Hours: 15

- 2.1 Functions - Bindings and Scopes - Functions as Values. (K2)
- 2.2 Declaration Notation - Arrow Functions - The Call Stack. (K2, K3, K4)
- 2.3 Optional Arguments - Closure – Recursion - Growing Functions. (K3, K4)
- 2.4 Data Structures: Objects and Arrays: The Were Squirrel - Data Sets – Properties – Methods – Objects. (K3, K4)
- 2.5 Mutability - The Lycanthrope’s Log - Computing Correlation - Array Loops - The Final Analysis - Further Arrayology - Strings and their Properties. (K2, K3, K4, K5)
- 2.6 Rest Parameters - The Math Object - Destructuring – JSON. (K2, K3, K4)

## Unit III: PHP PROGRAMMING

Hours: 15

- 3.1 Web Server – Apache - PHP Introduction - PHP Install - PHP Syntax - PHP Variables. (K1, K2)
- 3.2 PHP Echo / Print - PHP Data Types - PHP Strings - PHP Constants - PHP Operators. (K1, K2)
- 3.3 Control Structures - PHP Functions - Directory Functions - File System Functions. (K2, K3)
- 3.4 PHP Arrays - PHP Sorting – Arrays - PHP - Super Global. (K3, K4)
- 3.5 String Functions - Date and Time Functions. (K1, K2, K3, K4)
- 3.6 Mathematical Functions - Miscellaneous Functions. (K3, K4)

## Unit IV

Hours: 15

- 4.1 Basic Form Processing (GET And POST Method) - PHP Form Handling. (K1, K2)
- 4.2 PHP Form Validation - PHP Form Required– URL - E-Mail. (K1, K2)
- 4.3 PHP Form Complete PHP MYSQL Functions -Connect- Create DB. (K4, K6)
- 4.4 Create Table- Insert Data - Get Last ID - Insert Multiple. (K3, K4, K5)
- 4.5 Prepared-Select Data - Delete Data - Update Data - Limit Data. (K3, K4, K5)
- 4.6 Table Join - Database Driven Application. (K3, K4)

## Unit V

Hours: 15

- 5.1 PHP Arrays Multi-PHP Date and Time - PHP Include. (K2, K3)
- 5.2 PHP File Handling- PHP File Open/Read. (K3)
- 5.3 PHP File Create/Write - PHP File Upload-PHP Cookies. (K4, K5)
- 5.4 PHP Sessions-PHP Filters - PHP Filters Advanced. (K4)
- 5.5 PHP Error Handling - PHP Exception. (K4, K5)
- 5.6 COM-DOM-CURL-SOAP. (K5, K6)

**Books for Study:**

1. MarijiHaverbeke, “Eloquent Javascript, A Modern Introduction to Programming”, Third Edition, Published by No Starch Press, 2018.
2. Julie C Meloni, Sams “Teach yourself PHP, MySQL and Apache”, 6<sup>th</sup> edition, Sams Publishing, 2012.

**Books for Reference:**

1. Phil Ballard , JavaScript in 24 Hours, 6th Edition, Sams Teach Yourself, 2015.
2. Ed LeckyThompson Steven D. Nowicki Thomas Myer, “Professional PHP6”, Wrox Press, Paperback Edition, 2011.

**OER:**

1. [https://www.google.com/url?sa=t&source=web&rct=j&url=https://eloquentjavascript.net/Eloquent\\_JavaScript.pdf&ved=2ahUKEwjEhbu95qnrAhVo8XMBHb4VBXEQFjAQegQIDBAB&usg=AOvVaw1\\_3Ap2aatDU0qxPmbiCRbI&cshid=1598184133112](https://www.google.com/url?sa=t&source=web&rct=j&url=https://eloquentjavascript.net/Eloquent_JavaScript.pdf&ved=2ahUKEwjEhbu95qnrAhVo8XMBHb4VBXEQFjAQegQIDBAB&usg=AOvVaw1_3Ap2aatDU0qxPmbiCRbI&cshid=1598184133112)

**SEMESTER VI**  
**UCCA W20 - Data Mining**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	UCCA W20	Data Mining	Theory	Core	5	3	40+60

**COURSE OBJECTIVES**

1. To study the methodology of engineering legacy databases for data warehousing and data mining to derive business rules for decision support systems.
2. To analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
3. To develop research interest towards advances in data mining
4. To impart the knowledge of how Data Mining could be used to solve scientific and social problems.
5. To expose to various Data Mining techniques

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand Data Warehouse fundamentals and Data Mining Principles
2. Understand and implement classical algorithms in data mining and identify the application area of algorithms.
3. Compare and evaluate different data mining techniques like, prediction, clustering and association rule mining
4. Describe complex data types with respect to spatial and web mining.
5. Analyze the temporal mining techniques to detect patterns in the e-world.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	L	L	H	L	M
CO2	H	M	M	L	L	H
CO3	M	L	M	M	L	M
CO4	L	M	L	M	M	L
CO5	H	L	L	M	H	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	L	M	H
CO2	L	M	L	M	M	L
CO3	M	H	M	L	L	M
CO4	L	L	H	M	L	M
CO5	H	L	L	H	M	L

**Low – L, Medium – M, High - H**

# COURSE SYLLABUS

## Unit I

**Hours: 14**

- 1.1 Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery In Databases (K1, K2)
- 1.2 Data Mining Issues – Social Implications of Data Mining (K2)
- 1.3 Data Mining from A Database Perspective. Data Mining Techniques: Introduction – A Statistical Perspective on Data Mining (K2, K3)
- 1.4 Similarity Measures (K1, K2, K3)
- 1.5 Decision Trees (K2, K3)
- 1.6 Neural Networks – Genetic Algorithms. (K1, K2, K3)

## Unit II

**Hours: 13**

- 2.1 Classification: Introduction (K1, K2, K3)
- 2.2 Statistical – Based Algorithms (K2, K3, K5)
- 2.3 Distance- Based Algorithms (K2, K3, K5)
- 2.4 Decision Tree- Based Algorithms (K2, K3, K5)
- 2.5 Neural Network – Based Algorithms (K2, K3, K5)
- 2.6 Rule-Based Algorithms (K2, K3, K5)

## Unit III

**Hours: 15**

- 1.7 Clustering: Introduction – Similarity and Distance Measures – Outliers (K2, K3, K5)
- 1.8 Hierarchical Algorithms – Partitional Algorithms (K3, K4, K5)
- 1.9 Association Rules: Introduction - Large Item Sets – Basic Algorithms (K2, K3, K5)
- 1.10 Parallel and Distributed Algorithms (K2, K3, K5)
- 1.11 Comparing Approaches – Incremental Rules (K3, K5, K6)
- 1.12 Advanced Association Rules Techniques – Measuring the quality of Rules (K3, K5)

## Unit IV

**Hours: 15**

- 4.1 Web mining: Introduction – Web content Mining Crawlers (K2, K3)
- 4.2 Web Structure Mining (K2, K3)
- 4.3 Web Usage Mining (K2, K3)
- 4.4 Spatial Mining: Overview – Primitives (K2, K3, K5)
- 4.5 Generalization and specialization (K2, K3, K5)
- 4.6 Spatial Rules- Spatial Classification Algorithm. (K2, K3, K5)

## Unit V

**Hours: 12**

- 5.1 Temporal Mining: Introduction (K2)
- 5.2 Modeling temporal events (K2, K3)
- 5.3 Time series (K2, K3, K5)
- 5.4 Pattern detection (K2, K3, K4, K5, K6)
- 5.5 Sequences (K2, K3, K5, K6)
- 5.6 Temporal Associations Rules (K2, K3, K5)

## Books for Study:

1. Margaret H.Dunham - “Data Mining: Introductory and Advanced Topics”, 1<sup>st</sup> Edition, Pearson Education 2012.
2. Jiawei Han and MichelineKamber - “Data Mining Concepts and Techniques” - Elsevier Fifth Edition, 2009.

**Books for Reference:**

1. Soumendra Mohanty - "Data Warehousing DesignDevelopment and best practices", First Edition, TataMcGraw Hill, 2005.
2. William H Inmon - "Building the Datas warehousing", Fourth Edition, Wiley India.
3. RajanChattamvelli"Data Mining Methods", Second Edition, Narosa Publishing House Pvt. Ltd. New Delhi, 2016

**OER:**

1. <https://www.slideshare.net/akannshat/data-mining-15329899>
2. <http://myweb.sabanciuniv.edu/rdehkharghani/files/2016/02/The-Morgan-Kaufmann-Series-in-Data-Management-Systems-Jiawei-Han-Micheline-Kamber-Jian-Pei-Data-Mining.-Concepts-and-Techniques-3rd-Edition-Morgan-Kaufmann-2011.pdf>
3. [https://www.youtube.com/watch?v=f7NfO16l04U&list=PL8eNk\\_zTBST-gN6Y5E-5FZdARXjglYpyT](https://www.youtube.com/watch?v=f7NfO16l04U&list=PL8eNk_zTBST-gN6Y5E-5FZdARXjglYpyT)

**SEMESTER VI**  
**UECAD20 - ELECTIVE – II A: CRYPTOGRAPHY**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	UECAD20	Elective – II A: Cryptography	Theory	Elective	5	3	40 + 60

**COURSE OBJECTIVES**

1. To understand Cryptography Theories, Algorithms and Systems.
2. To understand necessary Approaches and Techniques
3. To build protection mechanisms in order to secure computer networks.
4. Enable the students to learn fundamental concepts of computer security and cryptography and utilize these techniques in computing systems.
5. Understand vulnerability assessments and the weakness of using passwords for authentication.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Classify the symmetric encryption techniques
2. Illustrate various Public key cryptographic techniques
3. Evaluate the authentication and hash algorithms.
4. Summarize the intrusion detection and its solutions to overcome the attacks.
5. Basic concepts of system level security.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	L	M	M	L	L
CO2	M	M	L	H	L	L
CO3	H	L	M	L	M	M
CO4	L	M	L	M	L	M
CO5	H	L	M	M	L	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	L	M	H
CO2	L	H	L	H	M	L
CO3	M	L	M	L	H	M
CO4	H	L	M	M	L	M
CO5	H	L	L	H	M	L

**Low – L, Medium – M, High – H**

# **COURSE SYLLABUS**

## **Unit I**

**Hours: 15**

- 1.1 Computer Security Concepts (K2)
- 1.2 The OSI Security Architecture (K2 K4)
- 1.3 Security Attacks - Security Services Security Mechanisms - A model for Network Security(K2)
- 1.4 Symmetric Cipher Model (K2, K4)
- 1.5 Substitution Techniques (K2, K5)
- 1.6 Transposition Techniques - Stenography.(K2, K5)

## **Unit II**

**Hours: 16**

- 2.1 Block Cipher Principles (K2, K3)
- 2.2 The DES - A DES example - The strength of DES(K2, K4)
- 2.3 Differential and Linear Cryptanalysis (K2)
- 2.4 Block Cipher Design Principles (K2, K4)
- 2.5 Divisibility and Division algorithms (K2, K4)
- 2.6 The Euclidean Algorithm - Modular Arithmetic.(K2, K4)

## **Unit III**

**Hours: 15**

- 3.1 Origin of AES - AES Structure (K2)
- 3.2 AES round function (K2, K4)
- 3.3 AES Key Expansion (K2)
- 3.4 AES Implementation. (K2, K3)
- 3.5 Multiple Encryption (K2, K3)
- 3.6 Triple DES (K2, K3)

## **Unit IV**

**Hours: 14**

- 4.1 Prime Numbers (K2, K3)
- 4.2 Fermat's and Euler's Theorem (K2, K3)
- 4.3 Testing for Primality (K2, K3)
- 4.4 The Chinese Remainder Theorem (K2, K4)
- 4.5 Principles of Public Key Cryptosystems(K2, K4)
- 4.6 The RSA Algorithm.K2, K3, K4)

## **Unit V**

**Hours: 12**

- 5.1 Diffie - Helman Key Exchange (K2, K3)
- 5.2 Digital Signatures (K2)
- 5.3 Symmetric Key Distribution Using Symmetric Encryption (K2, K4)
- 5.4 Symmetric Key Distribution Using Asymmetric Encryption (K2, K4)
- 5.5 Distribution of Public Keys (K2)
- 5.6 Kerberos.(K2)

## **Book for Study:**

1. William Stallings, "Cryptography and Network Security Principles and Practices", Seventh Edition, Prentice Hall, 2017.
2. Behrouz A. Foruzan, "Cryptography and Network Security", 2<sup>nd</sup> Edition, Tata McGraw Hill 2007.

**Book for Reference:**

1. C K Shyamala, N Harini and Dr. T R Padmanabhan: “Cryptography and Network Security”, First Edition, Wiley India Pvt.Ltd, 2011.
2. Sudha Sridhar , “ Cryptography and Network Security”, Charulatha Publications, 2013

**OER:**

1. <https://faculty.nps.edu/dedennin/publications/Denning-CryptographyDataSecurity.pdf>
2. <https://www.youtube.com/watch?v=9X1rSWLFhLY&list=PL9FuOtXibFjV77w2eyil4Xzp8eooqsPp8>

**SEMESTER V**  
**UECAE20 - Elective II B: COMPUTER GRAPHICS**

Year/ Sem	Course Code	Title of The Course	Course Type	Course Category	H/W	Credits	Marks
III/ V	UECAE20	Elective II B: Computer Graphics	Theory	Elective	5	3	40+60

**COURSE OBJECTIVES**

1. Understand two dimensional graphics and their transformations.
2. Gain knowledge about graphics hardware devices and software used.
3. Understand three dimensional graphics and their transformations and to become familiar with clipping techniques.
4. To understand the importance of visual representation.
5. To design 2D and 3D techniques for graphics.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand the basic objectives and scope of computer graphics
2. To acquire knowledge on graphics hardware devices and software used.
3. Implement various algorithms to scan, convert the basic geometrical primitives, Transformations, Area filling, clipping.
4. Understand the concepts of and techniques used in 2D and 3D computer graphics, including viewing transformations, hierarchical modeling, color, lighting and texture
5. Understand the concepts of computer graphics, including viewing, projection, Perspective, modeling and transformation in two and three dimensions.

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	H	L	M	M	M
CO2	H	L	M	M	M	L
CO3	M	M	L	L	M	H
CO4	M	L	M	M	L	L
CO5	H	M	L	H	M	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	H	M	H
CO2	L	H	L	H	M	L
CO3	M	M	M	L	H	M
CO4	H	L	L	M	L	M
CO5	H	M	L	H	M	M

**Low -L, Medium -M, High-H**

# COURSE SYLLABUS

## Unit I

Hours: 15

- 1.1 Overview of graphics Systems: Video Display Device (K1, K2, K3)
- 1.2 Raster Scan Displays and Random Scan Displays (K1, K2, K3)
- 1.3 Graphics Monitor and Workstation (K1, K2)
- 1.4 Input Devices (K1, K2)
- 1.5 Hard Copy Devices (K1, K2)
- 1.6 Graphics software (K1, K2)

## Unit II

Hours: 15

- 2.1 Output Primitives: Points and Lines (K1, K2, K3)
- 2.2 Line Drawing Algorithms: DDA Algorithms and Bresenham's Line Algorithm (K1, K2, K3, K4)
- 2.3 Circle generating Algorithm (K1, K2, K3, K4)
- 2.4 Attributes of Output Primitives: Line Attributes (K1, K2, K3)
- 2.5 Area-Fill Attributes (K1, K2, K3)
- 2.6 Character Attributes (K1, K2, K3)

## Unit III

Hours: 15

- 3.1 Two Dimensional Geometric Transformation: Basic Transformations (K1, K2, K3)
- 3.2 Matrix Representations and Homogeneous Coordinates (K1, K2, K3)
- 3.3 Composite Transformations (K1, K2, K3)
- 3.4 Other Transformations Reflections (K1, K2, K3)
- 3.5 Two Dimensional Viewing: Viewing Pipeline (K1, K2, K3)
- 3.6 Window to Viewport Coordinate Transformation (K1, K2, K3)

## Unit IV

Hours: 15

- 4.1 Clipping Operations - Point Clipping (K1, K2, K3)
- 4.2 Line Clipping: Cohen-Sutherland Line Drawing Algorithm (K1, K2, K3)
- 4.3 Polygon Clipping: Sutherland Hodgeman Polygon Clipping (K1, K2, K3)
- 4.4 Curve Clipping - Text Clipping - Exterior Clipping (K1, K2, K3)
- 4.5 Input of Graphical Data Logical Classification of Input Devices (K1, K2, K3)
- 4.6 Interactive Picture Construction Techniques (K1, K2, K3)

## Unit V

Hours: 15

- 5.1 Three Dimensional Concepts: Three Dimensional Display methods - Parallel projection (K1, K2, K3)
- 5.2 Perspective Projection (K1, K2, K3)
- 5.3 Depth Cueing - Visible Line and Surface Identification (K1, K2, K3)
- 5.4 Three Dimensional Geometric and modeling Transformations: Translation – Rotation and Scaling (K1, K2, K3)
- 5.5 Other Transformations (K1, K2, K3)
- 5.6 Three Dimensional Viewing: Projections (K1, K2, K3)

### Books for Study:

1. Donald Hearn, M. Pauline Baker, "Computer Graphics", 2<sup>nd</sup> Edition, Prentice Hall of India Publication, 2011.
2. Donald Hearn, M. Pauline Baker Warren Carithers, "Computer Graphics with Open GL", 4<sup>th</sup> Edition, Pearson Publication, 2014.

### Books for Reference:

1. Apurva A. Desai - "Computer Graphics", 1<sup>st</sup> Edition, Prentice Hall of India Publication, 2008.
2. ISRD Group - "Computer Graphics", Second Edition, McGraw Hill Book Company, 2008.

**OER:**

1. <http://freecomputerbooks.com/specialcompsecGraphBooks.html>

**SEMESTER VI**  
**UECAF20- Elective - III A: Mobile Computing**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	UECAF20	Elective - III A: Mobile Computing	Theory	Elective	5	3	40+60

**COURSE OBJECTIVES**

1. To understand the basic concepts of mobile computing.
2. To be familiar with the network layer protocols and AdHoc networks.
3. To know the basis of transport and application layer protocols.
4. To gain knowledge about different mobile platforms and application development.
5. Understand fundamentals of wireless communications. Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understand the basic concepts of mobile computing.
2. Expand the network layer protocols and AdHoc networks.
3. Apply the basis of transport and application layer protocols.
4. Develop knowledge about different mobile platforms and application development.
5. Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	L	M	M	L	M
CO2	L	M	L	M	H	H
CO3	L	M	M	L	M	M
CO4	M	H	M	L	M	H
CO5	H	M	M	H	L	M

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	L	H	M	H
CO2	L	H	L	L	M	L
CO3	M	H	M	L	H	M
CO4	M	L	H	M	L	M
CO5	H	L	L	H	M	L

**Low - L, Medium - M, High - H**

# COURSE SYLLABUS

## Unit I

Hours: 15

- 1.1 Introduction to Mobile Computing (K1)
- 1.2 Applications of Mobile Computing (K2, K3, K4)
- 1.3 Generations of Mobile Communication Technologies (K1, K2, K3)
- 1.4 Multiplexing (K1, K2, K3, K4)
- 1.5 Spread spectrum (K1, K2, K3)
- 1.6 MAC Protocols – SDMA- TDMA- FDMA- CDMA (K1, K2, K3, K4)

## Unit II

Hours: 15

- 2.1 Introduction to Cellular Systems (K1, K2, K3, K4)
- 2.2 GSM – Services & Architecture – Protocols (K1, K2, K3)
- 2.3 Connection Establishment (K1, K2, K3)
- 2.4 Frequency Allocation – Routing (K1, K2, K3)
- 2.5 Mobility Management – Security (K1, K2, K3, K4)
- 2.6 GPRS- UMTS – Architecture – Handover – Security (K1, K2)

## Unit III

Hours: 15

- 3.1 Mobile IP – DHCP – AdHoc (K1, K2, K3)
- 3.2 Proactive protocol-DSDV (K1, K2, K3)
- 3.3 Reactive Routing Protocols – DSR, AODV Hybrid routing –ZRP (K1,K2)
- 3.4 Multicast Routing- ODMRP (K1, K2, K3, K4)
- 3.5 Vehicular Ad Hoc networks ( VANET) (K1, K2, K3, K4)
- 3.6 MANET Vs VANET – Security (K1, K2, K3, K4)

## Unit IV

Hours: 15

- 4.1 Mobile TCP (K1, K2, K3)
- 4.2 WAP – Architecture (K2, K3, K4)
- 4.3 WDP – WTLS (K2,K3)
- 4.4 WTP –WSP (K2,K3)
- 4.5 WAE – WTA Architecture (K2,K3)
- 4.6 WML (K2,K3)

## Unit V

Hours: 15

- 5.1 Mobile Device Operating Systems (K1, K2)
- 5.2 Special Constraints & Requirements (K1, K2)
- 5.3 Commercial Mobile Operating Systems (K1, K2, K3)
- 5.4 Software Development Kit: iOS, Android, BlackBerry, Windows Phone (K1, K2, K3)
- 5.5 M-Commerce – Structure – Pros & Cons (K1, K2)
- 5.6 Mobile Payment System – Security Issues (K1, K2)

### Book for Study:

1. Prasant Kumar Pattnaik, Rajib Mall, “Fundamentals of Mobile Computing”, Second Edition, PHI Learning Pvt. Ltd, New Delhi, 2012.

### Books for Reference:

1. Jochen H. Schller, “Mobile Communications”, Second Edition, Pearson Education, New Delhi, 2007.
2. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile Systems", Fourth Edition, Thomson Asia Pvt Ltd, 2017.
3. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of

Mobile Computing”, Second Edition, Springer, 2007.

**OER:**

1. <https://www.bookganga.com/eBooks/Books/details/4855549396506651616?BookName=Mobile-Computing>.
3. [https://www.tutorialspoint.com/cloud\\_computing/cloud\\_computing\\_tutorial.pdf](https://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf)

**SEMESTER VI**  
**UECAG20 – ELECTIVE – III B: ARTIFICIAL INTELLIGENCE**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	UCCAG20	ELECTIVE III B: Artificial Intelligence	Theory	Elective	5	3	40+60

**COURSE OBJECTIVES**

1. Gain a historical perspective of AI and its foundations.
2. Become familiar with basic principles of AI toward problem solving inference, perception, knowledge representation, and learning.
3. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. To understand the concept of learning techniques.
5. To know about Context Free Grammars.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Understanding different types of AI Agents and its Environments.
2. Know Various AI Search Algorithms (uninformed, informed, heuristic search).
3. Understand the fundamentals of Knowledge representation (logic based, frame based).
4. Understand the different types of Learning.
5. Ability to apply knowledge representation, reasoning , and machine learning Techniques

CO/ PO	PO					
	1	2	3	4	5	6
CO1	M	L	M	L	H	M
CO2	L	M	M	H	M	L
CO3	M	M	H	M	L	M
CO4	H	L	M	M	H	M
CO5	M	L	M	L	M	L

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	H	M	H
CO2	L	M	L	M	M	L
CO3	M	H	M	L	H	M
CO4	H	L	H	L	L	M
CO5	H	H	L	M	M	H

**Low -L, Medium -M, High-H**

# COURSE SYLLABUS

## Unit I

**Hours: 15**

- 1.1 Artificial Intelligence- Introduction- Foundation of Artificial Intelligence. (K1, K2)
- 1.2 History of Artificial Intelligence- Intelligent Agents- Agents and Environment. (K1, K2, K3)
- 1.3 Good Behavior- The Concept of Rationality- Performance Measures- Rationality. (K1, K2, K3)
- 1.4 Problem Solving- Solving Problem by searching- Problem Solve Agents. (K1, K2, K3, K4)
- 1.5 Well Defined Problems and Solutions- Formulating Problems. (K1, K2, K3, K4)
- 1.6 Uniformed Search Strategies- Breadth First Search- Depth First Search. (K1, K2, K3, K4)

## Unit II

**Hours: 15**

- 2.1 Informed Search- Greedy Best First Search- A\* Search Minimizing the total estimated Solution Cost. (K1, K2, K3, K4)
- 2.2 Hill Climbing Search- Genetic Algorithm. (K1, K2, K3, K4)
- 2.3 Local Search in Continuous space- Online Search Agents and Unknown environments - Online Search problems- Online Search Agents. (K1, K2, K3, K4)
- 2.4 Online Local Search- Learning in Online Search. (K1, K2, K3, K4)
- 2.5 Constraint Satisfaction Problems- Backtracking Search for CSPs. (K1, K2, K3, K4)
- 2.6 Backtracking and Local Search. (K1, K2, K3, K4)

## Unit III

**Hours: 15**

- 3.1 Logical Agents- Knowledge Based Agents. (K1, K2, K3)
- 3.2 Logic - Propositional Logic A Very simple logic. (K1, K2, K3)
- 3.3 Reasoning Pattern in Propositional Logic- Resolution Forward and Backward Chaining. (K1, K2, K3)
- 3.4 Syntax and Semantics of First order Logic- Models for First Order Logic. (K1, K2, K3)
- 3.5 Symbol and Interpretations- Terms. (K1, K2)
- 3.6 First Order Logic- Assertions and queries in First order Logic. (K1, K2, K3)

## Unit IV

**Hours: 15**

- 2.1 Learning from Observations- Forms of Learning. (K1, K2)
- 2.2 Inductive Learning- Knowledge in Learning- A logical Formulation of Learning. (K1, K2)
- 2.3 Examples and hypotheses- Current best hypothesis search. (K1, K2, K3)
- 2.4 Least Commitment Search- Explanation Based Learning- Extracting General rules from Examples. (K1, K2)
- 2.5 Improving Efficiency- Learning using Relevance Information. (K1, K2)
- 2.6 Inductive Logic Programming- An Example Top down inductive Learning Methods- Inductive learning with inverse deduction. (K1, K2)

## Unit V

**Hours: 15**

- 5.1 Communication –Communication as Action- Fundamentals of Language. (K1, K2)
- 5.2 Formal Grammar for a Fragment of English- Lexicon of  $\epsilon_0$ - Grammar of  $\epsilon_0$ . ((K1, K2, K3)
- 5.3 Syntactic Analysis Parsing- Efficient Parsing. (K1, K2, K3, K4)
- 5.4 Augmented Grammars- Semantic Interpretation. (K1, K2, K3, K4)
- 5.5 The semantics of a English Fragment- Time and Tense- Quantification- Pragmatic Interpretation. (K1, K2, K3, K4)
- 5.6 Languages and generation with DCG'S- Ambiguity and Disambiguation. (K1, K2, K3)

**Books for Study:**

1. Stuart Russel Peter Norvig, “Artificial Intelligence- A Modern Approach” Second Edition Pearson Education/ Prentice Hall of India 2010.

**Books for Reference:**

1. Nils J.Nilsson,” Artificial Intelligence: A new Synthesis”,First Edition, Harcourt Asia Pvt.Ltd.,1998.
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, Third Edition, Tata McGraw Hill, 2017.
3. George F.Luger “Artificial Intelligence Structures and Strategies for Complex Problem solving”, Third Edition, Pearson Education/PHI 1997.

**OER:**

1. [https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.cin.ufpe.br/~tfl2/artificial-intelligence-modern-approach.9780131038059.25368.pdf&ved=2ahUKEwi9\\_rSJrHrAhUHxzgGHaiCSgQFjAAegQIAxAB&usg=AOvVaw0Ba2OoXS14QuGW-AzLXmx1](https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.cin.ufpe.br/~tfl2/artificial-intelligence-modern-approach.9780131038059.25368.pdf&ved=2ahUKEwi9_rSJrHrAhUHxzgGHaiCSgQFjAAegQIAxAB&usg=AOvVaw0Ba2OoXS14QuGW-AzLXmx1)

**SEMESTER VI**  
**UCCAX20 -Practical X: INTERNET AND WEB PROGRAMMING**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	UCCAY20	Practical X: Internet and Web Programming	Practical	Core	3	2	40+60

**COURSE OBJECTIVES**

1. Comprehend the usage of PHP and JavaScript in dynamic web development.
2. Understand PHP language data types, logic controls, built-in and user-defined functions.
3. Describe Object oriented programming paradigm in PHP.
4. Understand user validation techniques and cookies.
5. Build a simple, yet functional web application using PHP/MySQL.

**COURSE LEARNING OUTCOMES**

The Learners will be able to

1. Know variable naming rules and JavaScript data types.
2. Use operators, variables, arrays, control structures, functions and objects in JavaScript.
3. Demonstrate objects and arrays usage
4. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
5. Validate user input and create cookies in PHP

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	H	L	M	L	M
CO2	L	H	M	M	L	M
CO3	H	L	L	M	M	L
CO4	M	M	M	M	H	L
CO5	M	L	M	L	M	H

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	L	M	H
CO2	L	H	L	H	M	L
CO3	M	M	M	L	H	M
CO4	H	L	H	M	L	M
CO5	H	M	L	H	M	L

**Low -L, Medium -M, High-H**

1. Implementing factorial of a number in JavaScript,
2. Animation in JavaScript.
3. Addition and Multiplication of two numbers in JavaScript.
4. Convert the first letter of each word of the sting toUppercase in JavaScript.
5. Implementing Arrays in JavaScript.
6. Implementing Control Statements and Looping in PHP.
7. Implementing Functions in PHP.
8. Implementing Form Processing (GET & POST) in PHP.
9. Implementing Validation in PHP.
10. Implementing Cookies in PHP.

**SEMESTER VI**  
**UCCAY20 - PROJECT WORK**

<b>Year /Sem</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
III / VI	UCCAY20	Project Work	Practical	Core	3	2	40+60

The objective of the project is to enable the students to work in a project of latest topic.. Students have to do project throughout the semester in any application to gain practical knowledge of what they have studied in five semesters. Each student shall have a guide from the Department, the students are expected to complete the project and submit a fullfledged report comprising of the complete system developed along with implementation and test results. The submitted report will be evaluated by conducting project viva at the end of the semester. Their progress is monitored continuously to award the internal assessment marks.

**ASSESSMENT:**

**Pattern of Question Paper**

**Theory- Total Marks 100**

Section A (Answer ALL) -  $10 \times 3 = 30$

Section B (either OR) -  $5 \times 5 = 25$

Section C (3 out of 5) -  $3 \times 15 = 45$

**Practical - Total Marks 60**

**Practical:** 45 Marks

**Record:** 10 Marks

**Viva:** 5 Marks

**SEMESTER V/VI**  
**USCSG520 –SKILL BASED ELECTIVE: R PROGRAMMING**

<b>Year /Sem</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
III / VI	USCSG520	Skill Based Elective: R Programming	Theory with Practical	Skill Based Elective	2	2	40+60

**COURSE OBJECTIVES**

1. Understand the usage of R programming interactive environment.
2. Understand R programming language includes functions, arrays and dataframes.
3. Describe the statistical computing includes programming in R, reading and accessing data in R.
4. Understand the concept of Meta Programming.
5. Build a simple sorting algorithm.

**COURSE SYLLABUS**

**Unit I**

**Hours: 6**

- 1.1 Introduction to R and R Studio. (K1, K2)
- 1.2 Basic Objects: Vector. (K2)
- 1.3 Matrix, Array. (K2, K3)
- 1.4 Lists. (K2)
- 1.5 Data Frames. (K3)
- 1.6 Functions. (K2, K3)

**Unit II**

**Hours: 6**

- 2.1 Basic Expressions: Assignment Expressions. (K1, K2)
- 2.2 Conditional Expressions. (K3, K4)
- 2.3 Loop Expressions. (K3, K4)
- 2.4 Basic Objects: Object Functions (K2, K3)
- 2.5 Logical Functions. (K2, K3)
- 2.6 Math functions (K2, K3)

**Unit III**

**Hours: 6**

- 3.1 Numeric Methods Statistical function. (K2, K3)
- 3.2 Family Functions. (K2, K3)
- 3.3 Working with Strings. (K2, K3)
- 3.4 Working with Data. (K2, K3)
- 3.5 Meta programming. (K2)
- 3.6 Object Oriented Programming. (K2, K3, K4)

**Unit IV**

**Hours: 6**

1. Write a program that prints ‘Hello World’ to the screen.
2. Write a program that asks the user for a number n and prints the sum of the numbers 1 to n.
3. Write a program that prints a multiplication table for numbers up to 12.
4. Write a function that returns the largest element in a list.

**Unit V****Hours: 6**

1. Write a function that computes the running total of a list.
2. Write a function that tests whether a string is a palindrome.
3. Implement the following sorting algorithms: Selection sort, Insertion sort, Bubble Sort.
4. Implement linear search.
5. Implement binary search.
6. Implement Matrices Addition, Subtraction and Multiplication

**Books for Study:**

1. Kun Ren, "Learning R. Programming, Packt Publishing" - ebooks Account, October 28, 2016.
2. Dr. Mark Gardener, "Beginning R: The Statistical Programming Language", Paperback, 2013.

**Books for Reference:**

1. Colin Gillespie, Robin Lovelace, "Efficient R Programming: A Practical Guide to Smarter Programming", O'Reilly Media, 1<sup>st</sup> Edition (October 25, 2016); eBook (2017-04-10).
2. Daniel Navarro, "Learning Statistics with R", lulu.com (2015); eBook (University of Adelaide, 2018. Updated Continuously)

**OER:**

1. [https://www.jmc.edu/econtent/ug/3202\\_R%20PROGRAM.pdf](https://www.jmc.edu/econtent/ug/3202_R%20PROGRAM.pdf)
2. [http://www.tutorialspoint.com/r/r\\_tutorial.pdf](http://www.tutorialspoint.com/r/r_tutorial.pdf)
3. [https://cran.r-project.org/doc/contrib/Paradis-rdebuts\\_en.pdf](https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf)

**SEMESTER V/VI**  
**USCSF620 - SKILL BASED ELECTIVE: DATA ANALYTICS USING DATA**  
**VISUALIZATION TOOLS**

Year /Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	USCSF620	Skill Based Elective: Data Analytics using Data Visualization	Theory with Practical	Skill Based Elective	2	2	40+60

**COURSE OBJECTIVES**

1. To understand and extend the current state of the art in data visualization.
4. To Understand the different data format and its graphical representation
2. To Identify the various data visualizations tools in the market and its features.
3. To provide skills present data effectively through chart, map and dashboard.
4. To Develop skills to present data effectively through chart, map and dashboard.

**COURSE SYLLABUS**

**UNIT I**

**Hours: 5**

- 1.1 Data Visualization: Introduction. (K1)
- 1.2 Benefits of Data Visualization. (K2)
- 1.3 Data Visualization Tools. (K2)
- 1.4 Features. (K2)
- 1.5 Data access from data sources. (K2)

**UNIT II**

**Hours: 5**

- 2.1 Data Transformation. (K1, K2)
- 2.2 Types of charts. (K2)
- 2.3 Bar Chart. (K1, K2)
- 2.4 Pie Chart. (K2)
- 2.5 Data Tables. (K2)
- 2.6 Scatter Chart. (K2)

**UNIT III**

**Hours: 5**

- 3.1 Time series Chart. (K2)
- 3.2 Score card. (K2)
- 3.3 Scatter Chart. (K2)
- 3.4 Bullet Chart. (K2)
- 3.5 Area Chart. (K2)
- 3.6 Heat Map. (K2)

**UNIT IV**

**Hours: 8**

1. Create a bar chart for the given data.
2. Create a pie chart for the given data.
3. Create a scatter chart for the given data.
4. Create a time series chart for the given data.

5. Create a bullet chart for the given data.
6. Create area chart for the given data.
7. Create a heat map for the given data.

**Book for Study:**

1. Nathan Yau Visualize This: The FlowingData Guide to Design, Visualization, and Statistics Wiley, 1st Edition 2011.

**Books for Reference:**

1. Cole Nussbaumer Knaflic Storytelling with Data: A Data Visualization Guide for Business Professionals John Wiley & Sons 2015.

**L) OER**

1. [https://www.tutorialspoint.com/tableau/tableau\\_tutorial.pdf](https://www.tutorialspoint.com/tableau/tableau_tutorial.pdf)
2. <https://www.pdfdrive.com/tableau-books.html>
3. <http://projanco.com/Library/Learning%20Tableau%202019%20Tools%20for%20Business%20Intelligence,%20data%20prep,%20and%20visual%20analytics.pdf>

**ASSESSMENT FOR SKILL-BASED ELECTIVE****Pattern of Question Paper****SBE: Total Marks 60**

Section A (Any 10 out of 15) -  $10 \times 2 = 20$

Section B

Practical: **35 Marks**

Record: **5 Marks**

**ASSESSMENT FOR NON-MAJOR ELECTIVE****NME - Total Marks 60**

Section A (Answer ALL) -  $5 \times 2 = 10$

Section B (Answer 3 out of 5)  $3 \times 5 = 15$

**Practical:** 30 Marks

**Record:** 5 Marks

# **Department of Commerce (UG)**

## **SYLLABUS AND REGULATIONS**

Under

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**Department of Commerce (UG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighboring districts.

**B) NAME OF THE PROGRAMME: B. Com**

**Vision**

To develop a centre for excellence providing conceptual knowledge and sharpen analytical and decision-making skills with ethical behaviour.

**ELIGIBILITY CRITERIA OF THE PROGRAMME**

A candidate who has passed the Higher Secondary Examinations (Academic [10 + 2] Stream) with Commerce, Accountancy, Economics, Computer Science/Statistics/Business Mathematics as subjects, conducted by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the Syndicate of the Thiruvalluvar University shall be eligible for admission to B. Com Degree Course in General Commerce.

## LIST OF COURSES:

### Structure of the course and scheme of Examination

Sem	Part	Paper Code	Title of Paper	Hours/week	Exam		credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil paper –I	6	3	-	3	40+60
	II	UENGA20	English paper – I	6	3	-	3	40+60
	III	UCCOA20	Principles of Accounting – I	5	3	-	4	40+60
	III	UCCOB20	Business Economics – I	5	3	-	4	40+60
	III	UABMA20	Allied I: Business Mathematics and Statistics	5	3	-	5	40+60
	IV	USCOA120/ USCOA220	Skill Based Elective – I Consumer Awareness	2	2	-	2	40+60
	IV	-	Value Education	1	-	-	-	-
			<b>Total</b>	<b>30</b>	-	-	<b>21</b>	<b>600</b>
II	I	ULTAB20	Tamil paper – II	6	3	-	3	40+60
	II	UENGB20	English paper – II	6	3	-	3	40+60
	III	UCCOC20	Principles of Accounting – II	5	3	-	4	40+60
	III	UCCOD20	Business Economics – II	5	3	-	4	40+60
	III	UASOR20	Allied II: Statistics and Operations Research	5	3	-	5	40+60
	IV	USCOA120/ USCOA220	Skill based elective – II Consumer Awareness	2	2	-	2	40+60
	IV	-	Value Education	1	-	-	-	-
			<b>Total</b>	<b>30</b>	-	-	<b>21</b>	<b>600</b>
III	III	UCCOE20	Financial Accounting – I	6	3	-	4	40+60
	III	UCCOF20	Principles of Cost Accounting	6	3	-	4	40+60
	III	UCCOG20	Law of Contract – I	5	3	-	4	40+60
	III	UAIED20	Allied III: Indian Economic Development Policy	5	3	-	5	40+60
	III	UECOA20	Elective I A: Principles of Management	5	3	-	5	40+60
	III	UECOB20	Elective I B: Essentials of Business Communication					
	IV	USCOB320	Skill based Elective – III Advertising & Sales Promotion Management	2	3	-	2	40+60
	IV	-	Value Education	1	-	-	-	-
			<b>Total</b>	<b>30</b>	-	-	<b>24</b>	<b>600</b>
IV	III	UCCOH20	Financial Accounting –II	5	3	-	4	40+60
	III	UCCOI20	Methods of Cost Accounting	5	3	-	4	40+60
	III	UCCOJ20	Law of Contract – II	5	3	-	4	40+60
	III	UCCOK20	Marketing	5	3	-	4	40+60
	III	UAITA20	Allied IV: International Trade	5	3	-	5	40+60
	IV	UNEVS20	Environmental Studies	2	2	-	2	40+60
	IV	USCOC420	Skill based elective – IV Entrepreneurship Development	2	2	-	2	40+60

	IV	-	Value Education	1	-	-	-	-
			Total	30	-	-	<b>25</b>	<b>700</b>
V	III	UCCOL20	Corporate Accounting – I	6	3	-	4	40+60
	III	UCCOM20	Management Accounting- II	6	3	-	4	40+60
	III	UCCON20	Income Tax – Law and Practice – I	6	3	-	5	40+60
	III	UECOC520	Elective II: Banking: Law and Practice	6	3	-	5	40+60
	III	UECOD520	Elective III: E-Commerce and Tally	4	3	-	3	40+60
	III	UECOE520	Elective Practicals: Tally	2	-	3	2	40+60
	IV	UGCOA520	Non Major Elective Book –keeping and accounting	3	2	-	2	40+60
	IV	USCOD520	Skill based Elective – V Consumer Guide and Empowerment	2	2	-	2	40+60
		USCOE520	Skill based Elective-VI Practical Auditing					
			Value Education	1	-	-	-	-
			Total	30	-	-	<b>22</b>	<b>600/700</b>
vi	III	UCCOO20	Corporate Accounting – II	6	3	-	5	40+60
	III	UCCOP20	Management Accounting – II	6	3	-	5	40+60
	III	UCCOQ20	Income Tax – Law and Practice –II	6	3	-	5	40+60
	III	UECOC620	Elective II: Banking: Law and Practice	6	3	-	5	40+60
	III	UECOD620	Elective III: E-Commerce and Tally	4	3	-	3	40+60
	III	UECOE620	Elective Practical: Tally	2	-	3	2	40+60
	IV	UGCOA620	Non-Major Elective Book –keeping and accounting	3	2	-	2	40+60
		USCOD620	Skill based Elective – V Consumer Guide and Empowerment					
	IV	USCOE620	Skill based Elective-VI SBE-Practical Auditing	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	2	-	2	40+60
			Total	30	-	-	<b>26</b>	<b>800/700</b>
	V		Extension Activities		-	-	1	-
			Grand Total				140	3900

**PROGRAMME OUTCOME:**

On completion of the UG Programme, students will be able to:

**PO 1: SOCIAL CONTRIBUTION:**

excel as a socially committed individual having empathy for the needs of the society through value-based education.

**PO 2: ENVIRONMENT AND SUSTAINABILITY:**

enhance the theoretical and practical knowledge gained in the field of auditing, tax filing, and share market.

**PO 3: PROFESSIONAL ETHICS:**

apply ethical principles in promoting values and attitudes and become responsible towards the practice of accounting norms.

**PO 4: INDIVIDUAL AND TEAM WORK:**

function effectively as an individual and as a member or leader in teams strengthening group dynamics to achieve the common goals of the organisations.

**PO 05: LIFE-LONG LEARNING:**

recognize the need for and have the ability to engage in life-long learning process to cope up with the emerging trends in social, cultural, economic and technological changes.

**PO6: HIGHER KNOWLEDGE :**

Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

**PROGRAMME SPECIFIC OBJECTIVE:**

Within few years of obtaining UG Degree in commerce, the students will be able to

**PSO 1. SUBJECT PROFICIENCY:**

succeed in obtaining employment appropriate to their interest in related fields and make a positive contribution in public practice, government, commerce and industry.

**PSO 2. PRACTICAL APPLICATION:**

Apply the practical knowledge gained over the years in the field of auditing, tax filing, share market and other finance related services

**PSO 3. PROFESSIONAL GROWTH:**

develop in their professional career through lifelong learning and excel as the fellow associates in the field of company secretaryship, chartered accountancy and business administration.

**PSO 4. MANAGEMENT SKILLS:**

Exercise leadership qualities and moral values through ethical ways with the concern for the society and the environment with team spirit to adapt to change throughout their professional career.

**PSO 5. ADDRESSING THE NEEDS OF THE NATION:**

Cater to the needs of the industry/society so as to contribute for the development of the nation.

**PSO6. ENTREPRENEURIAL SKILL:**

Enhance the Entrepreneurial skill, critical & creative thinking to thrive to be self-motivated and successful.

**MAPPING OF PROGRAMME SPECIFIC OBJECTIVE WITH PROGRAMME OUTCOME**

<b>PSO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>PO 1</b>	H	M	H	H	H	H
<b>PO 2</b>	H	H	H	M	H	M
<b>PO 3</b>	M	M	H	H	M	H
<b>PO 4</b>	H	H	M	H	H	H
<b>PO 5</b>	H	H	M	H	M	H

(Low – L, Medium – M, High – H)

**SEMESTER IV  
UCCOH20 - FINANCIAL ACCOUNTING II**

<b>Year/ Semester</b>	<b>Course Code</b>	<b>Title of the course</b>	<b>Course type</b>	<b>Course category</b>	<b>No. of. Hours</b>	<b>Credits</b>	<b>Marks</b>
II/IV	UCCOH20	Financial Accounting II	Theory	Core	5	4	40+60

**Course Objective:**

1. To impart the students with knowledge on the procedure for preparation of fire insurance Claims.
2. To enable the students prepare statement of affairs and deficiency account under insolvency Accounts.
3. To acquaint students with the partnership principles and concepts.
4. To assist the students in understanding the application of Partnership principles in different situations and conditions.
5. To enable the students differentiate the different methods of preparation under Piecemeal Distribution System.

**Course Outcome (CO):**

1. Students gained knowledge in computing the loss of stock or loss of profits under fire insurance claims.
2. Students were able to prepare the Statement of Affairs and Deficiency accounts under Insolvency system.
3. Students gained knowledge on applying the various concepts relating to partnership accounts.
4. Students were familiarised to choose different modes of Dissolution of Partnership firms.
5. Students were able to differentiate the different methods of preparation under Piecemeal Distribution System.

**COs consistency with POs**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	H	H	H	H
2	H	M	M	M	H	M
3	H	H	M	H	H	M
4	H	H	M	H	H	M
5	H	H	M	H	H	M

**(Low – L, Medium – M, High – H)****COs consistency with PSOs**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	H	H	H	H	H
2	H	M	M	M	H	H
3	H	H	M	H	H	H
4	H	H	M	H	H	H
5	H	H	M	H	H	H

**(Low – L, Medium – M, High –H)****Course Syllabus****Unit I: Fire Insurance Claims****(15 Hours)**

- 1.1 Meaning and need for fire insurance. (K<sub>1</sub>,K<sub>2</sub>)
- 1.2 Types of fire insurance policies(K<sub>1</sub>,K<sub>2</sub>)
- 1.3 Claim for loss of normal stock(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.4 Claim for loss of abnormal stock. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 1.5 Technical terms related to loss of profit policy (K<sub>1</sub>,K<sub>2</sub>)
- 1.6 Claim for loss of profits(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit II: Insolvency****(15 Hours)**

- 2.1 Meaning and nature of Insolvency (K<sub>1</sub>, K<sub>2</sub>)
- 2.1 Relevant acts – Presidency Town and Provincial Insolvency Act (K<sub>1</sub>, K<sub>2</sub>)
- 2.3 Difference between Statement of Affairs and Balance Sheet(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 2.4 Preparation of Statement of Affairs(K<sub>2</sub>,K<sub>3</sub>)
- 2.5 Preparation of Deficiency Accounts. (K<sub>1</sub>,K<sub>2</sub>)
- 2.6 Consolidated Preparation of Statement of Affairs and Deficiency Accounts (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit III: Partnership****(15 Hours)**

- 3.1 Meaning and features of Partnership Act and Contents of Partnership Deed(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 3.2 Difference between Sacrificing and Gaining Ratios and methods of Goodwill(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 3.3 Partnership Fundamentals(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 3.4 Admission of a Partner(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

3.5 Retirement of a Partner(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit IV: Death and Dissolution of a partners (15 Hours)**

4.1 Death of a partner (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)

4.2 Dissolution of firm – Meaning and Modes of Dissolution (K<sub>1</sub>,K<sub>2</sub>)

4.3 Normal Dissolution – Settlement of Accounts – Accounting Treatment of unrecovered assets and liabilities (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)

4.4 Insolvency of a Partner(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)

4.5 Insolvency of two Partners – Garner Vs Murray Rule(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

4.6 Insolvency of All Partners. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit V: Piecemeal Distribution (15 Hours)**

5.1 Meaning of Piecemeal Distribution. (K<sub>1</sub>, K<sub>2</sub>)

5.2 Methods of Piecemeal Distribution. (K<sub>1</sub>, K<sub>2</sub>)

5.3 Order of settlement of claims. (K<sub>1</sub>, K<sub>2</sub>)

5.4 Statement showing Absolute Surplus(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

5.5 Proportionate Capital Method. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

5.6 Maximum loss method. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

1.Reddy T.S and Murthy Advanced Accountancy – Margham Publications, Chennai, Reprint 2018.

**Reference Books**

1). Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(Volume I) – S.Chand& Company Limited, New Delhi, Reprint 2019.

2). Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.

3). Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khasa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.

4).Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint – 2017.

5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors – Guwahati, Edition 2018.

**Web Resources:**

1).MIT Open CourseWar (<http://ocw.mit.edu/courses/sloan>)

2). Khan Academy

3). Accounting Student Network

4). MissCPA

5)Accounting.com

6)Accounting Coach

7)AQA(aqa.org.uk.)

8)Accounting-World

9)AccountingInfo

10)Course Hero

## SEMESTER IV

### UCCOI20– Methods of Cost Accounting

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
II/IV	UCCOI20	Methods of Cost Accounting	Theory	Core	5	4	40+60

#### Course Objectives:

- 1.To introduce to the students the methods of process costing.
- 2.To teach various methods of apportionment of expenses.
- 3.To enable the students to ascertain cost for Joint products and by products.
- 4.To illustrate the students to calculate cost of complete and incomplete contracts.
5. Students are able to differentiate, analyze and prepare reconciliation statement.

#### Course Outcomes (CO):

Upon the successful completion of this course the students will be able to:

1. Acquire conceptual knowledge of process costing and its treatment.
2. Identify the methods of apportionment according to the impact of business.
3. Identify and analyze the costs incurred in contract costing and job costing.
4. Understand and apply the methods of calculating transport cost.
5. Differentiate and compare the cost and financial books to reconcile the accounts.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	M	M	M	H
2	H	H	M	H	H	M
3	H	M	M	M	H	M
4	H	M	M	M	M	M
5	H	H	M	H	H	M

(Low – L, Medium – M, High – H)

#### COs Consistency with PSOs

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	H	H	H	H	H
2	H	M	M	M	H	H
3	H	H	M	H	H	H
4	H	H	M	H	H	H
5	H	H	M	H	H	H

(Low – L, Medium – M, High –H)

## **Course Syllabus**

### **Unit I: Process Costing**

**(15 Hours)**

- 1.1. Introduction Features, costing procedures. (K<sub>1</sub>, K<sub>2</sub>)
- 1.2. Special points in Process costing – Normal loss and scrap. (K<sub>1</sub>, K<sub>2</sub>)
- 1.3. Abnormal Loss, Abnormal Gain. (K<sub>1</sub>, K<sub>2</sub>)
- 1.4. Problems on Normal Process account. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5. Process Cost with Normal Loss and Normal Gain with Units. (K<sub>3</sub>, K<sub>4</sub>)
- 1.6. Process Cost with Abnormal Loss and Abnormal Gain with Units. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Costing Methods**

**(15 Hours)**

- 2.1. Joint products – Meaning, Accounting for joint products, methods used in apportioning Joint cost. (K<sub>1</sub>, K<sub>2</sub>)
- 2.2. Problems on Joint products- Average Unit method, Physical Unit method, Survey method, Market value method. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.3. By-products – Meaning, Accounting for by-products, Methods used in apportioning By-products, Problems on By-products. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4. Job costing – Meaning, Features, Advantages, Limitations and procedures. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5. Batch costing – Elements of cost relating to batch, Economic Batch Quantity (EBQ). (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6. Problems on Job costing and batch costing. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Contract Costing**

**(15 Hours)**

- 3.1. Meaning, features, Difference between contract costing and job costing. (K<sub>1</sub>, K<sub>2</sub>)
- 3.2. Contract Costing, Problems on completed contract. (K<sub>3</sub>, K<sub>4</sub>)
- 3.3. Contract Costing – Treatment of plant. (K<sub>2</sub>, K<sub>3</sub>)
- 3.4. Incomplete Contracts. (K<sub>3</sub>, K<sub>4</sub>)
- 3.5. Incomplete contracts with laws. (K<sub>3</sub>, K<sub>4</sub>)
- 3.6. Multiple Contracts. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Transport Costing**

**(15 Hours)**

- 4.1. Meaning, Classification of cost, Selection of appropriate cost Unit. (K<sub>1</sub>, K<sub>2</sub>)
- 4.2. Computation of cost Unit. (K<sub>2</sub>, K<sub>3</sub>)
- 4.3. Calculation of cost for running distance. (K<sub>2</sub>, K<sub>3</sub>)
- 4.4. Passenger transport cost. (K<sub>2</sub>, K<sub>3</sub>)
- 4.5. Goods transport Cost. (K<sub>2</sub>, K<sub>3</sub>)
- 4.6. Comprehensive Problems. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Reconciliation Statement**

**(15 Hours)**

- 5.1. Introduction, Meaning and need for reconciliation. (K<sub>1</sub>, K<sub>2</sub>)
- 5.2. Reasons for difference in profit. (K<sub>1</sub>, K<sub>2</sub>)
- 5.3. Procedure of Reconciliation with format. (K<sub>2</sub>, K<sub>3</sub>)
- 5.4. Reconciliation statement – profit as per cost account and laws as per financial account. (K<sub>3</sub>, K<sub>4</sub>)
- 5.5. Reconciliation statement – profit as per financial account and laws as per cost account . (K<sub>3</sub>, K<sub>4</sub>)
- 5.6. Memorandum reconciliation statement. (K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

1. Reddy T.S and Hari Prasad Reddy Y. – Cost Accounting – Margham Publications, Chennai, Reprint 2018

**Reference Books:**

1. Jain S. P & Narang K.L. \_ Cost Accounting – Kalyani Publishers, New Delhi, Reprint 2017
2. Khanna, Ahuja and Pandey – Cost Accounting – S. Chand & Co., New Delhi, Reprint 2016
3. Lall Nigam B.M. and Bagavathi V. – Cost Accounting: An Introduction – Prentice Hall of India, New Delhi, Reprint 2018.
4. Pillai R.S.N. and Bagavathi V. – Cost Accounting – S. Chand & Co., Ltd., New Delhi, 2014
5. Arora M. N. – A Textbook of Cost and Management Accounting – Vikas Publishing House, Chennai, 10<sup>th</sup> Edition, 2012.

**Web Resources:**

- 1). MIT Open CourseWare (<http://ocw.mit.edu/courses/sloan>)
2. Costmgmt.org
3. [www.edx.org](http://www.edx.org)
4. study.com
5. [www.accountingcoach.com](http://www.accountingcoach.com)
6. fasab.gov
7. [www.freebookcentre.net](http://www.freebookcentre.net)
8. open.umn.edu
9. libguides.uwf.edu

## SEMESTER IV

### UCCOJ20 - LAW OF CONTRACTS II

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
II/IV	UCCOJ20	Law of Contracts II	Theory	Core	5	4	40+60

#### Course Objectives:

1. To gain knowledge on sales and consumer protection act.
2. To apprehend knowledge on pricing, performance of contract.
3. To acquire theoretical knowledge on special contracts.
4. To know about the incorporation of companies.
5. To have in-depth knowledge on the internal affairs of the companies

#### Course Outcomes (CO):

1. Students acquired conceptual knowledge on sales and consumer protection act.
2. Students were familiarised with the performance of valid contract.
3. Students gained an insight knowledge on special contracts.
4. Students gained thorough knowledge incorporation of companies.
5. Students were well versed in the internal affairs of the companies.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	M	H	M	H
2	H	H	M	H	M	M
3	H	H	M	H	M	M
4	H	H	M	H	M	M
5	H	H	M	H	M	M

(Low – L, Medium – M, High – H)

#### COs consistency with PSOs

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	H	M	H	M	H
2	H	H	M	H	M	H
3	H	H	M	H	M	H
4	H	H	M	H	M	H
5	H	H	M	H	M	H

(Low– L, Medium– M, High– H)

## **Course Syllabus**

### **Unit I: Sale of Goods Act – I**

**(15 Hours)**

- 1.1 Formation of contract of sale (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.2 Subject matter of contract of sale (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Conditions and Warranties (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Passing of property (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Contracts involving sea routes, Sale by non-owners (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.6 Consumer Protection Act-Unfair sale practices (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit II: Sale of Goods Act – II**

**(15 Hours)**

- 2.1 Delivery of goods (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Rights of buyer (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Rights of seller (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Rights of unpaid seller against goods (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Rights of unpaid seller against buyer personally (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Auction sales (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Other Special Contracts**

**(15 Hours)**

- 3.1 Contract of Indemnity and contract of Guarantee, Kinds of Guarantee (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Extent of Surety's liability (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Bailment, Duties and rights of Bailor and Bailee (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Law relating to Lien and finder of goods (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Pledge (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Hypothecation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Introduction to Companies Act –I**

**(15 Hours)**

- 4.1 Company law in India, Characteristics of a company,  
Lifting or piercing of corporate veil (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Kinds of companies (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Formation of a Company (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Memorandum of Association (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Articles of Association (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Doctrine of Ultra vires, Doctrine of indoor management (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Introduction to Companies Act –II**

**(15 Hours)**

- 5.1 Prospectus and contents of prospectus (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2 Meeting, Types (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Quorum (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Voting and poll (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Proxy (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Resolutions (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

**Text Books:**

Kapoor N. D. – Business Law – Sultan Chand & Sons, New Delhi, Revised Ed. 2015

**Reference Books**

1. Kapoor N. D. – Elements of Company Law – Sultan Chand & Sons New Delhi, Revised Ed.2015  
Kapoor N. D. – Business Law – Sultan Chand & Sons, New Delhi, Revised Ed. 2015
2. Gulshan S.S. – Mercantile Law – Excel Books, New Delhi, 2012
3. Pillai R.S.N. and Bagavathi V. – Business Law – Sultan Chand& Sons, New Delhi, Revised Edition 2017.
4. Kuchhal M.C. and VivekKuchhal – Business Laws – Vikas Publishing House, Chennai, 2015
5. Dr.Jain V.K. and CA Shashank S.Sharma – Business Laws, Business Correspondence and Reporting – Taxmann Publication, New Delhi, 2017

Study material will be provided by the department.

**Web Resources:**

- 1).www.himpub.com
- 2).www.rccmindore.com
- 3). www.dphu.org
- 4).www.geektonight.com
- 5). [www.epdf.pub](http://www.epdf.pub)
- 6). www.academia.edu

## SEMESTER IV

### UCCOK20 - MARKETING

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
II/IV	UCCOK20	Marketing	Theory	Core	5	5	40+60

#### Course Outcomes:

1. To identify, understand and satisfy the needs of customers and markets.
2. To provide knowledge on various marketing functions.
3. To analyse consumer behaviour and decision-making process.
4. This course enables the students to understand marketing mix elements.
5. To understand the dynamics of marketing and to know about latest trends in marketing.

#### Course Outcomes(CO):

The learners will able to:

1. Classify the various marketing activities and to summarize consumer behavior and decision making process.
2. Evaluate the strategies used by the marketers to sustain a product for longer period.
3. Familiarize the factors influencing pricing decisions.
4. Acquire knowledge on various promotional mix used by marketers to promote goods and services.
5. Understand the various methods of channels of distribution and familiarize with latest Technologies.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	H	H	H	H
2	H	H	H	H	H	M
3	H	H	H	H	H	M
4	H	H	H	H	H	M
5	H	H	H	H	H	M

(Low – L, Medium – M, High – H)

#### COs consistency with PSOs

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
1	H	M	L	L	M	H
2	H	H	M	H	H	H
3	H	M	M	M	M	H
4	H	M	M	M	H	H
5	M	M	M	H	H	H

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction**

**(15 Hours)**

- 1.1 Market, Meaning, Types, Marketing, Meaning, Definition (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Functions of Marketing, Role and Importance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.3 Marketing Mix, Classification of Goods (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Market Segmentation (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Consumer Behaviour, Meaning and Importance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Services Marketing, Difference between Product and Service, 7Ps of Service Marketing (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Product Mix**

**(15 Hours)**

- 2.1 Product, Meaning, Importance and Features (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 New Product Planning and Development, Types (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.3 Product Mix, Product Life Cycle (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.4 Branding, Brand Loyalty and Equity (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Copyrights, Trademarks and Patents (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Packing. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Price Mix**

**(15 Hours)**

- 3.1 Pricing, Meaning, Definitions, Objectives (K<sub>1</sub>, K<sub>2</sub>, K<sub>4</sub>)
- 3.2 Types of Pricing (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.3 Methods of Pricing (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4 Pricing Strategies (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.5 Factors affecting pricing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6 Pricing in Product Life Cycle. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Promotion Mix**

**(15 Hours)**

- 4.1 Promotion, Meaning, Need (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Promotion Mix, Meaning (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.3 Types of promotional mixes (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.4 Promotional mixes, strategies, Forms (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5 Advantages, Limitations (K<sub>1</sub>, K<sub>2</sub>)
- 4.6 Promotions in Product Life Cycle. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Channels of distribution and Electronic Marketing**

**(15 Hours)**

- 5.1 Channels of Distribution I, Meaning, Definition, Types (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Market consideration, Logistic Management. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Channels of Distribution II, Middlemen in Distribution, Agent Middlemen and Merchant Middlemen (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Wholesalers and Retailers, Recent Trends in Marketing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Tele-Marketing, Relationship Marketing, Word of Mouth Marketing, Test Marketing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 E-Marketing, Meaning, Types, Participants in E-Marketing, Crisis Marketing Techniques during the Pandemic period (K<sub>1</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Text Books:**

1. Pillai R.S.N. and Bagavathi V. – Modern Marketing – S. Chand and Co. Ltd., New Delhi, 2015
2. Natatrajan L. – Marketing – Margham Publications, Chennai. (latest Edition)

**Reference Books:**

1. Philip Kotler and Gary Armstrong –Principles of Marketing – Pearson Education India, New Delhi,2015
2. Gupta C.B. and Rajan Nair N. – Marketing Management Text and Cases – Sultan Chand and Sons, New Delhi,2018
3. Kavitha Sharma and Dr. Swathi Agarwal, Principles of Marketing, Taxmann Publication, New Delhi,2018
4. Govindarajan M. Marketing Management, Concepts, Cases, Challenges and Trends, Prentice Hall India Learning Private Ltd., New Delhi, Reprint2012
5. Jayachandran S. – Marketing Management – SAI Book House, Hyderabad, Edition2018

**Web Resources:**

1. Content Marketing Institute
2. Marketing Profs
3. American Marketing Association
4. eMarketer
5. Direct Marketing News
6. <https://www.sitepoint.com>
7. <http://www.ethinos.com>

## SEMESTER IV

### USCOC420 - Skill Based Elective -ENTREPRENEURIAL DEVELOPMENT

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of. Hours	Credits	Marks
II/IV	USCOC420	Entrepreneurial Development	Theory	Skill Based Elective	2	2	40+60

#### Course Objectives:

1. To understand about entrepreneurship and its functioning.
2. To know the financial institutions funding entrepreneurs.
3. To generate business ideas and its scope of implementation.
4. To understand the role of Government in developing entrepreneurship.
5. To realize the impact of entrepreneurs in economic growth.

#### Course Outcomes (CO):

1. Students understand the basic concepts of entrepreneurship and its functioning.
2. Students were able to select the best financial institutions for business as per the needs.
3. Students generated best innovative business ideas.
4. Students bridged the gap between Government and entrepreneurs.
5. Students made an impact on the development of economy.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	M	M	M	M	M	H
2	M	H	M	H	H	M
3	M	M	H	M	H	M
4	H	M	M	M	M	M
5	M	M	M	M	H	M

(Low – L, Medium – M, High – H)

#### COs Consistency with PSOs

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	M	H	M	H
2	M	H	M	H	H	H
3	M	M	H	M	H	H
4	H	M	M	H	M	H
5	M	H	H	M	H	H

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Concepts of Entrepreneurship**

**(6 Hours)**

- 1.1 Meaning and definition of entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.2 Types of entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.3 Qualities of entrepreneurs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Classifications of entrepreneurs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Factors influencing entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Functions of entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Industrial Finance to Entrepreneurs**

**(6 Hours)**

- 2.1 Introduction to SFC's (State Finance Corporation) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Explanation about SIDC'S (Small industries development corporation Limited) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.3 Introduction and brief achievements in SIPCOT (State Industries promotion corporation of Tamil Nadu) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.4 Introduction to DIC'S (District Industries centre) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Explanation to Commercial Banks measures and achievement (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Introduction to Small Industrial Development Banks of India (SIDBI) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Project Management**

**(6 Hours)**

- 3.1 Introduction to Business Ideas (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Business Generation techniques (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.3 Identification of Business opportunities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4 Checking feasibility for the study (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.5 Analysis of the project Report (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6 Project life cycle and classification (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Entrepreneurial Development Programme**

**(6 Hours)**

- 4.1 Introduction to EDP (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Role Relevance of EDP (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.3 Achievements in the sector (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.4 Role of the government (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5 Organising programmes towards the development (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.6 Benefits to Rural Entrepreneur (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Entrepreneurial Growth**

**(6 Hours)**

- 5.1 Introduction to economic development and Growth(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.2 Role of Entrepreneur and their growth (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Small scale entrepreneurs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Women and Entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Challenges faced by women entrepreneurs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Innovation process and Development of entrepreneurial skills during Pandemic period (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

#### **Text Books:**

Entrepreneurial Development Dr.Radha , Prasana & Co Triplicane Chennai

#### **Reference Books:**

1. Entrepreneurial Development Renu Arora S .K Sood.

2. Entrepreneurial Development S.S.Khanka S chand&company Ltd New Delhi
3. Entrepreneurship CA (Dr.) Abha Matuhr University of Delhi
4. Innovation and Entrepreneurship Peter F. Drucker
5. Entrepreneurship Development and Management in extension M. Priyadharshini S. Janani  
T.N.Sujatha et.al.,

**Web Resources:**

1. <https://balancesmb.go>
2. <https://www.freebookcentre.net>
3. The secrets of successful entrepreneurship (audio book) – Stephen Hawley [www.audible.in](http://www.audible.in)
4. <https://www.inc.com>
5. <https://www.pdfdrive.com>entrepreneur>

## SEMESTER V

### UCCOL20 - CORPORATE ACCOUNTING I

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
III/V	UCCOL20	Corporate Accounting I	Theory	Core	6	5	40+60

#### Course Objective

- 1.To teach the basic Accounting Concepts and Practices of Companies
- 2.It Provide the Knowledge of Issue of Share and Issued of Debentures etc
- 3.This Subject Describes the Pattern of final accounts of the company
4. This subject also provides the knowledge of amalgamation, absorption and external reconstruction
- 5.It also helps students to give practical knowledge of accounts

#### Course Outcomes (CO)

The learners will be able to:

- 1.Gain knowledge on the procedure of issue of shares and redemption of shares.
- 2.Understand the meaning and formalities of issues of debentures and underwriting of shares and debentures
- 3.Become proficient in preparing company final account as per the rules of Company Act
- 4.Know about the importance of Profit Prior to incorporation and their allocation.
- 5.Calculate Purchase consideration during the event of amalgamation, absorption and external reconstruction

#### CO's consistency with PO'S

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

#### CO's consistency with PSO'S

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I : Issue and Redemption of Shares (15 Hours)**

- 1.1 Meaning and definition of Share (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Meaning of Joint Stock Company (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Difference between a Private limited Company and Public Limited Company (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4 Issue of shares and Redemption of Preference Shares (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Forfeiture and Reissue of Shares (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.6 Alternative method of Recording Share Premium (K<sub>1</sub>, K<sub>2</sub>)

### **UnitII: Issue and Redemption of Debentures (15 Hours)**

- 2.1 Meaning, issue of Debentures and Redemption of Debentures (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Difference between Debentures and Shares(K<sub>1</sub>, K<sub>2</sub>)
- 2.3 Consideration for Issue of Debentures (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Terms relating to Issue Price and Conditions of Redemption of Debentures (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Payment of the Underwriting Commission (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Marked and Unmarked firm - Under writing Application (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Final Accounts of Companies (15 Hours)**

- 3.1 Meaning of Final Accounts of Company (K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Form of Statement of Profit and loss Account (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Advance tax, income tax, and tax deducted at sources (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Contents of Balance Sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Reserves and Surplus (K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Profits Prior to Incorporation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **UnitIV: Amalgamation, Absorption and External Reconstruction (15 Hours)**

- 4.1 Meaning of Amalgamation, Absorption and External Reconstruction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Accounting problems relating to Amalgamation and Absorption (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Calculation of purchase Consideration (K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Inter Company Holding (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Accounting Treatment for Amalgamation and Absorption (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Preparation of entries for Amalgamation cum Absorption (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **UnitV: Internal Reconstruction (15 Hours)**

- 5.1 Meaning of Alteration of Share Capital (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Schemes of Reconstruction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Steps for Reconstruction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Different kinds of Alteration of Share Capital and the necessary Accounting entries (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Internal Reconstruction or Capital Reduction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Procedure for Reduction of Share Capital (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Text Books:**

1. Reddy T.S. & Murthy A. – Corporate Accounting – Margham Publications, Chennai, 2016.

### **Reference Books:**

1. Jain S.P. and Narang K. L. – Advanced Accounts – Vol II – Kalyani Publishers, New Delhi, 2018
2. Gupta R.L. and Radhasamy M. – Advanced Accounts – Vol II – S. Chand & Sons., New

Delhi, 2017

3. Dr.Maheswari S.N. – Corporate Accounting – Vikas Publishing House, New Delhi, 2017
4. Shukla M.C. and Grewal T. S. – Advanced Accounts – Vol II - S. Chand & Sons., New Delhi, 2019
5. Dr.Arulanandam M.A. & Raman K.S – Advanced Accountancy – Himalaya Publishing House, Revised Edition 2015

**Web Resources:**

1. MIT open course ware (<https://ocw.mit.edu/courses/sloan>)
2. Khan academy
3. Accounting student network
4. Miss CPA
5. Accounting.com
6. Account coach
7. Accounting world

**SEMESTER V**  
**UCCOM20 - MANAGEMENT ACCOUNTING I**

Year/ Semester III/V	Course Code UCCOM20	Title of the course Management Accounting I	Course type Theory	Course category Core	No. of Hours 6	Credits 5	Marks 40+60

**Course Objectives**

- 1.To enhance the abilities of learners to develop the concept of management accounting and its significance in the business.
- 2.To improve the abilities of learners to analyze the financial statement.
- 3.To impart knowledge on management accounting system to the students and to teach the analytical tools applied in companies.
- 4.To provide adequate knowledge on cash flow analysis.
- 5.To Prepare a budget and budgetary control an understanding of the relationship.

**Course Outcomes (CO)**

The learners will be able to

- 1.Understand the importance of management accounting and the installation of management accounting system
- 2.Analyze various financial statements and application of various ratio's
- 3.Interpret inflow and outflow of funds in computation of fund flow statement
- 4.Report on cash flow analysis.
- 5.Prepare different budgets.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus:**

### **Unit 1: Introduction (15 Hours)**

- 1.1 Meaning and definition of Management Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Nature and scope of Management Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.3 Objectives and Function of Management Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Relationship between financial, Cost and Management Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.5 Installation of Management Accounting system (K<sub>1</sub>, K<sub>2</sub>)
- 1.6 Duties of Management Accounting (K<sub>1</sub>,K<sub>2</sub>)

### **Unit II: Analysis of Financial Statements (15 Hours)**

- 2.1 Meaning and Analysis of Financial Statements (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Comparative and Common Size Financial Statement (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Procedure for Financial Interpretation (K<sub>2</sub>,K<sub>3</sub>, K<sub>4</sub>)
- 2.4 Analysis of Techniques or Tools of Financial Statement Analysis (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Calculation of Trend Percentages and Ratio Analysis (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Calculation of Profitability, Solvency and Turnover Ratio (including reconstruction of Profit and Loss Account and Balance Sheet) (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)

### **Unit III: Fund Flow Statement (15 Hours)**

- 3.1 Meaning and definition of Fund Flow Statement (K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Meaning of Working Capital (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Preparation of Statement showing changes in Working Capital (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Calculation of Funds From Operation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Calculation of Fund Flow Statement (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 External sources and Applications of Funds (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit VI: Cash Flow Analysis (15 Hours)**

- 4.1 Meaning and importance of Cash Flow Statements (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Difference between Fund Flow Analysis and Cash Flow Analysis (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.3 Preparation of Cash Flow Statement (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.4 Calculation of Cash From Operations (K<sub>2</sub>, K<sub>3</sub>)
- 4.5 External sources and Application of Cash (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Statement of Cash from Operation and Cash Flow Statements (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Budgets – Budgetary Control (15 Hours)**

- 5.1 Meaning and Definition of Budgeting and Budgetary Control (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Advantages and limitation of Budgetary Control (K<sub>1</sub>, K<sub>2</sub>)
- 5.3 Essentials of a successful Budgetary Control system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Organization for installation of Budgetary Control system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Classification of Budget and Functional Budgets, Sales Budgets, Production Budget , Material Budget, Overheads, Budget, Cash Budget, Master Budget (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Fixed and Flexible Budget and performance budgeting (theory) K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

## **Text Books:**

Reddy T.S. and Hari Prasad Reddy Y. – Management Accounting – Margham Publications, Chennai

## **Reference Books:**

1. Khan M.Y. and Jain S.P. – Management Accounting – Tata McGraw Hill, New

Delhi, 6<sup>th</sup> Edition, 2017

2. Pillai R.S. N. and Bhagavathi V. – Management Accounting – S. Chand, New Delhi, 4<sup>th</sup> Edition, 2017
3. Dr. Murthy A. and Dr. Guruswamy S. – Management Accounting – Margham Publications, Chennai, Edition 2009.
4. Manmohan S.P. and Goyal P. S. – Principles of Management Accounting – S. Chand & Co., Delhi, Revised Edition 2019.
5. Sekhar R.C. and Rajagopalan A.V. – Management Accounting – Oxford University Press Chennai, Edition 2019

**Web Resources:**

1. Journal of Accountancy
2. Khan Academy
3. Accounting Student Network
4. The Blunt Counter
5. Insightful Accountant
6. Account Coach
7. Accounting Today
8. 360 Degrees of Financial Literacy
9. Accounting & Business Magazines

**SEMESTER V**  
**UCCON20 - INCOME TAX LAW AND PRACTICE I**

<b>Year/ Semester</b>	<b>Course Code</b>	<b>Title of the course</b>	<b>Course type</b>	<b>Course category</b>	<b>No. of Hours</b>	<b>Credits</b>	<b>Marks</b>
III/V	UCCON20	Income Tax Law and Practice I	Theory	Core	6	5	40+60

**Course Objectives:**

1. To enable the students learn the basic concepts of Income Tax.
2. To analyse the provisions relating to Income from Salaries.
3. To impart the learners the need for Computation of Income from House Property.
4. To examine the provisions relating to Income from Business or Profession.
5. To familiarize with the powers and duties of Income Tax Authorities and the Assessment Procedure.

**Course Outcomes(CO):**

1. Students gained knowledge on the basic concepts of Income Tax.
2. Students became familiar with the provisions relating to Income from Salaries.
3. Students learnt to compute taxable Income from House Property.
4. Students became competent in computing Income from Business or Profession.
5. Students were familiarized with the powers and duties of different income tax authorities and their assessment procedure.

**CO's consistency with PO'S**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	M
<b>3</b>	H	H	M	H	M	M
<b>4</b>	M	H	H	M	H	M
<b>5</b>	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

<b>CO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	H
<b>3</b>	H	H	M	H	M	H
<b>4</b>	M	H	H	M	H	H
<b>5</b>	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Introduction**

**(15 Hours)**

- 1.1 Brief history of Income Tax in India (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Important Definitions (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Residential Status of different persons (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4 Incidence and Scope of Tax Liability (only theory) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Incomes exempt from tax (Theory) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Incomes exempt from tax and its practical applications (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit II: Income from Salaries**

**(15 Hours)**

- 2.1 Meaning and Definition of Salary (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Allowances and its types (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Perquisites and its treatment (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Profits in lieu of salary, superannuation fund Types of Provident fund (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Deductions from Gross Salary (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Computation of Taxable Salary (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Income from House Property**

**(15 Hours)**

- 3.1 Meaning and Definition of Annual Value (K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Exemptions regarding Income from House Property (K<sub>1</sub>, K<sub>2</sub>)
- 3.3 Determination of Actual Rent (K<sub>1</sub>, K<sub>2</sub>)
- 3.4 Computation of Annual Value of a house under situations (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Deductions from Annual Value and Interest on loan (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Computation of Income from House Property (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Profits and Gains of Business or Profession**

**(15 Hours)**

- 4.1 Meaning and conditions for allowance for Depreciation (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Additional Depreciation, Written Down Value Rates of Depreciation, Investment Allowance and unabsorbed depreciation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Computation of Depreciation Allowance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Meaning of Business and Profession, Expenses expressly allowed and Disallowed (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Computation of Business (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.6 Computation of Profession (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Income Tax authorities and Assessment Procedure**

**(15 Hours)**

- 5.1 Income Tax authorities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2 Powers of Income Tax authorities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Procedure for Assessment (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Types of Assessment (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Permanent Account Number (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Provisions relating to Quoting of Aadhar (K<sub>1</sub>, K<sub>2</sub>)

### **Text Books:**

Dr. Mehrotra H.C. – Income Tax Law & Practice - Sahitya Bhawan Publications, Agra, (Relevant Edition)

### **Reference Books**

1. Vinod. K. Singhanian – Students Guide to Income Tax – Tax man Publications Pvt. Ltd., New Delhi (Relevant Edition)
2. Gaur V.P. and Narang D.B. – Income Tax – Kalyani Publishers, New Delhi (Relevant Edition)

Edition)

3. Reddy T.S. and Hari Prasad Reddy Y. – Income Tax – Margham Publications, Chennai (Relevant Edition)
4. Hariharan N. – Income Tax Law and Practice – McGrawHill, New Delhi, Reprint(Relevant Edition)

**Web Resources:**

1. IRS.gov
2. E-file Colorado taxes with Revenue Online
3. DABC Free Tax Supersites
4. AARP Tax-Aide
5. Federal: [www.irs.gov](http://www.irs.gov)
6. Missouri:  
[www.dor.mo.gov/forms/Other](http://www.dor.mo.gov/forms/Other) States:
7. [www.taxadmin.org/state-tax-forms](http://www.taxadmin.org/state-tax-forms)
8. Affordable Care Act(ACA)  
Tax Provisions – IRS
9. <https://books.google.co.in>
10. <https://www.incometaxindia.gov.in>
11. <https://www.incometaxindiaefiling.gov.in>
12. <https://www.denverlibrary.org>

**SEMESTER V / VI**  
**UECOC520 / UECOC620– Banking: Law and Practice**

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
III/V/VI	UECOC520/ UECOC620	Banking : Law and Practice	Theory	Elective II A	6	5	40+60

**Course Objectives:**

- 1.To make the students understand the current law and practice in banking.
- 2.To update the regulations and technological implementation in modern scenario.
- 3.To upgrade the students regarding the service provided by the banks in view of customer relations.
- 4.To teach the learners new emerging dimensions in banking system including e – banking.
- 5.To make them understand the core concept of banking as a financial intermediation service provider.

**Course Outcomes(CO):**

Upon the successful completion of this course the students will be able to:

1. Gain versatile knowledge on features, functions of banking. Operate various accounts as Per KYC norms.
2. Discern knowledge on the relationships between banker and customer. Analyze the concept of money laundering.
3. Gain in-depth knowledge on negotiable instruments and rights and duties of paying and Collecting banker
4. Impart knowledge on various types of loans & advances. Modes of charging securities. analyze the mechanism of customer grievance
5. Execute and apply the modern technologies for making payments and other technological services.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **UnitI: Opening and Operating of Account (15 Hours)**

- 1.1. Definition, (Banking, Business of banking, Customers), other business permitted. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.2. Types of deposit accounts, Features, Joint Account, Operation Style. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.3. Procedure for opening a bank account, letter of Introduction, Risk in opening Account without proper introduction. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4. Pay-in-slip, Printed Cheque book, advantages, Pass book, Wrong entry and legal effects, Insurance of Bank deposits, Inoperative accounts, Closing of Accounts and Nominations & its legal status. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5. Special types of Customers including Senior citizens Account. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6. KYC, RBI Guidelines, Unique Customer Identification Code. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **UnitII:Banker and Customer Relationship (15 Hours)**

- 2.1. Banker customer relationship – Meaning, Types of Relationship. ( K<sub>1</sub>, K<sub>2</sub>)
- 2.2. General relationship – Principle and agent, Trustee and beneficiary, Bailor and Bailee. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3. Debtor – Creditor relationship, Banker as a Privileged Debtor. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4. Special relationship – Rights of a Banker. (K<sub>2</sub>, K<sub>3</sub>)
- 2.5. Obligations of a banker. (K<sub>2</sub>,K<sub>3</sub>)
- 2.6. Money Laundering, RBI Guidelines for Anti money Laundering. (K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Negotiable Instruments, Paying & Collecting Banker (15 Hours)**

- 3.1. Meaning, Difference between Negotiability and Transferability, definition of Negotiable instruments. ( K<sub>1</sub>, K<sub>2</sub>)
- 3.2. Types of Negotiable instruments, Definitions and Characteristic features. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3. Crossing of cheque, features, Types of crossing. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4. Endorsement of a cheque, Features, Types, Regularity of endorsement. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.5. Paying banker- Duties and Liabilities, Payment in due course, suitable replies for dishonour. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6. Collecting banker – Duties and Liabilities, Material and non material alteration, Forgery and consequences. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Loans and Advances (15 Hours)**

- 4.1. Meaning of loans and advances, importance. ( K<sub>1</sub>, K<sub>2</sub>)
- 4.2. Principles of sound Lending, Sources (infra structure bonds). ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3. Types and Styles of securities. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4. Different modes of creating charges.( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5. Factors affecting the level of advances. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6. Customer Grievance, Redressal and Ombudsman. ( K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Electronic Banking (15 Hours)**

- 5.1. Meaning, Core banking solutions, Traditional banking Vs Internet banking, drawbacks and issues. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2. Mobile banking, Meaning, Features, Telephone banking, features, ATM, features. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3. Electronic Fund transfer, NEFT, RTGS, features, Difference between NEFT & RTGS. ( K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

- 5.4. Electronic Clearing System – Debit, Credit, Operations and benefits. ( K<sub>2</sub>, K<sub>3</sub>)
- 5.5. Electronic Payment System – meaning, features and process. ( K<sub>2</sub>, K<sub>3</sub>)
- 5.6. Electronic Payment methods, (Digital cheques, e-cash, e- cards, SWIFT, Plastic cards, UPL payments, etc. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

1. Kandasami K.P. Natarajan S., Parameswaran R. – Banking – S. Chand & Co. Ltd., New Delhi. (Latest Edition)
2. Dr. Guruswamy S. – Banking Theory, Law and practice – Vijay Nicole Imprints Pvt. Ltd., (Latest Edition).
3. Natarajan S. and Parameswaran R. – Indian Banking – S. Chand & Co. Ltd., New Delhi (latest Edition)
4. Vasudevan S.V – Theory of Banking - S. Chand & Co. Ltd., New Delhi. (Latest Edition)
5. Sundharam and Varshney – Banking Law & practice - S. Chand & Co. Ltd., New Delhi. (Latest Edition)
6. Gopinath M.N. - Banking Principles & Operations – Snow White Publishers (Latest Edition)
7. Indian Institute of Banking and Finance - Anti money Laundering & KYC – Macmillan Publishers, (Latest Edition)

**Web Resources:**

1. Books.google.co.in
2. iiblp.org – institute of international banking law & Practice. Khan Academy.
3. En.m.wikipedia.org
4. [www.freebookcentre.net](http://www.freebookcentre.net)
5. Bookauthority.org
6. Ebooks.ipude.in
7. [www.alphainvesco.com](http://www.alphainvesco.com)
8. rbidocs.rbi.org.in
9. [www.ibef.org](http://www.ibef.org)
10. M.economicstimes.com

**SEMESTER VI**  
**UCCOO20 - CORPORATE ACCOUNTING II**

<b>Year/ Semester</b> III/VI	<b>Course Code</b> UCCOP20	<b>Title of the course</b> Corporate  Accounting  II	<b>Course type</b> Theory	<b>Course category</b> Core	<b>No. of. Hours</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
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**Course Objectives**

- 1.To provide in depth knowledge on various Accounting valuation of goodwill and shares
- 2.It also describes the process of liquidation which in included in the company accounts
- 3.It include account of holding company and consolidation of balance sheet
- 4.It also helps students to give practical knowledge of general insurance company
5. This subject also differentiate accounts of banking company

**Course Outcomes(CO)**

The learners will be able to:

- 1.Value Goodwill and shares of Company through different methods.
- 2.Prepare the statement of affairs and Liquidators final statement of Accounts
- 3.Get a comprehensive knowledge about the latest provisions of companies Act relating to consolidation of Holding and Subsidiary Company
- 4.Gain expertise knowledge in the preparation of final accounts of General Insurance Companies as per the revised AS of IRDA.
- 5.Prepare Profit & Loss and final Accounts of Banking Companies as per the Guidelines of RBI

**CO's consistency with PO'S**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	M
<b>3</b>	H	H	M	H	M	M
<b>4</b>	M	H	H	M	H	M
<b>5</b>	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

<b>CO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	H
<b>3</b>	H	H	M	H	M	H
<b>4</b>	M	H	H	M	H	H
<b>5</b>	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Valuation of Goodwill and Shares (15 Hours)**

- 1.1 Meaning of Valuation of Goodwill (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Factors determining the Valuation of Goodwill (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Methods of Valuation of Shares (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Factors Affecting of Goodwill(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Profitability Normal Rate of Return (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Average capital Employed and Methods of Valuation of Goodwill (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit II: Liquidation of Companies (15 Hours)**

- 2.1 Liquidation of Companies (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Contributory Statement Preparation (K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Preferential Payments (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Statement of Affairs and Deficiency of Accounts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Liquidator's Final Statement of Accounts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Fully paid Equity Shareholders (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Accounts of Holding Company (15 Hours)**

- 3.1 Accounts of Holding Companies (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Consolidation of Balance Sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.3 Minority Interest (K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Pre-acquisition or Capital Profits (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.5 Cost of Control or Goodwill (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6 Requirement relating to Presentation of Accounts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Accounts of General Insurance Company (15 Hours)**

- 4.1 Accounts of General Insurance Company (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Definition of General Insurance Business (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Commission and Reinsurance Premium (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Commission on Reinsurance Accepted (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Commission on Reinsurance ceded Reserve for Unexpired Risks (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Preparation of financial statements as per IRDA Regulations (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Accounts of General Insurance Company (15 Hours)**

- 5.1 Accounts of Banking Companies (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Regulation of Banking Companies (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Management Capital and Reserve (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Final Accounts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Business of Banking Companies and its legal Requirement (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Preparation of Profit and loss Account and Balance Sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Text Books:**

1. Reddy T.S. & Murthy A. – Corporate Accounting – Margham Publications, Chennai, 2016.

### **Reference Books:**

1. Jain S.P. and Narang K. L. – Advanced Accounts – Vol II – Kalyani Publishers, New Delhi, 2018

2. Gupta R.L. and Radhasamy M. – Advanced Accounts – Vol II – S. Chand & Sons., New Delhi, 2017
3. Dr.Maheswari S.N. – Corporate Accounting – Vikas Publishing House, New Delhi, 2017
4. Shukla M.C. and Grewal T. S. – Advanced Accounts – Vol II - S. Chand & Sons., New Delhi, 2019
5. Dr.Arulanandam M.A. & Raman K.S – Advanced Accountancy – Himalaya Publishing House, Revised Edition 2015

**Web Resources:**

1. MIT open course ware (<https://ocw.mit.edu/courses/sloan>)
2. Khan academy
3. accounting student network
4. miss CPA
5. accounting.com
6. account coach
7. accounting world

**SEMESTER VI**  
**UCCOP20 - MANAGEMENT ACCOUNTING II**

<b>Year/ Semester</b> III/VI	<b>Course Code</b> UCCOP20	<b>Title of the course</b> Management  Accounting II	<b>Course type</b> Theory	<b>Course category</b> Core	<b>No. of. Hours</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
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**Course Objectives**

1. To acquire the basic concepts and processes used to determine the marginal costing
2. To impart practical applications of marginal costing
3. To help the students understand the standard costing and variance analysis
4. To enable the students to learn various methods of capital budgeting
5. To analyse the simple theories, cases of responsibility accounting and zero based budgeting

**Course Outcomes(CO)**

The learners will be able to:

1. Understand Various Elements of Marginal Costing and Break Even Analysis.
2. Get Familiar with different Managerial Decision Making Techniques and its Practical Applicability
3. Apply norms of Variances Relating to Cost
4. Compute Capital Budgeting under different Methods
5. Know the importance of Responsibility Accounting and Zero Based Budgeting

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Marginal Costing**

**(15 Hours)**

- 1.1 Meaning and definition of Marginal Costing (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Marginal costing and Absorption Costing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Cost Volume Profit Analysis (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Fixed cost and Variable cost (Important terms) ( K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Contribution to Sales (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.6 Calculation of Break - Even Analysis (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Practical Applications of Marginal Costing**

**(15 Hours)**

- 2.1 Practical Applications of Marginal Costing for Managerial Decision Making (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Key Factors in Make or Buy Decision (K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Idle facilities and Plant Mergers (K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Product Mix or Sales Mix (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Export decision - Product Elimination Decision (K<sub>1</sub>, K<sub>2</sub>)
- 2.6 Plant or Equipment Purchase Decision (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Standard costing and Variance Analysis**

**(15 Hours)**

- 3.1 Meaning of Standard Costing and Variance Analysis (K<sub>1</sub>, K<sub>2</sub>, K<sub>4</sub>)
- 3.2 Advantages and Limitations of Standard Costing and Variance Analysis (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.3 Computation of Variances Relating to Materials (K<sub>1</sub>, K<sub>2</sub>)
- 3.4 Labour, Overheads and Sales based on Sales Value (Simple problems) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Standard Costs and Estimated Costs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Applicability of Standard Cost (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Capital Budgeting**

**(15 Hours)**

- 4.1 Meaning and definition of Capital Budgeting (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Difference between Traditional Methods and Non Traditional Methods (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Pay back accounting Rate of Return (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Profitability Index and Internal Rate of Return (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Discounted Cash Flow Method (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 N.P.V and I.R.R Method (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Responsibility Accounting and Zero Base Budgeting**

**(15 Hours)**

- 5.1 Meaning of Responsibility accounting and Zero Base Budgeting (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2 Essentials of Responsibility accounting (K<sub>1</sub>, K<sub>2</sub>)
- 5.3 Responsibility Centres (K<sub>1</sub>, K<sub>2</sub>)
- 5.4 Advantages and Limitations of Responsibility Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 5.5 Cost centre and Profit centre (K<sub>1</sub>, K<sub>2</sub>)
- 5.6 Zero Base budgeting and process (K<sub>1</sub>, K<sub>2</sub>)

**Text Books:**

Reddy T.S. and Hari Prasad Reddy Y. – Management Accounting – Margham Publications, Chennai

**Reference Books:**

1. Khan M.Y. and Jain S.P. – Management Accounting – Tata McGraw Hill, New Delhi, 6<sup>th</sup> Edition, 2017
2. Pillai R.S. N. and Bhagavathi V. – Management Accounting – S. Chand, New Delhi, 4<sup>th</sup> Edition, 2017
3. Dr. Murthy A. and Dr. Guruswamy S. – Management Accounting – Margham Publications, Chennai, Edition 2009.
4. Manmohan S.P. and Goyal P. S. – Principles of Management Accounting – S. Chand & Co., Delhi, Revised Edition 2019.
5. Sekhar R.C. and Rajagopalan A.V. – Management Accounting – Oxford University Press Chennai, Edition 2019

**Web Resources:**

1. journal of Accountancy
2. Khan Academy
3. Accounting Student Network
4. The Blunt Counter
5. Insightful Accountant
6. Account Coach
7. Accounting Today
8. 360 Degrees of Financial Literacy
9. Accounting & Business Magazines

**SEMESTER VI**  
**UCCOQ20 - INCOME TAX LAW AND PRACTICE II**

<b>Year/ Semester</b> III/VI	<b>Course Code</b> UCCOQ20	<b>Title of the course</b> Income Tax Law and Practice II	<b>Course type</b> Theory	<b>Course category</b> Core	<b>No. of Hours</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
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**Course Objectives:**

1. To enable the students determine the Provisions relating to Computation of Income from Capital Gains.
2. To impart the learners the skill of calculating the Income from Other Sources.
3. To familiarize with the different provisions relating to Set-off and carry forward of losses.
4. To make the students learn the importance of Computation of Total Income and Tax Liability of Individuals.
5. To gain practical knowledge on Filing of Returns of Income.

**Course Outcomes(CO):**

1. Students learnt to determine the Income from Capital Gains.
2. Students acquired the skill in calculating the Income from Other Sources.
3. Students were well versed in ascertaining the provisions relating to Clubbing of Incomes and set off and carry forward of losses.
4. Students were able to assess the total income and tax liability of individual assesseees.
5. Students gained practical knowledge on filing of returns of income.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Income from Capital Gains**

**(15 Hours)**

- 1.1 Meaning of Capital assets, its exceptions and Self generated assets(K<sub>1</sub>,K<sub>2</sub>)
- 1.2 Kinds of capital assets – Short term and Long term assets(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.3 Cost of acquisition and cost of improvement under different circumstances(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.4 Computation of short term and long term gains(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.5 Capital Gains exempt from tax(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.6 Computation of capital gains including exemptions (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

### **Unit II: Income from Other Sources**

**(15 Hours)**

- 2.1 Incomes chargeable under from Other Sources (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Meaning of dividend and taxation of dividend (K<sub>1</sub>, K<sub>2</sub>)
- 2.3 Taxation of casual incomes (K<sub>1</sub>, K<sub>2</sub>)
- 2.4 Interest on securities and kinds of securities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Deductions allowable from Income from other Sources. (K<sub>1</sub>, K<sub>2</sub>)
- 2.6 Computation of Income from Other Source (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Set off and Carry forward of losses**

**(15 Hours)**

- 3.1 Meaning of clubbing of incomes and deemed incomes(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>).
- 3.2 Income of Other Persons included in the Assessee's Total Income(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>).
- 3.3 Aggregation of incomes(K<sub>1</sub>, K<sub>2</sub>).
- 3.4 Provisions governing the set-off of losses(K<sub>1</sub>, K<sub>2</sub>).
- 3.5 Provisions regarding the carry forward and set off of losses(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>).
- 3.6 Computation of Gross Total Income(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Assessment of Individuals**

**(15 Hours)**

- 4.1 Deductions in respect of certain payments (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Deductions in respect of certain incomes. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Computation of Deductions eligible under Sec 80C to 80U (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Computation of Total Income (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5 Rates of Income Tax in case of Individuals (K<sub>1</sub>, K<sub>2</sub>)
- 4.6 Computation of Tax Liability of Individuals(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Preparation of Filing of Returns and Payment of Tax**

**(15 Hours)**

- 5.1 Preparation and Filing of Returns – E- Filing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.2 Deduction and Collection of Tax at Source (TDS) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Advance Payment of Tax (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Recovery of Tax (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Refund of Tax (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Appeals and Revision (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

Dr. Mehrotra H.C. and Goyal S.P – Income Tax Law & Practice - Sahitya Bhawan Publications, Agra, (Relevant Edition)

**Reference Books**

1. Vinod. K. Singhania – Students Guide to Income Tax – Tax man Publications Pvt. Ltd., New Delhi (Relevant Edition)
2. Gaur V.P. and Narang D.B. – Income Tax – Kalyani Publishers, New Delhi (Relevant Edition)
3. Reddy T.S. and Hari Prasad Reddy Y. – Income Tax – Margham Publications, Chennai (Relevant Edition)
4. Hariharan N. – Income Tax Law and Practice – McGrawHill, New Delhi, Reprint(Relevant Edition)

**Web Resources:**

1. IRS.gov
2. E-file Colorado taxes with Revenue Online
3. DABC Free Tax Supersites
4. AARP Tax-Aide
5. Federal: [www.irs.gov](http://www.irs.gov)
6. Missouri:  
[www.dor.mo.gov/forms/Other](http://www.dor.mo.gov/forms/Other) States:
7. [www.taxadmin.org/state-tax-forms](http://www.taxadmin.org/state-tax-forms)
8. Affordable Care Act(ACA)  
Tax Provisions – IRS
9. <https://books.google.co.in>
10. <https://www.incometaxindia.gov.in>
11. <https://www.incometaxindiaefiling.gov.in>
12. <https://www.denverlibrary.org>

**SEMESTER V / VI**  
**UECOD520/UECOD620 - ELECTIVE: ELECTRONIC COMMERCE AND TALLY**

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
III/V/VI	UECOD520/ UECOD620	Electronic Commerce and Tally	Theory	Elective III:A	4	3	40+60

**Course Objectives:**

1. To impart the knowledge about various concepts of e-commerce.
2. To enable the awareness through the usage of internet technologies.
3. To execute the different models of OSI
4. To evaluate the various knowledge about payment methods.
5. To criticize the features of tally & practical consideration of it.

**Course Outcomes (CO):**

The Learners will be able to:

1. To know the various concepts of e-commerce.
2. Awareness gained on the aspects of e-commerce, the usage of internet technologies
3. Executing different security, OSI models
4. Imbibe knowledge on various payment models and its application
5. In depth knowledge on Tally hands on training to create a company and preparation of final accounts.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Introduction to E-Commerce**

**(12 Hours)**

- 1.1 E-Commerce Meaning and Definition (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.2 Concept of Electronic Commerce (K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Nature, Scope ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4 Impact, challenges and limitations of E-Commerce (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Advantages of E-Commerce & Disadvantages (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Encryption and Decryption (K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Aspects of E-Commerce**

**(12 Hours)**

- 2.1 Evolution of E-Commerce (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Major categories of E-Commerce ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Advertising and Marketing through internet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.4 Internet Advertising and models (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Banner Advertisements (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Sponsoring content and push based advertising (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Security in E-Commerce**

**(12 Hours)**

- 3.1 Firewall and Securities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.2 OSI Models (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Network security and Firewalls (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4 Firewall & Protocols Types of Protocols (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Data and Message Security (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Security tools (Digital Signature and Digital Certificate) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: E-Commerce payment modes**

**(12 Hours)**

- 4.1 E-Payment Systems Introduction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Online payment & Prepaid and Post paid payment system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Types of Electronic Payment System (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.4 Security issues on Electronic payment system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5 Net Banking & Mobile Commerce. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.6 Requirements metrics of a payment system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Tally (Theory)**

**(12 Hours)**

- 5.1 Introduction of Tally Accounting and Inventory an outline (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Fundamentals of accounting, accounting terms, (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Definitions Ledger and ledger accounts Trial balance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Trading and profit and loss account Balance Sheet Fundamentals of Inventory (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Account creation, Account Information, Groups (create, display, delete) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Multiple groups ledger (create, display, alter) Multiple ledger Inventory master creation stock groups and stock items Entering Vouchers and Invoices Different types of Accounting vouchers and Inventory Vouchers, Reports in tally Balance sheet, Profit and Loss Account, Trial Balance, Day Book Ratio Analysis, Reconciliation of Bank account,

Interest Calculation (Simple Mode) (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit VI: Practical (12 Hours)**

1. Profit & Loss Account and Balance sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
2. Trial balance and Balance sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
3. Bank reconciliation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
4. Stock summary and Profit and loss Account (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
5. Interest receivables and payables (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

1. Dr. P. Rizwan Ahmed – E – Business & E-Commerce – Margham Publications, Chennai,  
2<sup>nd</sup> Edition 2016.

**Reference Books:**

1. Srinivasa Vallaban – E-Commerce – Srinivasa Vallaban S.V. – E-Commerce – Vijay Nicole Imprints Pvt. Ltd., Chennai, 2015
2. Abirami Devi K. and Alagammai M. – E-Commerce – Margham Publications, Chennai, Edition 2016
3. Bhasin T.M. – E-Commerce and E-Banking - Tarun Offset, New Delhi, Edition 2013
4. Palanivel S. – Tally Accounting Software – Margham Publications, Chennai, Reprint 2016
5. Nandhini A.K. and Nandhini K.K. – Tally ERP 9 – BPB Publications, New Delhi, Edition 2011

**Extra Reading** (if applicable) (can also be suggested unit wise) [Meant for self study/  
internal assessment (assignment/seminar/presentation/discussion) only]

## SEMESTER V / VI

### USCOD520/USCOD620 - CONSUMER GUIDE AND EMPOWERMENT

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of. Hours	Credits	Marks
III/V/VI	USCOD520/ USCOD620	Consumer Guide and Empowerment	Theory	Skill Based Elective	2 2	2	40+60

#### Course Objectives

- 1.To understand the advantages and limitation of the consumer movement and the right of consumer
- 2.To understand the role of the consumer guidance society of India
- 3.It get information about demerits or defects of products from consumer and suggests remedial measures
- 4.Students learn food safety and standards authority of India
5. Students will be able to appreciate the emerging questions and policy issues in consumer law for future research

#### Course Outcomes(CO)

- 1.Gain knowledge on Consumer Movement
2. Apprehend Knowledge on Right to Information act
- 3.Acquire Theoretical Knowledge Consumer Protection act
- 4.Know About FSSAI 2006 Act
- 5.Have In-Depth Knowledge on Certification Marks

#### CO's consistency with PO'S

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

#### CO's consistency with PSO'S

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Consumer Awareness Movement (6 Hours)**

- 1.1 Consumer Awareness Movement (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Gandhiji's quote - Brief History (K<sub>1</sub>, K<sub>2</sub>)
- 1.3 Main features and Provision for Consumer Rights (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Responsibilities towards each Right (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Critical Awareness (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.6 Environmental concern and United Nations Guidelines (K<sub>1</sub>, K<sub>2</sub>)

### **Unit II: Right to Information (6 Hours)**

- 2.1 Right to Information Act (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Public information Officer and Assistant (K<sub>1</sub>, K<sub>2</sub>)
- 2.3 Supply of Information to Associations (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Time period for supply of Information (K<sub>1</sub>, K<sub>2</sub>)
- 2.5 Appeals and Complaints (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Third party Information and Disclosure (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Consumer Protection Act 1986 (6 Hours)**

- 3.1 Consumer Protection Act 1986 (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Preliminary (Introduction, commencement and application) (K<sub>1</sub>, K<sub>2</sub>)
- 3.3 Consumer Protection Council (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Establishment, Composition, Jurisdiction, Complaint, Manner, Procedure on Receipt of Complaint finding, Appeal (K<sub>1</sub>, K<sub>2</sub>)
- 3.5 Finality of order -limitation Period (K<sub>1</sub>, K<sub>2</sub>)
- 3.6 Administrative control and Enforcement of Orders by the Redressal Agencies (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: FSSAI ACT 2006 (Food Safety and Standards) (6 Hours)**

- 4.1 FSSAI Act 2006 (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Food safety and standards Authority of India (K<sub>1</sub>, K<sub>2</sub>)
- 4.3 General provisions as to Articles of Food (K<sub>1</sub>, K<sub>2</sub>)
- 4.4 Compliance steps of FBO (K<sub>1</sub>, K<sub>2</sub>)
- 4.5 Liability of the Manufacturers, Packers, Wholesalers, Distributors and Sellers Food Recall Procedures (K<sub>1</sub>, K<sub>2</sub>)
- 4.6 Offences and penalties, General Provisions relating to Penalty (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Certification Agencies - Certification Mark (6 Hours)**

- 5.1 Certification Agencies (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Certification Marks, BIS Hall Mark, AGMARK, ISI Mark, FPO Mark (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Vegetarian and Non Vegetarian Mark, Geographical Indication Mark (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Significance of Certification Mark (K<sub>1</sub>, K<sub>2</sub>)
- 5.5 Bureau of Indian Standards (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Objectives and Activities (K<sub>1</sub>, K<sub>2</sub>)

**Text Books:**

- 1.E-books available in the FSSAI website like
- 2.Dart, Pink, Yellow and Orange books
3. Newsletters (quarterly publications) of State Consumer Knowledge Helpline Resource Management Portal (SCHKRMP)
- 4.“Nugarvor Kavasam” a publication by the Department of Civil Supplies and Consumer

**Web Resources:**

1. [www.consumer.tn.gov.in](http://www.consumer.tn.gov.in) – publications
2. [www.consumeradvice.in](http://www.consumeradvice.in) – publications

## SEMESTER V / VI

### USCOE520/USCOE620 - PRACTICAL AUDITING

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
III/V/VI	USCOE520/ USCOE620	Practical Auditing	Theory	Skill Based Elective	2	2	40+60

#### Course Objectives:

1. To understand basic principles governing audit.
2. To prepare audit programme.
3. To identify different audit evidence.
4. To apply practical knowledge in internal control, internal check and internal audit.
5. To know about vouching and verification.

#### Course Outcomes (CO):

1. Students acquired conceptual knowledge on basic audit principles.
2. Students were familiarized with the preparation of audit programmes for various situations.
3. Students gained an insight knowledge on different audit evidence.
4. Students were well versed in methodology of internal audit.
5. Students were able to differentiate between vouching and verification.

#### CO's consistency with PO'S

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

#### CO's consistency with PSO'S

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Nature of Auditing**

**(6 Hours)**

- 1.1 Definitions, features, Principles (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Qualifications and qualities of Auditor, Advantages and Disadvantages (K<sub>1</sub>, K<sub>2</sub>)
- 1.3 Primary object (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Secondary object (K<sub>1</sub>, K<sub>2</sub>)
- 1.5 Audit based on nature (K<sub>1</sub>, K<sub>2</sub>)
- 1.6 Audit based on period (K<sub>1</sub>, K<sub>2</sub>)

### **Unit II: Audit Programme**

**(6 Hours)**

- 2.1 Audit plan (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Audit program, Types (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Merits and demerits of Audit program (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Working papers (K<sub>1</sub>, K<sub>2</sub>)
- 2.5 Audit files (K<sub>1</sub>, K<sub>2</sub>)
- 2.6 Audit note book (K<sub>1</sub>, K<sub>2</sub>)

### **Unit III: Audit Evidence**

**(6 Hours)**

- 3.1 Compliance and substantive audit procedures (K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Types of audit evidence (K<sub>1</sub>, K<sub>2</sub>)
- 3.3 Stages in judging audit evidence (K<sub>1</sub>, K<sub>2</sub>)
- 3.4 Audit sampling (K<sub>1</sub>, K<sub>2</sub>)
- 3.5 Determinants of Audit sample (K<sub>1</sub>, K<sub>2</sub>)
- 3.6 Risks of audit sample (K<sub>1</sub>, K<sub>2</sub>)

### **Unit IV: Internal Control, Internal Check, Internal Audit**

**(6 Hours)**

- 4.1 Audit risk, Types (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Concept of Internal control (K<sub>1</sub>, K<sub>2</sub>)
- 4.3 Characteristics of effective Internal control system (K<sub>1</sub>, K<sub>2</sub>)
- 4.4 objects, principles and advantages of internal check (K<sub>1</sub>, K<sub>2</sub>)
- 4.5 Internal check as regards to various transactions (K<sub>1</sub>, K<sub>2</sub>)
- 4.6 Difference between external and internal audit (K<sub>1</sub>, K<sub>2</sub>)

### **Unit V: Vouching and Verification**

**(6 Hours)**

- 5.1 Audit of cash transactions (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.2 Audit of trading transactions (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Vouching of Impersonal Ledger (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Verification of Assets (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Verification of Liabilities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Valuation of Assets and Liabilities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

DingarPagare – Principles and Practice of Auditing – Sultan chand& sons, New Delhi, Reprint 2017.

Study material will be provided by the department.

**Web Resources:**

1. [www.auditnet.org](http://www.auditnet.org)
2. [www.fasab.org](http://www.fasab.org)

**SEMESTER I**  
**UAAFA20– Accounting Fundamentals-1**

<b>Year/ Semester</b>	<b>Course Code</b>	<b>Title of the course</b>	<b>Course type</b>	<b>Course category</b>	<b>No. of Hours</b>	<b>Credits</b>	<b>Marks</b>
I/I	UAAFA20	Accounting Fundamentals – I	Theory	Allied	5	5	40+60

**Course Objectives:**

1. To introduce the basic concepts and conventions of accounting.
2. To teach them accounting techniques used in a business.
3. Teach them practically to prepare accounting reports.
4. Develop the skills needed to analyze the financial statement effectively.
5. To teach the learners to sort the financial records of various companies and reveal their financial positions to interested parties of business.

**Course Outcomes (CO):**

Upon the successful completion of this course the students will have the ability to

1. Adopt the rules of Double entry system in sorting and preparing Accounts.
2. Understand the Accounting Cycle and prepare various accounts and to check Accounting errors.
3. Calculate and explain financial Accounts to reveal the profits/losses of an organization and also to evaluate the values of Assets and Liabilities.
4. Charge Depreciation on assets under straight line and written down value methods.
5. Differentiate Single entry & Double entry and ascertain the net worth of a business.

**CO's consistency with PO'S**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	M
<b>3</b>	H	H	M	H	M	M
<b>4</b>	M	H	H	M	H	M
<b>5</b>	H	M	H	H	H	M

**(Low – L, Medium – M, High – H)**

**CO's consistency with PSO'S**

<b>CO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	H
<b>3</b>	H	H	M	H	M	H
<b>4</b>	M	H	H	M	H	H
<b>5</b>	H	M	H	H	H	H

**(Low– L, Medium – M, High– H)**

## **Course Syllabus**

### **Unit I: Introduction to Accounting, Concepts & Conventions & Accounting Cycle (15 Hours)**

- 1.1. Meaning of Accounting, Definition of Accounting, Need and Steps in Accounting. (K<sub>1</sub>, K<sub>2</sub>)
- 1.2. Advantage and limitations of Accounting, Groups interested in Accounting and Branches of Accounting. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3. Concepts and Conventions of Accounting, Classification of Various concepts and Conventions. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4. Double Entry System- (Accounting Equations, Rules pertaining to Accounting equations), and Accounting Cycle. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5. Journal: Recording of transactions. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6. Ledger- Classification of transactions. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Trial Balance, Subsidiary Books & Bank Reconciliation Statements (15 Hours)**

- 2.1. Meaning of Trial balance, Definition, Objectives, Methods of Trial balance, Schedule of Debtors and Creditors and Errors not disclosed in Trial Balance. (K<sub>1</sub>, K<sub>2</sub>)
- 2.2. Problems (Trial Balance). (K<sub>3</sub>, K<sub>4</sub>)
- 2.3. Meaning of Subsidiary books, Types of Subsidiary books, Benefits, Methods of Recording and Posting. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4. Accounting treatment of Subsidiary books. (K<sub>3</sub>, K<sub>4</sub>)
- 2.5. Meaning of Reconciliation, Need, Causes for difference and Methods of preparing Bank Reconciliation Statements. (K<sub>1</sub>, K<sub>2</sub>)
- 2.6. Preparation of Bank Reconciliation Statement. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Final Accounts with Simple adjustments (15 Hours)**

- 3.1. Introduction to Final Accounts, Meaning of Manufacturing Account and features of Manufacturing Accounts. (K<sub>1</sub>, K<sub>2</sub>)
- 3.2. Trading Account Meaning and its Accounting treatment. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3. Profit & Loss Account Meaning and its accounting treatment. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4. Balance sheet meaning, Classification of Assets and Liabilities and Adjustments. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5. Problems (Final Accounts without Adjustments). (K<sub>3</sub>, K<sub>4</sub>)
- 3.6. Problems (Final Accounts with Simple Adjustments). (K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Depreciation Accounting (15 Hours)**

- 4.1. Meaning and Definition of Depreciation, Characteristic features of Depreciation. (K<sub>1</sub>, K<sub>2</sub>)
- 4.2. Objectives of Depreciation, Factors affecting the amount of Depreciation. (K<sub>1</sub>, K<sub>2</sub>)
- 4.3. Methods of providing depreciation – Introduction. (K<sub>1</sub>, K<sub>2</sub>)
- 4.4. Straight Line method Meaning, Merits and Demerits, Calculations for finding the Rate of Depreciation ( & More than one Asset). (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5. Diminishing Balance method Meaning, Merits and Demerits, Simple problems. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6. Problems related to Depreciation. (K<sub>3</sub>, K<sub>4</sub>)

## **Unit 5: Single Entry System**

**(15 Hours)**

**5.1.** Meaning, Definition, Characteristic Features and Limitations of Single Entry System.  
( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

**5.2.** Difference between Double Entry System and Single Entry System. (K<sub>3</sub>, K<sub>4</sub>)

**5.3.** Ascertainment of Profit: Net worth method, Steps in calculating Profit or Loss.  
(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

**5.4.** Conversion Method: Meaning, Need, Steps for conversion of incomplete records.  
(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

**5.5.** Net worth Method: Preparation of Statement of Affairs and Statement of Profit.  
(K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**5.6.** Conversion Method: Debtors Account, Creditors Account, Bills Payable Account, Bills receivable Account and preparation of Final Account. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Text Books:**

Reddy T.S and Murthy – Advanced Accountancy – MarghamPublications,Chennai, Reprint 2018

### **Reference Books**

1. Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(Volume I) – S.Chand& Company Limited, New Delhi, Reprint 2019.
2. Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.
3. Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khasa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.
4. Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint – 2017.
- 5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors – Guwahati, Edition 2018.

### **Web Resources:**

- 1).MIT Open CourseWare  
(<http://ocw.mit.edu/courses/sloan>)
2. [www.accountingschoolguide.com](http://www.accountingschoolguide.com)
3. [www.edx.org](http://www.edx.org)
4. study.com
5. [www.accountingcoach.com](http://www.accountingcoach.com)
6. fasab.gov
7. [www.freebookcentre.net](http://www.freebookcentre.net)

**SEMESTER II**  
**UAAFB20– ACCOUNTING FUNDAMENTALS-II**

Year/ Semester I/II	Course Code UAAFB20	Title of the course Accounting Fundamentals – II	Course type Theory	Course category Allied	No. of Hours 5	Credits 5	Marks 40+60

**Course Outcomes:**

Upon the successful completion of this course the students will have the ability to:

1. Illustrate and build Knowledge of Partnership fundamentals and admission of a partner.
2. To solve problems relating to retirement and death of a partner.
3. Do the accounting related to various Branch offices under stock & Debtors and final accounts method.
4. Calculate and reveal the profits/ losses of a Department through Departmental Accounting Techniques.
5. Understand and adopt the rules of Hire purchase and installment system accounting.

**Course Objectives (CO):**

1. To introduce the students with different forms of business and its Accounting Concepts.
2. To teach them to prepare accounts for partnership fundamentals, admission, retirement and death.
3. To practice them with the accounting techniques to prepare accounts for Various Branches, Departments to analyze the profits /Losses.
4. To make students aware about Hire purchase and installments system and make them to prepare accounts.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Partnership Account –I (Fundamentals & Admission) (15 Hours)**

- 1.1. Definition, Meaning, Partnership deed. (K<sub>1</sub>, K<sub>2</sub>)
- 1.2. Accounts of partnership firm. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3. Partners Capital account (Fixed & Fluctuating). (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4. Admission of a partner- Introduction, Goodwill –meaning, need & Factors affecting the value of Goodwill. (K<sub>1</sub>, K<sub>2</sub>)
- 1.5. Calculation of Sacrificing Ratio and Valuation of Goodwill. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6. Problems of Admission of a partner (Capital account and Balance sheet). (K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Partnership Account – II (Retirement & Death) (15 Hours)**

- 2.1. Introduction to Retirement of Partner – Profit Sharing Ratio, Gaining Ratio, Difference between Sacrificing Ratio and Gaining Ratio and Treatment of Goodwill. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2. Problems (Treatment of Goodwill). (K<sub>3</sub>, K<sub>4</sub>)
- 2.3. Comprehensive problems on Retirement of a Partner. (K<sub>2</sub>, K<sub>3</sub>)
- 2.4. Introduction to Death of a partner, Mode of payment. (K<sub>1</sub>, K<sub>2</sub>)
- 2.5: Calculation of Gaining ratio and share of Goodwill. (K<sub>2</sub>, K<sub>3</sub>)
- 2.6: Comprehensive problems on Death of a Partner. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Branch Accounts (15 Hours)**

- 3.1. Meaning and objectives of Branch Account. (K<sub>1</sub>, K<sub>2</sub>)
- 3.2. Types of Branch Account. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3. Features of Dependent Branch. (K<sub>1</sub>, K<sub>2</sub>)
- 3.4. Debtors System (Dependent Branch System). (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5. Stock and Debtors System. (K<sub>3</sub>, K<sub>4</sub>)
- 3.6. Final Accounts System. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Departmental Accounting (15 Hours)**

- 4.1. Meaning, Need, Advantages of Departmental Accounting. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2. Difference between Departmental accounts and Branch Accounts, Apportionment of expenses. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3. Apportionment of Indirect expenses. Problems (K<sub>2</sub>, K<sub>3</sub>)
- 4.4. Departmental Trading Account (K<sub>2</sub>, K<sub>3</sub>)
- 4.5. Departmental Profit and Loss Account with indirect expenses (K<sub>2</sub>, K<sub>3</sub>)
- 4.6. Inter Departmental transfer at cost price. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Hire Purchase System (15 Hours)**

- 5.1. Meaning, Definition and characteristic features of Hire purchase. (K<sub>1</sub>, K<sub>2</sub>)
- 5.2. Difference between Hire purchase system and Instalment System. (K<sub>3</sub>, K<sub>4</sub>)
- 5.3. Calculation of Interest. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4. Journal in the books of buyer and seller. (K<sub>3</sub>, K<sub>4</sub>)
- 5.5. Ledger in the books of both buyer and seller. (K<sub>3</sub>, K<sub>4</sub>)
- 5.6. Default and repossession – Complete repossession. (K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

Reddy T.S and Murthy – Advanced Accountancy – MarghamPublications,Chennai, Reprint 2018

**Reference Books**

1. Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(Volume I) – S.Chand& Company Limited, New Delhi, Reprint 2019.
2. Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.
3. Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khasa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.
4. Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint – 2017.
- 5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors – Guwahati, Edition 2018.

**Web Resources:**

- 1).MIT Open CourseWare  
(<http://ocw.mit.edu/courses/sloan>)
2. [www.accountingschoolguide.com](http://www.accountingschoolguide.com)
3. [www.edx.org](http://www.edx.org)
4. study.com
5. [www.accountingcoach.com](http://www.accountingcoach.com)
6. fasab.gov
7. [www.freebookcentre.net](http://www.freebookcentre.net)
8. open.umn.edu
9. libguids.uwf.edu
- 10.books.google.co.in

**SEMESTER V / VI**  
**NON MAJOR ELECTIVE:**  
**UGCOA520/UGCOA620 - BOOK KEEPING AND ACCOUNTING**

Year/ Semester I/V/VI	Course Code UGCOA520/ UGCOA620	Title of the course Book Keepingand Accounting	Course type Theory	Course category Non Major Elective	No. of Hours 3	Credits 2	Marks 40+60

**Course Objectives:**

1. To ascertain the different types of accounts rules and its concepts.
2. To impart the learners the need for journal, ledger and preparation of trial balance.
3. To enable students to prepare various subsidiary books.
4. To analyse errors in rectification.
5. To examine the various adjustments in preparation of final accounts.

**Course Outcomes (CO):**

1. Students acquired conceptual knowledge on accounting rules and its concepts.
2. Students were familiarised with the preparation of basic accounts.
3. Students gained an insight knowledge on preparation of various subsidiary books.
4. Students were well versed in analysing different types of errors
5. Students were able to prepare final accounts with different adjustments.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Basic concepts of Accounting**

**(9 Hours)**

- 1.1 Definition, Objectives (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Groups interested in accounting information (K<sub>1</sub>, K<sub>2</sub>)
- 1.3 Branches, methods, Types, Bases of accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Accounting Terminology (K<sub>1</sub>, K<sub>2</sub>)
- 1.5 Accounting concepts (K<sub>1</sub>, K<sub>2</sub>)
- 1.6 Conventions and Equations (K<sub>1</sub>, K<sub>2</sub>)

### **UnitII: Journal & Ledger**

**(9 Hours)**

- 2.1 Journal, meaning and objectives (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Recording of transactions in journal (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Ledger, meaning and its features and difference between Journal and ledger (K<sub>1</sub>, K<sub>2</sub>)
- 2.4 Posting of journal into ledger (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Trial balance, meaning, objectives (K<sub>1</sub>, K<sub>2</sub>)
- 2.6 Preparation of Trial balance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Subsidiary Books**

**(9 Hours)**

- 3.1 Purchase and Purchase returns Book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Sales and Sales returns Book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Simple cash book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Two column cash book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Three columnar cash book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Petty cash book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Rectification of errors**

**(9 Hours)**

- 4.1 Meaning, classification of errors (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Errors of casting (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Errors of carry forward (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Errors of posting (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 One sided errors (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Double sided errors (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Final Accounts**

**(9 Hours)**

- 5.1 Trading account, meaning, items appearing in Trading account (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Preparation of Trading account (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Profit and Loss account, meaning, contents of P&L A/c (K<sub>1</sub>, K<sub>2</sub>)
- 5.4 Preparation of P&L A/c (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Balance sheet, classification of assets and liabilities (K<sub>1</sub>, K<sub>2</sub>)
- 5.6 Preparation of Balance sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

**Text Books:**

Study material will be provided by the department.

- 1). Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(Volume I) – S.Chand& Company Limited, New Delhi, Reprint 2019.
- 2). Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.
- 3). Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khasa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.
- 4). Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint – 2017.
- 5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors, Guwahati Edition

**Web Resources:**

- 1).MIT Open CourseWare  
(<http://ocw.mit.edu/courses/sloan>)
- 2). Khan Academy
- 3). Accounting Student Network
- 4). MissCPA
- 5) Accounting.com
- 6) Accounting Coach
- 7) AQA(aqa.org.uk.)
- 8) Accounting-World
- 9) AccountingInfo
- 10)Course Hero

**Semester Examination (100 Marks)**

**Time: 3 Hours**

**Section A – 10 x 2 = 20 marks**

Answer **all** questions

10 questions (2 questions from each Unit)

**Section B – 5 x 7 = 35 marks**

Answer **all** questions

5 questions with internal choice (1 question from each Unit)

**Section C – 3 x 15 = 45 marks**

Answer **any three** questions

5 questions (1 question from each Unit)

**CA Examination (50 Marks)**

**Time: 1 Hour 30 Minutes**

**Section A – 7 x 2 = 14 marks**

Answer **all** questions

7 questions

**Section B – 3 x 7 = 21 marks**

Answer **any three** questions

3 out of 5 questions

**Section C – 1 x 15 = 15 marks**

Answer **any one** question

2 questions (1 question from each Unit)

**Department of Biochemistry**

**B.Sc. Biochemistry**

**SYLLABUS AND REGULATIONS**

**Under**

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**B.Sc. Biochemistry - OUTCOME BASED EDUCATION - 2020**  
(Effective for the Batch of Students Admitted from 2020-2021)

**STRUCTURE OF THE COURSE AND SCHEME OF EXAMINATIONS:**

Sem	Part	Paper Code	Title	Hours/ Week	Exam		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil-I	6	3	-	3	40+60
	II	UENGA20	English-I	6	3	-	3	40+60
	III	UCBCA20	Bio Organic Chemistry	6	3	-	5	40+60
	III	UCBCC20	Main Practical-I	3	-	-	-	-
	III	UACHA20	Allied-I Chemistry-I	4	3	-	4	40+60
	III	UACHC20	Allied practical	2	-	-	-	-
	IV		Skill Based Elective-I	2	2	-	2	40+60
	IV		Value Education-I	1	-	-	-	-
<b>TOTAL</b>				<b>30</b>			<b>17</b>	<b>500</b>
II	I	ULTAB20	Tamil-II	6	3	-	3	40+60
	II	UENGB20	English-II	6	3	-	3	40+60
	III	UCBCB20	Cell Biology	6	3	-	5	40+60
	III	UCBCC20	Main Practical-I	3	-	6	5	40+60
	III	UACHB20	Allied-II Chemistry-II	4	3	-	4	40+60
	III	UACHC20	Allied Practical	2	-	3	2	40+60
	IV		Skill Based Elective-II	2	2	-	2	40+60
	IV		Value Education-II	1	-	-	-	-
<b>TOTAL</b>							<b>24</b>	<b>700</b>

Sem	Part	Code	Title of the paper	Hours/ Week	Exam		Credits	Marks
					Th	Pr		
III	I	ULTAC20	Tamil-III	6	3	-	3	40+60
	II	UENGC20	English-III	5	3	-	3	40+60
	III	UCBCD20	Biochemical Techniques	7	3	-	5	40+60
	III	UCBCF20	Main Practical-II	3	-	-	-	-
	III	UAMBA20	Allied-III Microbiology-I	4	3	-	4	40+60
	III	UAMBC20	Allied Practical	2	-	-	-	-
	IV	USBCA320	Skill Based Elective: Nutrition Biochemistry	2	2	-	2	40+60
	IV		Value Education-III	1	-	-	-	-
<b>TOTAL</b>							<b>17</b>	<b>500</b>
IV	I	ULTAD20	Tamil-IV	5	3	-	3	40+60
	II	UENGD20	English-IV	6	3	-	3	40+60
	III	UCBCE20	Physiology and Nutrition	5	3	-	5	40+60
	III	UCBCF20	Main Practical-II	3	-	6	5	40+60
	III	UAMBB20	Allied-III Microbiology-II	4	3		4	40+60
	III	UAMBC20	Allied Practical	2	-	3	2	40+60
	IV	USBCB420	Skill Based Elective: Health Care for Women	2	2	-	2	40+60
	IV	UNEVS20	Environmental studies	2	2	-	2	40+60
	IV		Value Education-IV	1	-	-	-	
<b>TOTAL</b>							<b>26</b>	<b>800</b>

Sem	Part	Code	Title of the paper	H / W	Exam		Credits	Marks
					Th	Pr		
V	III	UCBCG20	Enzymes & Intermediary Metabolism	6	3	-	6	40+60
	III	UCBCH20	Endocrinology	5	3	-	6	40+60
	III	UEBCA20	Elective I A: Immunology	5	3	-	5	40+60
	III	UEBCB20	Elective IB: Environmental Toxicology					
	III	UCBCJ20	Main Practical- III	4	-	-	-	-
	III	UCBCK20	Main Practical- IV	4	-	-	-	-
	IV	USBCC520	Skill Based Elective - III: Entrepreneurial Biochemistry	2	2	-	2	40+60
	IV		Non major Elective-I	3	3	-	2	40+60
	IV		Value Education-V	1	-	-	-	-
<b>TOTAL</b>							<b>21</b>	<b>600</b>
VI	III	UCBCI20	Molecular Biology	6	3	-	6	40+60
	III	UEBCC20	Elective II A: Clinical Biochemistry	5	3	-	6	40+60
	III	UEBCD20	Elective II B: Pharmacology					
	III	UEBCE20	Elective III A: Biotechnology	5	3	-	5	40+60
	III	UEBCF20	Elective III B: Plant Biochemistry					
	IV	UCBCJ20	Main Practical- III	4	-	6	6	40+60
		UCBCK20	Main Practical- IV	4	-	6	6	
	IV	USBCD620	Skill Based Elective - IV: Medical Laboratory Technology	2	2	-	2	40+60
	IV		General Elective-II	3	3	-	2	40+60
	IV		Value Education-VI	1	2	-	2	40+60
<b>TOTAL</b>							<b>35</b>	<b>800</b>
<b>GRAND TOTAL</b>							<b>140</b>	<b>3900</b>

**Programme Outcomes (PO):**

- PO 1** Attain knowledge and understand the principles and concepts in the respective discipline.
- PO 2** Acquire and apply analytical, critical and creative thinking, and problem-solving skills
- PO 3** Effectively communicate general and discipline-specific information, ideas and opinions
- PO 4** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.
- PO 5** Emulate positive social values and exercise leadership qualities and team work.
- PO 6** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

**Programme Specific Outcomes (PSO)**

- PSO 1:** Acquire knowledge about the principles and theories related to Biochemistry
- PSO 2:** Attain skills to tackle issues and apply knowledge to find solutions for the problem
- PSO 3** Bring economically challenged, socially backward young women to be competent with today's modern world for their sustenance
- PSO 4** Create an awareness of resources and enhance eco - consciousness for sustainable development of society
- PSO 5** Function effectively as a member or leader in a team and demonstrate professional ethics, Community living and Nation building initiatives
- PSO 6** Build a critical thinking skill and use them to update scientific knowledge throughout life.

	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>
<b>PSO 1</b>	H	H	H	M	M	L
<b>PSO 2</b>	H	H	H	H	M	L
<b>PSO 3</b>	H	H	H	H	H	L
<b>PSO 4</b>	H	M	H	H	H	H
<b>PSO 5</b>	M	M	H	H	H	H
<b>PSO 6</b>	L	L	H	H	H	H
<b>H- High (3), M – Moderate (2), L – Low (1)</b>						

**SEMESTER – I**  
**UCBCA20 - BIOORGANIC CHEMISTRY**

<b>Year/ Sem</b> I	<b>Course Code</b> UCBCA20	<b>Title of the Course</b> Bioorganic Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> <b>100</b> 40+60=100
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**Objectives:**

To provide a clear note on the bioorganic compounds.

**Course Outcomes (CO)**

On completion of the course, the students will be able to;

1. Outline the structure, properties and biological importance of carbohydrates.
2. Classify the structure and functions of amino acids along with proteins.
3. Build an idea about the role of lipids in the living system.
4. Assess the structural features of genetic material.
5. Explain the crucial role of vitamins and minerals for maintaining healthy life.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	L	L	L	H
CO 2	H	M	M	M	H	M
CO 3	H	H	H	M	M	M
CO 4	H	M	H	M	H	H
CO 5	H	M	H	M	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	L	M	H
CO 2	H	M	M	M	H	M
CO 3	H	H	H	M	M	M
CO 4	H	M	H	M	H	L
CO 5	H	M	H	M	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(18 hours)**

- 1.1 Carbohydrates: Occurrence and Structure of Carbohydrates (K1, K2, K3)
- 1.2 Classification of Carbohydrates (K1, K2, K3)
- 1.3 Physical and chemical properties of Glucose and Fructose (Oxidation, Reduction and Phenylhydrazine reaction), Isomerism of monosaccharides (K1, K2, K3, K4)
- 1.4 Biological importance of Monosaccharides (Glucose and Fructose) (K1, K2, K3, K4)
- 1.5 Disaccharides (Maltose, Lactose, Sucrose) (K1, K2, K3)
- 1.6 Polysaccharides (Starch, Glycogen, Cellulose) and Mucopolysaccharides. (K1, K2, K3)

**Unit II: (18 hours)**

- 2.1 Amino Acids: Structure of naturally occurring and non-protein amino acids (K1, K2, K3, K4)
- 2.2 Classification of amino acids based on structure, number of amino and carboxylic groups, nutrition and polarity of side chain (K1, K2, K3, K4)
- 2.3 Physical properties - Chemical properties - Structure of Peptide bond (K1, K2, K3)
- 2.4 Classification of proteins - Primary Structure - Secondary structure- Tertiary structure - Quaternary structure - Various forces stabilizing the structures (K1, K2, K3, K4)
- 2.5 Biologically important peptides - Glutathione (K1, K2, K3)
- 2.6 Biologically important peptide hormones- Insulin, Vasopressin, Oxytocin (Structure and functions). (K1, K2, K3)

**Unit III: (18 hours)**

- 3.1 Lipids- Structure of fatty acids and Classification of fatty acids (K1, K2, K3, K4)
- 3.2 Functions of lipids and fatty acids (K1, K2, K3)
- 3.3 Classification of lipids: Simple, Compound lipids, Derived lipids (K1, K2, K3, K4)
- 3.4 Sterols (Cholesterol, Ergosterol - structure and functions) (K1, K2, K3, K4)
- 3.5 Characteristics of lipids - Iodine number, acid number, Saponification number, Reichert - Meissl number (K1, K2, K3)
- 3.6 Properties of lipids- Physical and Chemical properties. (K1, K2, K3)

**Unit IV: (18 hours)**

- 4.1 Nucleic Acids: Structure of Purine and Pyrimidines (K1, K2, K3)
- 4.2 Nucleosides and Nucleotides (K1, K2, K3, K4)
- 4.3 Structure and forms of DNA (A, B, Z) (K1, K2, K3)
- 4.4 Properties-Denaturation, T<sub>m</sub>, Hypo and Hyperchromicity, Cot value (K1, K2, K3, K4)
- 4.5 Renaturation, Hybridization (K1, K2, K3, K4)
- 4.6 Structure and types of RNA - rRNA, tRNA, mRNA and SnRNA- Functions of RNA. (K1, K2, K3, K4)

**Unit V: (18 hours)**

- 5.1 Vitamins: Classification of vitamins (K1, K2, K3, K4)
- 5.2 Fat soluble vitamins- Sources, RDA, Biochemical functions and Deficiency diseases (A, D, E, K) (K1, K2, K3)
- 5.3 Water soluble vitamin B-complex (vitamin B<sub>1</sub>, B<sub>2</sub>, B<sub>5</sub>, B<sub>6</sub> and B<sub>12</sub>) (Structure not required) (K1, K2, K4)
- 5.4 Water soluble vitamin non-B complex (vitamin C) (K1, K2, K3)
- 5.5 Minerals: Iron, Calcium, Sodium, Potassium (K1, K2, K3)
- 5.6 Microelements: Copper, Iodine and Zinc. (K1, K2, K3)

[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyse]

**Text Books:**

1. Satyanarayana U - Textbook of Biochemistry - Books and Allied Pvt Ltd, 2<sup>nd</sup> edition, 2005
2. Martin David W, Harper, Harold A - Harper's review of Biochemistry- 31<sup>st</sup> edition, 2018

**Reference Book:**

1. West, Todd, Mason, Vanbruggen - Textbook of Biochemistry. - Oxford Publishers, - 4<sup>th</sup> edition, 2000.
2. Chatterjea M N - Textbook of Medical Biochemistry. R S Jaypee Publications, 7<sup>th</sup> edition, 2007.
3. Lehninger D Nelson and Cox - Principles of Biochemistry. WH Freeman and Company Ltd, 4<sup>th</sup> edition, 2005.
4. Gurdeep Chatwal - Organic Chemistry of Natural Products. Himalaya Publishing House, Vol I, 2<sup>nd</sup> edition, 2003.
5. Donald Voet and Judith G Voet – Biochemistry. VP and Publisher Kaye Pace Associate Publisher, 4<sup>th</sup> edition, 2011.

**Open Educational Resources (OER):**

1. <https://youtu.be/JxK5rZxbyQY>
2. <https://youtu.be/NfMZLk-8r34>
3. <https://youtu.be/GVWBcEv1bgk>
4. <https://youtu.be/0lZRAShqft0>
5. [https://youtu.be/qmUtK\\_Rf7iY](https://youtu.be/qmUtK_Rf7iY)

**SEMESTER – II**  
**UCBCB20 - CELL BIOLOGY**

Year/ Sem I/ II	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks 100 40+60=100
	UCBCB20	Cell Biology	Theory	Core	6	5	

**Objective:**

To provide a deep knowledge about cell – the basic unit of life.

**Course Outcomes (CO)**

On completion of the course, the students will be able to;

1. Describe cell as the basic unit of life, its structural organization and cytoskeleton
2. Develop knowledge about the functions of various subcellular organelles
3. Identify the type of cell division processes and its significance
4. Recall on the components of cell membrane and its role in maintaining cell function
5. Examine clearly about the mechanism of transport across the membrane

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	M	M	L	M
CO 2	H	H	M	M	L	H
CO 3	H	H	H	H	M	L
CO 4	H	H	H	M	M	M
CO 5	H	H	H	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	M	L	L	H
CO 2	H	M	M	M	L	M
CO 3	H	H	H	L	M	M
CO 4	H	M	H	M	H	H
CO 5	H	M	H	M	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(18 hours)**

- 1.1 An overall view of cells- origin-evolution of cells- Cell theory (K1, K2, K3)
- 1.2 Cell organization: Types of cell - Structural organization of Prokaryotic (*E.coli*) and Eukaryotic cells (Animal and plant cell) (K1, K2, K3, K4)
- 1.3 Comparison between plant cell and animal cell structure (K1, K2, K3, K4)
- 1.4 Virus cell structure: T4 Bacteriophage, Corona virus (K1, K2, K3)
- 1.5 An overview of molecular organization of cells - Microfilaments (Actin and Intermediary filament), Microtubules, Centrioles, Basal bodies, Cilia, flagella (K1, K2, K3)
- 1.6 Structure and function of TMV (Tobacco Mosaic Virus). (K1, K2, K3)

**Unit II: (18 hours)**

- 2.1 Components and functions of Organelles: Structure and functions of Mitochondria (K1, K2, K3, K4)
- 2.2 Endoplasmic reticulum- Rough and Smooth endoplasmic reticulum (K1, K2, K3, K4)
- 2.3 Structure and functions of Ribosomes (K1, K2, K3)
- 2.4 Structure and functions of Golgi apparatus (K1, K2, K3)
- 2.5 Structure and functions of Lysosomes – Chloroplast (K1, K2, K3)
- 2.6 Structure and functions of Peroxisomes and Glyoxysomes (K1, K2, K3)

**Unit III: (18 hours)**

- 3.1 Nucleus: Nuclear membrane, nucleolus, nuclear pore and annulus (K1, K2, K3)
- 3.2 Structure of chromosomes (K1, K2, K3, K4)
- 3.3 Functions of chromosomes (K1, K2, K3, K4)
- 3.4 Materials of chromosomes (K1, K2, K3, K4)
- 3.5 Cell cycle – Overview - Cell Division - Mitosis (K1, K2, K3, K4)
- 3.6 Cell Division- Meiosis I & II. (K1, K2, K3, K4)

**Unit IV: (18 hours)**

- 4.1 Cell membrane: Molecular organization of animal cell membrane (K1, K2, K3, K4)
- 4.2 Membrane lipids, proteins and carbohydrates (K1, K2, K3, K4)
- 4.3 The Fluid Mosaic Model and artificial membranes (K1, K2, K3, K4)
- 4.4 Structure of Mitochondrial membrane (K1, K2, K3)
- 4.5 Structure of Red cell membrane (K1, K2, K3)
- 4.6 Cell wall: Components and role of cell wall. (K1, K2, K3)

**Unit V: (18 hours)**

- 5.1 Membrane functions: Cell permeability, Ion selective channels (Uniport, Antiport, Symport with example) and carriers (K1, K2, K3, K4)
- 5.2 Transport processes, Diffusion, Facilitated diffusion (K1, K2, K3, K4)
- 5.3 Active transport proteins ( $\text{Na}^+$ - $\text{K}^+$  ATPase), Ionophores (K1, K2, K3)
- 5.4 Types of cell junctions: Gap junction and tight junctions (K1, K2)
- 5.5 Cell-Cell communication (Belt and Spot desmosomes) (K1, K2, K3)
- 5.6 Cell adhesion proteins: Integrin, Cadherin and selectin. (K1, K2, K3)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]**

**Text Books:**

1. Powar CB - Cell Biology - Himalaya Publishing House, 2010
2. Arumugam N - Cell Biology - Saras Publication, 2014

**Reference Books:**

1. Dalela A Verma - Text book of Cytology- Jai Prakash Nath and Co, 2000
2. De Robertis - Cell and Molecular Biology. Lippincott Williams, 8<sup>th</sup> edition -, 2017
3. Verma S and Agarwal V K - Cell Biology, Genetics, Molecular Biology, Evolution and Ecology - S Chand and Company Ltd, 2005
4. Becker and Hardin- The World of Cell. Academic Internet Publishers. 9<sup>th</sup> edition, 2016
5. Harvey Lodish. Molecular Cell Biology. WH Freeman, 8<sup>th</sup> edition, 2016

**Open Educational Resources (OER):**

1. <https://youtu.be/7X2a2Vwboek>
2. <https://youtu.be/1Z9pqST72is>
3. <https://youtu.be/DwAFZb8juMQ>
4. <https://youtu.be/LXaPt9i9hqk>
5. <https://youtu.be/Ptmlvtei8hw>

**SEMESTER I & II**  
**UCBCC20 MAIN PRACTICAL – I**

<b>Year: I</b> <b>Sem: I/II</b>	<b>Course Code:</b> UCBCC20	<b>Title of the Course:</b> Main Practical - I	<b>Course Type:</b> Practical	<b>Course Category</b> : Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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**Objective:**

To provide a wide practical knowledge on Qualitative and Quantitative Analysis.

**Course Outcomes (CO):**

On the completion of the course, the students will be able to;

1. Apply the safety rules in the laboratory
2. Use the measuring technique to weigh the compounds
3. Analyses quantitatively the biomolecules and mineral components
4. Identify the carbohydrate and amino acids qualitatively
5. Explain the idea on the cell division process

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	M	H	H
CO 2	H	H	H	H	H	H
CO 3	H	H	H	H	H	H
CO 4	H	H	H	M	H	H
CO 5	H	H	H	M	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	M	M	H
CO 2	H	H	H	H	L	H
CO 3	H	M	H	H	M	H
CO 4	H	H	H	M	H	M
CO 5	H	H	H	M	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

## **1. Safety Measures In The Laboratory-I**

### **2. Balance**

Physical Balance, Electronic Balance, Analytical Balance, Weight Box, Types of error

### **3. Volumetric Analysis**

1. Estimation of Glucose by Benedict's method
2. Estimation of Glycine by Sorenson's method
3. Estimation of Ascorbic acid using 2,6 Dichlorophenol indophenol
4. Estimation of Nitrite using sodium hydroxide
5. Estimation of Iron using potassium permanganate
6. Estimation of Copper
7. Estimation of Hydrogen peroxide using potassium permanganate
8. Estimation of Calcium in milk
9. Estimation of Chloride by Mohr's method
10. Acid number of oils
11. Iodine number of edible oils
12. Saponification number of lipids

### **4. Qualitative Analysis**

1. Carbohydrates: Glucose, Fructose, Galactose, Lactose, Maltose, Sucrose, Starch
2. Amino acids: Tyrosine, Tryptophan, Arginine, Cysteine, Methionine, Proline

### **5. Cell Biology**

1. Mitosis in onion root tip
2. Identification of plant and animal cell
3. Meiosis in Flower

### **Reference Books:**

1. Jayaraman J - Manuals in Biochemistry - New Age International Publishers, 2011
2. Varley, Alan, Gowen lock - Practical Biochemistry, CBS Publishers 6<sup>th</sup> edition, 2002
3. David T Plummer - Practical Biochemistry. McGraw Hill Publishers, 3<sup>rd</sup> edition, 2005
4. Sawhney SK and Randhir Singh - Introductory Practical Biochemistry. Narosa Publishers, 2<sup>nd</sup> edition - 2001
5. Sadhana Sharma and Reema Sharma - Practical Manual of Biochemistry. Medtec publication, 1<sup>st</sup> edition, 2016

### SEMESTER III

#### UCBCD20 - BIOCHEMICAL TECHNIQUES

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	UCBCD20	Biochemical Techniques	Theory	Core	7	5	40+60=100

#### Objective:

To study about the principles and applications of biochemical techniques.

#### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Develop the ability to apply the principles of biochemical techniques
2. Compare the difference between various methods of chromatography
3. Explain how electrophoresis and centrifugation facilitates the separation of molecules
4. Analyse certain functionalities of bio molecules by using spectroscopic techniques
5. Compare natural and artificial radiation source and its importance

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	H	M	M
CO 3	H	H	H	H	M	M
CO 4	H	H	H	H	M	M
CO 5	H	H	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	H	M	M
CO 3	H	H	H	H	M	M
CO 4	H	H	H	H	M	M
CO 5	H	H	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(15 hours)

- 1.1 Expression of the concentration of solutes in solutions: Normality, Molarity, Molality, Mass concentration- Osmole- Acids, Bases, Buffers and pH (Definition and examples) (K1, K2, K3, K4)

- 1.2 Buffer system of the body – Henderson equation - Osmosis, Isotonic- Hypo and Hypertonic, Osmotic Pressure (VantHoff's Law) (K1, K2, K3, K4)
- 1.3 Surface tension and Viscosity: Biological importance (K1, K2, K3, K4)
- 1.4 pH Electrode (Hydrogen and Glass): Instrumentation, operation and application. (K1, K2, K3, K4)
- 1.5 Clark Oxygen Electrode: Instrumentation, operation and application. (K1, K2, K3, K4)
- 1.6 Colloids: Definition - Types and Application (K1, K2, K3)

**Unit II:** **(15 hours)**

- 2.1 Chromatography – General Principles- Paper and TLC: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)
- 2.2 Affinity chromatography: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)
- 2.3 Ion-exchange chromatography: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)
- 2.4 Molecular sieve chromatography: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)
- 2.5 Gas chromatography: Principle, instrumentation, operation and applications (K1, K2, K3, K4)
- 2.6 HPLC: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)

**Unit III:** **(15 hours)**

- 3.1 Electrophoresis- General Principles -Factors affecting electrophoretic mobility - Paper, Agarose and Starch Electrophoresis: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)
- 3.2 SDS-PAGE: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)
- 3.3 Isoelectric focusing and Capillary electrophoresis: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)
- 3.4 Centrifugation: Svedberg unit- Basic principle of centrifugation. (K1, K2)
- 3.5 Types of Centrifuges and Rotors (K1, K2)
- 3.6 Preparative and Analytical Ultra Centrifuges: Instrumentations and applications (Cell fractionation) (K1, K2, K3, K4)

**Unit IV:** **(15 hours)**

- 4.1 Spectroscopy: Fundamental principles of spectroscopy - Basic laws of absorption - Beer-Lambert's law - Principle and applications of Colorimetry (K1, K2, K3)
- 4.2 Ultra violet – Visible (UV-VIS) Spectrophotometry: Principle, instrumentation, operation and applications (K1, K2, K3, K4)
- 4.3 Infra-Red (IR) Spectrophotometry: Principle, instrumentation, operation and applications (K1, K2, K3, K4)
- 4.4 Fluorimetry: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)
- 4.5 Atomic absorption spectrometry (AAS): Principle, instrumentation, operation and applications. (K1, K2, K3, K4)

4.6 Flame Emission Spectroscopy (FES): Principle, instrumentation, operation and applications. (K1, K2, K3, K4)

**Unit V : ( 15 hours)**

- 5.1 Radio isotopic Techniques: Radioisotopes- Stable and Unstable, Units of Radioactivity, Types of Radioactivity (K1, K2, K3, K4)
- 5.2 Detection and measurement of radioactivity: Based on Gas ionization (K1, K2, K3, K4)
- 5.3 Detection and measurement of radioactivity: Based on Autoradiography (K1,K2 K3, K4)
- 5.4 Detection and measurement of radioactivity(Method based on excitation)(K1,K2,K3, K4)
- 5.5 Application of radioisotopes in biological science: (Isotope dilution technique, metabolic studies, radio dating) (K1, K2, K3)
- 5.6 Radiation hazards and safety aspects (K1, K2, K3)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyse]**

**Text Books:**

- 1. Keith Wilson and John Walker - Principles and Techniques of Practical biochemistry - 5<sup>th</sup> edition - Cambridge University,2005
- 2. Upadhyay, Upadhyay and Nath - Biophysical Chemistry: Principles and Techniques - 2<sup>nd</sup> edition - Himalaya Publishing House,2009

**Reference Books:**

- 1. Chatwal Anand - Instrumental methods of Analysis - Himalaya Publishing House,2011
- 2. Galen Wood Ewing - Instrumental methods of Chemical Analysis - 5th edition - McGraw Hill College
- 3. Robert D Braun - Introduction to Instrumental Analysis - Pharma Book Syndicate,2006
- 4. David Freifelder - Physical Biochemistry - 2nd edition - WH Freeman
- 5. Shawney SK and Randhir Singh - Practical Biochemistry - 2nd edition - Alpha Science,2005

**OPEN EDUCATIONAL RESOURCES (OER):**

- 1. <https://youtu.be/y7zbmlEaPAs>
- 2. <https://youtu.be/eCj0cRtJvJg>
- 3. [https://youtu.be/i\\_6y6Z5UvwE](https://youtu.be/i_6y6Z5UvwE)
- 4. <https://youtu.be/A9wmCsMiy70>
- 5. <https://youtu.be/QPHo5IFWgT0>
- 6. <https://youtu.be/VTHQYjkCqV0>
- 7. <https://youtu.be/A8EEH5Fyc8k>

## SEMESTER IV

### UCBCE20 – PHYSIOLOGY AND NUTRITION

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	UCBCE20	Physiology and Nutrition	Theory	Core	5	5	40+60=100

**Objectives:** To understand the homeostatic mechanism of each organ.

#### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Outline the mechanism of breathing and the circulatory system
2. Describe the basic components and functions of the digestive system
3. Compile the functions of the urinary system and the physiology of muscle
4. Explain the central and peripheral nervous system organization
5. Identify the nutrients in food and their functions in maintaining health

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	L	M	M
CO 2	H	M	H	L	M	M
CO 3	H	M	H	L	M	M
CO 4	H	M	H	L	M	M
CO 5	H	H	H	M	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	H	L	M	M
CO 2	H	M	H	L	M	M
CO 3	H	M	H	L	M	M
CO 4	H	M	H	L	M	M
CO 5	H	H	H	M	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:** **(15 hours)**

1.1 Respiratory system: Overview of respiratory system (K1, K2)

1.2 Exchange of Gases (K1, K2)

1.3 Circulation: Blood composition and Functions - Types of Blood cells –  
Morphology and Function (K1, K2)

- 1.4 ABO Blood Groups - Blood Coagulation (K1, K2)
- 1.5 Structure of Heart and Blood vessels (K1, K2)
- 1.6 Cardiac cycles - Blood pressure (Diastolic, Systolic and Normal Blood pressure) Normal ECG curve (K1, K2, K3)

**Unit II: (15 hours)**

- 2.1 Digestive System: Structure and function of different components of digestive system (K1, K2)
- 2.2 Carbohydrates: Digestion, Absorption and Nutritional significance (K1, K2, K3)
- 2.3 Lipids: Digestion, Absorption and Nutritional significance (K1, K2, K3)
- 2.4 Proteins: Digestion, Absorption and Nutritional significance (K1, K2, K3)
- 2.5 Role of Bile salts in Digestion and Absorption (K1, K2, K3)
- 2.6 Mechanism of HCl and Gastric juice formation in stomach (K1, K2, K3)

**Unit III: (15 hours)**

- 3.1 Excretory System: Structure of Kidney and Nephron - Composition of Urine (K1, K2)
- 3.2 Formation of Urine – Filtration, Active and passive transport of various substances and Secretion. (K1, K2, K3)
- 3.3 Muscle: Types of Muscle - Structure of Skeletal Muscle (K1, K2)
- 3.4 Mechanism of Muscle Contraction (K1, K2, K3)
- 3.5 Male reproductive system (K1, K2)
- 3.6 Female reproductive system (K1, K2)

**Unit IV: (15 hours)**

- 4.1 Nervous System: Brief outline of Nervous system – Nerve fibres (K1, K2)
- 4.2 Structure of Brain and Spinal Cord (K1, K2)
- 4.3 Synapses – Nerve Impulse – Action potential, Membrane potential, Types and Mechanism – Neurotransmitters (K1, K2, K3)
- 4.4 Composition and functions of CSF and Lymph (K1, K2, K3)
- 4.5 Eye: Structure and functions (K1, K2, K3)
- 4.6 Ear: Structure and functions (K1, K2, K3)

**Unit V: (15 hours)**

- 5.1 Nutrition: Nutrients - Balanced diet –Nutritional status - Food groups (K1, K2, K3)
- 5.2 Calorific value of food- Bomb calorimeter (K1, K2, K3, K4)
- 5.3 RQ: Definition and Measurement (K1, K2, K3, K4)

5.4 SDA: Definition and Measurement (K1, K2, K3, K4)

5.5 BMR: Definition and Measurement (K1, K2, K3, K4)

5.6 Adverse effects of Fast foods -Brief outline on the common adulterants in food (K1, K2)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]**

**Text Books:**

1. Ross, Wilson – Anatomy and Physiology in Health and illness – 13<sup>th</sup> edition – Elsevier, 2018
2. Swaminathan MS – Principles of Nutrition – Bappco publishers,2010

**Reference Books:**

1. Ganong – Review of Medical Physiology- 25<sup>th</sup> Edition – McGraw – Hill Education,2016
2. Davidson and Passmore – Human Nutrition and Dietetics – 8<sup>th</sup> edition – Churchill Livingstone
3. Skilis ME and Young VR – Modern Nutrition and Health Diseases, 2004
4. Chatterjee CC – Human Physiology- 11<sup>th</sup> edition - CBS publishers, 2019
5. Guyton and Hall – Textbook of Medical Physiology – 13<sup>th</sup> edition – 2016 Elsevier

**Open Educational Resources (OER)**

1. <https://youtu.be/XOGn4IKjcl8>
2. <https://youtu.be/kacMYexDgHg>
3. [https://youtu.be/\\_qmNCJxpsr0](https://youtu.be/_qmNCJxpsr0)
4. <https://www.youtube.com/watch?v=Og5xAdC8EUI>
5. <https://youtu.be/zVzgswdRRHA>
6. <https://www.youtube.com/watch?v=ousflrOzQHc>
7. <https://youtu.be/R5myMWxKD4k>
8. <https://youtu.be/YdlTLuweXv8>

**SEMESTER III & IV**  
**UCBCF20 MAIN PRACTICAL - II**

<b>Year/ Sem</b> II / IV	<b>Course Code</b> UCBCF20	<b>Title of the Course</b> Main Practical - II	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/ W</b> 3	<b>Credits</b> 5	<b>Marks</b> 40+60=100
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**Objective:**

To inculcate practical skill in biochemistry.

**Course Outcomes (CO)**

On completion of the course, the students will be able to;

1. Work safely and effectively in a laboratory
2. Implement experimental protocol, and adapt them to plan and carry out simple colorimetric estimation
3. Explain the basic principles involved in isolation of bio molecules from various source
4. Analyse, interpret and report the results of their biochemical experiments

<b>CO / PO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>
<b>CO 1</b>	H	H	H	H	M	M
<b>CO 2</b>	H	H	H	H	M	M
<b>CO 3</b>	H	H	L	H	M	M
<b>CO 4</b>	H	H	H	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

<b>CO / PSO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>CO 1</b>	H	H	H	H	M	M
<b>CO 2</b>	H	H	H	H	M	M
<b>CO 3</b>	H	H	L	H	M	M
<b>CO 4</b>	H	H	H	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**1. Safety Measures In The Laboratory – II**

**2. Colorimetric Estimation:**

1. Estimation of Carbohydrate by Anthrone method
2. Estimation of Fructose by Resorcinol method
3. Estimation of Protein by Biuret method
4. Estimation of Amino acids by Ninhydrin method

5. Estimation of Ascorbic acid
6. Estimation of Iron
7. Estimation of Inorganic phosphorous by Fiske & Subbarow method
8. Estimation of Tryptophan

### **3. Preparations:**

1. Preparation of Starch from potatoes
2. Preparation of Casein from Milk
3. Preparation of Lactalbumin from Milk
4. Preparation of Lecithin from egg yolk
5. Preparation of Albumin from Egg
6. Buffers: Phosphate Buffer, Citrate Buffer, Bicarbonate buffer and Tris buffer
7. Sols and Colloids

### **4. Biochemical Techniques:**

1. Paper Chromatography
2. Thin Layer Chromatography
3. Determination of pH of Saliva/ Urine
4. Agarose gel electrophoresis (Demonstration)
5. SDS - PAGE electrophoresis (Demonstration)

### **Reference Books:**

1. Jayaraman J - Manuals in Biochemistry - 4th edition - New Age International Publishers,2011
2. Varley and Alan H Gowen lock - Practical Biochemistry -6th edition - CBS Publishers,2002
3. David T Plummer - Practical Biochemistry - 3rd edition - McGraw Hill Publishers, 2005
4. Sawhney SK and Randhir Singh - Introductory Practical Biochemistry - 2nd edition - Narosa Publishers,2001
5. Praful B Godkar - Text book of Medical Laboratory Technology- 3rd edition - Volume I &II, Bhalani Publishing House,2014

## SEMESTER V

### UCBCG20 - ENZYMES AND INTERMEDIARY METABOLISM

Year/ Sem III / V	Course Code UCBCG20	Title of the Course Enzymes and Intermediary Metabolism	Course Type Theory	Course Category Core	H/W 6	Credits 6	Marks 40+60=100

#### Objective:

To impart knowledge about the enzymes and the metabolism of biomolecules and its interrelationship.

#### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Describe the properties, hypothesis and IUB classification of enzymes
2. Discuss the kinetics of enzyme catalyzed reactions, enzyme immobilization and applications of enzymes and their future potential
3. List the major pathways of carbohydrates metabolism and discuss their bioenergetics and regulation
4. Compile the catabolism of amino acid and metabolism of lipids with their significance
5. Revise the metabolic activity of tissues and organ with their function

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit 1:** (18 hours)

- 1.1 Enzymes - Nomenclature and IUB classification. (K1, K2, K3, K4, K5, K6)
- 1.2 Enzymes: Properties and Specificity (K1, K2, K3, K4, K5, K6)
- 1.3 Salient features of active site. (K1, K2, K3, K4, K5, K6)
- 1.4 Enzyme units (IU, Katal and Turnover number) (K1, K2, K3, K4, K5, K6)
- 1.5 Lock and key hypothesis and induced fit theory (K1, K2, K3, K4, K5, K6)
- 1.6 Collision theory (K1, K2, K3, K4, K5, K6)

**Unit II:** (18 hours)

- 2.1 Kinetics of single and bi substrate enzyme catalyzed reaction (K1, K2, K3, K4, K5, K6)
- 2.2 Catalysis-mechanism of reactions involving acid-base catalysis, electrostatic catalysis and Covalent catalysis (K1, K2, K3, K4, K5, K6)
- 2.3 Co-enzymes -NAD<sup>+</sup>, FMN, Co-ASH, Pyridoxyl phosphate, Biotin, FH 4 - Structure and Functions (K1, K2, K3, K4, K5, K6)
- 2.4 Enzyme Inhibition- Competitive, Non- competitive and Uncompetitive inhibition – Irreversible inhibition – Suicidal Inhibitors (K1, K2, K3, K4, K5, K6)
- 2.5 Various methods of immobilization (K1, K2, K3, K4, K5, K6)
- 2.6 Industrial and Medical applications of Enzyme (K1, K2, K3, K4)

**Unit III:** (18 hours)

- 3.1 Carbohydrate metabolism: Glycolysis - Role of PDH complex - Citric acid cycle (Pathway, Key enzymes and Regulation) Amphibolic role of TCA cycle (K1, K2, K3, K4, K5, K6)
- 3.2 Glycogenesis – Glycogenolysis: Pathway, Key enzymes and Regulation (K1, K2, K3, K4, K5, K6)
- 3.3 Gluconeogenesis: Pathway, Key enzymes and Regulation (K1, K2, K3, K4, K5, K6)
- 3.4 Pentose phosphate pathway: Pathway, Key enzymes and Regulation (K1, K2, K3, K4, K5, K6)
- 3.5 Metabolism of Galactose and Fructose - High energy compounds (K1, K2, K3, K4, K5, K6)
- 3.6 Electron transport chain, Oxidative Phosphorylation, Uncoupler and Inhibitors (K1, K2, K3, K4, K5, K6)

**Unit IV:** (18 hours)

- 4.1 Fate of Dietary proteins - Catabolism of amino acids -Oxidative and non-oxidative deamination – Transamination (K1, K2, K3, K4, K5, K6)
- 4.2 Decarboxylation and Urea cycle (K1, K2, K3, K4, K5, K6)
- 4.3 Fate of dietary lipids – Biosynthesis fatty acids (K1, K2, K3, K4, K5, K6)
- 4.4  $\alpha$ ,  $\beta$ ,  $\omega$ - Oxidation of fatty acids-Energetic of  $\beta$  Oxidation (K1, K2, K3, K4, K5, K6)
- 4.5 Biosynthesis of Cholesterol. (K1, K2, K3, K4, K5, K6)
- 4.6 Biosynthesis of TG and Phospholipids (K1, K2, K3, K4, K5, K6)

**UNIT V:****(18 hours)**

- 5.1 Nucleic acid metabolism: Fate of dietary nucleic acid (K1, K2, K3, K4, K5, K6)
- 5.2 Purine: Biosynthesis (K1, K2, K3, K4, K5, K6)
- 5.3 Pyrimidine: Biosynthesis (K1, K2, K3, K4, K5, K6)
- 5.4 Degradation of Purine and Pyrimidine nucleotides - Inhibitors of nucleotide biosynthesis (K1, K2, K3, K4, K5, K6)
- 5.5 Interrelationship of carbohydrates, proteins and fat metabolism (K1, K2, K3, K4, K5, K6)
- 5.6 Detoxification - Conjugation, Hydrolysis, Reduction and Oxidation (K1, K2, K3, K4, K5, K6)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create]**

**Text Books:**

1. Robert K Murray - Harper's Illustrated Biochemistry - 31<sup>st</sup> edition - McGraw Hill, 2018
2. Satyanarayana U - Biochemistry- 5<sup>th</sup> edition - Elsevier, 2017
3. Trevor Palmer and Philip Bonner - Enzymes: Biochemistry, Biotechnology and Clinical Chemistry, 1<sup>st</sup> edition - Horwood Publishing, Chichester 2008

**Reference Books:**

1. David L Nelson Michael M cox - Lehninger's Principles of Biochemistry - 8th edition - W H Freeman and co, 2021.
2. Davidson and Sittman - Biochemistry- NMS- 4<sup>th</sup> edition - Lippincott Williams and Wilkins
3. Donald Voet and Judith G Voet - Biochemistry- 4<sup>th</sup> edition - CBS Publishers and Distributers -2011
4. Jeremy M Berg, John L Tymoczko, Stryer L -Biochemistry -7<sup>th</sup> edition - W H Freeman 2011
5. Christopher K Mathews, KE Van Holde, Kevin G Ahern - Biochemistry - 3<sup>rd</sup> edition – Pearson Education, 2000

**OPEN EDUCATIONAL RESOURCES (OER):**

1. [https://youtu.be/pVoytz\\_3H\\_s](https://youtu.be/pVoytz_3H_s)
2. [https://youtu.be/sL\\_iEOuvK80](https://youtu.be/sL_iEOuvK80)
3. <https://youtu.be/i8CC8pmtAp4>
4. <https://youtu.be/9kcrJZNFslw>
5. <https://youtu.be/fJScSmrR1MI>

## SEMESTER V

### UCBCH20 – ENDOCRINOLOGY

Year/ Sem	Course Code	Title of The Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UCBCH20	Endocrinology	Theory	Core	5	6	40+60=100

#### Objective:

Endocrinology describes in detail the role of endocrine glands, their secretion and its regulatory effect on metabolic activities to maintain homeostasis.

#### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Identify the various endocrine glands, morphology and their relevant hormones secreted
2. Know the chemical nature and structure of Hormones
3. Demonstrate the mechanisms of hormone action
4. Explain the functions of hormones
5. Analyze the clinical disorders of hormones

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	M
CO 2	H	H	H	M	H	H
CO 3	H	H	M	H	H	H
CO 4	H	M	H	M	H	M
CO 5	H	H	M	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	M	M	M	H	M	M
CO 2	H	H	H	M	H	H
CO 3	M	H	M	H	M	H
CO 4	H	M	H	M	H	M
CO 5	H	H	M	H	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:** (15 Hours)

- 1.1 Glands- types of glands-General features and functions of Endocrine system (K1, K2, K3)
- 1.2 Definition of Hormones, Effector cell, target cell, Hormone target relationship (K1, K2, K4)
- 1.3 Classification of hormones based on Solubility, types of receptors, mechanism of action, (K1, K2, K3)
- 1.4 Steroid and protein hormones- Salient features, Biosynthesis, Secretion, Storage (K2, K3, K4, K5, K6)
- 1.5 Steroid and protein hormones (cAMP and tyrosine kinase) - transport and Mechanism of action (K3, K4, K5, K6)
- 1.6 Structure and types of Receptors (K1, K2, K3)

**Unit II:** (15 Hours)

- 2.1 Hypothalamus – Structure (K1, K2, K3)
- 2.2 Pituitary Gland – Structure (K1, K2, K3)
- 2.3 Anterior pituitary hormones -TSH, ACTH, LH, FSH, growth hormone, prolactin - Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Function (K3, K4, K5, K6)
- 2.4 Posterior pituitary hormones - Vasopressin, Oxytocin - Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Function (K3, K4, K5, K6)
- 2.5 Hypothalamic releasing factors (K1, K2, K3)
- 2.6 Pituitary Gland disorders - Gigantism, Acromegaly, Dwarfism (Etiology, Clinical features) (K1, K2, K3)

**Unit III** (15 Hours)

- 3.1 Thyroid Gland – Structure (K1, K2)
- 3.2 Parathyroid Gland – Structure (K1, K2)
- 3.3 Thyroid hormones – T3 and T4: Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Function (K3, K4, K5, K6)
- 3.4 Calcium regulating hormones – PTH and Calcitonin - Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Function (K3, K4, K5, K6)
- 3.5 Thyroid gland disorders -Goiter, Grave's disease, Hashimoto's disease (Etiology, Clinical features) (K1, K2, K3)
- 3.6 Functions of atrial natriuretic peptide (heart), hormones of pregnancy- human chorionic gonadotropin (placenta), Erythropoietin and renin (kidneys), leptin and resistin (adipose tissue), Thymosin (thymus gland) (K1, K2, K3, K4)

**Unit IV:** (15 Hours)

- 4.1 Pancreas – Structure (K1, K2)
- 4.2 Dual Function of the Pancreatic Gland (K1, K2, K3)
- 4.3 Pancreatic Hormones: Insulin - Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Function (K3, K4, K5, K6)
- 4.4 Pancreatic Hormones: Glucagon - Biosynthesis, Secretion, Storage, Transport,

Mechanism of action and Function (K3, K4, K5, K6)

4.5 Disorders of Pancreatic Hormone: Diabetes mellitus, Hyperglycemia and Hypoglycemia (K1, K2, K3)

4.7 Gastro Intestinal hormones (K1, K2, K3, K4)

#### **Unit V:**

**(15 Hours)**

5.1 Adrenal Gland – Anatomy (K1, K2)

5.2 Gonads – Structure (K1, K2)

5.3 Adrenal medullary hormones- Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Function (K3, K4, K5, K6)

5.4 Adrenal cortex hormones - Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Function (K3, K4, K5, K6)

5.5 Disorders of Adrenal hormones: Addison's disease, Cushing syndrome (Etiology, Clinical features) (K1, K2, K3)

5.6 Gonadal Hormones - Androgens, Estrogens, Progesterone - Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Function (K2, K3, K4, K5, K6)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]**

#### **Text Books:**

1. Prakash S Lohar- Endocrinology- Hormones and Human Health- MJP Publishers,2007
2. Lippincott W and Wilkins - Manual of Endocrinology and Metabolism- 5<sup>th</sup> edition – 2018

#### **Reference Books:**

- 1.Charles GD Brook and Nicholas J Marshall- Essential Endocrinology - New Age International Publishers,4<sup>th</sup> edition -2006
- 2.Franklyn F B - Molecular Endocrinology - Elsevier Publication, 3<sup>rd</sup> edition -2006
- 3.Maurice GH- Basic Medical Endocrinology-Elsevier Publication, 4<sup>th</sup> edition -2009
- 4.Ashok Kumar B- Mammalian Endocrinology - New Central book Agency, 3<sup>rd</sup> edition - 2008
5. White, Handler Smith - Mammalian Biochemistry-McGraw Hill, 7<sup>th</sup> edition -2008

#### **Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=YcPicFL5Jnw>
2. <https://www.youtube.com/watch?v=pMn4nlYzTm8>
3. <https://www.youtube.com/watch?v=rQsfhSbK53s>
4. <https://www.youtube.com/watch?v=S95FSQ6ACsI>
5. <https://www.youtube.com/watch?v=JII5N2N4d-k>
6. <https://www.youtube.com/watch?v=Cvb1L9cejJ8>

## SEMESTER-V

### UEBCA20- ELECTIVE I A: IMMUNOLOGY

Year / Sem	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
III/V	UEBCA20	Elective I A: Immunology	Theory	Elective I A	5	5	40+60=100

#### Objective:

To help the students to understand the components of Immune system

#### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Outline the cell types and organ present in the immune response
2. Identify the role of MHC antigens
3. Discuss the basic techniques of antigen and antibody interactions
4. Compare the spectrum of autoimmune diseases
5. Explain the stages of transplantation

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	M
CO 2	L	L	H	M	H	L
CO 3	M	H	M	L	H	M
CO 4	H	M	H	M	L	H
CO 5	M	H	L	H	M	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	M	M	H
CO 2	H	M	L	M	M	M
CO 3	H	H	H	H	H	H
CO 4	H	M	M	M	H	M
CO 5	H	H	M	H	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(15 Hours)

- 1.1 Lymphoid Organs-Primary Lymphoid organs—Structure of Thymus and Bone marrow (K1, K3)
- 1.2 Secondary Lymphoid organs -Structure of Lymph node, Spleen (K2)
- 1.3 Cells involved in immune system -Morphology, secretions and functions (K3)
- 1.4 Immunity-Innate immunity and Acquired immunity (K2)
- 1.5 Immuno techniques: RIA-Types, advantages and disadvantages (K1, K4)
- 1.6 ELISA- Types - Direct, Indirect, Competitive ELISA (K2)

**Unit II:** (15 Hours)

- 2.1 Antigens: Essential features (K1, K2)
- 2.2 Epitopes, Haptens and Adjuvants (K1, K2)
- 2.3 Types of MHC antigens (K3)
- 2.4 Antibodies: Types, structure, properties and biological functions (K2, K4)
- 2.5 Clonal Selection theory (K3)
- 2.6 Production and applications of monoclonal antibodies (K3, K4)

**Unit III:** (15 Hours)

- 3.1 Antigen - antibody interactions: Precipitation reaction (K2, K4)
- 3.2 Agglutination (K2, K3)
- 3.3 Complement fixation, Lysis, and Opsonization (K3, K4)
- 3.4 Fluorescent antibody technique (K2, K4)
- 3.5 Immunoblotting technique (K2, K4)
- 3.6 Immuno electrophoresis with their types (K2, K3, K4)

**Unit IV:** (15 Hours)

- 4.1 Complement- Salient features, Classical pathway and Alternative pathway (K2, K4)
- 4.2 Humoral immunity and Cell mediated immunity (K2, K4)
- 4.3 Autoimmunity- Pathogenesis of Graves diseases and Myasthenia gravis -etiology, clinical features and treatment (K2, K3)
- 4.4 Rheumatoid arthritis and Systemic lupus erythematosus (SLE) -Etiology, clinical features and treatment (K2, K3)
- 4.5 Multiple Sclerosis -Etiology, clinical features and treatment (K2, K3)
- 4.6 Corona -Etiology, clinical features and treatment (K2)

**Unit V:** (15 Hours)

- 5.1 Transplantation immunology: Types of grafts (K3)
- 5.2 Mechanism of allograft rejection (K3, K4)
- 5.3 Hypersensitivity-factors affecting hypersensitivity (K1, K3)
- 5.4 Hypersensitivity type I-Mechanism (K2, K3)
- 5.5 Hypersensitivity type II, III Mechanism (K3)
- 5.6 Hypersensitivity type IV- Mechanism (K3)

[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]

**Text Books:**

- 1. Kuby J -Immunology - W H Freeman Company, New York, 8<sup>th</sup> edition ,2022
- 2. Dulsy Fathima and Arumugam- Immunology- Saras Publication ,2014

**Reference Books:**

- 1. Tizard L R -Immunology, Saunders 13<sup>th</sup> edition ,2017
- 2. Eli Benjamin -Immunology: A Short Course, Wiley Liss, 8<sup>th</sup> edition ,2021
- 3. Roitt -Essential Immunology -Blackwell Science, 12<sup>th</sup> edition ,2015
- 4. Raj Khanna-Immunology- Oxford University Publication, 3<sup>rd</sup> edition , 2011

5. Ramesh - Essential Immunology - Mc Graw Hill India Publishers,2017

**Open Educational Resources (OER):**

1. <https://youtu.be/lgapzgPAsZ0>
2. <https://youtu.be/8iyrbv1JauY>
3. [https://youtu.be/Ll\\_7z4YS2Ak](https://youtu.be/Ll_7z4YS2Ak)
4. <https://youtu.be/3XszVyYWZJE>
5. <https://youtu.be/2HPWIgzeRCs>

## SEMESTER V

### UEBCB20 - ELECTIVE I B: ENVIRONMENTAL TOXICOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	UEBCB20	Environmental Toxicology	Theory	Elective- I B	5	5	40+60=100

#### Objective:

To understand the basics in toxicological aspects that effects the environment.

#### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Explain the properties of pollutants, effects, origin and occurrence in the environment
2. Use clinical and laboratory findings in the treatment of acute toxic exposures
3. Compare and interpret the results of occupational exposure assessments within the context of safety assessments
4. Identify signs and symptoms of important toxic syndromes
5. Discuss the role of poison information services and systems for the surveillance of Poisoning

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	M
CO 2	H	H	H	M	H	M
CO 3	H	H	M	H	H	M
CO 4	H	M	H	M	H	M
CO 5	H	H	M	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	M	M	H
CO 2	H	M	L	M	M	M
CO 3	H	H	H	H	H	H
CO 4	H	M	M	M	H	M
CO 5	H	H	M	H	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(15 hours)

- 1.1 Definition and scope of toxicology (K1, K2, K3)
- 1.2 Eco-toxicology and its environment significance (K1, K2, K3)
- 1.3 Basis for general classification and nature, dose - response relationship (K1, K2)
- 1.4 Synergism and Antagonism, Determination of ED<sub>50</sub> and LD<sub>50</sub> (K1, K2)
- 1.5 Acute and chronic exposures. Factors influencing toxicity (K1, K2)
- 1.6 Pharmaco dynamics & Chemo dynamics (K1, K2)

**Unit II: (15 Hours)**

- 2.1 Principles and procedures of testing for acute toxic effects (K1, K2, K4)
- 2.2 Regulators guidelines, mammalian systems affected and the clinical signs (K1, K2, K3)
- 2.3 Factors affecting acute toxicity studies. Biochemical basis of toxicity (K1, K2)
- 2.4 Mechanism of toxicity: disturbance of excitable membrane function altered calcium homeostasis (K1, K2)
- 2.5 Covalent binding to cellular macromolecules (K1, K2)
- 2.6 Tissue specific toxicity (K1, K2)

**Unit III: (15 Hours)**

- 3.1 Toxicity testing: Test Protocol, Genetic Toxicity Testing (K1, K2, K4)
- 3.2 Mutagenesis Assays: In-vivo test systems- Bacterial Mutation Tests: Reversion Tests, Ames test, Fluctuation Tests (K1, K2, K4)
- 3.3 Use of drosophila in toxicity testing. (K1, K2, K4)
- 3.4 DNA repair assays. (K1, K2, K4)
- 3.5 Chromosome damage test. (K1, K2, K4)
- 3.6 Toxicological evaluation of Recombinant DNA –Derived Proteins. (K1, K2)

**Unit IV: (15 Hours)**

- 4.1 Food toxicology: Toxin and Toxicants (K1, K2)
- 4.2 Toxicology of food additives. (K1, K2, K3)
- 4.3 Metal toxicity: Toxicology of Arsenic and Mercury (K1, K2, K3)
- 4.4 Metal contamination and human disease (K1, K2)
- 4.5 Environmental Factors Affecting Metal Toxicity- Effect of Light, Temperature & P<sup>H</sup> (K1, K2)
- 4.6 Diagnosis of toxic changes in liver and kidneys (K1, K2, K4)

**Unit V: (15 Hours)**

- 5.1 Air Pollution: Common Air Pollutants And Their Sources (K1, K2)
- 5.2 Air Pollution & Ozone. (K1, K2)
- 5.3 Air Pollution Due To Chlorofluorocarbons (CFCS) And Asbestos. (K1, K2, K3)
- 5.4 Occupational Toxicology And Assessment Of Occupational Hazards (K1, K2)
- 5.5 An Overview Of Regulatory Agencies: Responsibilities Of Regulatory Agencies. (K1, K2, K3)
- 5.6 Management of toxicological risks. (K1, K2)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]**

**Text Books:**

1. Tyler Miller G and Scott E. Spoolman, Environmental Science, 16th edition, Cengage learning, 2018
2. Principles of Forensic Medicine & Toxicology 2<sup>nd</sup> edition – Rajesh Bardale , 3<sup>rd</sup> edition, 2021.

**Reference Books:**

1. Casarett and Doull's Toxicology, 4<sup>rd</sup> edition - Klaassen C D, Amdur M O & Doull J - Macmillan publishing company, New York, 2021
2. Williams P L & Burson J L Van- Nostrand Reinhold - Industrial Toxicology - New York, 1985
3. Hayes A W - Principles and methods of toxicology, 2<sup>nd</sup> edition Raven press New York - 1988
4. Stewart C P & Stolman A - Toxicology, Vol I Academic press, New York, 1960
5. George Tyler Miller, Jr. and Scott Spoolman, Living in the Environment – Principles, Connections and Solutions, 17th Edition, Brooks/Cole, USA, 2012.

**Open Educational Resources (OER):**

1. <https://youtu.be/O4VMW52gx90>
2. <https://youtu.be/fEibDPQRbMc>
3. <https://youtu.be/FTPscvo4H0Y>
4. [https://youtu.be/QwFl\\_PbEj1E](https://youtu.be/QwFl_PbEj1E)
5. <https://youtu.be/mMEb5pzY6wI>

## SEMESTER V

### USBCC520 – SBE: ENTREPRENEURIAL BIOCHEMISTRY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / V	USBCC520	Entrepreneurial Biochemistry	Theory	Skill Based Elective III	2	2	40+60=100

#### Objective:

To understand the concept of entrepreneurship

#### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Explain the theory of entrepreneurship and its practical implementation
2. Explore and experience the joy of creating small business ideas
3. Identify strategic marketing planning and mobilize resources for future growth, development and protection of their enterprise
4. Implement market opportunities into business plan
5. Re-construct and build a mindset focusing on unique approach to market opportunities

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	M
CO 2	H	H	H	M	H	M
CO 3	H	H	M	H	H	M
CO 4	H	M	H	M	H	M
CO 5	H	H	M	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	M	M	H
CO 2	H	M	L	M	M	M
CO 3	H	H	H	H	H	H
CO 4	H	M	M	M	H	M
CO 5	H	H	M	H	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

**(6 Hours)**

- 1.1 Entrepreneurship - concept (K1, K2)
- 1.2 Entrepreneurship - Need and importance (K1, K2, K3)
- 1.3 Types of entrepreneur (K1, K2)

- 1.4 Characters of entrepreneur (K1, K2, K3)
- 1.5 Entrepreneurial values (K1, K2, K3)
- 1.6 Role of society and family in the growth of an entrepreneur. (K1, K2, K4)

**Unit II: (6 Hours)**

- 2.1 Business ideas (K1, K2)
- 2.2 Methods of generating ideas (K1, K2, K3)
- 2.3 Feasibility study and Opportunity assessment (K1, K2, K4)
- 2.4 Business plan preparation and Execution (K1, K2, K3)
- 2.5 Project report - Patent registration process (K1, K2, K4)
- 2.6 Challenges faced by women in entrepreneurship (K1, K2, K4)

**Unit III: (6 Hours)**

- 3.1 Institutional Support System and Government schemes for Entrepreneurs (K1, K2, K3)
- 3.2 Central Government Support system MSME – NABARD – SIDO – NSIC – KVIC –DIC (K1, K2, K3)
- 3.3 Start-up India - Make in India (K1, K2, K3)
- 3.4 Supports to Training and Employment Programme for Women (STEP) (K1, K2, K3)
- 3.5 Biotechnology Industry Research Assistance Council (BIARC). (K1, K2, K3)
- 3.6 Export- Packing licence- Marketing (K1, K2, K3)

**Unit IV: (6 Hours)**

- 4.1 Organic Farming (K1, K2, K3)
- 4.2 Preparation of value-added product from dairy farms (K1, K2, K3)
- 4.3 Food processing (K1, K2, K3)
- 4.4 Mushroom cultivation (K1, K2, K3)
- 4.5 Compost fertilizer production - Vermi compost (K1, K2, K3)
- 4.6 Biopesticide manufacturing. (K1, K2, K3)

**Unit V: (6 Hours)**

- 5.1 Health drinks preparation (K1, K2, K3)
- 5.2 Seasonal juice preparation (K1, K2, K3)
- 5.3 Homemade cakes and cookies (K1, K2, K3)
- 5.4 Homemade chocolates (K1, K2, K3)
- 5.5 Handmade soaps (K1, K2, K3)
- 5.6 Herbal preparation (Herbal incense) (K1, K2, K3)

[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]

**Text Books:**

**Note:** The study materials will be provided by the Department

**Reference Books:**

1. Jayashree Suresh - Entrepreneurial Development 1<sup>st</sup> edition – Margham Publication, 2016
2. Bygrave W., & Zacharakis, A, Entrepreneurship, 4<sup>th</sup> edition Wiley, 2017
3. Rajeev Roy, Entrepreneurship 2<sup>nd</sup> edition, Oxford University Press,2011
4. Khanka S.S., Entrepreneurial Development S. Chand & Co.Ltd., Ram Nagar, Newdelhi, 2013.
5. Donald F. Kuratko, Entrepreneurship – Theory, Process and Practice, 9<sup>th</sup> Edition, Cengage learning 2014.

**Open Educational Resources (OER):**

1. <https://youtu.be/92ZmzD70sOU>
2. <https://youtu.be/Fqch5OrUPvA>
3. [www.businessmanagementideas.com](http://www.businessmanagementideas.com)
4. <https://msme.gov.in/all-schemes>
5. <https://youtu.be/y0ux7mYJXcs>
6. <https://youtu.be/Z82rct0pknk>

**SEMESTER VI**  
**UCBCI20 - MOLECULAR BIOLOGY**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	UCBCI20	Molecular Biology	Theory	Core	6	6	40+60=100

**Objective:**

To make a study on life and the information centers called genes.

**Course Outcomes (CO):**

On completion of the course, the students will be able to;

1. Demonstrate the nature of Genes
2. Analyze the blueprint of life
3. Describe the mechanism of replication
4. Illustrate the mechanism of Transcription
5. Demonstrate the features of Genetic code and mechanism of Translation

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	M	H
CO 2	H	H	H	H	H	M
CO 3	H	H	M	M	H	H
CO 4	H	M	H	M	H	H
CO 5	H	H	M	H	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	M	M	M	H
CO 2	H	H	H	H	H	M
CO 3	H	H	H	H	M	M
CO 4	H	H	H	H	H	H
CO 5	H	M	H	H	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(18 Hours)**

- 1.1 Genetics- Mendel's laws of inheritance, test cross, back cross and law of incomplete dominance (K1, K2, K3, K4)
- 1.2 Genomic organization of prokaryotes cells (K1, K2, K3, K4)
- 1.3 Genomic organization of eukaryotic cells (K1, K2, K3, K4)
- 1.4 Genetic Material – DNA and RNA, Evidences for DNA as genetic material - Griffith,

Avery et al and Hershey chase experiments (K1, K2, K3, K4)

1.5 Central dogma of molecular genetics (K1, K2, K3, K4)

1.6 Repetitive DNA (K1, K2, K3, K4)

**Unit II:** (18 Hours)

2.1 Prokaryotic replication: Modes of replication (K1, K2)

2.2 Semi conservative replication - Experimental evidences (K1, K2)

2.3 Process of Prokaryotic replication - Initiation, Elongation and Termination (K1, K2)

2.4 Enzymes and proteins involved in replication (K1, K2)

2.5 Inhibitors of replication (K1, K2)

2.6 DNA repair - Overview (K1, K2)

**Unit III:** (18Hours)

3.1 Prokaryotic transcription: Promoters (K1, K2)

3.2 Process of transcription- Initiation, Elongation & Termination (K1,K2, K3,K4)

3.3 Enzymes and proteins involved in transcription (K1, K2)

3.4 Inhibitors of transcription (K1, K2)

3.5 Post transcriptional processing of rRNA and tRNA in prokaryotes (K1, K2)

3.6 Reverse transcription (K1, K2)

**Unit IV:** (18 Hours)

4.1 Genetic code dictionary - General features, Wobble hypothesis (K1, K2)

4.2 Composition of prokaryotic ribosome (K1, K2)

4.3 Composition of eukaryotic ribosome (K1, K2)

4.4 Process of protein synthesis in prokaryotes - Initiation, Elongation and Termination (K1,K2, K3, K4)

4.5 Inhibitors of protein synthesis in prokaryotes (K1, K2)

4.6 Post translational modification (K1, K2)

**Unit V:** (18 Hours)

5.1 Regulation of gene expression in prokaryotes: Operon concept - lac operon (K1, K2)

5.2 Mutation: Definition, Classification with example (K1, K2)

5.3 An overview of Genomics (K1, K2)

5.4 An overview of Proteomics (K1, K2)

5.5 Chromosome mapping, Human Genome Project (K1, K2)

5.6 DNA micro arrays, DNA fingerprinting and foot printing (K1, K2)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyse]**

**Text Books:**

1. Lehninger, David Nelson and M Chael M Cox - Principles of Biochemistry - WH Freeman and Company Ltd, 5th edition -2009
2. David Friefelder - Molecular Biology- Narosa Publishing House, 2nd edition -2008

**Reference Books:**

1. Lodish, Darnell and Baltimore - Molecular Cell Biology - WH Freeman and Company, 4th edition -2000
2. Brown TA - Gene Cloning- Blackwell Science, 8th edition -2018
3. Benjamin Lewin - Gene VIII - Pearson Education International, 8th edition -2018
4. David Friefelder - Molecular Biology -Narosa Publishing House, 2nd edition -2008
5. Veer Bala Rastogi - Principles of Molecular Biology ,4th edition - 2016
6. Batiza Ann. Bioinformatics, Genomics, and Proteomics (English, Hardcover, Batiza Ann), Chelsea House Publishers, 2005

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=0yBD0xKbcVU>
2. <https://www.youtube.com/watch?v=gZAw7pahzMM>
3. <https://www.youtube.com/watch?v=k4AI4UipziI>
4. <https://www.youtube.com/watch?v=gvYJaPpkSZg>
5. <https://www.youtube.com/watch?v=xYOK-yzUWSI>

## SEMESTER- VI

### UEBCC20- ELECTIVE II A: CLINICAL BIOCHEMISTRY

Year / Sem	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
III/VI	UEBCC20	Clinical Biochemistry	Theory	Elective II A	5	6	40+60=100

#### Objective

To understand the biochemical basis of various diseases and disorders

#### Course Outcomes (CO):

On completion of the course, the students will be able to;

1. Discuss the disorders of carbohydrate metabolism
2. Outline the role of serum lipids
3. Describe the types of jaundice and serum enzyme activities in diseases
4. Identify various renal disorders and examination of gastric residuum
5. Compare the application of diagnostic enzymes

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	M	H
CO 2	H	H	H	H	H	M
CO 3	H	H	M	M	H	H
CO 4	H	M	H	M	H	H
CO 5	H	H	M	H	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	M	M	M	H
CO 2	H	H	H	H	H	M
CO 3	H	H	H	H	M	M
CO 4	H	H	H	H	H	H
CO 5	H	M	H	H	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(15 Hours)

- 1.1 Regulation of Blood Glucose level - Hypoglycemia and Hyperglycemia, renal threshold value and Tubular maximum reabsorption of Glucose (TmG) (K1, K2)
- 1.2 Diabetes mellitus - Types, Etiology, Clinical features, Complications and Management- Diabetic ketoacidosis (K2, K3)
- 1.3 Significance of fasting and post prandial blood glucose (K1, K2)
- 1.4 Glucose tolerance test and Glycosylated Hb (K2, K4)
- 1.5 Galactosemia - Fructosuria – Lactose intolerance (K2, K3)

## 1.6 Glycogen storage diseases (K2, K4)

### **Unit II: (15 Hours)**

- 2.1 Lipoproteins- Types and function, Elementary details of Hypo and Hyper lipoproteinemia (K1, K2)
- 2.2 Atherosclerosis and Ischemic Heart disease (K2, K3)
- 2.3 Factors affecting Blood Cholesterol level, Hypercholesterolemia (K2, K3, K4)
- 2.4 Fatty liver-types and treatment, Cirrhosis (K2, K4)
- 2.5 Inborn errors of Amino acid Metabolism- Phenylketonuria, Alkaptonuria (K2, K3)
- 2.6 Inborn errors of Amino acid Metabolism-Cystinuria, Hemophilia, Albinism (K2, K3)

### **Unit III: (15 Hours)**

- 3.1 Metabolism of Bilirubin (K2, K3)
- 3.2 Jaundice – Types: Haemolytic jaundice, Obstructive jaundice, Hepatic jaundice (K3, K4)
- 3.3 Liver function test based on abnormalities of pigment metabolism - Vandenbergh reaction and Urine bilirubin (K3)
- 3.4 Galactose tolerance test (K2, K3)
- 3.5 BSP test (K3, K4)
- 3.6 Prothrombin time (K1, K3)

### **Unit IV: (15 Hours)**

- 4.1 Kidney diseases -Glomerulonephritis, Nephrotic syndrome - Etiology, clinical features, diagnosis and treatment (K2, K3)
- 4.2 Clearance- Definition and types, Renal function tests based on glomerular filtration urea and creatinine clearance (K2, K3)
- 4.3 Renal plasma flow (PAH test) and Tubular function- Phenol sulphathelein test (K3)
- 4.4 Gastric function test – Collection and Examination of gastric contents (K3, K4)
- 4.5 FTM– Collection and Examination of gastric contents (K3)
- 4.6 Stimulation test- Alcohol, Caffeine and Histamine (K2, K3)

### **Unit V: (15 Hours)**

- 5.1 Assessment of Cell Damage and Proliferation – Localization of Damage – Nonspecific causes of Raised plasma Enzyme activities (K2, K3)
- 5.2 Enzymes of Diagnostic importance- Aspartate transaminase, Alanine transaminase, Lactate Dehydrogenase, Creatinine Kinase (K2, K3)
- 5.3 Enzymes of Diagnostic importance – Amylase, Acid phosphatase, Alkaline phosphatase (K2, K4)
- 5.4 Enzymes of Diagnostic importance -Streptokinase,  $\gamma$  Glutamyl transferase, Aldolase (K2, K4)
- 5.5 Cancer: Etiology- Morphological changes in Tumour cells (K4)
- 5.6 Tumour markers - AFP, CEA HCG (K4)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]**

**Text Books:**

1. Chatterjea MN and Rana Shinde -Text Book of Medical Biochemistry - Jaypee Brothers-Medicinal Publishers Ltd,8<sup>th</sup> edition -2012
2. Kaplan L A, Perce A J, Steven C Kazmierczak - Clinical Chemistry - 5<sup>th</sup> edition - 2009

**Reference Books:**

1. Carl A Burtis, Edward R Ashwood-Tietz-Fundamentals of Clinical Chemistry - Harcourt Private Limited, 8<sup>th</sup> edition -2017
2. Davidson and Henry-Clinical Diagnosis by Laboratory Methods - 19<sup>th</sup> edition -2005
3. A H Gowen lock, -Varley's Practical Clinical Biochemistry - 5<sup>th</sup> edition - 2009
4. Philip D Mayne - Clinical Chemistry in Diagnosis and Treatment - ELST Publishers, 6<sup>th</sup> edition
5. Thomas M Devlin- Practical Clinical Biochemistry - 6<sup>th</sup> edition – 2006

**Open Educational Resources (OER):**

1. <https://youtu.be/LuVcPNF5Slg>
2. <https://youtu.be/wytTRDz8syo>
3. <https://youtu.be/c4CvXTYimck>
4. <https://www.youtube.com/watch?v=RwvbO-40xvw>
5. <https://www.youtube.com/watch?v=1S8XpJ1UVVM>

**SEMESTER-VI**  
**UEBCD20- PHARMACOLOGY**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	UEBCD20	Pharmacology	Theory	Elective II B	5	5	40+60=100

**Objective**

To make detailed study of drugs, and their actions on living systems

**Course Outcomes (CO):**

On completion of the course, the students will be able to,

1. Classify different dosage forms of drug
2. Discuss the basic understanding of detoxification mechanisms
3. Compare the structure and uses of antibiotics available
4. Outline the clinical applications, side effects and toxicities of cardiovascular drugs
5. List out commonly used analgesic and anesthetic drug classes

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	M	H	H	M	M	M
CO 2	M	M	H	H	M	L
CO 3	H	H	M	H	M	M
CO 4	L	H	H	M	H	M
CO 5	M	M	M	M	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	M	H	H	M	M	M
CO 2	M	M	H	H	M	L
CO 3	H	H	M	H	M	M
CO 4	L	H	H	M	H	M
CO 5	M	M	M	M	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(15 hours)**

- 1.1 Introduction - Sources and dosage forms (K2, K3)
- 1.2 Route of administration (K3, K4)
- 1.3 Classification- absorption of drugs, Distribution (K2, K3)
- 1.4 Binding of drugs to plasma proteins (K2, K4)
- 1.5 Receptor- Types and Binding forces in Drug-receptor interaction (K1, K3)
- 1.6 Consequences of Drug-receptor interaction (K4)

**Unit II:** (15 hours)

- 2.1 Xenobiotics (K2, K4)
- 2.2 Mechanism of oxidation in Phase I (K2, K3)
- 2.3 Mechanism of reduction in Phase I (K2, K3)
- 2.4 Mechanism of hydrolysis in Phase I (K2, K3)
- 2.5 Phase II- conjugation (K3, K4)
- 2.6 Structure and uses of oral hypoglycemic drugs - Classes, Parenteral (K3)

**Unit III:** (15 hours)

- 3.1 Antibiotics: Structure and therapeutic uses of Penicillin, Streptomycin, Tetracycline, Chloramphenicol and Erythromycin (K2, K3)
- 3.2 Antiseptics (K1, K2)
- 3.3 Disinfectants (K1, K2)
- 3.4 Structure and uses of Phenols and related compounds - (a) Alkyl substituted Phenols: Cresol, Thymol (b) Chlorinated Phenols: Chloroxymol (K3, K4)
- 3.5 Halogen compounds – Chloramine and Organic mercurial - Thiomersol (K2, K3)
- 3.6 Formaldehyde and its derivative - Formaldehyde and Nitro furan derivative - Nitro furazone (K2, K3)

**Unit IV:** (15 hours)

- 4.1 Cardiovascular Drugs - Structure And Action Of Cardiac Glycosides- Digoxin And Digitoxin (K2, K3)
- 4.2 Antiarrhythmic Drugs - Structure And Uses Of Propranolol And Procainamide (K1, K2)
- 4.3 Anti- Hypertensive Agents - Drugs Acting Centrally - Example: Clonidine And Alpha Methyl Dopa (K2, K3)
- 4.4 Ganglion Blockers - Example: Pentolinium Tartrate (K2, K3)
- 4.5 Vasodilators - Example: Tolazaline (K1, K2)
- 4.6 B Blockers - Example: Phenoxybenzamine – Hypotensive agents (K2, K3)

**Unit V:** (15 hours)

- 5.1 Analgesics -Morphine, Pethidine, Aspirin (K2, K3)
- 5.2 Salicin (K1, K2)
- 5.3 Paracetamol and Phenacetin (K2, K3)
- 5.4 Analgin and Indomethacin (K3)
- 5.5 Anesthetics - Chloroform, Nitrous oxide, Trichloro ethylene, Benzocaine, Procaine, Lignocaine (K2, K4)
- 5.6 Cytotoxic agents – Chlorambucil (K3)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]**

**Text books:**

1. Jayashree Ghosh - A Textbook of Pharmaceutical Chemistry, - SS Chand and Company, 5th edition, 2014
2. Seth SD - Textbook of Pharmacology, Reed Elsevier India Private Limited, 3rd edition, 2009

**Reference Books:**

1. Satoskar RS, Bhandarkar SD and Ainapure SS - Pharmacology and Pharmacotherapeutics, Popular Prakashan, 24th edition, 1995
2. William Foye - Principles of Medicinal Chemistry, 5th edition, 2002
3. Patrick I Graham - An Introduction to Medicinal Chemistry, Oxford University Press, 6th edition, 2017
4. Graham, Smith DG and Arosen JK - Textbook of Clinical Pharmacology and Drug Therapy, Oxford University Press, 3rd edition, 2002
5. West SE, Todd RW, Mason SR and Bruggen TJ- Textbook of Biochemistry, Oxford University Press, 4<sup>th</sup> edition, 1974

**Open Educational Resources (OER):**

1. <https://youtu.be/--sqCGRij40>
2. <https://youtu.be/GUyGklIMqL8>
3. <https://youtu.be/mMk6VWVpRpo>
4. <https://youtu.be/caJZweuzQO8>
5. <https://youtu.be/wx3dZmv5pM0>
6. <https://youtu.be/t2tKyjj7u5Y>

## SEMESTER VI

### UEBCE20 – ELECTIVE III A: BIOTECHNOLOGY

Year/ Sem III / VI	Course Code UEBCE20	Title of the Course Biotechnology	Course Type Theory	Course Category Elective III A	H/W 5	Credits 5	Marks 40+60=100
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#### Objective:

To explore the applications and future potential of Biotechnology

#### Course Outcomes (CO):

On completion of the course, the students will be able to;

1. Recall the steps involved in recombinant DNA technology
2. Outline the role of vector in gene technology and explain the construction of Genomic and cDNA library and their importance
3. Explain the principles of plant tissue and animal cell culture and summarize the methods used to produce transgenic plants and animals
4. Identify and debate the ethical and social issues in the field of biotechnology and get insight in application of rDNA technology
5. Discuss the various aspects of bioprocess technology

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(15 hours)

- 1.1 Introduction to Biotechnology and its branches- Scope and importance of biotechnology (K1, K2)
- 1.2 Biotechnology in India (K1, K2)
- 1.3 Introduction to Genetic Engineering- Steps and enzymes involved in Genetic Engineering (K1, K2, K3, K4)
- 1.4 Restriction endonucleases: Nomenclature – Types (K1, K2, K3, K4)
- 1.5 Reverse Transcriptase, Taq polymerase and DNA Ligases (K1, K2, K3, K4)

1.6 Applications of genetic Engineering. (K1, K2, K3)

**Unit II: (15 hours)**

- 2.1 Gene cloning vectors: Plasmids: Classification, Characteristics, Example: pBR322 (K1, K2, K3, K4)
- 2.2 Shuttle vectors: Example pJDB219 (K1, K2, K3, K4)
- 2.3 Cosmid: Feature, Example: pLFR5 (K1, K2, K3, K4)
- 2.4 DNA Library: Genomic and cDNA library (K1, K2, K3)
- 2.5 Methods of Gene Transfer (K1, K2, K3)
- 2.6 Gene cloning in Prokaryotes: methodology of Gene cloning with reference to Insulin gene (K1, K2, K3, K4)

**Unit III: (15 hours)**

- 3.1 Plant tissue Culture: Basis of Plant cell and tissue culture- A tissue culture laboratory – Nutrient media composition and preparation - maintenance of Aseptic Environment (K1, K2, K3, K4)
- 3.2 Methods of Plant cell, Tissue and Organ culture - Somatic embryogenesis and Somaclonal variation (K1, K2, K3, K4)
- 3.3 Animal cell culture - Characteristics, Substrates and Culture Media (K1, K2, K3, K4)
- 3.4 Somatic cell fusion - Valuable products from cell culture- Tissue Plasminogen Activator (K1, K2, K3, K4)
- 3.5 Gene transfer in plants and animals- Transgenic plants -Herbicide resistance - stress tolerance - Transgenic plants as bioreactor (K1, K2, K3, K4)
- 3.6 Transgenic animals- Transgenic cattle- The first mammalian clone “Dolly- Animal Bioreactors (K1, K2, K3, K4)

**Unit IV: (15 hours)**

- 4.1 Genetically engineered microorganisms (GEMOs) in health care products: Insulin (K1, K2, K3)
- 4.2 Cytokines: Importance (K1, K2, K3)
- 4.3 Interferon: Importance (K1, K2, K3)
- 4.4 Vaccines: Importance (K1, K2, K3)
- 4.5 Risks of releasing Genetically Engineered Organisms (K1, K2)
- 4.6 Ethics of biotechnology (K1, K2)

**Unit V: (15 hours)**

- 5.1 Fermentation systems- Batch and continuous process (K1, K2)
- 5.2 Fermentor design (K1, K2)
- 5.3 Solid substrate fermentation (K1, K2, K3)
- 5.4 Components of Medium - criteria used in media formulation (K1, K2, K3)
- 5.5 Downstream processing - introduction, separation process, example of recovery process (K1, K2, K3, K4)
- 5.6 Wine and SCP: Production and types (K1, K2, K3)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]**

**Text Books:**

1. Dubey RC - A Text book of Biotechnology - 5th edition - S Chand Publishing
2. Satyanarayana U - Biotechnology - 5th edition - Books and Allied Private Ltd, 2022

**Reference Books:**

1. William J Thieman, Michael A Palladino - Introduction to Biotechnology: Pearson New international edition - 2013
2. Bourgaise Jewell, Buiser - Biotechnology- 2nd edition - Pearson Education Pvt Ltd,2004
3. Lewin B - Genes - VIII - Pearson,2004
4. Glick and Pasternak - Molecular Biotechnology - 5th edition - ASM Press, 2017
5. Brown TA Gene - Cloning and DNA Analysis: An Introduction - 6th edition - Wiley-Blackwell

**OPEN EDUCATIONAL RESOURCES (OER):**

1. <https://youtu.be/BK12dQq4sJw>
2. <https://youtu.be/VvusmIcA6i0>
3. <https://youtu.be/q0B9Bn1WW>
4. <https://youtu.be/CfTnVx31pr0>
5. <https://youtu.be/unkZIN5qeXM>
6. <https://youtu.be/Bz02Qlsu4XI>

## SEMESTER- VI

### UEBCF20 - ELECTIVE III B: PLANT BIOCHEMISTRY

Year/ Sem	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks 100
III/VI	UEBCF20	Plant Biochemistry	Theory	Elective III B	5	5	40+60=100

#### Objectives:

To explore the applications of plant and their products

#### Course Outcomes (CO):

On completion of the course, the students will be able to;

1. Describe the structural features of plant cell and phytohormones
2. Outline the types of photosynthetic pigments
3. Create the impact of nitrogen, sulphur and carbon cycle on nature
4. Compile the mechanism of seed germination
5. Identify the antioxidant potential and role of secondary metabolites

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(15 Hours)

- 1.1 Architecture of plant cell and its role - Plasmodesmata, Vacuoles, Plastids, Chloroplast, Mitochondria, Peroxisomes. (K2, K3)
- 1.2 Cell wall - Structure of plant cell wall - Cellulose and Hemicelluloses. (K3)
- 1.3 Plant growth regulators - structure and physiological effects of Auxins structure and Physiological effects of Gibberellins (K2, K3)
- 1.4 Structure and physiological effects of Cytokinin. (K3, K4)
- 1.5 Structure and physiological effects of Abscisic acid. (K3, K4)
- 1.6 Structure and physiological effects of Ethylene – Phytochromes (K3, K4)

**Unit II: (15 Hours)**

- 2.1 Photosynthesis - photosynthetic pigments Chlorophyll Structure and their function (K2, K3)
- 2.2 Carotenoid - Structure and their function (K1, K3)
- 2.3 Phycobilin -Structure and their function (K1, K3)
- 2.4 Light reaction - Photo system I and Photo system II (K3, K4)
- 2.5 Hill's reaction - Emerson effect - Cyclic and non-cyclic photo phosphorylation (K3, K4)
- 2.6 Dark reaction - Calvin' s cycle (K3, K4)

**Unit III: (15 Hours)**

- 3.1 Nitrogen cycle - Ammonification, Nitrification, nitrate reduction (K2, K4)
- 3.2 Denitrification - Symbiotic and non-symbiotic Nitrogen fixation (K2, K4)
- 3.3 Nitrogenase enzyme - Nodule development (K3, K4)
- 3.4 Sulfur cycle - release of sulfur from organic compounds (K1, K2)
- 3.5 Oxidation of sulfur compounds (K1, K4)
- 3.6 Reduction of sulfate Carbon cycle (K3, K4)

**Unit IV: (15 Hours)**

- 4.1 Seed germination - Mobilization of storage lipids during seed germination (K4)
- 4.2 Glyoxylate cycle (K2, K3)
- 4.3 Seed dormancy - Definition of vernalization and devernization (K2, K3)
- 4.4 Cold tolerance in metabolic compounds (K1, K3)
- 4.5 Enzymatic activity for Esterase (K3)
- 4.6 Enzymatic activity for Peroxidases (K3)

**Unit V: (15 Hours)**

- 5.1 Secondary metabolites in plant - Biological role of Phenolic compounds (K4)
- 5.2 Biological role of Terpenoids (K3)
- 5.3 Biological role of Tannins (K3)
- 5.4 Biological role of Lignin (K4)
- 5.5 Biological role of Pectin (K3, K4)
- 5.6 Biological role of Antioxidant compounds (K3, K4)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]**

**Text Books:**

1. Lehninger, D Nelson and C M Cox - Principles of Biochemistry -WH Freeman and Company Ltd, 4<sup>th</sup> edition -2005
2. Donald Voet and Judith G Voet - Biochemistry- 4<sup>th</sup> edition -2002

**Reference Books:**

1. Hans-Walter Heldt - Plant Biochemistry - Elsevier Publishers, 3<sup>rd</sup> edition 2005
2. Dey PM and Horborne JB - Plant Biochemistry - Harwart Academic Press 1<sup>st</sup> edition - 2000
3. Dubey RC - A Textbook of Biotechnology - S Chand and Co Ltd, 4<sup>th</sup> edition -2006
4. Mathews C K, VanHolde K E – Biochemistry, Pearson Education - 3<sup>rd</sup> edition 2000
5. Jeremy M Berg, J L Tymoczko, L Stryer - Biochemistry - WH Freeman Company, 5<sup>th</sup> edition 2002

**OPEN EDUCATIONAL RESOURCES (OER):**

1. <https://youtu.be/yXqRsH8Dul4>
2. <https://youtu.be/muDk823-6Yo>
3. <https://youtu.be/D68TxxbGWfo>
4. <https://youtu.be/N9X0Pue6Ffc>
5. <https://youtu.be/7rI-Lyftpd0>

## SEMESTER- VI

### USBCD620 – SBE- IV - MEDICAL LABORATORY TECHNOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credit	Marks 100
III/VI	USBCD620	Medical Laboratory Technology	Theory	Skilled Based Elective - IV	2	2	40+60=100

#### Objectives:

To make detailed study of the organization and functions of a laboratory

#### Course Outcome (CO):

On completion of the course, the students will be able to;

1. Outline the organization of a laboratory for its efficient functioning
2. Discuss the various methods of blood collection and its preservation
3. Evaluate the significance of urine analysis and its correlation with disease
4. Demonstrate about the blood transfusion method
5. Apply histopathological techniques in detecting abnormal cells

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit-I:

(6 Hours)

- 1.1 Introduction: Code of conduct for laboratory personnel (K1, K2, K3)
- 1.2 Medical care, organization of the clinical laboratory (K1, K2, K3)
- 1.3 Functional components of a laboratory (K1, K2)
- 1.4 Basic needs and role of medical laboratory technician (K1, K2)
- 1.5 Safety aspects in the laboratories (K1, K2, K3)
- 1.6 First aid in the laboratories (K1, K2, K3)

**Unit-II: (6 Hours)**

- 2.1 Specimen collection: Blood collection by vein puncture and capillary puncture (K1, K2, K3)
- 2.2 Equipment and storage of blood collection - transport and waste disposal (K1, K2, K3)
- 2.3 Anticoagulants (K1, K2, K3)
- 2.4 Collection and preservation of urine, sputum, throat swab (K1, K2, K3)
- 2.5 Collection and preservation of stool (K1, K2, K3)
- 2.6 Collection and preservation of CSF specimens (K1, K2, K3)

**Unit-III: (6 Hours)**

- 3.1 Collection and processing of blood for transfusion (K1, K2, K3)
- 3.2 Preparation for blood collection and Blood bank (K1, K2, K3)
- 3.3 Screening, Rejection, Registration of Donors (K1, K2, K3)
- 3.4 Blood Collection procedure, Transportation (K1, K2, K3)
- 3.5 Clinical significance of Blood Transfusion (K1, K2, K3)
- 3.6 Coomb's test (K1, K2, K3)

**Unit-IV: (6 Hours)**

- 4.1 Urine - Normal and Abnormal constituents of urine (K1, K2, K3)
- 4.2 Routine examination of urine- Physical examination -Colour, Appearance, Odour and Specific gravity (K1, K2, K3)
- 4.3 Microscopic examination of urine sediment - organized and unorganized elements – Culture test (24 and 48 Hrs) – Crystal appearance in urine (K1, K2, K3)
- 4.4 Pregnancy test (hCG test) –Typhoid test (Widal test) (K1, K2, K3)
- 4.5 Malaria test (QBC test) (K1, K2, K3)
- 4.6 Tuberculosis test (Mantoux tuberculin skin test) (K1, K2, K3)

**Unit-V: (6 Hours)**

- 5.1 Introduction to histopathology and cytology (K1, K2, K3)
- 5.2 Laboratory equipment for cytology and histology (K1, K2, K3)
- 5.3 Reagents, microscope, microtome, paraffin oven, tissue floating bath, automated tissue processor and slide warmer (K1, K2, K3)
- 5.4 Preparation of tissues for histology (K1, K2, K3)
- 5.5 Collection of specimens for cytological evaluation (K1, K2, K3)
- 5.6 Clinical significance of cytological technique (K1, K2, K3)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze]**

**Note:** The study materials will be provided by the Department

**Text Books:**

1. Ramakrishnan S, Sulochana KN. Manual of Medical Laboratory Techniques. Jaypee Brothers Medical Publishers Pvt.Ltd, 1<sup>st</sup> edition, 2012
2. Sood Ramnik. Concise Book of Medical Laboratory Technology: Methods & Interpretation. Jaypee Brothers Medical Publishers. 2<sup>nd</sup> edition, 2014

**Reference Books:**

1. Kanai L Mukherjee- Medical laboratory technology. Tata MC Graw-hill publishing company limited, Volume-I, 2<sup>nd</sup> edition, 2010
2. Kanai L Mukherjee- Medical laboratory technology. Tata MC Graw-hill publishing company limited, Volume-II, 2<sup>nd</sup> edition, 2010
3. Kanai L Mukherjee- Medical laboratory technology. Tata MC Graw-hill publishing company limited. Volume-III - 2<sup>nd</sup> edition, 2010
4. Talib VH - A Hand book of Medical laboratory technology - CBS publishers, 2004
5. Shivaraja Shankara YM - Laboratory manual for Practical Biochemistry. Jaypee publication, 2<sup>nd</sup> edition, 2013

**Open Educational Resources (OER):**

1. <https://youtu.be/OauxaRXQ2IM>
2. [https://youtu.be/a\\_m76KUab9s](https://youtu.be/a_m76KUab9s)
3. <https://youtu.be/58Gp8Tiui1E>
4. <https://youtu.be/22MHdz5sEuc>
5. <https://youtu.be/qAoa94WBaIc>

**SEMESTER – V & VI**  
**UCBCJ20- MAIN PRACTICAL -III**

<b>Year/ Sem</b> III / VI	<b>Course Code</b> UCBCJ20	<b>Title of the Course</b> Main Practical –III	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 4	<b>Credits</b> 6	<b>Marks</b> 40+60=100
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**Objective:**

The course is aimed to enhance the practical skill of the student in handling and estimating the components present in the biological samples.

**Course Outcomes (CO)**

On Completion of the course, the students will be able to;

1. Apply the safety measures in the laboratory
2. Predict the biochemical laboratory analysis
3. Analyse the presence and absence of abnormalities in blood
4. Assess the presence and absence of abnormalities in urine

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	M	L	H
CO 2	L	M	L	H	H	M
CO 3	H	L	M	M	L	M
CO 4	H	M	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	L	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	L	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**1. Safety Measures In The Laboratory-III**

**2. Colorimetric Estimations In Clinical Samples:**

1. Estimation of Creatinine by Jaffe's method
2. Estimation of Glucose by Orthotoluidine method
3. Estimation of Urea by Diacetyl Monoxime method
4. Estimation of Cholesterol by Zak's method
5. Estimation of Bilirubin by Vandenbergh method
6. Estimation of Uric acid by Caraway's method
7. Estimation of Protein by Biuret method and determination of A/G ratio
8. Estimation of Protein by Lowry's method
9. Estimation of DNA by Diphenyl amine method
10. Estimation of RNA by Orcinol method

**3. Urine Analysis:**

1. Methods for Preservation of Urine for analysis
2. Qualitative Analysis of Urine for Normal Constituents
3. Qualitative Analysis of Urine for Abnormal Constituents

#### **4. Extraction, Isolation, Identification And Purification**

1. DNA
2. RNA
3. Proteins

#### **Reference Books:**

1. Jayaraman J - Manuals in Biochemistry - New Age International Publishers,2001
2. Varley, Alan H Gowen lock - Practical Biochemistry - 6<sup>th</sup> edition - CBS Publishers,2002
3. David T Plummer - Practical Biochemistry- 3<sup>rd</sup> edition - McGraw Hill Publishers,2005
4. Sawhney SK, Randhir Singh - Introductory Practical Biochemistry - 2<sup>nd</sup> edition - Narosa Publishers,2001
5. Kanai L Mukherjee - Medical Laboratory Technology - Volume I - Tata Graw Hill Publication Company Limited,2010

**SEMESTER – V & VI**  
**UCBCK20- MAIN PRACTICAL –IV**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III / VI	UCBCK20	Main Practical - IV	Practical	Core	4	6	40+60=100

**Objective:**

The course is aimed to enhance the practical skill of the student in handling and estimating the components present in the biological samples.

**Course Outcomes (CO)**

On completion of the course, the students will be able to;

1. Apply the safety measures in the laboratory
2. Analyze the biological sample for the enzyme activity
3. To obtain practical skills in basic hematological techniques.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	M	L	H
CO 2	M	M	L	H	H	M
CO 3	H	L	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	L	H	M	H	M
CO 3	M	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**1. Safety Measures In The Laboratory-IV**

**2. Enzyme Analysis:**

1. Determination of SGOT activity.
2. Determination of SGPT activity
3. Effect of pH on the activity of the enzyme -Acid phosphatase
4. Effect of Temperature on the activity of the enzyme - Acid phosphatase
5. Effect of substrate concentration on the activity of the enzyme -Acid phosphatase
6. Determination of Specific activity of the enzyme - Acid phosphatase
7. Effect of pH on the activity of the enzyme - salivary amylase
8. Effect of Temperature on the activity of the enzyme - salivary amylase
9. Effect of substrate concentration on the activity of the enzyme - salivary amylase
10. Determination of Specific activity of the enzyme - salivary amylase

**3. Hematological Experiments:**

1. Methods for Preservation of blood for analysis
2. Collection of Blood
3. Enumeration of RBC
4. Enumeration of WBC
5. Enumeration of Platelets
6. Estimation of Erythrocyte sedimentation rate
7. Determination of Hemoglobin

8. Packed cell volume
9. Determination of Bleeding time
10. Determination of Clotting Time
11. Grouping of Blood & Rh typing

**Reference Books:**

1. Jayaraman J - Manuals in Biochemistry - New Age International Publishers,2011
2. Varley, Alan H Gowen lock - Practical Biochemistry - 6<sup>th</sup> edition - CBS Publishers,2002
3. David T Plummer - Practical Biochemistry- 3<sup>rd</sup> edition - McGraw Hill Publishers,2005
4. Sawhney SK, Randhir Singh - Introductory Practical Biochemistry - 2<sup>nd</sup> edition - Narosa Publishers,2001
5. Kanai L Mukherjee - Medical Laboratory Technology - Volume I - Tata Graw Hill Publication Company Limited,2010

**SEMESTER – III – SKILL BASED ELECTIVE -II YEARS**

**USBCA320 - NUTRITIONAL BIOCHEMISTRY**

<b>Year / Sem</b> II / III	<b>Course Code</b> USBCA320	<b>Title Of the course</b> Nutritional Biochemistry	<b>Course Type</b> Theory	<b>Course Category</b> Skill Based Elective I	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> <b>100</b> 40+60=100
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**Objective:**

To make a note on nutrients and its role on metabolism.

**Course Learning Outcomes (CLO)**

On Completion of the course, the students will be able to:

1. Explain the functions of specific nutrients in maintaining health
2. Describe the role of antioxidants
3. Use a balanced diet for diseased conditions
4. Discuss basic principles and practices of common food preservation methods
5. Discuss the various aspects of protein quality

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	M	M	L	H
CO 2	H	M	M	H	H	M
CO 3	H	H	H	H	M	M
CO 4	H	H	H	M	H	H
CO 5	H	M	H	M	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	M	H
CO 2	H	H	H	H	H	M
CO 3	H	H	M	M	H	H
CO 4	H	M	H	M	H	H
CO 5	H	H	M	H	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit - I:**

**(6 Hours)**

- 1.1 Definition of food and Nutrition, (K1, K3, K4)
- 1.2 Basic Food groups - Energy yielding foods, Body Building, Protective Foods (K1, K3)
- 1.3 Basic concepts of Energy Expenditure, Unit of Energy, Measurements of Food stuffs by Bomb Calorimeter (K2)
- 1.4 Calorific values of Proteins, Carbohydrates and Fats (K1, K3)
- 1.5 Basal metabolic rate (K2, K3)
- 1.6 Factors affecting BMR (K3)

**Unit - II:****(6 Hours)**

- 2.1 Antioxidants-Types (K2, K3)
- 2.2 Antioxidant rich food (K3)
- 2.3 Sources and health effects of free radical (K2, K3)
- 2.4 Dietary fibres (K2, K3)
- 2.5 Single Cell Proteins (K1, K2)
- 2.6 Probiotics (K3)

**Unit - III:****(6 Hours)**

- 3.1 Balanced diet - Nutrition in infancy (K2, K3)
- 3.2 Nutrition in childhood (K2, K3)
- 3.3 Nutrition in Adolescence (K3)
- 3.4 Nutrition in Adulthood (K2, K3)
- 3.5 Nutrition in Elderly person. (K2)
- 3.6 Nutrition during pregnancy and lactation (K2, K3)

**Unit - IV:****(6 Hours)**

- 4.1 Food processing and preservation: Types (K2, K3)
- 4.2 Food fortification (K3)
- 4.3 Sanitation and Hygiene in Food service (K2, K3, K4)
- 4.4 Food Toxicities - organic toxicants (K2, K3, K4)
- 4.5 Inorganic toxicants (K2, K3, K4)
- 4.6 Methods of detecting adulterated food (K3)

**Unit - V:****(6 Hours)**

- 5.1 Protein Malnutrition (Kwashiorkor) Under Nutrition (Marasmus) their preventive and curative measures (K2, K3, K4)
- 5.2 Protein quality and requirement (K3)
- 5.3 Dehydration (K2, K3)
- 5.4 Overhydration (K2, K3)
- 5.5 Eating disorders -Signs of eating disorder (K3)
- 5.6 Body mass index (BMI) - obesity (K3)

**Text Books:** The study materials will be provided by the Department

**Reference Books:**

1. Shubangini Joshi - Nutrition and Dietetics - 5<sup>th</sup> edition - Tata McGraw Hill Publication, 1998
2. Mahtab S Bamji, Prasad Rao N, Vinodhini Reddy - Textbook of Human Nutrition - 2<sup>nd</sup> edition - Oxford Publication, 2004
3. Martin Eastwood - Principles of Human Nutrition - 2<sup>nd</sup> edition - Blackwell Publishing, 2003
4. Eleanor, Noss, Whitney - Understanding Nutrition - 8<sup>th</sup> edition - Thomson Publishing, 2002
5. Davidson and Passmore – Human Nutrition and Dietetics – 8<sup>th</sup> edition – Churchill Livingstone

**Open Educational Resources (OER):**

1. [https://youtu.be/Ph1t\\_X1Zch8](https://youtu.be/Ph1t_X1Zch8)
2. <https://youtu.be/iP93MjBStks>
3. [https://youtu.be/\\_Ap4BXhig5c](https://youtu.be/_Ap4BXhig5c)
4. <https://youtu.be/zq6SvljUcfU>
5. <https://youtu.be/QNH79fC421g>

**SEMESTER IV– SKILL BASED ELECTIVE -II YEARS**

**USBCB420- SBE: HEALTH CARE FOR WOMEN**

<b>Year / Sem</b> II/IV	<b>Course Code</b> USBCB420	<b>Title of the Course</b> Health Care for Women	<b>Course Type</b> Theory	<b>Course Category</b> Skill Based Elective - II	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> <b>100</b> 40+60=100
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**Objective:**

To provide awareness about common health problems of women and how to overcome certain diseases

**Course Outcomes (CO)**

On completion of the course, the students will be able to;

1. Understand the common health problems of women
2. Describe the function of Estrogen and Progesterone hormone
3. Outline the Stages of women hood
4. Discuss the types of anemia and obesity
5. Gain knowledge to overcome PCOS, Ovarian cancer and Depression

<b>CO / PO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>
<b>CO 1</b>	H	H	H	H	M	L
<b>CO 2</b>	H	H	H	H	H	M
<b>CO 3</b>	H	H	M	L	H	H
<b>CO 4</b>	H	M	H	M	H	H
<b>CO 5</b>	H	H	M	H	M	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

<b>CO / PSO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>CO 1</b>	H	H	H	H	M	H
<b>CO 2</b>	H	H	H	H	H	M
<b>CO 3</b>	H	H	M	M	L	L
<b>CO 4</b>	H	M	H	M	H	H
<b>CO 5</b>	H	H	M	H	M	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit - I:**

**(6 Hours)**

- 1.1 Introduction-Women’s health-Importance, Healthy tips for women (K4)
- 1.2 Healthy diet for Women – Physiology of Exercise – Importance of yoga (K3)
- 1.3 Preventive care and screenings (K2, K3)
- 1.4 Women and Drug abuse (K3)
- 1.5 Feminism and women’s health movement (K2, K4)
- 1.6 Factors influencing women’s health (K3)

**Unit - II:** (6 Hours)

- 2.1 Anatomy of female reproductive system (K3)
- 2.2 Primary and secondary sexual organs (K2, K4)
- 2.3 Hormones related with females-Estrogen and Progesterone (K3)
- 2.4 Puberty-Early and Late puberty (K2, K4)
- 2.5 Menstrual cycle, Menopause Amenorrhea (K3)
- 2.6 Endometriosis, Vaginal discharge (K4)

**Unit - III:** (6 Hours)

- 3.1 Stages of women hood: Pregnancy, Delivery, Lactating period - Gestation Diabetes – Hypertension during pregnancy period (K2, K4)
- 3.2 C-Section, D and C, Hysterectomy (K3)
- 3.3 Obstetrical fistula (K2, K4)
- 3.4 Female infertility (K4)
- 3.5 Contraception-Variou s methods (K3)
- 3.6 Diet and nutrition services (K3, K4)

**Unit - IV:** (6 Hours)

- 4.1 Anemia-Types, Causes, Symptoms, Diagnosis and Treatment (K2, K4)
- 4.2 Osteoporosis (K4)
- 4.3 Obesity (K2, K4)
- 4.4 Urinary infection (K3)
- 4.5 Blood Grouping, Erythroblastosis foetalis (K3)
- 4.6 Role of thyroid hormones (K4)

**Unit - V:** (6 Hours)

- 5.1 Cancer Prevalent In Women: Ovarian Cancer, Cervical Cancer, -Etiology, Symptoms, Diagnosis And Treatment (K3)
- 5.2 Breast Cancer-Etiology, Symptoms, Diagnosis And Treatment (K3)
- 5.3 Polycystic Ovaries, Fibroids- Etiology, Symptoms, Diagnosis & Treatment (K3, K4)
- 5.4 Violence Against Women-Domestic Violence And Intimate Partner Violence (K2)
- 5.5 Depression And Anxiety (K2, K3)
- 5.6 Chronic Fatigue Syndrome (K2)

**Note:** The study material will be provided by the Department

**Reference Books:**

1. N. Murugesh-Health Education and community Pharmacy- Sathya publishing Company, 4<sup>th</sup> edition, 2005
2. Ross and Wilson-Anatomy and Physiology in Health and illness-Churchill living stone publishers,10<sup>th</sup> edition, 2008
3. Dr .Ch.Murali Manothar-Ayurveda for All- Pustak Mahal Publication-1<sup>st</sup> edition, 2003
4. John Zerwekh-Women's health Nurse Practioner 1<sup>st</sup> edition, 2013
5. Victoria Maizes-Integrative Women's health,4<sup>th</sup> edition, 2015

**Open Educational Resources (OER):**

1. <https://youtu.be/FxvQBx-AKDg>
2. <https://youtu.be/T7t8eM6gbvk>
3. <https://youtu.be/mOrRJBqm744>
4. <https://youtu.be/6nrnczjKS2o>
5. [https://youtu.be/wJCVU4L\\_fqA](https://youtu.be/wJCVU4L_fqA)

**SEMESTER-V/VI - NON-MAJOR ELECTIVE – III YEARS**

**UGBCA520/620– NON-MAJOR ELECTIVE - DISEASES AND TREATMENT**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
III / VI	UGBCA520 /620	Diseases and Treatment	Theory	Non-major elective - I	3	2	40+60=100

**Objective:**

To provide a basic knowledge about common diseases and its treatment.

**Course Outcomes (CO):**

On completion of the course, the students will be able to,

1. Understand the concept of immune system, blood and bone diseases
2. Know the pathology of liver and lung diseases
3. Acquire a broad knowledge about the deadliest diseases in the world
4. Understand about the pathophysiology of cardiovascular and neurological diseases
5. Learn the various types of skin diseases

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	M	L	L	L
CO 2	H	M	M	M	H	M
CO 3	H	H	H	H	M	M
CO 4	H	M	H	M	H	H
CO 5	H	H	H	M	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	M	H
CO 2	H	H	H	H	M	M
CO 3	H	H	M	M	H	M
CO 4	H	M	H	M	M	L
CO 5	H	H	M	H	M	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit - I:**

**(9 Hours)**

- 1.1 Diseases and its types (K1, K3)
- 1.2 Immune system - Types - Innate and Acquired (K3, K4)
- 1.3 Phagocytosis (K1)
- 1.4 Blood: Composition, Sickle Cell Anemia, Iron deficiency Anemia, Leucopenia, Hemolysis (K2, K3)

- 1.5 Bleeding disorder- Hemophilia A and B (K1, K2, K3)
- 1.6 Bone disorder: Osteomalacia, Rickets, Joint Pain (K2, K3)

**Unit - II: (9 Hours)**

- 2.1 Asthma-Types, Causes, Clinical feature and Treatment (K1, K2)
- 2.2 Tuberculosis-Causes, Clinical feature, Prevention and Treatment (K2, K3)
- 2.3 Pneumonia: Causes, Clinical features, Prevention and Treatment (K1, K3)
- 2.4 Jaundice: Causes, Clinical features, Prevention and Treatment (K1, K2)
- 2.5 Hepatitis: Causes, Clinical features, Prevention and Treatment (K2, K3)
- 2.6 Fatty liver: Causes, Clinical features, Prevention and Treatment (K2, K3)

**Unit - III: (9 Hours)**

- 3.1 Diabetes Mellitus- Types, Causes, Clinical features and Treatment (K1, K2)
- 3.2 Cancer-Causes, Clinical features and Treatment (K2, K3)
- 3.3 Types of Tumors (K1, K2)
- 3.4 Oncogenes (K3)
- 3.5 Tumor markers (K1)
- 3.6 AIDS, COVID: Causes, Clinical features, Diagnosis, Prevention and Treatment (K2, K3)

**Unit - IV: (9 Hours)**

- 4.1 Hypertension-Causes, Clinical features, Management (K2, K3)
- 4.2 Heart attack- Causes, Clinical features and Prevention (K3)
- 4.3 Dementia-Types, Causes, Symptoms and Treatment (K3, K4)
- 4.4 Seizures (K2)
- 4.5 Coma (K2)
- 4.6 Autism- Causes, Clinical features and Treatment (K2, K3)

**Unit - V: (9 Hours)**

- 5.1 Anatomy of skin (K3)
- 5.2 Alopecia Areata- Classification, Causes, Clinical features and Treatment (K2, K3)
- 5.3 Hirsutism- Causes, Clinical features and Treatment (K2)
- 5.4 Psoriasis (K2, K3)
- 5.5 Acne Vulgaris (K3)
- 5.6 Dandruff – Causes, Clinical features and Treatment (K2, K3)

**NOTE:** The study materials will be provided by the Department

**Reference Books:**

- 1. Davidson- Principles and practice of Medicine, Elsevier Publication, 9<sup>th</sup> edition, 2002
- 2. Richard A Goldsby, Thomas J Kindt, Barabra A Osborne, Janis Kubey- Immunology, W H Freeman and Company, 6<sup>th</sup> edition, 2003
- 3. Ada P Khan – Diabetes- Causes, Prevention and Treatment- Orient paperbacks, 2004
- 4. Virender N Sehgal -Diagnosis and treatment of common skin diseases, Jaypee Brothers Medical Pub, 5<sup>th</sup> edition, 2016

5. Chatterjea MN and Rana Shinde -Text Book of Medical Biochemistry - Jaypee Brothers- Medicinal Publishers Ltd,8<sup>th</sup> edition -2012

**Open Educational Resources (OER):**

1. <https://youtu.be/P6bDq8sv91A>
2. <https://youtu.be/p14tLl8rORE>
3. <https://youtu.be/pZQ46fHFm2A>
4. <https://youtu.be/6akhmBqAe2g>
5. [https://youtu.be/Ep\\_nCSEDeAE](https://youtu.be/Ep_nCSEDeAE)
6. <https://youtu.be/rtPQHDWg-6M>
7. <https://youtu.be/ryox2SQKQPU>

**SEMESTER V / VI - NON-MAJOR ELECTIVE – III YEARS**

**UGBCB520/620 – NON-MAJOR ELECTIVE: THERAPEUTIC AGENTS**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks 100 40+60=100
III/ V/VI	UGBCB520/ 620	Therapeutic Agents	Theory	Non-major elective - II	3	2	

**Objective:**

To impart knowledge on action of drugs in treating diseases.

**Course Outcomes (CO)**

1. Analyze the drug dosage forms and its mechanism of action
2. Assess the role of vaccines in preventing diseases
3. Outline the role of antibiotics and its side effects
4. Acquire knowledge on the medicinal therapy for various health conditions and function of medicinal plants as therapeutics
5. Utilize the importance of first aid in accidents to preserve life

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	M	H	M
CO 2	H	H	H	H	H	M
CO 3	H	M	H	H	H	H
CO 4	H	M	M	L	H	M
CO 5	H	H	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	M	H	M
CO 2	H	H	H	H	H	M
CO 3	H	M	H	H	H	H
CO 4	H	M	M	L	H	M
CO 5	H	H	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit - I:**

**(9 Hours)**

- 1.1 Drug – Definition – Nature of drug (K1, K2)
- 1.2 Dosage forms of Drugs (K1, K2, K3)
- 1.3 Routes of administration (K1, K2, K3)
- 1.4 Drug Absorption – Drug Distribution (K1, K2, K3, K4)
- 1.5 Termination of Drugs – Elimination of Drugs (K1, K2, K3, K4)
- 1.6 Biotransformation (K1, K2, K3)

**Unit - II:**

**(9 Hours)**

- 2.1 Vaccines - Definition (K1, K2, K3)
- 2.2 Types of vaccines: Attenuated live Vaccine (K1, K2, K3)
- 2.3 Killed Viral Vaccine and examples (K1, K2, K3)
- 2.4 Types of Immunization (K1, K2, K3)
- 2.5 Immunization Schedule for Children (K1, K2, K3)
- 2.6 Immunization under special circumstances (K1, K2, K3)

**UNIT - III:**

**(9 Hours)**

- 3.1 Antibiotics: Definition (K1, K2, K3)
- 3.2 Therapeutic role of Penicillin, Erythromycin, Tetracycline, Streptomycin and Chloramphenicol (K1, K2)
- 3.3 Uses of Antiseptics (K1, K2)
- 3.4 Disinfectant and its types (K1, K2)
- 3.5 Analgesics: Morphine, Aspirin, Paracetamol (K1, K2, K3)
- 3.6 Anaesthetics: Chloroform, Procaine (K1, K2, K3)

**Unit - IV:**

**(9 Hours)**

- 4.1 Medical Therapies for Mouth Ulcer (K1, K2, K3)
- 4.2 Definition, symptoms, causes, diagnosis and treatment of Gallstones (K1, K2, K3)
- 4.3 Definition, symptoms, causes, diagnosis and treatment of Urinary Stones (K1, K2, K3)
- 4.4 Definition, symptoms, causes, diagnosis and treatment of Intestinal Worms (K1, K2, K3)
- 4.5 Medicinal plants: Tulsi, Mint (K1, K2)
- 4.6 Medicinal plants: Neem, Turmeric (K1, K2)

**Unit - V:****(9 Hours)**

5.1 First Aid: Important Rules of First Aid - First Aid Box (K1, K2, K3)

5.2 Cuts and Abrasions – Types of Bleeding (K1, K2, K3)

5.3 Types of Fractures (K1, K2, K3)

5.4 Types of Burns, Fainting (K1, K2, K3)

5.5 Poisonous Bites - Some Common Poisons and their antidotes (K1, K2, K3)

5.6 Acid Poisoning - Alkali Poisoning and poisoning by Disinfectant (K1, K2, K3)

**Note:** The study materials will be provided by the Department

**Text Books:**

1. Jayashree Ghosh. A Textbook of Pharmaceutical Chemistry. SS Chand and Company - 5<sup>th</sup> edition , 2014
2. Kanai L Mukherjee. Medical Laboratory Technology. Tata Graw Hill Publication Company Limited - Volume I, 2010

**Reference Books:**

1. Davidson and Henry - Clinical diagnosis by Laboratory Methods. edition -Saunder Publisher, 22<sup>nd</sup> edition, 2011
2. Antia FP and Philip Abraham - Clinical Dietetics and Nutrition - 4<sup>th</sup> edition - OUP India, 2002
3. Jose L Martinez- Ethnobotany application of medicinal plants - CRC Press, 2018
4. Leon Shargel and Andrew B.C Yu. Applied Biopharmaceutics and Pharmacokinetics. McGraw-Hill Education/Medical; 7<sup>th</sup> edition, 2015.
5. Laurence Bruton, Bjorn Knollman and Randa Hilal- Dandan. The Pharmacological Basis of Therapeutics. Kindle 13<sup>th</sup> edition, 2019

**Open Educational Resources (OER):**

1. <https://youtu.be/EakBZqmmfMQ>
2. <https://youtu.be/qrNUPA0xaLY>
3. <https://www.dictionary.com/e/disinfectant-vs-antiseptic/>
4. <https://youtu.be/GErcHVxxK5c>
5. <https://youtu.be/V1YiDNEqOHM>

**ALLIED BIOCHEMISTRY**  
**For B.Sc. Microbiology**  
**Students**

## SEMESTER-I

### UABCA20– ALLIED BIOCHEMISTRY-I

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I/I	UABCA20	Allied Biochemistry-I	Theory	Allied	4	4	40+60=100

#### Objective:

To acquire knowledge on the structure and the function of biomolecules

#### Course Outcomes (CO):

On completion of the course, the students will be able to,

1. Write about the properties and biological importance of carbohydrates
2. Outline the properties and structural organization of proteins
3. List out the structural components, properties and biological importance of nucleic acids.
4. Classify the biological importance of lipids
5. Identify the role of water- and fat-soluble vitamins for maintaining healthy life

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	M	M	M
CO 2	H	H	H	M	L	M
CO 3	H	M	L	H	M	H
CO 4	H	M	H	M	M	M
CO 5	H	M	M	H	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	H	M	M	M
CO 2	H	H	H	M	L	M
CO 3	H	M	L	H	M	H
CO 4	H	M	H	M	M	M
CO 5	H	M	M	H	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(12 hours)

- 1.1 Carbohydrates: Structure and biological importance of carbohydrates (K2, K3)
- 1.2 Classification and Physical properties of Carbohydrate –Mutarotation, isomerism (K1,K3)
- 1.3 Chemical Properties- Reactions of Glucose -Oxidation, Reduction and Osazone formation (K3, K4)
- 1.4 Reactions of Fructose: Oxidation with Concentrated Nitric acid, Reduction with sodium amalgam and Osazone formation (K3, K4)
- 1.5 Occurrence, Structure and Properties of Disaccharides (Maltose, Lactose, Sucrose) (K1,K2)

1.6 Polysaccharides (Starch) (K2, K3)

**Unit II: (12 hours)**

2.1 Amino Acids: Occurrence, biological importance of amino acids and structure of Peptide bond (K2, K3)

2.2 Classification of amino acids based on the Structure, Polarity of side chain and Nutritional factor (K1, K3)

2.3 Physical properties (Amphoteric nature and Isoelectric pH) (K4)

2.4 Chemical properties (reactions involving Carboxyl, Amino and both the groups) and color reactions of amino acids (K3)

2.5 Occurrence, biological importance of proteins, physical properties: Denaturation, salting in and salting out effect. Functions and classifications based on shape, solubility, composition and biological function (K2, K3)

2.6 Structural Organization of Proteins - Primary, Secondary (alpha helix and beta pleated sheet), Tertiary and Quaternary structure (K1, K3)

**Unit III: (12 hours)**

3.1 Nucleic Acids: Structural Components and Biological Importance of DNA (K1, K2)

3.2 Structural Components and Biological Importance of RNA (K1, K2)

3.3 Double helical structure of DNA proposed by Watson and Crick (K2, K4)

3.4 Denaturation and Annealing of DNA (K2, K3)

3.5 Structure and role of ribosomal, messenger and transfer RNA (K2, K3, K4)

3.6 Difference between DNA and RNA (K3, K4)

**Unit IV: Lipids: (12 hours)**

4.1 Biological importance of lipids and types of Fatty acid–Saturated and Unsaturated (K2, K3)

4.2 Physical Properties and Chemical Properties–Reactions involving Double bond, Carboxyl and Hydroxyl groups (K2, K3)

4.3 Classification of Lipids - Simple Lipids (Fats, Oils and Waxes) (K3)

4.4 Compound lipids - Phospholipids: Phosphoglycerides (Lecithin, Cephalin and Plasmalogen), Phosphoinositides (Phosphotidyl inositol) and phosphosphingosides (Sphingomyelin), Glycolipids: Cerebrosides, Gangliosides (K1, K4)

4.5 Derived lipids - Sterols (cholesterol - structure and functions) (K1, K3)

4.6 Iodine number, Acid number, Saponification number, Reichert -meissl number of oils (K1, K2)

**Unit V: Vitamins: (12 hours)**

5.1 Vitamins: Fat soluble vitamins A and D - Sources, RDA, Biochemical functions and Deficiency diseases (K1, K3)

5.2 Vitamins: Fat soluble vitamins E - Sources, RDA, Biochemical functions and Deficiency diseases (K2, K3)

5.3 Fat soluble vitamin K - Sources, RDA, Biochemical functions and Deficiency diseases (K2)

- 5.4 Water soluble vitamins B1, B2 and B5- Sources, RDA, Biochemical functions and Deficiency diseases (K1, K3)
- 5.5 Water soluble vitamins B6 and B12 - Sources, RDA, Biochemical functions and Deficiency diseases (K2, K3)
- 5.6 Water soluble vitamin C - Sources, RDA, Biochemical functions and Deficiency diseases (K1, K2)

**Text Books:**

1. Jain J L, Sanjay Jain, Nithin Jain - Fundamentals of Biochemistry, S Chand and Company Ltd, 8<sup>th</sup> edition, 2008
2. Satyanarayana U- Textbook of Biochemistry, Books and Allied Private Ltd, 4<sup>th</sup> edition, 2013

**Reference Books:**

1. Deb AC - Fundamentals of Biochemistry, New Central Book Agency Ltd, 9<sup>th</sup> edition, 2008
2. Ambika Shanmugam - Medical Biochemistry, Wolters Kluwer India Private Ltd, 8<sup>th</sup> edition, 2016
3. Arun Bahl and Bahl B S - Advanced Organic Chemistry, S Chand and Company Ltd, 22<sup>nd</sup> edition, 2003
4. Varley, Alan H Gowen lock - Practical Biochemistry - 6<sup>th</sup> edition - CBS Publishers, 2000
5. Lehninger D Nelson and Cox - Principles of Biochemistry. WH Freeman and Company Ltd, 4<sup>th</sup> edition, 2005.

**Open Educational Resources (OER):**

1. <https://youtu.be/JxK5rZxbyQY>
2. [https://youtu.be/N\\_n0iL3lY2A](https://youtu.be/N_n0iL3lY2A)
3. <https://youtu.be/7AtO8DuWscK>
4. <https://youtu.be/xZdTfhsypjM>
5. <https://youtu.be/uORW0xS-qs>
6. [https://youtu.be/qmUtK\\_Rf7iY](https://youtu.be/qmUtK_Rf7iY)

## SEMESTER-II

### UACB20- ALLIED BIOCHEMISTRY-II

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / II	UACB20	Allied Biochemistry-II	Theory	Allied	4	4	40+60=100

#### Objective:

To understand the basic of metabolic pathway

#### Course Outcomes (CO):

On completion of the course, the students will be able to

1. Provide a deeper insight into the fundamentals of structure, function and kinetics of enzymes
2. Describe and identify the main characteristics of diagnosis, screening and prognosis of disease
3. Gain knowledge of intermediary metabolism and regulation of individual metabolism
4. Provide the knowledge of the key concepts of endocrine system
5. Understand the role of minerals in health and disease

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	M	M	M
CO 2	H	H	H	M	L	M
CO 3	H	M	L	H	M	H
CO 4	H	M	H	M	M	M
CO 5	H	M	M	H	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	H	M	M	M
CO 2	H	H	H	M	L	M
CO 3	H	M	L	H	M	H
CO 4	H	M	H	M	M	M
CO 5	H	M	M	H	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I: Enzymes:

(12 hours)

- 1.1 General characteristics, IUB classification, enzyme units (IU and Katal)-  
Active site (K2, K3)
- 1.2 Lock and key and induced fit hypothesis (K1, K2)
- 1.3 Effect of temperature, pH and Substrate concentration on enzyme activity (K2, K3)
- 1.4 Michaelis – Menten equation (K2, K4)
- 1.5 Enzyme Inhibition - Competitive, non-competitive and uncompetitive inhibition

(kinetics not required) (K2, K4)

1.6 Industrial and Medical applications of enzymes (K1, K3)

**Unit II: Clinical Biochemistry:**

**(12 hours)**

2.1 Diabetes mellitus: Types, Causes and Symptoms (K1, K2)

2.2 Atherosclerosis: Stages, Risks and Consequences (K1, K3)

2.3 Obesity (K2, K3)

2.4 Gout (K1, K3)

2.5 Protein Calorie Malnutrition (K1, K3)

2.6 Marasmus and Kwashiorkor (K3)

**Unit III: Intermediary Metabolism:**

**(12 hours)**

3.1 Glycolysis- Pathway and energetics (Regulation not required) (K2, K3)

3.2 TCA cycle- energetics (Regulation not required) (K2, K4)

3.3 Electron transport chain (K1, K2)

3.4 Beta - oxidation of fatty acids (K2, K3)

3.5 Urea cycle and Decarboxylation (K1, K3)

3.6 Transamination (K1, K2)

**Unit IV: Hormonal Biochemistry:**

**(12 hours)**

4.1 Hormones, Receptors, Effectors, Targets–Definition (K1, K2)

4.2 Classification based on nature: Protein, steroid and amino acid derived hormone (K3, K4)

4.3 Insulin - Biological function and Disorders (K1, K3)

4.4 Thyroid hormones- Biological function and Disorders (K2, K3)

4.5 Growth hormone- Biological function and Disorders (K1, K2)

4.6 Oxytocin and Vasopressin -Biological function and Disorders (K1, K3)

**Unit V: Minerals:**

**(12 hours)**

5.1 Calcium - Source, RDA, Role and Deficiency diseases (K1, K2)

5.2 Iron - Source, RDA, Role and Deficiency diseases (K1, K3)

5.3 Potassium - Source, RDA, Role and Deficiency diseases (K1, K2)

5.4 Iodine - Source, RDA, Role and Deficiency diseases (K2, K3)

5.5 Sodium - Source, RDA, Role and Deficiency diseases (K1, K2)

5.6 Copper - Source, RDA, Role and Deficiency diseases (K1, K2)

**Text Books:**

1. Satyanarayana U- Textbook of Biochemistry - 3<sup>rd</sup> edition - Books and Allied Private Ltd,2008
2. Chatterjea M N, Rana Shinde - Textbook of Medical Biochemistry - 7<sup>th</sup> edition - Jaypee Publishers,2007

**Reference Books:**

1. Lehninger, David Nelson and M Chael M Cox - Principles of Biochemistry, WH Freeman and Company Ltd, 6<sup>th</sup> edition, 2012
2. Jain J L, Sanjay Jain, Nithin Jain - Fundamentals of Biochemistry, S Chand and Company Ltd, 8<sup>th</sup> edition, 2008
3. Trevor Palmer – Enzymes, Harwood Publishing Chichester, 2<sup>nd</sup> edition, 2007
4. Deb AC - Fundamentals of Biochemistry, New Central Book Agency Ltd, 9<sup>th</sup> edition, 2008
5. Ambika Shanmugam - Medical Biochemistry, Wolters Kluwer India Private Ltd, 8<sup>th</sup> edition, 2016

**OPEN EDUCATIONAL RESOURCES (OER):**

1. <https://youtu.be/2S2wCL1A4tg>
2. <https://youtu.be/BCSdVZtWOaM>
3. <https://youtu.be/OHE1ig4k64M>
4. <https://youtu.be/MHOpVy8VcXk>
5. <https://youtu.be/tMsrBsaBSFc>

**SEMESTER I & II**  
**UABCC20 - ALLIED BIOCHEMISTRY PRACTICAL**

Year/ Sem I / II	Course Code	Title of the Course Allied Biochemistry Practical	Course Type Practical	Course Category Allied Practical	H/ W 2	Credits 2	Marks 40+60=100
	UABCC20						

**Objective:**

To acquire knowledge on the structure and the function of biomolecules

**Course Outcomes (CO):**

On completion of the course, the students will be able to,

1. Understand the various identification tests for carbohydrates
2. Demonstrate separation of protein by electrophoresis
3. Estimate the amount of biomolecules
4. Discuss the principle and application of centrifugation

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	M	M	M
CO 2	H	H	H	M	L	M
CO 3	H	M	L	H	M	H
CO 4	H	M	H	M	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	H	M	M	M
CO 2	H	H	H	M	L	M
CO 3	H	M	L	H	M	H
CO 4	H	M	H	M	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**1. Safety Measures in The Laboratory**

**2. Volumetric Analysis:**

1. Estimation of Glucose by Benedicts method
2. Estimation of Glycine by Sorenson's method
3. Estimation of Ascorbic acid using 2,6 Dichlorophenol indophenol
4. Estimation of Iron using potassium permanganate
5. Estimation of Nitrite using sodium hydroxide
6. Estimation of Calcium in Milk

### **3. Qualitative Analysis:**

1. Carbohydrates: Glucose, Fructose, Galactose, Lactose, Maltose, Sucrose, Starch
2. Amino acids: Tyrosine, Tryptophan, Arginine, Cysteine

### **4. Instrumentation: (Demonstration)**

1. Chromatography: Column, Paper, Thin layer
2. Electrophoresis: Vertical and Horizontal
3. Colorimeter
4. UV Spectrophotometer
5. Centrifuge

### **Reference Books:**

1. Jayaraman J - Manuals in Biochemistry - New Age International Publishers,2001
  2. Varley, Alan H Gowen lock - Practical Biochemistry - 6<sup>th</sup> edition - CBS Publishers,2002
  3. David T Plummer - Practical Biochemistry - 3<sup>rd</sup> edition - McGraw Hill Publishers,2005
  4. Sawhney SK and Randhir Singh - Introductory Practical Biochemistry- 2<sup>nd</sup> edition - Narosa Publishers, 2001
  5. Kanai L Mukherjee - Medical Laboratory Technology - Volume I - Tata Graw Hill Publication Company Limited,2010
-

# Department of Chemistry (UG)

## SYLLABUS AND REGULATIONS

Under

### OUTCOME-BASED EDUCATION

2020

(Effective for the Batch of Students Admitted from 2020-2021)



### AUXILIUM COLLEGE (Autonomous)

*(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)*

**Gandhi Nagar, Vellore-632 006.**

**AUXILIUM COLLEGE (Autonomous)**  
*(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)*  
**Gandhi Nagar, Vellore-632 006.**

**Department of Chemistry (UG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**Eligibility for admission to B.Sc. Chemistry:**

- A pass in Higher Secondary with Mathematics, Physics, Chemistry and Biology.
- A pass in Higher Secondary with Mathematics, Physics, Chemistry and Computer Science.
- A pass in Higher Secondary with Physics, Chemistry, Zoology and Botany.

**Allied Subjects:**

1. Mathematics/ Botany
2. Physics

**Eligibility to take Allied Subjects:**

Students who belong to category I and II are eligible to take Mathematics as one of the Allied courses. Students who belong to category III are eligible to take Botany as one of the Allied courses.

Sem	Part	Paper Code	Title	Hours/ Week	Exam		Credits	Marks
					Th	Pr		
<b>I</b>	I	ULTAA20	Tamil Paper – I	6	3	-	3	40 + 60
	II	UENGA20	English Paper – I	6	3	-	3	40 + 60
	III	UCCHA20	General Chemistry – I	6	3	-	5	40 + 60
	III	UCCHC20	Practical - I: Inorganic Qualitative Analysis	3	-	-	-	-
	III	UBMAA20	Optional Allied - I: Mathematics – I	6	3	-	5	40 + 60
	III	UBBTA20	Optional Allied - I: Botany– I	4	3	-	4	40 + 60
	III	UBBTC20	Optional Allied Practical: Botany	2	-	-	-	-
	IV	UVEDA20	Value Education	1	-	-	-	-
	IV	-	Skill Based Elective – I	2	2	-	2	40 + 60
<b>Total</b>							<b>18/17</b>	<b>500</b>
<b>II</b>	I	ULTAB20	Tamil Paper – II	6	3	-	3	40 + 60
	II	UENGB20	English Paper – II	6	3	-	3	40 + 60
	III	UCCHB20	General Chemistry – II	6	3	-	5	40 + 60
	III	UCCHC20	Practical - I: Inorganic Qualitative Analysis	3	-	3	4	40 + 60
	III	UBMAB20	Optional Allied - II: Mathematics – II	6	3	-	5	40 + 60
	III	UBBTB20	Optional Allied - II: Botany – II	4	3	-	4	40 + 60
	III	UBBTC20	Optional Allied Practical: Botany	2	-	3	2	40 + 60
	IV	UVEDA20	Value Education	1	-	-	-	-
	IV	-	Skill Based Elective – II	2	2	-	2	40 + 60
<b>Total</b>							<b>22/23</b>	<b>600/700</b>
<b>III</b>	I	ULTAC20	Tamil Paper – III	5	3	-	3	40+60
	II	UENGC20	English Paper – III	6	3	-	3	40+60
	III	UCCHD20	General Chemistry – III	7	3	-	5	40+60
	III	UCCHF20	Practical – II: Volumetric Estimation	3	-	-	-	-
	III	UAPHA320	Allied - III: Physics – I	4	3	-	4	40+60
	III	UAPHC420	Allied Practical: Physics	2	-	-	-	-
	IV	USCHA320	Skill Based Elective – III Industrial Chemistry	2	3	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
<b>Total</b>							<b>17</b>	<b>500</b>

Sem	Part	Paper Code	Title	Hours /Week	Exam		Credits	Marks
					Th	Pr		
IV	I	ULTAD20	Tamil Paper – IV	6	3	-	3	40+60
	II	UENGD20	English Paper – IV	5	3	-	3	40+60
	III	UCCHE20	General Chemistry – IV	5	3	-	5	40+60
	III	UCCHF20	Practical – II: Volumetric Estimation	3	-	3	4	40+60
	III	UAPHB420	Allied - IV: Physics – II	4	3	-	4	40+60
	III	UAPHC420	Allied Practical: Physics	2	-	3	2	40+60
	IV	USCHB420	Skill Based Elective – IV Agricultural Chemistry	2	3	-	2	40+60
	IV	UNEVS20	Environmental Studies	2	3	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
<b>Total</b>							<b>25</b>	<b>800</b>
V	III	UCCHG20	Inorganic Chemistry	4	3	-	4	40+60
	III	UCCHH20	Organic Chemistry	4	3	-	4	40+60
	III	UCCHI20	Physical Chemistry	5	3	-	4	40+60
	III	UECHA20	Elective - I A: Analytical Chemistry	5	3	-	5	40+60
	III	UECHB20	Elective - I B: Basics of Computer Programming in C and its Applications in Chemistry					
	III	UCCHL20	Practical - III: Physical Chemistry	2	-	-	-	-
	III	UCCHM20	Practical - IV: Gravimetric Estimation	2	-	-	-	-
	III	UCCHN20	Practical - V: Organic Analysis and Preparation	2	-	-	-	-
	IV	USCHC520	SBE – V: Small Scale Chemistry	2	3	-	2	40+60
	IV	-	Non Major Elective – I	3	3	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
	<b>Total</b>							<b>21</b>
VI	III	UCCHJ20	Coordination Chemistry	4	3	-	4	40+60
	III	UCCHK20	Electro Chemistry	4	3	-	4	40+60
	III	UECHC20	Elective II A: Chemistry of Natural Products	5	-	-	5	40+60
	III	UECHD20	Elective - II B: Polymer Chemistry					
	III	UECHE20	Elective - III A: Applied Chemistry	5	-	-	5	40+60
	III	UECHF20	Elective - III B: Pharmaceutical Chemistry					
	III	UCCHL20	Practical - III: Physical Chemistry	6	-	3	4	40+60
	III	UCCHM20	Practical - IV: Gravimetric Estimation		-	3	4	40+60
	III	UCCHN20	Practical - V: Micro Scale Organic Analysis and Preparation		-	3	4	40+60
	IV	USCHD620	SBE – VI: Food Chemistry	2	2	-	2	40+60
	IV	-	Non-Major Elective – II	3	2	-	2	40+60
	IV	UVEDA20	Value Education	1	2	-	2	40+60
<b>Total</b>							<b>36</b>	<b>1000</b>
	V	-	Extension Activities (90 Hours)				<b>1</b>	
<b>Total</b>							<b>140</b>	<b>4000/4100</b>

## PROGRAMME OUTCOMES (PO)

- PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.
- PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills
- PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.
- PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.
- PO5:** Emulate positive social values and exercise leadership qualities and team work.
- PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

## PROGRAMME SPECIFIC OUTCOMES (PSO)

**PSO1:** Demonstrate a firm foundation in fundamentals and gain an in depth knowledge in different fields of Chemistry such as Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Analytical Chemistry, Pharmaceutical Chemistry, Food Chemistry and Small Scale Chemistry.

**PSO2:** Apply laboratory skills, carry out experiments, record observations and inferences and analyze the results and follow the correct procedures and regulations for safe handling and usage of chemicals.

**PSO3:** Communicate effectively chemistry specific information, ideas and opinions and be able to comprehend and write reports effectively.

**PSO4:** Develop an interest in pursuing higher studies in Chemistry and related subjects which are relevant to employment and entrepreneurship.

**PSO5:** Demonstrate the knowledge of professional and ethical practices.

**PSO6:** Integrate the knowledge and skills developed in multidisciplinary environments and function effectively as an individual or a leader and contribute towards the needs of the society.

PO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
PO1	H	H	H	H	H	H
PO2	H	H	H	H	H	M
PO3	H	H	H	M	M	M
PO4	H	H	H	M	M	M
PO5	H	H	M	M	M	M
PO6	M	M	M	M	M	M

(HIGH -3, MODERATE – 2, LOW -1)

## SEMESTER I

### UCCHA20 - GENERAL CHEMISTRY – I

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code</b> UCCHA20	<b>Title of the Course</b> General Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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#### Learning Objectives:

1. To impart knowledge on periodicity of properties and to learn the theory behind inorganic qualitative analysis.
2. To learn the IUPAC system of nomenclature of organic compounds and shapes of molecules based on hybridization.
3. To help the students to recapitulate the fundamentals in gaseous state, liquid state and quantum chemistry.

#### Course Outcomes:

The Learners will be able to

1. Recall and understand the concepts of valency, oxidation and reduction, classify the elements in the periodic table and explain the periodicity of properties.
2. Recall the concepts and theories of acid - base, buffer solutions, understand the principle of inorganic qualitative analysis and apply it in practicals.
3. Apply IUPAC nomenclature in naming organic compounds and the concept of hybridization to identify the geometry and shape of the simple organic molecules.
4. Analyse and apply the concepts of liquid and gaseous states.
5. Recall the concepts of classical and quantum mechanics and solve related problems.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:** (18 hours)

- 1.1 Valency, oxidation number, oxidation and reduction in terms of oxidation number, calculation of oxidation state- acids, bases, salts, oxidizing and reducing agents. (K1, K2, K3 & K4)
- 1.2 Oxidation, reduction and redox reactions (definition and examples). Oxidizing and reducing agents (definition and examples). Balancing chemical equations - oxidation number and ion electron methods. (K1, K2, K3 & K4)
- 1.3 Modern periodic law, general classification of elements in the periodic table, general characteristics of s, p, d, and f block elements. (K1, K2, K3 & K4)
- 1.4 Periodicity of properties – definition, factors affecting and periodicity of the following properties - atomic radii, ionic radii, ionization potential and electron affinity. (K1, K2, K3 & K4)
- 1.5 Factors affecting and periodicity of electronegativity. (K1, K2, K3 & K4)
- 1.6 Determination of electronegativity – Pauling's scale and Mulliken's scale. (K1, K2, K3 & K4)

**Unit II:** (18 hours)

- 2.1 Acids and Bases-concepts- Arrhenius, Lowry-Bronsted and Lewis acid – base theory, acid- base equilibria. (K1, K2, K3 & K4)
- 2.2 Definition of pH of strong and weak acid solutions, calculation. Hard and soft acids and bases – definition. (K1, K2, K3 & K4)
- 2.3 Buffer solutions, relative strength of acids and bases from  $k_a$  and  $k_b$  values, Henderson-Hasselbalch equations.) (K1, K2, K3 & K4)
- 2.4 Common ion effect, concept of sparingly soluble salts, solubility product principle, relation between solubility and solubility product. (K1, K2, K3 & K4)
- 2.5 Application of common ion effect and solubility product principle in inorganic qualitative analysis, eliminating the interfering radicals, significance of sodium carbonate extract. (K1, K2, K3 & K4)
- 2.6 Spot test reagents – Magneson, Aluminon, Nessler's, Thiourea, Cupferon and DMG (K1, K2, K3 & K4)

**Unit III:** (18 hours)

- 3.1 IUPAC system of nomenclature of organic compounds- introduction, rules of IUPAC system of nomenclature of organic compounds. (K1, K2, K3 & K4)
- 3.2 IUPAC system of nomenclature for complex organic compounds, alkanes, substituted alkanes, alkyl halides, alkenes, alkynes, alkyl substituents and cycloalkanes. (K1, K2, K3 & K4)
- 3.3 Nomenclature of compounds having functional groups - alcohols, ethers, aldehydes, ketones, carboxylic acids, esters, nitro compounds. (K1, K2, K3 & K4)
- 3.4 Nomenclature of aromatic compounds and substituted aromatic compounds, poly functional and heterocyclic compounds, bicyclic and spiro compounds. (K1, K2, K3 & K4)
- 3.5 Concept of Hybridization – definition, characteristics of hybrid orbitals, modes of hybridization. (K1, K2, K3 & K4)

3.6 Hybridization – tetra valency of carbon, geometry of molecules - methane, ethane, ethylene, acetylene and benzene. (K1, K2, K3 & K4)

**Unit IV:**

**(18 hours)**

- 4.1 Gaseous state - kinetic gas equation, derivation, gas laws from the kinetic gas equation, types of velocities - Mean, Root Mean Square Velocity (RMS), Most Probable Velocities (MPV), calculation of molecular velocities. (No derivation). (K1, K2, K3 & K4)
- 4.2 Maxwell's distribution of molecular velocities (derivation), equipartition of energy, collision number, Collision diameter, mean free path, definition. (No derivation). (K1, K2, K3 & K4)
- 4.3 Real gases – deviation from ideal behavior – van der Waal's equation- Virial equation of state, Boyle's temperature (No derivation). (K1, K2, K3 & K4)
- 4.4 Joule's law, Joule Thomson effect, Joule Thomson Coefficient and its derivation, inversion temperature and its significance. (No derivation) (K1, K2, K3 & K4)
- 4.5 Liquid State - qualitative treatment of the structure of liquids, surface tension – definition, effects of surface tension, experimental determination – capillary rise method – drop weight method, applications. (K1, K2, K3 & K4)
- 4.6 Viscosity – definition, effect of viscosity on temperature and pressure, experimental determination - Saybolt Viscometer and Ostwald's Viscometer method (Including problems). (K1, K2, K3 & K4)

**Unit V:**

**(18 hours)**

- 5.1 Classical Mechanics –the  $e/m$  of an electron, Rutherford's scattering experiments, Rutherford atomic model. (K1, K2, K3 & K4)
- 5.2 The Bohr theory of hydrogen atom, Sommerfeld extension of the Bohr theory. (K1, K2, K3 & K4)
- 5.3 Photoelectric effect and Compton effect- Wave mechanical concept of the atom, de Broglie's relationship. (K1, K2, K3 & K4)
- 5.4 Davisson and Germer experiment, wave nature of electron, Heisenberg's uncertainty principle. (K1, K2, K3 & K4)
- 5.5 Quantum mechanics- postulates of quantum mechanics, concept of operators, angular wave function, Eigen values, Schrodinger wave equation (no derivation), and significance of wave functions. (K1, K2, K3 & K4)
- 5.6 Radial and angular wave functions, probability distribution of electrons, radial probability distribution curves. (K1, K2, K3 & K4)

\*Related problems to be worked out

**Text Books:**

1. R.D.Madan, Modern Inorganic Chemistry, 2<sup>nd</sup> Edition, S. Chand & Co, Reprint 2004.
2. B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co. Ltd., Reprint 2008.
3. B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43<sup>rd</sup> Edition, Vishal Publishing Co., 2008.

## Reference Books:

1. P.L Soni and Mohan Katyal, Textbook of Inorganic Chemistry, 20<sup>th</sup> Edition, Sultan Chand & Sons, Reprint 2001.
2. P.L Soni and H.M Chawla, Textbook of Organic Chemistry, 25<sup>th</sup> Revised Edition, Sultan Chand & Sons, 1992.
3. Arun Bahl and B.S.Bahl, Advanced Organic Chemistry, 1<sup>st</sup> Revised Multicolour Edition 2012.
4. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co, New Delhi, Golden Jubilee Year Edition, 2017.
5. K.S Tewari and M.K Vishnoi, A Textbook of Organic Chemistry, 3<sup>rd</sup> Edition, Vikas Publishing House Pvt. Ltd., 2006.
6. M.K Jain and S.C Sharma, Modern Organic Chemistry, Vishal Publishing Co, 2004.
7. P.L Soni, O.P Dharmarha and U.N Dash, Textbook of Physical Chemistry, 21<sup>st</sup> Revised Edition, S. Chand & Co, Reprint 2000.
8. P.K Mani and A.O Thomas, A Textbook of Practical Chemistry, Scientific Publication, 1973.
9. O.P. Pandey, D. N. Bajpai and S.Giri, Practical Chemistry, 8<sup>th</sup> Edition, S. Chand & Co, 2001.
10. R.K.Prasad, Quantum Chemistry through problems and solutions, New Age International Publishers, New Delhi, 1997.

## OER:

1. <https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/5e79007116b51c232c3fb959>  
(Classification of elements and periodic properties)
2. <https://nptel.ac.in/courses/104/101/104101121/> (Properties of elements)
3. <https://nptel.ac.in/courses/104/103/104103071/> (IUPAC Nomenclature)
4. V-labs- <http://www.olabs.edu.in/>
5. <https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/5b20c14016b51c01f3e567b5> (pH scale)
6. <https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/5e79007216b51c232c3fb95b>  
(Hybridization)
7. [https://chem.libretexts.org/Bookshelves/General\\_Chemistry/Map%3A\\_Principles\\_of\\_Modern\\_Chemistry\\_\(Oxtoby\\_et\\_al.\)/UNIT\\_3%3A\\_THE\\_STATES\\_OF\\_MATTER/09%3A\\_The\\_Gaseous\\_State](https://chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_Principles_of_Modern_Chemistry_(Oxtoby_et_al.)/UNIT_3%3A_THE_STATES_OF_MATTER/09%3A_The_Gaseous_State)
8. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> – (PO2 -Physical Chemistry-1-  
Quantum Chemistry, MO2- Fundamentals of quantum mechanics-1)

## SEMESTER II

### UCCHB20 - GENERAL CHEMISTRY – II

<b>Year: I</b> <b>SEM: II</b>	<b>Course Code</b> UCCHB20	<b>Title of the Course</b> General Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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#### Learning Objectives:

1. To throw light on alkali metals and their compounds, different types of bonding and its importance in inorganic compounds.
2. To understand the importance of VSEPR and MO theories.
3. To give a detailed knowledge on electron displacement effects and reaction intermediates, the mechanistic aspects of free radical substitution reactions in alkanes and addition reactions in alkenes and dienes.
4. To understand the properties of liquid crystals and solutions.

#### Course Outcomes:

The Learners will be able to

1. Illustrate the different types of bonds with examples and apply the knowledge of VSEPR theory to determine geometries of molecules.
2. Interpret the molecular orbital theory of homo and hetero nuclear diatomic molecules, compare the chemical and physical properties of alkali metals and their compounds and understand the chemistry of lithium.
3. Analyse and apply the electronic displacement effects, reactions, generation, structure and stability of reaction intermediates.
4. Examine and analyse the reactions and mechanisms of alkanes, alkenes, dienes and alkynes.
5. Analyse the laws and concepts of ideal and non ideal solutions, mesomorphic and colloidal states.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:****(18 hours)**

- 1.1 Chemical bonding: Introduction- Types of bonds - Ionic, Covalent, and Coordinate bonds- characteristics and examples. (K1,K2, K3 &K4)
- 1.2 Ionic bond - conditions for the formation of ionic bond. (K1,K2, K3 &K4)
- 1.3 Characteristics and general properties, radius ratio rule and its limitation - Comparison of ionic and covalent bonds. (K1,K2, K3 &K4)
- 1.4 Hydration energy, lattice energy and their applications. (K1,K2, K3 &K4)
- 1.5 Born-Haber cycle – Hydrogen bond - Fajan’s rule. (K1,K2, K3 &K4)
- 1.6 VSEPR theory- geometry of  $\text{NH}_3$ ,  $\text{H}_2\text{O}$ ,  $\text{XeF}_2$ ,  $\text{XeF}_4$ ,  $\text{XeF}_6$ ,  $\text{XeF}_5^-$ ,  $\text{XeOF}_5^-$ ,  $\text{XeF}_8^{2-}$ ,  $\text{IF}_7$  and  $\text{NH}_4^+$ . (K1,K2, K3 &K4)

**Unit II:****(18 hours)**

- 2.1 Molecular orbital theory - Postulates of MOT, formation of bonding and antibonding molecular orbitals. (K1,K2, K3 &K4)
- 2.2 Bond order – Stability and magnetic property of the molecules. (K1,K2, K3 &K4)
- 2.3 MO diagrams of homo nuclear diatomic molecules  $\text{H}_2$ ,  $\text{O}_2$ ,  $\text{O}_2^+$ ,  $\text{N}_2$  and hetero nuclear diatomic molecules-  $\text{CO}$ ,  $\text{NO}$ . (K1,K2, K3 &K4)
- 2.4 Chemical and physical properties of alkali metals, Comparative study of the elements and the compounds of alkali metals- carbonates, oxides, hydroxides and halides. (K1,K2, K3 &K4)
- 2.5 Exceptional properties of lithium, diagonal relationship of lithium and magnesium. (K1,K2, K3 &K4)
- 2.6 Lithium- occurrence, ores, extraction from phosphate and silicate ores and uses. Preparation, properties and uses of lithium carbonate. (K1,K2, K3 &K4)

**Unit III:****(18 hours)**

- 3.1 Electron displacement effects- inductive effect- effect on bond length, dipole moment, reactivity of alkyl halides, strength of carboxylic acids and basic character of amines. (K1,K2, K3 &K4)
- 3.2 Electromeric effect, comparison with inductive effect, mesomeric effect, comparison with inductive effect. (K1,K2, K3 &K4)
- 3.3 Hyperconjugative effect and steric effect. (K1,K2, K3 &K4)
- 3.4 Bond fission- homolytic fission, heterolytic fission. Reaction intermediates- Carbocations – generation, structure, stability and reactions. (K1,K2, K3 &K4)
- 3.5 Generation, structure, stability and reactions of carbanions and free radicals. (K1,K2, K3 &K4)
- 3.6 Generation of benzyne, nitrenes and carbenes. (K1,K2, K3 &K4)

**Unit IV:****(18 hours)**

- 4.1 Alkanes - chemical properties, mechanism of free radical reactions, halogenation of alkanes. (K1,K2, K3 &K4)

- 4.2 Alkenes - addition reactions of alkenes with hydrogen, halogens, hydrogen halides- Markownikoff's rule and anti Markownikoff's rule (peroxide effect), sulphuric acid, water. (K1,K2, K3 &K4)
- 4.3 Hydroboration, ozonolysis, hydroxylation with  $\text{KMnO}_4$ , allylic substitution by NBS. (K1,K2, K3 &K4)
- 4.4 Dienes - types, stability and 1,2 and 1,4 addition reactions - Diels –Alder reaction. (K1,K2, K3 &K4)
- 4.5 Alkynes- acidity of alkynes, formation of acetylides, addition reactions with water, hydrogen halides, halogens. (K1,K2, K3 &K4)
- 4.6 Alkynes- oxidation, ozonolysis and hydroxylation with  $\text{KMnO}_4$ . (K1,K2, K3 &K4)

**Unit V:**

**(18 hours)**

- 5.1 Mesomorphic state - Liquid crystals – classification, thermotropic and lyotropic, Smectic, Nematic and Cholestric liquid crystals and the molecular arrangements and its applications. (K1,K2, K3 &K4)
- 5.2 Solutions - solutions of gases in liquids, Henry's law- solutions of liquids in liquids- Raoult's law, binary liquid mixtures, ideal solutions. (K1,K2, K3 &K4)
- 5.3 Deviations from ideal behaviour, vapour pressure-composition curves and boiling point, composition curves. (K1,K2, K3 &K4)
- 5.4 Distillation -types of distillation, fractional distillation, steam distillation, vacuum distillation, column distillation and azeotropic distillation. (K1,K2, K3 &K4)
- 5.5 Colloidal State - colloidal systems- classification of colloids, preparation of colloidal solutions, dispersion methods and condensation methods. (K1,K2, K3 &K4)
- 5.6 Properties of colloidal systems –Tyndall effect, importance and applications of colloids. (K1,K2, K3 &K4)

\*Related problems to be worked out

**Text Books:**

- 1. R.D.Madan, Modern Inorganic Chemistry, 2<sup>nd</sup> Edition, S. Chand & Co., Reprint 2004.
- 2. B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co.Ltd., Reprint 2008.
- 3. B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43<sup>rd</sup> Edition, Vishal Publishing Co., 2008.

**Reference Books:**

- 1. P.L Soni and Mohan Katyal, Text book of Inorganic Chemistry, 20<sup>th</sup> Edition, Sultan Chand & Sons, Reprint 2001.
- 2. P.L Soni and H.M Chawla, Textbook of Organic Chemistry, 25<sup>th</sup> Revised Edition, Sultan Chand & Sons, 1992.
- 3. Arun Bahl and B.S.Bahl, Advanced Organic Chemistry, 1<sup>st</sup> Revised Multi colour Edition 2012.
- 4. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., New Delhi, Golden Jubilee Year Edition, 2017.

5. K.S Tewari and M.K Vishnoi, A Text book of Organic Chemistry, 3<sup>rd</sup> Edition, Vikas Publishing House Pvt. Ltd., 2006.
6. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co, 2004.
7. P.L. Soni, O.P. Dharmarha and U.N. Dash, Textbook of Physical Chemistry, 21<sup>st</sup> Revised Edition, S. Chand & Co, Reprint 2000.
8. P.K Mani and A.O Thomas, A Textbook of Practical Chemistry, Scientific Publication, 1973.
9. O.P. Pandey, D. N. Bajpai and S.Giri, Practical Chemistry, 8<sup>th</sup> Edition, S. Chand & Co., 2001.

**OER:**

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> – (P-05–Reaction intermediate)
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> – (P-09- Organic Chemistry-III Reaction mechanism-2)
3. <https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/57cfec5816b51c6b39a8075f> (Solutions)
4. <https://nptel.ac.in/courses/104/103/104103071/> (Molecular orbital theory)
5. <https://nptel.ac.in/courses/104/103/104103069/> (VSEPR Theory)
6. [https://chem.libretexts.org/Bookshelves/General\\_Chemistry/Book%3AChemistry\\_\(OpenSTAX\)/11%3A\\_\(Solutions\\_and\\_Colloids\)](https://chem.libretexts.org/Bookshelves/General_Chemistry/Book%3AChemistry_(OpenSTAX)/11%3A_(Solutions_and_Colloids)) (Solutions\_and\_Colloids)

## SEMESTER II

### UCCHC20- PRACTICAL I: INORGANIC QUALITATIVE ANALYSIS

<b>Year : I</b> <b>SEM: II</b>	<b>Course Code</b> UCCHC20	<b>Title of the Course</b> Inorganic Qualitative Analysis	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 3	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Outcomes

The Learners will be able to

1. Recall the principles of inorganic qualitative analysis.
2. Apply the concepts of semimicro analysis in inorganic qualitative analysis.
3. Develop skill to analyse systematically the given inorganic mixture and identify the acid and basic radicals.
4. Understand the importance of eliminating the interfering radical.
5. Eliminate the interfering acid radical for group separation and identification of basic radicals.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

Analysis of a mixture containing two cations and two anions, one of which will be an interfering ion. Semi micro methods using the conventional scheme may be adopted.

Reactions of the following anions to be analysed:

carbonate, sulphide, sulphate, fluoride, chromate, bromide, chloride, nitrate, oxalate, phosphate and borate.

Reactions of the following cations to be analysed:

Lead, copper, cadmium, bismuth, aluminium, iron, manganese, zinc, cobalt, nickel, calcium, strontium, barium, magnesium and ammonium.

### Text Books:

1. Departmental Under Graduate Laboratory Manual.
2. Dr. V. V. Ramanujam, Inorganic Semimicro Qualitative Analysis, National Publishing Company.

### Reference Books:

1. Dr. O. P. Pandey, D. N. Bajpai, Dr. S. Giri, Practical Chemistry, S. Chand Ltd., Revised Edition, 2013.
2. Vogel's Text book of Qualitative Inorganic Analysis, Pearson, 7<sup>th</sup> Edition, 2012.

### OER:

1. [https://amrita.olabs.edu.in/?sub=73&brch=7&sim=180&cnt=515\(Analysisof anions\)](https://amrita.olabs.edu.in/?sub=73&brch=7&sim=180&cnt=515(Analysisof anions))
2. [http://amrita.olabs.edu.in/?sub=73&brch=7&sim=31&cnt=1 \(Analysisof cations\)](http://amrita.olabs.edu.in/?sub=73&brch=7&sim=31&cnt=1 (Analysisof cations))
3. [http://web.mst.edu/~gbert/qual/qual.html \(Analysisof cations\)](http://web.mst.edu/~gbert/qual/qual.html (Analysisof cations))
4. <https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/58664a1e472d4a6379bd98a5> (Analysis of anions)
5. <https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/58664a74472d4a6379bd98c7> (Analysis of cations)

Continuous Assessment	40 marks
I CA	50
II CA	50
Average	25
Performance during regular practical's	10
Regularity in submission of observation note-book and record	5

<b>Semester Practical Examination</b>	<b>60 marks</b>
Viva-Voce	5
Record	10
Qualitative Analysis	45
Simple Acid Radical	8
Eliminating Radical	10
Each Basic Radical	9 (9 x 2 = 18)
Other tests	9
<b>Total</b>	<b>100</b>

(Note: For each radical spotting - 2 marks)

**SEMESTER III****UCCHD20 - GENERAL CHEMISTRY – III**

<b>Year: II</b> <b>SEM: III</b>	<b>Course Code</b> UCCHD20	<b>Title of the Course</b> General Chemistry - III	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 7	<b>Credits</b> 5	<b>Marks</b> 100
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**Learning Objectives:**

1. To understand the principles of volumetric analysis.
2. To gain knowledge on alkaline earth metals and their compounds.
3. To learn the reactivity of cycloalkanes, carbonyl compounds, carboxylic acids, alcohols, ethers and epoxides.
4. To provide knowledge on solid-state chemistry.

**Course Outcomes:**

The Learners will be able to

1. Define and calculate equivalent weights and concentration terms and explain the principles of volumetric analysis, and illustrate the theories of different types of titrations and indicators.
2. Discuss the trend in periodicity of Beryllium, Boron and Carbon family elements and their compounds.
3. Describe the methods of preparation and properties of cycloalkanes, dicarboxylic acids and carbonyl compounds, and apply the concept of acidity and acid strength of carboxylic acids.
4. Describe the methods of preparation and properties of alcohols, ethers and epoxides.
5. Elaborate the basic concepts of solid-state chemistry including solid state defects and semiconductors.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:****(21 hours)**

- 1.1 Definition of Mole, Molarity, Molality, Normality, Mole fraction, Equivalent Weights of acid, base, oxidizing agent, reducing agent and salt. (K1, K2, K3 & K4)
- 1.2 Volumetric analysis - principle, titrand, titrant, indicator, preparation of solutions and standardization of commercial acids. (K1, K2, K3 & K4)
- 1.3 Primary and secondary standards – characteristics and examples. Standardisation of solutions. (K1, K2, K3 & K4)
- 1.4 Theories of acid-base titrations, redox, complexometric and iodometric and iodimetric titrations. (K1, K2, K3 & K4)
- 1.5 Theories of acid-base, redox, metal ion and adsorption indicators, choice of indicators. (K1, K2, K3 & K4)
- 1.6 Types of errors, minimizing the errors, accuracy and precision, significant figures. (K1, K2, K3 & K4)

**Unit II:****(21 hours)**

- 2.1 Alkaline earth metals - Be, Mg, Ca, Sr, Ba - occurrence, comparative study of elements and compounds- oxides, halides, hydroxides, sulphates and carbonates. (K1, K2, K3 & K4)
- 2.2 Exceptional properties of Beryllium –Diagonal relationship between Be and Al, extraction of magnesium. (K1, K2, K3 & K4)
- 2.3 p - block elements -Boron family-comparative study of elements and compounds- oxides, hydroxides, halides and hydrides. (K1, K2, K3 & K4)
- 2.4 Preparation, properties, uses and structures of  $\text{LiAlH}_4$ ,  $\text{NaBH}_4$ , diborane and Borazole. (K1, K2, K3 & K4)
- 2.5 Carbon family - comparative study of elements and compounds- hydrides, oxides and halides. (K1, K2, K3 & K4)
- 2.6 Classification of silicates, chemistry of silicones and their applications. (K1, K2, K3 & K4)

**Unit III:****(21 hours)**

- 3.1 Cycloalkanes – preparation using Wurtz's reaction, Dieckmann's ring closure and reduction of aromatic hydrocarbons. (K1, K2, K3 & K4)
- 3.2 Substitution and ring opening reactions, Baeyer's strain theory, theory of strainless rings. (K1, K2, K3 & K4)
- 3.3 Carboxylic acid- ionization of carboxylic acids, acidity constants, comparison of acid strengths of substituted halo acids, acid strengths of substituted benzoic acids. Conversion of acids to their derivatives. (K1, K2, K3 & K4)
- 3.4 Dicarboxylic acids- preparation and properties of oxalic, malonic, succinic, glutaric and adipic acids. (K1, K2, K3 & K4)
- 3.5 Carbonyl compounds- preparation from alcohols, alkene, alkyne, acid chloride, Grignard reagent, chemical reactions, relative reactivities of aldehydes and ketones. (K1, K2, K3 & K4)

3.6 Acidity of  $\alpha$ -hydrogen, nucleophilic addition reactions (bisulphite, HCN, Grignard and alcohol). (K1, K2, K3 & K4)

**Unit IV:**

**(21 hours)**

- 4.1 Alcohols - reactions of alcohols with Na, HX, esterification, oxidation with alk.  $\text{KMnO}_4$ , acidic dichromate, con  $\text{HNO}_3$ , catalytic dehydrogenation. (K1, K2, K3 & K4)
- 4.2 Dihydric alcohol -Glycol- preparation, properties and uses. (K1, K2, K3 & K4)
- 4.3 Trihydric alcohol - Glycerol- preparation, properties and uses. (K1, K2, K3 & K4)
- 4.4 Ethers- isomerism, preparation by Williamson synthesis, reactions of ethers. (K1, K2, K3 & K4)
- 4.5 Epoxides- preparation from alkene, ring opening reactions. (K1, K2, K3 & K4)
- 4.6 Reactions of epoxides with alcohol, ammonia derivative and  $\text{LiAlH}_4$ . (K1, K2, K3 & K4)

**Unit V: (21 hours)**

- 5.1 The Solid State - difference between crystalline and amorphous solids, symmetry in crystal systems - elements of symmetry, space lattice, unit cell, Bravais lattices, law of rational indices and Miller indices. (K1, K2, K3 & K4)
- 5.2 X - ray diffraction – derivation of the Bragg's equation – experimental methods – Laue's method and powder method. (K1, K2, K3 & K4)
- 5.3 Types of crystals – characteristics of molecular, covalent, metallic and ionic crystals. (K1, K2, K3 & K4)
- 5.4 Three-dimensional close packing of spheres – ccp and hcp – characteristics of hcp, ccp and bcc structures, interstitial sites in closely packed arrangement of atoms – triangular, tetrahedral and octahedral sites, radius ratio rule and its effect on the shapes of ionic crystals, structures of ionic crystals- $\text{NaCl}$ ,  $\text{CsCl}$ ,  $\text{ZnS}$ , Wurtzite, Fluorite and Rutile. (K1, K2, K3 & K4)
- 5.5 Imperfections in crystal systems – Schottky and Frenkel defects, metal excess and metal deficiency defects. (K1, K2, K3 & K4)
- 5.6 Semiconductors – band theory of solids, intrinsic semiconductors, extrinsic semiconductors - n-type and p-type semiconductors. (K1, K2, K3 & K4)

\*Related problems to be worked out

**Text Books:**

1. R.D.Madan, Modern Inorganic Chemistry, 3<sup>rd</sup> Edition, S. Chand & Co., Reprint 2016.
2. B.S.Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co.Ltd., Reprint 2012.
3. B. R. Puri, L. R Sharma and M.S. Pathania, Principles of Physical Chemistry, 47<sup>th</sup> Edition, Vishal Publishing Co., 2017.

**Reference Books:**

1. P. L. Soni and Mohan Katyal, Textbook of Inorganic Chemistry, 20<sup>th</sup> Edition, Sultan Chand & Sons, Reprint 2015.
2. P. L. Soni and H. M. Chawla, Textbook of Organic Chemistry, 29<sup>th</sup> Revised Edition, Sultan Chand & Sons, 2012.

3. K. S. Tewari and M. K. Vishnoi, A Textbook of Organic Chemistry, 3<sup>rd</sup> Edition, Vikas Publishing House Pvt. Ltd., 2015.
4. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 2019.
5. P. L. Soni, O. P. Dharmarha and U. N. Dash, Textbook of Physical Chemistry, 23<sup>rd</sup> Revised Edition, S. Chand & Co., Reprint, 2016.
6. P.K. Mani and A.O. Thomas, A Textbook of Practical Chemistry, Scientific Publication, 1973.
7. O.P. Pandey, D. N. Bajpai and S.Giri, Practical Chemistry, 8<sup>th</sup> Edition, S. Chand & Co, 2016.
8. J. Bassett, R. C. Denney, G. H. Jeffery and J. Mendham, Vogel's Textbook of Quantitative Inorganic Analysis-ELBS.
9. J.N. Gurtu, Solid State Chemistry, Second Edition, Pragati Prakashan Publishers, 2015.

**Open Educational Resources (OER):**

1. <https://phet.colorado.edu/en/simulation/acid-base-solutions>
2. [https://chem.libretexts.org/Bookshelves/Inorganic\\_Chemistry/Modules\\_and\\_Websites\\_\(Inorganic\\_Chemistry\)/Descriptive\\_Chemistry](https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Modules_and_Websites_(Inorganic_Chemistry)/Descriptive_Chemistry)
3. [https://chem.libretexts.org/Courses/Athabasca\\_University/Chemistry\\_360%3A\\_Organic\\_ChemistryII](https://chem.libretexts.org/Courses/Athabasca_University/Chemistry_360%3A_Organic_ChemistryII)
4. <https://www.khanacademy.org/science/chemistry/chemical-bonds>
5. <https://www.khanacademy.org/science/organic-chemistry/aldehydes-ketones>

### SEMESTER III

#### USCHA320 - SKILL BASED ELECTIVE: INDUSTRIAL CHEMISTRY

<b>Year: II</b> <b>SEM:III</b>	<b>Course Code</b> USCHA320	<b>Title of the Course</b> Industrial Chemistry	<b>Course Type</b> Theory	<b>Course category</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

1. To acquire an in depth knowledge on various areas of industrial chemistry like polymers, leathers, textile, fuels, glasses, ceramics, cements and paints.
2. To help the students enhance the reasoning skills and understand the working of industrial processes.

#### Course Outcomes:

The Learners will be able to

1. Discuss the composition, characteristics and manufacture of various industrial products. (Polymer, Leather, Textile, Glass, Ceramics, Cements, Paints and Pigments).
2. Explain the various process involved in the manufacture of leathers and leather products.
3. Describe the importance of natural and synthetic fibres in textile industry.
4. Understand the classifications of fuels and learn the common terms related to it.
5. Understand how to implement the concepts in industrial working environment.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H
CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

#### Unit I:

(6 Hours)

- 1.1 Introduction- terms involved in polymers. (K1 & K2)
- 1.2 Classification of polymers. (K1, K2 & K3)

- 1.3 Polymerization, types of polymerization. (K1, K2 & K3)
- 1.4 Preparation, properties and uses of natural polymers. (K1 & K2)
- 1.5 Preparation, properties and uses of synthetic rubber- polyvinyl chloride, polyester, polyamide. (K1, K2 & K3)
- 1.6 Biodegradable polymers. (K1 & K2)

**Unit II:**

**(6 Hours)**

- 2.1 Introduction-constituent of animal skin. (K1 & K2)
- 2.2 Preparation of hides for tanning. (K1 & K2)
- 2.3 Process - cleaning and soaking, liming and unhairing, delimiting, bating and pickling. (K1, K2 & K3)
- 2.4 Leather tanning-vegetable and chrome tanning. (K1, K2 & K3)
- 2.5 Finishing process- dyeing and fat liquoring. (K1, K2 & K3)
- 2.6 Cleaner processing and practices in beam house, Effluent treatment (K1, K2 & K3)

**Unit III:**

**(6 Hours)**

- 3.1 Introduction to textile fibres-Classification of textile fibres. (K1 & K2)
- 3.2 Differences between natural and synthetic fibres. (K1 & K2)
- 3.3 Synthetic fibres- Preparation and properties of Rayon and Nylon. (K1, K2 & K3)
- 3.4 Textile chemical processing for the fibres-Singeing, de-sizing, scouring, bleaching, mercerization. (K1, K2, K3 & K4)
- 3.5 Textile dyes- difference between pigments and dyes. (K1 & K2)
- 3.6 Classification of dyes- vat dyes, Azo dyes, chrome dyes, Acid and base dyes. (K1 & K2)

**Unit IV:**

**(6 Hours)**

- 4.1 Introduction- Classification of fuels. (K1 & K2)
- 4.2 Solid fuel-coal and coke- composition and properties. (K1 & K2)
- 4.3 Liquid fuel- Petroleum processing and fractions, Biofuels.(K1 & K2)
- 4.4 Cracking- catalytic cracking and methods-Knocking- octane number and cetane number. (K1, K2 & K3)
- 4.5 Synthetic petrol-Fischer Tropsch and Bergius processes. (K1, K2 & K3)
- 4.6 Fuel gases- Natural gas and Water gas. (K1 & K2)

**Unit V:**

**(6 Hours)**

- 5.1 Glass- Raw materials- characteristics. (K1 & K2)
- 5.2 Methods of Manufacture- melting, shaping, annealing, finishing- special glasses. (K1, K2 & K3)
- 5.3 Refractories- characteristics, classification and properties. (K1 & K2)
- 5.4 General methods of manufacture of refractories. (K1, K2 & K3)
- 5.5 Cement- composition, setting of cement- crystalline and colloidal theory. (K1, K2 & K3)
- 5.6 Paints and pigments- Constituent of paints, pigments- white lead, ultramarine, Chrome yellow. (K1, K2 & K3)

**References:**

1. B.K. Sharma, Industrial Chemistry, Goel Publishing House, Meerut, 2016.
2. B.N.Chakrabarty, Industrial Chemistry, Oxford & IBH Publishing Co, New Delhi, 1981.
3. P.C. Jain, Monika Jain, Engineering Chemistry, Dhanpat Rai Publishing Co (P) Ltd, 2018.
4. K. Sessa Maheswaramma, Mridula Chugh, Engineering Chemistry, Pearson Education India, 2016.
5. Thomas Bechtold, Tung Pham, Textile Chemistry, Walter de Gruyter GmbH & Co, 2019.
6. Jayashree Ghosh, A Textbook of Pharmaceutical Chemistry, S.Chand and Company Ltd., Reprint 2013.

**Open Educational Resources (OER):**

1. <https://plastics.americanchemistry.com/How-Plastics-Are-Made/>
2. <http://wwwchem.uwimona.edu.jm/courses/CHEM2402/Textiles/Leather.html>
3. <http://www.petroleum.co.uk/>
4. <https://nios.ac.in/media/documents/313courseE/L34A.pdf>

## SEMESTER IV

### UCCHE20 - GENERAL CHEMISTRY – IV

Year: II	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
SEM: IV	UCCHE20	General Chemistry - IV	Theory	Core	5	5	100

#### Learning Objectives:

1. To give in depth knowledge about nitrogen family, oxygen family, halogen family and zero group elements.
2. To learn the mechanistic details of electrophilic and nucleophilic substitution in aromatic compounds.
3. To gain knowledge on heterocyclic compounds and phenols.
4. To learn the laws of thermodynamics and their applications.

#### Course Outcomes:

The Learners will be able to

1. Explain the periodic properties of Nitrogen, Oxygen and Halogen family elements and their compounds, and reason out the position of noble gases in the periodic table and describe the preparation and properties of xenon compounds.
2. Illustrate the mechanisms of aliphatic, aromatic nucleophilic substitution and elimination reactions.
3. Recall and apply Huckel's rule, illustrate the preparation, properties and uses of heterocyclic compounds, dihydric and trihydric phenols, and related named reactions.
4. Define the terms involved in thermodynamics, the laws of thermodynamics and their developments.
5. Describe the concept of entropy and calculate the entropy changes during various processes, and to explain the third law of thermodynamics and its applications.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:****(15 hours)**

- 1.1 Nitrogen family - preparations, properties and uses of hydrazine. (K1, K2 & K3)
- 1.2 Structure and properties of oxides, oxyacids of N ( $N_2O$ , NO,  $N_2O_5$ ) and phosphorous ( $H_3PO_4$ ,  $H_3PO_3$ ,  $PCl_3$ ,  $PCl_5$ ). (K1, K2, K3 & K4)
- 1.3 Oxygen Family - comparative study of compounds- hydrides, halides, oxides and oxyacids. (K1, K2, K3 & K4)
- 1.4 Halogens - comparative study of elements and compounds of halogens- hydracids, oxyacids and inter halogen compounds. Pseudo halogens- comparison of halogens and pseudo halogens. (K1, K2, K3 & K4)
- 1.5 Noble gases - position in the periodic table, clathrates and their applications. (K1, K2, K3 & K4)
- 1.6 Preparation and properties of  $XeF_6$ ,  $XeO_3$  and  $XeOF_4$ . (K1, K2, K3 & K4)

**Unit II:****(15 hours)**

- 2.1 Aliphatic Nucleophilic Substitution - mechanism of  $S_N1$ ,  $S_N2$ , and  $S_{Ni}$  reactions. (K1, K2, K3 & K4)
- 2.2 Effect of structure of substrate, solvent, nucleophile and the leaving group. (K1, K2, K3 & K4)
- 2.3 Aromatic nucleophilic substitution - benzyne and intermediate complex mechanism. (K1, K2, K3 & K4)
- 2.4 Effect of substituents on reactivity, orientation and reactivity in substituted benzenes. (K1, K2, K3 & K4)
- 2.5 Aromatic electrophilic substitution reactions in benzene and substituted benzenes- nitration, halogenation, sulphonation, Friedel-Craft's acylation and alkylation reactions. (K1, K2, K3 & K4)
- 2.6 Elimination reaction- Hoffmann and Saytzeff's rules. cis and trans eliminations- mechanisms of E1 and E2 reactions, elimination vs substitution. (K1, K2, K3 & K4)

**Unit III:****(15 hours)**

- 3.1 Aromaticity – Huckel's rule and its applications. (K1, K2, K3 & K4)
- 3.2 Heterocyclic compounds - preparation, properties and uses of furan, thiophene and pyrrole. (K1, K2, K3 & K4)
- 3.3 Preparation, properties and uses of pyridine, quinoline and isoquinoline. (K1, K2, K3 & K4)
- 3.4 Phenols - acidic character of phenols, preparation, properties and uses of dihydric phenols. (K1, K2, K3 & K4)
- 3.5 Preparation, properties and uses of trihydric phenols. (K1, K2, K3 & K4)
- 3.6 Mechanisms of Kolbe's, Riemeier-Tiemann, Gattermann, Mannich and Houben –Hoesch reactions. (K1, K2, K3 & K4)

**Unit IV:****(15 hours)**

- 4.1 Thermodynamics - types of systems – isolated, closed, open, homogeneous and heterogeneous systems, phase, state of a system, state variables. Thermodynamic equilibrium - thermal, mechanical and chemical equilibria, extensive and intensive

properties, processes and their types – isothermal, adiabatic and isobaric processes, reversible and irreversible processes, nature of work and heat. (K1, K2, K3 & K4)

- 4.2 The first law of thermodynamics - concept of internal energy, statements of I law, state functions, exact and inexact differentials, the Euler reciprocal relation, enthalpy of a system, enthalpies of vaporization and fusion, heat capacity of a system - relationship between  $C_p$  and  $C_v$  in gaseous systems. (K1, K2, K3 & K4)
- 4.3 Calculation of  $w$ ,  $\Delta U$ ,  $q$  and  $\Delta H$  for expansion and compression of ideal gases under reversible and irreversible isothermal conditions. Adiabatic expansion – calculation of  $w$ ,  $\Delta U$  and  $\Delta H$ , final temperatures in reversible and irreversible adiabatic expansions, Comparison of isothermal and adiabatic expansions. Zeroeth law of thermodynamics. (K1, K2, K3 & K4)
- 4.4 Thermochemistry - heat of reaction, exothermic and endothermic reactions, relationship between  $q_p$  and  $q_v$ , standard enthalpy changes of reactions, standard enthalpies of combustion, neutralization and formation, determination of enthalpies of reactions, variation of enthalpy of reaction with temperature -Kirchhoff's equations. (K1, K2, K3 & K4)
- 4.5 Bond energies-definition, calculation and applications of bond energies. (K1, K2, K3 & K4)
- 4.6 The Second law of thermodynamics - need for the second law, statements of II law, spontaneous processes, Carnot's cycle - efficiency of a heat engine-Carnot's theorem (statement only). (K1, K2, K3 & K4)

#### Unit V:

(15 hours)

- 5.1 Entropy – the concept of entropy, entropy changes in isothermal expansion of an ideal gas, in reversible and irreversible processes, entropy change accompanying change of phase. (K1, K2, K3 & K4)
- 5.2 Calculation of entropy changes with changes in T, V, and P, entropy changes in different processes, entropy of a mixture of ideal gases, entropy of mixing, physical significance of entropy. (K1, K2, K3 & K4)
- 5.3 Helmholtz and Gibbs free energy functions, variation of free energy change with T and P. Maxwell's relations, criteria for reversible and irreversible processes, Gibbs-Helmholtz equation. (K1, K2, K3 & K4)
- 5.4 Partial molar properties – concept of chemical potential, Gibbs-Duhem equation, variation of chemical potential with temperature and pressure, chemical potential in a system of ideal gases. (K1, K2, K3 & K4)
- 5.5 The Clapeyron-Clausius equation and its applications. (K1, K2, K3 & K4)
- 5.6 Third law of thermodynamics - Nernst heat theorem, statement of third law, determination of absolute entropies of solids, liquids and gases, residual entropy. (K1, K2, K3 & K4)

\*Related problems to be worked out

#### Text Books:

1. R.D.Madan, Modern Inorganic Chemistry, 3<sup>rd</sup> Edition, S. Chand & Co., Reprint 2016.

2. B.S. Bahl, and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co. Ltd., Reprint 2012.
3. B. R. Puri, L. R. Sharma and M. S. Pathania, Principles of Physical Chemistry, 47<sup>th</sup> Edition, Vishal Publishing Co., 2017.

#### **Reference Books:**

1. P.L. Soni and Mohan Katyal, Textbook of Inorganic Chemistry, 20<sup>th</sup> Edition, Sultan Chand & Sons, Reprint 2015.
2. B. R. Puri, L. R. Sharma and Kalia, K. C., Principles of Inorganic Chemistry, 33<sup>rd</sup> Edition, Shoban Lal, Nagin Chand & Co., 2019.
3. P. L. Soni and H. M. Chawla, Textbook of Organic Chemistry, 29<sup>th</sup> Revised Edition, Sultan Chand & Sons, 2012.
4. K. S. Tewari and M. K. Vishnoi, A Textbook of Organic Chemistry, 3<sup>rd</sup> Edition, Vikas Publishing house Pvt. Ltd., 2015.
5. M. K. Jain and S. C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 2019.
6. P.L. Soni. O. P. Dharmarha, and U.N. Dash, Textbook of Physical Chemistry, 23<sup>rd</sup> Revised Edition, S. Chand & Co., Reprint 2016.
7. J. Rajaram and J. C. Kuriakose, Thermodynamics, 3<sup>rd</sup> Edition, Vishal Publications, 2013.
8. J. N. Gurtu, Thermodynamics, 4<sup>th</sup> Edition, Pragati Prakashan, 2014.

#### **Open Educational Resources (OER):**

1. [https://chem.libretexts.org/Bookshelves/Inorganic\\_Chemistry/Book%3A\\_Chemistry\\_of\\_the\\_Main\\_Group\\_Elements\\_\(Barron\)](https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Book%3A_Chemistry_of_the_Main_Group_Elements_(Barron))
2. <https://www.khanacademy.org/science/organic-chemistry/substitution-elimination-reactions>
3. <https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/intro1.htm>
4. <https://nptel.ac.in/courses/104/106/104106107/> (Thermodynamics)
5. <https://www.khanacademy.org/science/chemistry/thermodynamics-chemistry>

## SEMESTER IV

### UCCHF20 – PRACTICAL II: VOLUMETRIC ESTIMATION

<b>Year: II</b> SEM: IV	<b>Course Code</b> UCCHF20	<b>Title of the Course</b> Volumetric Estimation	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 3	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Outcomes:

The Learners will be able to

1. Use double titration method in volumetric analysis.
2. Prepare standard solutions.
3. Apply volumetric principles to carry out acid-base titrations, complexometric titrations, precipitation titration and redox titrations like permanganometric, dichrometry and iodometric titrations.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H

#### Acidimetry

1. Estimation of sodium hydroxide- standard sodium carbonate
2. Estimation of borax-standard sodium carbonate

#### Permanganometry

3. Estimation of oxalic acid- standard Mohr's salt or ferrous sulphate
4. Estimation of sodium nitrite- standard oxalic acid
5. \*\*Estimation of Calcium
6. \*\*Determination of percentage of Manganese dioxide in Pyrolusite

#### Iodometry

7. Estimation of copper-standard copper sulphate
8. Estimation of potassium dichromate- standard potassium dichromate

### Complexometry

9. Estimation of magnesium using EDTA
10. Estimation of nickel using EDTA
11. \*Estimation of temporary and permanent hardness of water

### Dichrometry

12. Estimation of ferrous ion using diphenylamine/ N-phenyl anthranilic acid as indicator

### Precipitation titration

13. \*Estimation of chloride in neutral medium

\* & \*\*Not to be given for examination.

\*\* To be given as a group experiment.

Continuous Assessment	40 marks
I CA	50
II CA	50
Average	25
Performance during regular practical's	10
Regularity in submission of observation notebook and record	5

### Semester Practical Examination - 60 marks

Short Procedure writing - 5

Viva-voce -5

Record -10

Volumetric Analysis:

≤ 2% - 40 marks

> 1 upto 2% - 35 marks

>2 upto 3% - 25 marks

>3 upto 4% - 15 marks

> 4% - 10 marks

### Reference Books:

1. A. I. Vogel, Vogel's Textbook of Quantitative Chemical Analysis, 5<sup>th</sup> Edition, Longman Scientific & Technical, 1989.
2. Peter A C McPherson, Practical Volumetric Analysis, 4<sup>th</sup> Edition, Cambridge: The Royal Society of Chemistry, 2015.

### Open Educational Resources (OER):

1. <http://rohmatchemistry.staff.ipb.ac.id/files/2015/07/vogels-textbook-of-quantitative-chemical-analysis.pdf>

## SEMESTER 1V

### USCHB420 - SKILL BASED ELECTIVE: AGRICULTURAL CHEMISTRY

<b>Year: II</b> <b>SEM: IV</b>	<b>Course Code</b> USCHB420	<b>Title of the Course</b> Agricultural Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Skill Based	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

1. To impart elementary ideas of soil chemistry, types of farming, insecticides, fungicides and herbicides.
2. To emphasize the importance of fertilizers.

#### Course Outcomes:

The Learners will be able to

1. Understand the scope of agriculture in India and Tamil Nadu.
2. Explain the physical and chemical properties of soil.
3. Describe the types of farming.
4. Summarize the certification of organic products.
5. Identify the benefits and adverse effects of pesticides.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:****(6 Hours)**

- 1.1 Agriculture – Definition – Scope of agriculture in India and Tamil Nadu. (K1 & K2)
- 1.2 Branches of agriculture. (K1 & K2)
- 1.3 Agronomy – Art, Science and business of crop production. (K1 & K2)
- 1.4 Agronomical classification of crops - their importance. (K1 & K2)
- 1.5 Major crops of India and Tamil Nadu, Water resources in Tamil Nadu. (K1 & K2)
- 1.6 Factors affecting crop production – Moisture, aeration, light, temperature and nutrients. (K1 & K2)

**Unit II:****(6 Hours)**

- 2.1 Soil chemistry – Introduction, soil classification and survey. (K1 & K2)
- 2.2 Properties of soil – soil texture and soil water. (K1 & K2)
- 2.3 Soil temperature and soil colloids. (K1 & K2)
- 2.4 Soil minerals and soil pH. (K1 & K2)
- 2.5 Soil acidity – alkalinity and buffering soil. (K1 & K2)
- 2.6 Soil fertility and soil formation. (K1 & K2)

**Unit III:****(6 Hours)**

- 3.1 Farming – types – subsistence farming and commercial farming. (K1 & K2)
- 3.2 Plantation farming, mixed farming and conventional farming. (K1 & K2)
- 3.3 Organic farming, poultry farming and dairy farming. (K1 & K2)
- 3.4 Advantages of organic farming- limitation of organic farming. (K1 & K2)
- 3.5 Certification of organic products – OFAI organic labeling system. (K1 & K2)
- 3.6 Research findings on organic food. (K1 & K2)

**Unit IV:****(6 Hours)**

- 4.1 Insecticides, Fungicides and Herbicides - Introduction. (K1 & K2)
- 4.2 Methods of using pest controls. (K1 & K2)
- 4.3 Insecticides – Arsenic compounds, fluorine compounds and boron compounds. (K1 & K2)
- 4.4 Insecticides- mercury compounds, copper compounds and sulphur compounds. (K1 & K2)
- 4.5 Modern insecticides – some important herbicides -Rodenticides. (K1 & K2)
- 4.6 Benefits of Pesticides, Adverse environmental effects of Pesticides. (K1 & K2)

**Unit V:****(6 Hours)**

- 5.1 Fertilizers – Classification- Examples of fertilizers. (K1 & K2)
- 5.2 Nitrogenous fertilizers- phosphate fertilizers- potash fertilizers. (K1 & K2)
- 5.3 Ill effects of fertilizers. (K1 & K2)
- 5.4 Manures, compost and saw dust. (K1 & K2)
- 5.5 Farmyard manure, compost, reinforcing manure and green manure. (K1 & K2)
- 5.6 Sewage and sludge - biogas production. (K1 & K2)

**References:**

1. Sankaran, S. and V.T. Subbiah Mudaliar. Principles of Agronomy. The Bangalore Printing and Publishing Co. Ltd., Bangalore. 1997
2. Principles and Practices of Agronomy. Agrobios. Jodhpur - 342 002.
3. Jayashree Ghosh. Fundamental Concepts of Applied Chemistry. S. Chand Publishing Ltd., 2006.
4. Kirpal Singh. Chemistry in Daily life 1<sup>st</sup> Edition, Prentice Hall of India Pvt. Ltd., 2008.

**Open Educational Resources (OER):**

1. <https://nptel.ac.in/courses/126/105/126105016/>
2. <https://nptel.ac.in/courses/126/105/126105016/>
3. <https://nptel.ac.in/content/storage2/courses/103107086/module1/lecture1/lecture1.pdf>
4. <https://nptel.ac.in/courses/126/105/126105014/>

## SEMESTER V

### UCCHG20 - INORGANIC CHEMISTRY

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code</b> UCCHG20	<b>Title of the Course</b> Inorganic Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

1. To discuss in detail the general characteristics of d block and f block elements, make a comparative study of a few group elements and the metallurgy of certain elements and compounds.
2. To make an in-depth study on nuclear chemistry.
3. To introduce the field of bioinorganic chemistry.

#### Course Outcomes:

The Learners will be able to

1. Discuss the general characteristics of d and f block elements, and compare the properties of elements belonging to Ti, V, Cr, Mn and Fe groups.
2. Summarize the various steps involved in metallurgical processes, and illustrate the preparation, properties and uses of Ti, Zr, U, Pt and Th.
3. Recall the basic concepts of nuclear chemistry, and to explain the stability of nuclides by n/p ratio, mass defect and binding energy, packing fraction, magic numbers and natural radioactivity.
4. Explain nuclear transmutation reactions, artificial radioactivity, nuclear fission and fusion reactions.
5. Describe the biological importance of certain elements, chelate therapy, radio pharmaceuticals, contrast agents and toxicity of few metals.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	H	H	H
CO2	H	L	H	H	H	H
CO3	H	L	H	H	H	H
CO4	H	L	H	H	H	H
CO5	H	L	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**Unit I:****(12 Hours)**

- 1.1 d-block elements - general characteristics of d block elements. (K1, K2, K3 & K4)
- 1.2 Group discussion of d-block elements - titanium, vanadium and chromium groups - electronic configuration, occurrence, oxidation states, reactivity, magnetic properties, catalytic properties, colour and comparative study of their compounds. (K1, K2, K3 & K4)
- 1.3 Comparative account of manganese and iron groups - electronic configuration, occurrence, oxidation states, reactivity, magnetic properties, catalytic properties, colour and comparative study of their compounds. (K1, K2, K3 & K4)
- 1.4 f-block elements – position in the periodic table, general characteristics of lanthanides - occurrence, electronic configuration, oxidation states, ionic radii – lanthanide contraction, colour, spectra, magnetic properties and formation of complexes. (K1, K2, K3 & K4)
- 1.5 General characteristics of actinides - occurrence, electronic configuration, oxidation states, ionic radii - actinide contraction, colour, spectra, magnetic properties and formation of complexes. (K1, K2, K3 & K4)
- 1.6 Comparative account of lanthanides and actinides. (K1, K2, K3 & K4)

**Unit II:****(12 Hours)**

- 2.1 Principle and processes of metallurgy – minerals and ores, occurrence of metals in nature, various steps of metallurgy – various ore-dressing methods, calcination, roasting, various reduction and refining methods. (K1, K2, K3 & K4)
- 2.2 Titanium, Zirconium and Platinum – occurrence, extraction, properties and uses. (K1, K2, K3 & K4)
- 2.3 Uranium – occurrence, extraction from pitchblende - acid and alkali digestion processes, extraction from carnotite, properties and uses. (K1, K2, K3 & K4)
- 2.4 Chemistry of Thorium – occurrence, extraction from monazite sand, properties and uses. (K1, K2, K3 & K4)
- 2.5 Preparation and uses of ammonium molybdate, vanadium pentoxide, uranium hexa fluoride. (K1, K2, K3 & K4)
- 2.6 Heat treatment of steel, uses of steel alloys. (K1, K2, K3 & K4)

**Unit III:****(12 Hours)**

- 3.1 Nuclear chemistry - sub atomic particles of the nucleus, nucleon terminology, classification of nuclides – based on Z and N values - isotopes, isobars, isotones, mirror nuclei and isomers – based on stability. (K1, K2, K3 & K4)
- 3.2 Theories of nuclear forces operating between the nucleons inside the nucleus – meson theory and nuclear fluid theory. (K1, K2, K3 & K4)
- 3.3 Stability of nuclides - odd-even nature of Z and N values, N/P ratio - stability belt, packing fraction, mass defect and nuclear binding energy - calculations involving mass defect and B.E per nucleon. (K1, K2, K3 & K4)
- 3.4 Liquid drop model, shell model- magic numbers. (K1, K2, K3 & K4)
- 3.5 Natural radioactivity - general properties of radioactive radiations, properties of alpha, beta and gamma rays, modes of radioactive decay, group displacement law, rate of disintegration and half-life period. (K1, K2, K3 & K4)
- 3.6 Radioactive series – uranium, thorium, actinium and neptunium series – similarities between radioactive series. (K1, K2, K3 & K4)

**Unit IV:****(12 Hours)**

- 4.1 Nuclear transmutation – introduction, Bohr’s theory of nuclear reactions, classification of nuclear reactions – based on overall energy transformation. (K1, K2, K3 & K4)
- 4.2 Classification of nuclear reactions – based on the nature of the bombarding particles, nuclear reactions versus chemical reactions. (K1, K2, K3 & K4)
- 4.3 Artificial radioactivity - discovery, reactions emitting electrons and positrons, preparation of trans-uranium elements. (K1, K2, K3 & K4)
- 4.4 Nuclear fission – definition, reaction, Q-value, mechanism, uses - atom bomb, nuclear reactor and its components, breeder reactor. (K1, K2, K3 & K4)
- 4.5 Nuclear fusion – definition - thermonuclear reactions, uses – stellar energy, hydrogen bomb. (K1, K2, K3 & K4)
- 4.6 Comparison of fission and fusion, atom bomb and hydrogen bomb. (K1, K2, K3 & K4)

**Unit V:****(12 Hours)**

- 5.1 Bioinorganic Chemistry – micro and macro nutrients, biological aspects of Fe, Co and Zn. (K1, K2, K3 & K4)
- 5.2 Biological role of Mg, P and Mo. (K1, K2, K3 & K4)
- 5.3 Biological importance of Na, K and Ca. (K1, K2, K3 & K4)
- 5.4 Biological importance of copper, sulphur, iodine and selenium. (K1, K2, K3 & K4)
- 5.5 Inorganic medicinal chemistry - radio pharmaceuticals, chelate therapy, and contrast agents in MRI. (K1, K2, K3 & K4)
- 5.6 Toxicity of metals – As, Hg, Cd, Pb and Cr toxic effects. (K1, K2, K3 & K4)

**Text Books:**

1. R. D. Madan, Inorganic Chemistry, 2<sup>nd</sup> Edition, S. Chand & Co., Reprint 2004.
2. Puri and Sharma Nagin, Inorganic Chemistry, 9<sup>th</sup> Edition, Sultan Chand & Co., 1979.
3. P.L. Soni, Inorganic Chemistry, 4<sup>th</sup> Edition, Sultan Chand & Co., 1991.

**Reference Books:**

1. J.D. Lee, Concise Inorganic Chemistry, 3<sup>rd</sup> Edition, Von Nostrand, 1997.
2. Cotton and Wilkinson, Advanced Inorganic Chemistry, 5<sup>th</sup> Edition, Wiley Eastern Ltd., 1988.
3. A. K. De, A Textbook of Inorganic Chemistry, New Age-8<sup>th</sup> Edition, Wiley Eastern Ltd., 2001.
4. Shriver and Atkins, Inorganic Chemistry, 5<sup>th</sup> Edition, Wiley Eastern Ltd., 2005.
5. A. K. Srivastava & P. C. Jain, Elements of Nuclear Chemistry, 2<sup>nd</sup> Edition, S.Chand & Co., 1989.
6. S. Glasstone, Sourcebook on Atomic Energy, 3<sup>rd</sup> Edition, East- West Press Pvt. Ltd., 1967.
7. H. J. Arnikaar, Essentials of Nuclear Chemistry, 3<sup>rd</sup> Edition, Wiley Eastern Limited, 1990.
8. Shamsuddin M, Physical Chemistry of Metallurgical Processes, 1<sup>st</sup> Edition, John Wiley, 2016.

**Open Educational Resources (OER):**

1. [https://nptel.ac.in/courses/104/101/104101121/\(Extraction of Metals\)](https://nptel.ac.in/courses/104/101/104101121/(Extraction%20of%20Metals))
2. <https://www.khanacademy.org/science/chemistry/nuclear-chemistry>
3. <http://eacharya.inflibnet.ac.in/index.php/content/index/5a3a00708007be612465cb92>  
(Biological importance of elements)
4. <http://eacharya.inflibnet.ac.in/index.php/content/index/5a3a00708007be612465cb93>  
(Toxicity of metals)

**SEMESTER V**  
**UCCHH20 - ORGANIC CHEMISTRY**

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
	UCCHH20	Organic Chemistry	Theory	Core	4	4	100

**Learning Objectives:**

1. To acquire knowledge on active methylene compounds, organic photochemistry and mechanisms of certain named reactions.
2. To give a broad outline of stereochemistry and conformational analysis.
3. To learn the mechanisms of molecular rearrangements.

**Course Outcomes:**

The Learners will be able to

1. Remember the concepts of stereoisomerism and apply it in identifying the configurations of the optical and geometrical isomers.
2. Illustrate tautomerism and conformational analysis.
3. Explain the preparation and synthetic uses of active methylene compounds, basic concepts of organic photochemistry and illustrate organic photochemical reactions.
4. Apply the knowledge of various named reactions in organic synthesis.
5. Summarize the different types of molecular rearrangements their mechanisms and applications.

<b>CO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	M	H	H	H	H
<b>CO2</b>	H	M	H	H	H	H
<b>CO3</b>	H	M	H	H	H	H
<b>CO4</b>	H	M	H	H	H	H
<b>CO5</b>	H	M	H	H	H	H

<b>CO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	H
<b>CO2</b>	H	H	H	H	M	H
<b>CO3</b>	H	H	H	H	M	H
<b>CO4</b>	H	H	H	H	M	H
<b>CO5</b>	H	H	H	H	M	H

**Unit I:****(12 Hours)**

- 1.1 Stereoisomerism: Optical isomerism – conditions for optical activity. Projection formulae: Fischer, Flying wedge, Sawhorse and Newmann projection formulae. (K1,K2,K3&K4)
- 1.2 Cahn –Ingold – Prelog rules, R-S notations for optical isomers with one and two asymmetric carbon atoms. (K1,K2,K3&K4)
- 1.3 Optical activity in compounds not containing asymmetric carbon atoms – biphenyls (atropisomerism), allenes and spiranes. (K1,K2,K3&K4)
- 1.4 Geometrical isomerism: cis - trans, syn - anti and E-Z notations.(K1,K2,K3&K4)
- 1.5 Geometrical isomerism in maleic and fumaric acids and unsymmetrical ketoximes. (K1,K2,K3&K4)
- 1.6 Methods of distinguishing geometrical isomers using chemical and physical methods – cyclisation, by converting into compounds of known configuration, method of optical activity, acid strengths, dipole moment, melting point, boiling point, solubility, density, refractive index. (K1,K2,K3&K4)

**Unit II:****(12 Hours)**

- 2.1 Tautomerism – definition, cause of tautomerism, acidity of alpha hydrogen, reasons for acidity. (K1,K2,K3&K4)
- 2.2 Keto- enol tautomerism- evidences in favour of the keto and enol form, enolisation- acid - base catalysed mechanisms. (K1, K2, K3& K4)
- 2.3 Nitro-acinitro tautomerism and amido-imidol tautomerism – evidences. (K1,K2,K3&K4)
- 2.4 Conformational analysis- conformational analysis of ethane including energy diagrams. (K1,K2,K3&K4)
- 2.5 Conformational analysis of n- butane including energy diagrams. (K1,K2,K3&K4)
- 2.6 Conformers of cyclohexane – axial and equatorial bonds, ring flipping showing axial equatorial inter conversions, conformers of mono and di substituted cyclohexanes – 1,2 and 1,3 interactions.(K1, K2, K3& K4)

**Unit III:****(12 Hours)**

- 3.1 Active methylene group – characteristic reactions of active methylene groups in acetoacetic ester and its uses. (K1,K2,K3&K4)
- 3.2 Characteristic reactions of malonic ester and cyano acetic esters and their synthetic uses. (K1,K2,K3&K4)
- 3.3 Basic concepts of organic photochemistry. (K1,K2,K3&K4)
- 3.4 Photochemistry of carbonyl compounds –Norrish type I and II reactions. (K1,K2,K3&K4)
- 3.5 Photo reduction, photo addition. (K1,K2,K3&K4)
- 3.6 Photochemical rearrangement (di-pi methane rearrangement), Paterno- Buchi reaction, Barton reaction and Photo Fries reaction. (K1,K2,K3&K4)

**Unit IV:****(12 Hours)**

- 4.1 Reaction Mechanisms – mechanism and applications of Aldol, Benzoin and Claisen condensations.(K1, K2, K3& K4)

- 4.2 Darzen condensation, Cannizaro, Reformatsky and Perkin reactions – mechanism and applications. (K1, K2, K3 & K4)
- 4.3 Micheal addition, Knoevenagal and haloform reactions – mechanism and applications. (K1, K2, K3 & K4)
- 4.4 Dakin, Wittig and Dieckmann reactions – mechanism and applications. (K1, K2, K3 & K4)
- 4.5 Mechanism of reduction with  $\text{NaBH}_4$  and  $\text{LiAlH}_4$ . (K1, K2, K3 & K4)
- 4.6 Wolf Kishner and MPV reduction – mechanism and applications. (K1, K2, K3 & K4)

**Unit V:**

**(12 Hours)**

- 5.1 Molecular rearrangements – classification as anionotropic, cationotropic and inter molecular, intra molecular. (K1, K2, K3 & K4)
- 5.2 Mechanism, evidence for carbonium ion intermediate formation, migratory aptitude, inter / intra molecular rearrangement. Migration to electron deficient carbon atom – Pinacol-Pinacolone rearrangement. (K1, K2, K3 & K4)
- 5.3 Rearrangement involving electron deficient nitrogen atom- Beckmann rearrangement, migration to electron deficient oxygen – Baeyer Villiger oxidation. (K1, K2, K3 & K4)
- 5.4 Rearrangement of aromatic compounds- benzidine rearrangement. (K1, K2, K3 & K4)
- 5.5 Rearrangements involving sigmatropic shifts – Claisen and Paracaisen rearrangement. (K1, K2, K3 & K4)
- 5.6 Rearrangements to electron rich carbon atom – Favorskii rearrangements. (K1, K2, K3 & K4)

**Text Books:**

1. B.S. Bahl and Arun Bahl, Advanced Organic Chemistry, 5<sup>th</sup> Edition, Sultan Chand & Co., 2014.
2. K.S. Tewari, S.N. Mehrotra, K. Vishnoi, A Text book of Organic Chemistry, Vikas Publishing House, Reprint, 2017.
3. P.L. Soni, Text book of Organic Chemistry, Sultan and Chand, Reprint, 2019.
4. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, S. Chand & Co, Reprint, 2019.

**Reference Books:**

1. O.P. Agarwal, Organic Chemistry, Reactions and Reagents, 55<sup>th</sup> Edition, GOEL Publishing House, 2017.
2. P.S. Kalsi, Stereo Chemistry, Conformations and Mechanisms, New Age International Pvt. Ltd., 10<sup>th</sup> Edition, 2019.
3. D. Nasipuri, Stereochemistry of Organic Compounds – Principles and Applications, New Age International, 3<sup>rd</sup> Edition, 2011.
4. Gurdeep R. Chatwaal, Reaction Mechanism and Reagents in Organic Chemistry, 4<sup>th</sup> Edition, Himalaya Publishing House, 2005.
5. R.T. Morrison and Boyd, Organic Chemistry, 6<sup>th</sup> Edition, Prentice Hall India Pvt. Ltd., 2001.
6. I.L. Finar, Organic Chemistry, Vol I, 5<sup>th</sup> Edition, Addison Wesley, 2000.
7. Jerry March, Reaction Mechanism and Structure, 4<sup>th</sup> Edition, John Wiley and Sons, 1992.
8. A.K. Bansal, A Textbook of Organic Chemistry, New Age International Pvt. Ltd., 1990.
9. Peter Sykes, A Guidebook to Mechanism in Organic Chemistry, 6<sup>th</sup> Edition, 1988.

**Open Educational Resources (OER):**

1. Infowledge - <https://www.youtube.com/watch?v=h0rUn2jzGjs>(R and S )
2. Infowledge - <https://www.youtube.com/watch?v=w74NxOkvXg8>(E and Z)
3. Infowledge - <https://www.youtube.com/watch?v=A5ROLfgxFFw>(Tautomerism)
4. Infowledge - <https://www.youtube.com/watch?v=MDa-waAbJ30>(Tautomerism)
5. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5PO9>(Conformational analysis)
6. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5PO1>(Named reactions)

**SEMESTER V**  
**UCCHI20 – PHYSICAL CHEMISTRY**

<b>Year: III</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>SEM: V</b>	UCCHI20	Physical Chemistry	Theory	Core	5	4	100

**Learning Objectives:**

1. To understand the importance of chemical kinetics and the theories on reaction rates, catalysis and adsorption.
2. To gain knowledge about photophysical and photochemical processes.
3. To understand the applications of phase rule through the study of one component and two component systems.
4. To gain an understanding on catalysis, adsorption and enzyme catalysis.

**Course Outcomes:**

The Learners will be able to

1. Demonstrate the plausible mechanisms based on the study of the kinetics of chemical reactions.
2. Describe the theories developed to understand the reaction kinetics of simple and complex reactions.
3. Explain the basic principles of photo chemistry, deduce rate laws of photochemical reactions and discuss the applications of photo physical processes.
4. Apply Phase rule to study one component and two component systems and interpret phase diagrams.
5. Apply the knowledge gained about catalysis and adsorption to deduce the kinetics of homogeneous and heterogeneous surface reactions.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	M
CO2	H	M	H	H	H	M
CO3	H	M	H	H	H	M
CO4	H	M	H	H	H	M
CO5	H	M	H	H	H	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	L	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	L	M	H
CO5	H	H	H	M	M	H

**Unit I:****(15 Hours)**

- 1.1 Chemical Kinetics – scope of chemical kinetics, rate, rate constant and rate law. Factors that affect the rate of the reaction. Measurements of reaction rates. Order and molecularity of chemical reactions- Differences between order and molecularity. Methods to determine the rate of the reactions. (K1,K2,K3 & K4)
- 1.2 Derivation of rate constants of first, second, third and zero order reactions and derivation for time for half change. (K1,K2,K3 & K4)
- 1.3 Examples of first, second, third and zero order reactions and study of kinetics of hydrolysis of ester, inversion of cane sugar, decomposition of  $\text{H}_2\text{O}_2$ , thermal decomposition of acetaldehyde and gaseous reactions involving NO. (K1,K2,K3 & K4)
- 1.4 Methods to determine the order of chemical reactions – Integration method, Graphical method, Vant Hoff differential method, Method using half life period and Ostwald's dilution method. (K1,K2,K3 & K4)
- 1.5 Experimental methods in the study of kinetics of reactions- Volumetry, Manometry, Polarimetry, Dilatometry and Colorimetry. (K1,K2,K3 & K4)
- 1.6 Effect of temperature on the rate of reactions –Arrhenius equation and concept of energy of activation. (K1,K2,K3 & K4)

**Unit II:****(15 Hours)**

- 2.1 The Collision theory of bimolecular reactions and derivation of rate constant. (K1,K2,K3 & K4)
- 2.2 Theory of unimolecular reactions- Lindemann's theory, draw backs of collision theory. (K1,K2,K3 & K4)
- 2.3 Theory of Absolute Reaction Rates based on thermodynamics. Derivation for the rate constant of a bimolecular reaction based on ARRT. (K1,K2,K3 & K4)
- 2.4 Comparison of Collision theory and ARRT. (K1,K2,K3 & K4)
- 2.5 Significance of entropy, enthalpy and free energy of activation and determination of  $\Delta G^*$ ,  $\Delta H^*$  and  $\Delta S^*$ .(K1,K2,K3 & K4)
- 2.6 Complex reactions: types – consecutive, parallel, reversible and chain reactions (no derivation, only examples). (K1,K2,K3 & K4)

**Unit III:****(15 Hours)**

- 3.1 Photochemistry- differences between thermal and photochemical reactions. Laws of light absorption – Beer's law and Beer Lambert's law. (K1,K2,K3 & K4)
- 3.2 Laws of photochemistry – Grotthus Draper's law and Stark Einstein's law. (K1,K2,K3 & K4)
- 3.3 Jablonski diagram –singlet and triplet states, qualitative description of fluorescence and phosphorescence. (K1,K2,K3 & K4)
- 3.4 Primary and secondary reactions – quantum yield – experimental determination by using Eder's and Uranyl oxalate actinometers. (K1,K2,K3 & K4)
- 3.5 Kinetics of Hydrogen – Bromine reaction, photolysis of aldehyde- Rice Herzfeld mechanism. (K1,K2,K3 & K4)
- 3.6 Photosensitization, chemiluminescence and bioluminescence. (K1,K2,K3 & K4)

**Unit IV:****(15 Hours)**

- 4.1 Phase equilibria – Gibbs phase rule –statement, definition of terms and derivation of phase rule. (K1,K2,K3 & K4)
- 4.2 One component systems – water system and sulphur system. (K1,K2,K3 & K4)
- 4.3 Reduced phase rule – two component systems: Pb – Ag system, desilverization of Pb-Pattinson’s process. Thermal analysis and cooling curves. (K1,K2,K3 & K4)
- 4.4 Compound formation with congruent melting point: Zn-Mg system and FeCl<sub>3</sub>-H<sub>2</sub>O system, Freezing mixtures. (K1,K2,K3 & K4)
- 4.5 Incongruent melting point: Na-K system. (K1,K2,K3 & K4)
- 4.6 CST and effect of impurity on Phenol – Water system. (K1,K2,K3 & K4)

**Unit V:****(15 Hours)**

- 5.1 Catalysis-definition and characteristics of a catalyst –homogeneous catalysis-function of a catalyst in terms of Gibbs free energy of activation. (K1,K2,K3 & K4)
- 5.2 Heterogeneous catalysis- Mechanisms of surface reactions –Simple decompositions on surfaces - Kinetics of unimolecular surface reactions-Langmuir Hinshelwood mechanism. (K1,K2,K3 & K4)
- 5.3 Enzyme catalysis- characteristics of enzymes. Derivation of Michaelis Menton equation. (K1,K2,K3 & K4)
- 5.4 Adsorption – physisorption and chemisorption -differences. (K1,K2,K3 & K4)
- 5.5 Freundlich adsorption isotherm - Langmuir adsorption isotherm. (K1,K2,K3 & K4)
- 5.6 BET equation (no derivation) - applications of adsorption. (K1,K2,K3 & K4)

**Text Books:**

1. B. R. Puri, L. R Sharma and M.S. Pathania, Principles of Physical Chemistry, 47th Edition, Vishal Publishing Co., 2017.
2. P.L.Soni, Textbook of Physical Chemistry, Sultan Chand & Co., Reprint 2000.
3. Negi and Anand, Physical Chemistry, 2<sup>nd</sup> Edition, New Age copy right, Eastern Wiley Pvt. Ltd., 1985.
4. Kundu and Jain, Physical Chemistry, 2<sup>nd</sup> Edition, S.Chand & Co., 1987.

**Books for Reference:**

1. S.Glasstone, A Textbook of Physical Chemistry, 5<sup>th</sup> Edition, MacMillan (India) Ltd, New Delhi, Reprint 1978.
2. G.W.Castellan, Physical Chemistry, 3<sup>rd</sup> Edition, Addison-Wesley, 1983.
3. Walter J.Moore, Physical Chemistry, 5<sup>th</sup> Edition Prentice Hall, 1972.
4. Jainudeen, Chemical Kinetics and Photochemistry, 1<sup>st</sup> Edition, Jazeeme Publication, 1982.
5. Gurtu, Phase Rule, 2<sup>nd</sup> Edition, Pragathi Prakash Publications, 1972.
6. Laidler, K.J, Chemical Kinetics, 3<sup>rd</sup> Edition, Harper and Row, 1987.
7. Dogra, S. K., and Dogra S, Physical Chemistry through Problems, Wiley Eastern Ltd., 1984.
8. J. Rajaram and J.C. Kuriacose, Kinetics and Mechanism of Chemical Transformations. Mac Millan India Ltd., 1993.

**Open Educational Resources (OER):**

1. <https://www.khanacademy.org/science/chemistry/chem-kinetics>(20 videos)
2. <https://ocw.mit.edu/courses/chemistry/5-111sc-principles-of-chemical-science-fall-2014/unit-v-chemical-kinetics/lecture-30/>
3. [https://application.wiley-vch.de/books/sample/3527316728\\_c01.pdf](https://application.wiley-vch.de/books/sample/3527316728_c01.pdf)



## SEMESTER V

### UECHA20 - ELECTIVE I A: ANALYTICAL CHEMISTRY

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code</b> UECHA20	<b>Title of the Course</b> Analytical Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Learning Objectives:

1. To learn the principles behind gravimetric analysis.
2. To acquire an in depth knowledge on the principle, instrumentation, working and applications of NMR, IR, Raman, UV-Visible, Raman and Mass Spectroscopy.

#### Course Outcomes:

The Learners will be able to

1. Summarize the various steps involved in gravimetric analysis.
2. Demonstrate the principles and techniques involved in paper, column, TLC and ion exchange chromatography and their applications.
3. Explain the absorption laws, instrumentation and working of UV-Visible spectrophotometers.
4. Elaborate the principle, instrumentation of IR spectroscopy for the identification of simple organic molecules.
5. Explain the principle involved in NMR and interpret NMR spectra of simple organic compounds, describe the principle, instrumentation of Mass spectroscopy and determine the molecular formulae of simple organic molecules.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H
CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:** (15 Hours)

- 1.1 Principles of gravimetric analysis—characteristics of precipitating agents, choice of precipitants and conditions of precipitation. (K1, K2, K3 & K4)
- 1.2 Organic precipitants, specific and selective precipitants. (K1, K2, K3 & K4)
- 1.3 Steps in gravimetric analysis- sequestering agents, co-precipitation-mechanism of co-precipitation. (K1, K2, K3 & K4)
- 1.4 Post precipitation, differences between co precipitation and post precipitation. (K1, K2, K3 & K4)
- 1.5 Solubility product and precipitation- reduction of error-precipitation from homogeneous solutions. (K1, K2, K3 & K4)
- 1.6 Types, care and use of crucibles. (K1, K2, K3 & K4)

**Unit II:** (15 Hours)

- 2.1 Chromatography –principle, classifications. (K1, K2, K3 & K4)
- 2.2 Column chromatography –principle, adsorbents, solvents, apparatus, experimental procedure, applications. (K1, K2, K3 & K4)
- 2.3 Paper chromatography – principle, experimental procedure,  $R_f$  value- factors affecting  $R_f$  value, technique. (K1, K2, K3 & K4)
- 2.4 Precautions taken and applications of paper chromatography, two dimensional-radial paper chromatography. (K1, K2, K3 & K4)
- 2.5 Thin layer chromatography- principle, experimental method, superiority of TLC,  $R_f$  value, factors affecting  $R_f$  value. (K1, K2, K3 & K4)
- 2.6 Ion exchange chromatography- principle-types and properties of ion exchangers, applications. Specific examples- separation of chloride and bromide, cadmium and zinc. (K1, K2, K3 & K4)

**Unit III:** (15 Hours)

- 3.1 Concepts in spectroscopy- introduction, types of spectra-radiant energy, wave and particle properties of electromagnetic radiation. (K1, K2, K3 & K4)
- 3.2 Flame photometer – Principle and working. (K1, K2, K3 & K4)
- 3.3 UV – Visible spectroscopy– Born-Oppenheimer approximation, absorption laws, deviation from Beer- Lambert's law. (K1, K2, K3 & K4)
- 3.4 Instrumentation –photocolorimeter and spectrophotometer, block diagrams with description of components, working and applications. (K1, K2, K3 & K4)
- 3.5 Electronic transitions –types- chromophore and auxochromes, factors influencing  $\lambda_{max}$  and  $\Sigma_{max}$ . (K1, K2, K3 & K4)
- 3.6 Sensors—definition- chemical and physical sensors with examples. (K1, K2, K3 & K4)

**Unit IV:** (15 Hours)

- 4.1 Infrared Spectroscopy –principle, molecular vibrations, types with reference to linear and nonlinear molecules. (K1, K2, K3 & K4)
- 4.2 Vibrational frequencies, factors influencing vibrational frequencies. (K1, K2, K3 & K4)
- 4.3 Instrumentation –block diagram, source, monochromator and sample cell. (K1, K2, K3 & K4)
- 4.4 Sampling techniques. (K1, K2, K3 & K4)
- 4.5 Detectors and recorder, working of IR. (K1, K2, K3 & K4)
- 4.6 Identification of simple organic molecules from characteristic absorption bands. (K1, K2, K3 & K4)

**Unit V:****(15 Hours)**

- 5.1 Nuclear magnetic resonance spectroscopy –principle, instrumentation, block diagram with different components, chemical shift, factors influencing chemical shift, number of signals. (K1, K2, K3 & K4)
- 5.2 Shielding mechanism – spin-spin splitting or coupling, coupling constants. (K1, K2, K3 & K4)
- 5.3 NMR spectra of simple organic compounds- alcohols, aldehydes and ketones. (K1, K2, K3 & K4)
- 5.4 Mass Spectroscopy–basic principles, instrumentation with block diagram. (K1, K2, K3 & K4)
- 5.5 Molecular peak – base peak, isotopic peak, metastable peak, their uses, fragmentation of alcohols, aldehydes and aromatic hydrocarbons. Nitrogen rule. (K1, K2, K3 & K4)
- 5.6 Determination of molecular formula with examples. (K1, K2, K3 & K4)

**Text Books:**

1. R. Gopalan *et al.*, Elements of Analytical Chemistry, 2<sup>nd</sup> Edition, Sultan Chand & Sons, New Delhi, 1993.
2. S. Usha Rani , Analytical Chemistry , Macmillan India Ltd., New Delhi, 2000.

**Reference Books:**

1. B.K. Sharma, Instrumental Methods of Chemical Analysis, 24<sup>th</sup> Edition, Goel Publications, 2004.
2. A.K Srivastava and P.C Jain, Chemical Analysis: An Instrumental Approach, 3<sup>rd</sup> Edition, Sultan Chand and Sons, New Delhi, 1997.
3. Jag Mohan, Organic Analytical Chemistry Theory and Practice, 1<sup>st</sup> Edition, Narosa Publishing House, New Delhi, 2003.
4. C.R Chatwal, Analytical Spectroscopy, 1<sup>st</sup> Edition, Himalaya Publishing House, New Delhi, 1996.
5. H. Kaur, Spectroscopy, 1<sup>st</sup> Edition, Pragati Prakashan Publication, Meerut, 2001.
6. P.S Kalsi, Spectroscopy of Organic Compounds, 2<sup>nd</sup> Edition, New Age International, New Delhi.
7. Dr. H. Kaur, An Introduction to Chromatography, 1<sup>st</sup> Edition, Pragati Prakashan Publication, 2001.

**Open Educational Resources (OER)**

1. <https://www.slideshare.net/MarkSelby2/gravimetric-analysis-44916288>

## SEMESTER V

### UECHB20 – ELECTIVE I B: BASICS OF COMPUTER PROGRAMMING IN C AND ITS APPLICATIONS IN CHEMISTRY

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code</b> UECHB20	<b>Title of the Course</b> Basics of Computer programming in C and its applications in chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Learning Objectives:

1. To introduce the basics of computers.
2. To learn C language and its applications and solving problems in chemistry.

#### Course Outcomes:

The Learners will be able to

1. Define and relate software and hardware.
2. Describe the various components of C language.
3. Demonstrate the uses of functions, arrays and pointers.
4. Apply C language for solving problems in chemistry.
5. Apply C language to calculate specific terms in Chemistry.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**Unit I:****(15 hours)**

- 1.1 Basic computer organization, processors. (K1, K2, K3 & K4)
- 1.2 Types of memory- main memory and secondary memory, storage hierarchy. (K1, K2, K3 & K4)
- 1.3 Basics of operating systems. (K1, K2, K3 & K4)
- 1.4 Software – relationship between hardware and software – types of software. (K1, K2, K3 & K4)
- 1.5 Planning the computer program – algorithm and flowcharts. (K1, K2, K3 & K4)
- 1.6 Computer languages – machine language, assembly language, assembler, compiler, interpreter and programming languages. (K1, K2, K3 & K4)

**Unit II:****(15 hours)**

- 2.1 C language – introduction and its historical development. (K1, K2, K3 & K4)
- 2.2 Structure of C Programming – the main () function, character set, variables, constants, operators, input/output functions. (K1, K2, K3 & K4)
- 2.3 Variables - local variables, global variables and formal parameters, Constants. (K1, K2, K3 & K4)
- 2.4 Operators - Arithmetic, Relational and logical, Bitwise operators. (K1, K2, K3 & K4)
- 2.5 Input & Output – Formated input and output – scanf() and printf( ). (K1, K2, K3 & K4)
- 2.6 Unformatted input and output - getchar(), putchar( ) , gets( ) and puts( ). (K1, K2, K3 & K4)

**Unit III:****(15 hours)**

- 3.1 Control structures –Control statements in C -*if* statement, *if-else* statement, Nested *if-else* statement. (K1, K2,K3 & K4)
- 3.2 The *switch* statement, *goto*and the *exit* ()function. (K1,K2,K3 & K4)
- 3.3 Looping in C language –*for* loop, *while* loop, *do-while* loop and continue statements in loops. (K1, K2,K3 & K4)
- 3.4 Functions - Functions with Arguments, Functions with Non-integer Arguments, Functions with no Arguments and Recursive Functions.(K1, K2,K3 & K4)
- 3.5 Arrays- initializing array elements, Character arrays, two-dimensional arrays. (K1, K2,K3 & K4)
- 3.6 Pointers – Array declaration using pointers-Pointers to pointers. (K1, K2, K3 & K4)

**Unit IV:****(15 hours)**

- 4.1 Applications in Chemistry – calculation of the radius of the first Bohr orbit for an electron. (K1,K2, K3 & K4)
- 4.2 Calculation of half-life time for an integral order reaction. (K1, K2, K3 & K4)
- 4.3 Calculation of molarity, molality and normality of a solution. (K1, K2, K3 & K4)
- 4.4 Calculation of pressure of ideal or Vanderwaal’s gas. (K1, K2, K3 & K4)
- 4.5 Calculation of electronegativity of an element using Pauling’s relation.(K1, K2, K3 & K4)

4.6 Determination of lattice energy of a crystal using Born- Lande equation.(K1, K2, K3 & K4)

**Unit V:**

**(15 hours)**

5.1 Applications in Chemistry – Calculation of empirical formulae of hydro carbon.(K1, K2, K3 & K4)

5.2 Calculation of reduced mass of a few diatomic molecules.(K1, K2, K3 & K4)

5.3 Determination of the wave numbers of spectral lines of hydrogen atom.(K1, K2, K3 & K4)

5.4 Calculation of work of expansion in adiabatic process.(K1, K2, K3 & K4)

5.5 Calculation of pH and solubility product.(K1, K2, K3 & K4)

5.6 Calculation of standard deviation and correlation coefficient.(K1, K2, K3 & K4)

**Reference Books:**

1. K.V. Raman, Computers in Chemistry, 8<sup>th</sup> Edition, Tata McGraw Hill, 2005.
2. Venugopal and Prasad, Programming with C, 11<sup>th</sup> Edition, 2014.
3. E. Balaguruswamy, Programming in C, 8<sup>th</sup> Edition, 2019.
4. Sudhir K Pundir, Anshu Bansal, Computers for Chemist, Pragati Prakashan Publishers, 2017.

**Open Educational Resources:**

1. <http://mpbou.edu.in/slm/mscche1p5c.pdf>
2. <https://www.tutorialspoint.com/cprogramming/index.htm>
3. [https://spoken-tutorial.org/tutorial-search/?search\\_foss=C+and+Cpp&search\\_language=English](https://spoken-tutorial.org/tutorial-search/?search_foss=C+and+Cpp&search_language=English)

## SEMESTER V

### USCHC520-SKILL BASED ELECTIVE: SMALL SCALE CHEMISTRY

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code</b> USCHC520	<b>Title of the Course</b> Small Scale Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

1. To impart knowledge on small-scale industries.
2. To acquire skills in the manufacture of various small-scale products.

#### Course Outcomes:

The Learners will be able to

1. Understand the laws, role and steps involved in starting small scale industries.
2. Acquire skills to prepare soaps and detergents.
3. Describe the characteristics and uses of cosmetics and perfumes.
4. Gain skills in the manufacture of selected small-scale products.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H

#### Unit I: Small - Scale Industry

- 1.1. Objectives and characteristics of small-scale industries (K1 & K2)
- 1.2. Types of SSI, role of SSI in Indian economy. (K1 & K2)
- 1.3. Steps in starting SSI (K1 & K2)
- 1.4. Laws for SSI, Problems of SSI (K1 & K2)
- 1.5. Finance management, Quality control – definition and advantages. (K1 & K2)

- 1.6. Marketing and branding, Advertising – definition, objectives, advertising media. (K1 & K2)

## **Unit II: Soaps and Detergents**

- 2.1. Soaps- definition, fatty and non- fatty raw materials. (K1 & K2)
- 2.2. Types of soaps, manufacture of laundry soap and bathing soap. (K1 & K2)
- 2.3. Mechanism of cleansing action of soap. (K1 & K2)
- 2.4. Composition, preparation and advantages of herbal soaps. (K1 & K2)
- 2.5. Detergents - classification of surfactive agents (LABSA), manufacture of detergents. (K1 & K2)
- 2.6. Shampoo – composition and manufacture of egg and herbal shampoo, anti-dandruff and conditioners. (K1 & K2)

## **Unit III: Cosmetics and Perfumes**

- 3.1. Cosmetics – definition and history. (K1 & K2)
- 3.2. Kinds of cosmetics. (K1 & K2)
- 3.3. Preparation of face powder, face cream and lipstick. (K1 & K2)
- 3.4. Perfumes - definition, essential ingredients in perfumes. (K1 & K2)
- 3.5. Classification of essential oils. (K1 & K2)
- 3.6. Preparation of perfumes. (K1 & K2)

## **Unit IV: Miscellaneous Small-Scale Products**

- 4.1. Camphor – production, biosynthesis and applications. (K1 & K2)
- 4.2. Bleaching powder – preparation, properties and uses. (K1 & K2)
- 4.3. Biogas- composition, production and uses. (K1 & K2)
- 4.4. Handmade paper from bagasse- composition of bagasse and uses. (K1 & K2)
- 4.5. Asofoetida – composition, cultivation, manufactures and uses. (K1 & K2)
- 4.6. Composition and manufacture of safety matches and agarbattis. (K1 & K2)

## **Unit V: Miscellaneous Small-Scale Products**

- 5.1. Recycling of synthetic organic polymers – applications of PET and PVC. (K1 & K2)
- 5.2. Recycling of synthetic organic polymers – applications of HDPE and polystyrene. (K1 & K2)
- 5.3. Reverse osmosis of water – production and applications. (K1 & K2)
- 5.4. Coconut oil – manufacture by dry and wet process and uses. (K1 & K2)
- 5.5. Vulcanization of rubber, making an eraser. (K1 & K2)
- 5.6. Pencils – forms of graphite, adhesion and lengthwise graphitization method & uses. (K1 & K2)

## **Reference Books:**

1. Dr. V. Balu, Entrepreneurship and Small Business Promotion, First Edition, Sri Venkateswara Publications, 2004.
2. B.N. Chakrabarty, Industrial Chemistry, Oxford & IBH Publishing Co. Pvt. Ltd., 1981.
3. A.N. Zamre, V.G. Ratoliker, A Textbook of Modern Applied Chemistry, M.G. Lomte Edition, S. Chand & Co., 1985.
4. Clarence Henry Eckles, Willes Barnes Combs and Harold Macy, Milk and Milk products, Tata McGraw- Hill Publishing Company, 2002.
5. B.K. Sharma, Industrial Chemistry, Goel Publishing House, 2008.

6. H.Panda, Herbal soaps detergents Hand Book, National Institute of Industrial Research,2011.

### **Open Educational Resources (OER)**

1. [https://chem.libretexts.org/Bookshelves/Organic\\_Chemistry/Supplemental Modules \(Organic Chemistry\)/Lipids/Properties and Classification of Lipids/Soaps and Detergents\(Soaps and Detergents\)](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Lipids/Properties_and_Classification_of_Lipids/Soaps_and_Detergents(Soaps_and_Detergents))
2. <https://www.pdfdrive.com/perfumes-cosmetics-and-soaps-modern-cosmetics-d157713809.html> (Perfumes, Cosmetics and Soaps e- book).

**SEMESTER VI****UCCHJ20 – COORDINATION CHEMISTRY**

<b>Year: III</b> <b>SEM: VI</b>	<b>Course Code</b> UCCHJ20	<b>Title of the Course</b> Coordination Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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**Learning Objective:**

1. To give students a thorough knowledge on Coordination Chemistry.

**Course Outcomes:**

The Learners will be able to

1. Define the terms involved in coordination chemistry and recall IUPAC nomenclature of coordination compounds and to explain the concept of chelation and illustrate the isomerism exhibited by coordination complexes.
2. Explain and compare Werner, Sidgwick and Valence Bond theories of bonding in coordination compounds.
3. Describe the various aspects of Crystal Field Theory and its applications.
4. Explain the importance of MOT, construct molecular orbital diagrams and to compare MOT with CFT.
5. Describe the synthesis, properties, uses, bonding, hybridization and structures of carbonyls of Ni, Cr, Fe, Co, Mn, Mo and W.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	H	H	H
CO2	H	L	H	H	H	H
CO3	H	L	H	H	H	H
CO4	H	L	H	H	H	H
CO5	H	L	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**Unit I:** (12 Hours)

- 1.1 Co-ordination compounds: Molecular compounds, difference between double salts and complex compounds, definition of terms used, classification of ligands – based on denticity and charge. (K1, K2, K3 & K4)
- 1.2 Chelation – tendency of poly dentate ligands to form chelates and applications of chelate formation. (K1, K2, K3 & K4)
- 1.3 Nomenclature of coordination compounds. (K1, K2, K3 & K4)
- 1.4 Isomerism in complexes: structural isomerism - conformation isomerism, ionization isomerism, hydrate isomerism, linkage isomerism, ligand isomerism, co-ordination isomerism, coordination position isomerism and polymerization isomerism. (K1, K2, K3 & K4)
- 1.5 Geometrical isomerism in 4- and 6- coordinate complexes. (K1, K2, K3 & K4)
- 1.6 Optical isomerism - optical activity, conditions, optical isomerism in 4- and 6- coordinated complexes. (K1, K2, K3 & K4)

**Unit II:** (12 Hours)

- 2.1 Theories of coordination compounds - Werner's theory – postulates, designation and formation of Co(III) ammine complexes, experimental verification. (K1, K2, K3 & K4)
- 2.2 Sidgwick theory – electronic concept of coordinate bond, EAN rule, limitations. (K1, K2, K3 & K4)
- 2.3 Theory of bonding - valence bond theory – postulates. (K1, K2, K3 & K4)
- 2.4 VBT as applied to outer orbital and inner orbital octahedral complexes. (K1, K2, K3 & K4)
- 2.5 VBT as applied to tetrahedral and square planar complexes - hybridization, geometry and magnetic properties. (K1, K2, K3 & K4)
- 2.6 Failures of Werner's, Sidgwick's and Pauling's theories. (K1, K2, K3 & K4)

**Unit III:** (12 Hours)

- 3.1 Crystal Field theory – salient features, splitting of d - orbitals in octahedral, tetrahedral and square planar complexes. (K1, K2, K3 & K4)
- 3.2 Crystal field stabilization energy - factors affecting the magnitude of  $\Delta_o$  - spectrochemical series. (K1, K2, K3 & K4)
- 3.3 Filling up  $t_{2g}$  and  $e_g$  orbitals with electrons in octahedral and tetrahedral complexes - low spin and high spin complexes. (K1, K2, K3 & K4)
- 3.4 Calculation of crystal field stabilization energy values of octahedral and tetrahedral complexes, uses of CFSE values. (K1, K2, K3 & K4)
- 3.5 Applications of CFT - explanation of magnetic properties, colour and geometry. (K1, K2, K3 & K4)
- 3.6 Limitations of CFT, comparison between VBT and CFT. (K1, K2, K3 & K4)

**Unit IV:** (12 Hours)

- 4.1 Molecular Orbital theory – need, introduction, construction of Coulson's MO diagram for CO. (K1, K2, K3 & K4)

- 4.2 Covalency in transition metal complexes - evidences for covalency. Molecular Orbital theory - postulates, metal orbitals and LGOs suitable for  $\sigma$ -bonding in octahedral geometry. (K1, K2, K3 & K4)
- 4.3 Construction of qualitative MO energy level diagrams for  $\sigma$  -bonding in octahedral complexes. (K1, K2, K3 & K4)
- 4.4 Metal orbitals and LGOs suitable for  $\pi$  -bonding in octahedral geometry. (K1, K2, K3 & K4)
- 4.5 Effect of  $\pi$ -bonding on the magnitude of  $\Delta_o$  – construction of  $\pi$  MOs for donor and acceptor ligands, relation between pi bonding ability of ligands and spectrochemical series. (K1, K2, K3 & K4)
- 4.6 Comparison between CFT and MOT - similarities and differences. (K1, K2, K3 & K4)

#### Unit V:

(12 Hours)

- 5.1 Pi acceptor ligands: metallic carbonyls – synergic effect, synthesis, properties and uses of carbonyls of Ni, Cr, Mo and W. (K1, K2, K3 & K4)
- 5.2 Synthesis, properties and uses of carbonyls of iron –  $\text{Fe}(\text{CO})_5$ ,  $\text{Fe}_2(\text{CO})_9$  and  $\text{Fe}_3(\text{CO})_{12}$ . (K1, K2, K3 & K4)
- 5.3 Carbonyls of Co and Mn – synthesis, properties and uses. (K1, K2, K3 & K4)
- 5.4 Bonding, hybridization and structures of carbonyls of Ni, Cr, Mo and W. (K1, K2, K3 & K4)
- 5.5 Bonding, hybridization and structures of carbonyls of Fe. (K1, K2, K3 & K4)
- 5.6 Bonding, hybridization and structures of carbonyls of Co and Mn. (K1, K2, K3 & K4)

#### Text Books:

1. R. D. Madan, Inorganic Chemistry, 2<sup>nd</sup> Edition, S. Chand & Co, Reprint 2004.
2. P.L. Soni, Inorganic Chemistry, 4<sup>th</sup> Edition. Sultan Chand & Co., 1991.
3. M. Satake Y. Mido, Coordination Chemistry, 1<sup>st</sup> Edition, 2001.
4. Puri and Sharma Nagin, Inorganic Chemistry, 9<sup>th</sup> Edition, Sultan Chand & Co, 1979.

#### Reference Books:

1. J.D. Lee, Concise Inorganic Chemistry, 3<sup>rd</sup> Edition, Von Nostrand, 1997.
2. Cotton and Wilkinson, Advanced Inorganic Chemistry, 5<sup>th</sup> Edition, Wiley Eastern Ltd., 1988.
3. A.K.De, A Textbook of Inorganic Chemistry, New age, 8<sup>th</sup> Edition, Wiley Eastern Ltd., 2001.
4. Gurdeep Chatwal and M. S. Yadav, Coordination Chemistry, First Edition, Himalaya Publishing House, 1992.
5. R Gopalan and V Ramalingam, Concise Coordination Chemistry, Vikas Publishing House Pvt. Ltd., 2001.
6. Wahid U. Malik, G. D. Tuli and R. D. Madan, Selected Topics in Inorganic Chemistry, S. Chand & Company Ltd., 2005.

### **Open Educational Resources (OER):**

1. <https://nptel.ac.in/courses/104/105/104105033/> (Coordination Chemistry)
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (CFT and MOT)
3. <https://nptel.ac.in/courses/104/106/104106064/> (Metallic Carbonyls)

**SEMESTER VI****UCCHK20 – ELECTRO CHEMISTRY**

<b>Year: III</b> <b>SEM: VI</b>	<b>Course Code</b> UCCHK20	<b>Title of the Course</b> Electro Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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**Learning Objectives:**

1. To provide an in-depth study on electrical conductance and electro motive force.
2. To highlight the working of different types of electrodes and electro chemical cells.
3. To throw light on their working and applications.
4. To understand hydrogen over voltage, decomposition potential, lead storage battery and fuel cells.

**Course Outcomes:**

The Learners will be able to

1. Apply the laws on electrolysis and definitions of specific, equivalent and molar conductance to the working of electrolytic cells.
2. Illustrate the Debye Huckel's theory of strong electrolytes.
3. Explain the use of electrical energy in bringing about chemical reactions and how chemical reactions can produce electrical energy so has to design cells and batteries.
4. Apply chemical cells and concentration cells for determining the valency of mercurous ion, transport number, solubility and solubility product.
5. Demonstrate the knowledge gained in the study of irreversible electrode processes. And illustrate the principle and applications of fuel cells.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**Unit I:****(12 Hours)**

- 1.1 Electrochemistry - conductance—metallic and electrolytic conductors, resistance, specific resistance, specific conductance, equivalent conductance and molar conductance – terms, definitions and units. (K1,K2,K3 & K4)
- 1.2 Measurement of conductance based on Wheatstone bridge principle.(K1,K2,K3 & K4)
- 1.3 Variation of conductance with dilution for strong and weak electrolytes (qualitative explanation) (K1,K2,K3 & K4)
- 1.4 Transport number and its determination by Hittorf's method by using Pt and Ag electrodes. (K1,K2,K3 & K4)
- 1.5 Ionic mobility – determination of ionic mobility, effect of temperature and concentration on ionic mobility. (K1,K2,K3 & K4)
- 1.6 Ionic conductance - Kohlrausch's law and its applications. (K1,K2,K3 & K4)

**Unit II:****(12 Hours)**

- 2.1 Theory of strong electrolytes - Debye -Huckel's theory- postulates, Debye Huckel limiting law and verification, Debye Huckel Bronsted equation. (K1,K2,K3 & K4)
- 2.2 Debye Huckel Onsager theory-verification of Onsager equation,Wein effect and Debye Falkenhagen effect. (K1,K2,K3 & K4)
- 2.3 Ionic strength and calculation of ionic strength. (K1,K2,K3 & K4)
- 2.4 Activity and activity coefficients of strong electrolytes. Mean ionic activity and mean ionic activity coefficients. (K1,K2,K3 & K4)
- 2.5 Applications of conductivity measurements – degree of hydrolysis and solubility product. (K1,K2,K3 & K4)
- 2.6 Conductometric titrations- principle, experimental techniques and sketch of curves of various types of titrations – Acid - Base, mixture of acids versus base and Precipitation titrations. Advantages of conductometric titrations. (K1,K2,K3 & K4)

**Unit III:****(12 Hours)**

- 3.1 EMF –construction of an electrochemical cell, definition of electrode and cell potentials, conventions regarding sign of emf, cell reaction and emf, Relationship between heat energy and electrical energy. Galvanic cells-reversible and irreversible cells. (K1,K2,K3 & K4)
- 3.2 EMF and its measurement based on Poggendorff compensation principle. (K1,K2,K3 & K4)
- 3.3 Types of electrodes – metal-metal ion, gas, metal-metal insoluble salt, amalgam and oxidation-reduction electrodes. Reference electrodes: Primary reference electrode-Hydrogen electrode, Secondary reference electrode-Calomel electrode. (K1,K2,K3 & K4)
- 3.4 Derivation of Nernst equation for electrode potentials, Thermodynamics and emf-derivation of  $\Delta G$ ,  $\Delta H$ ,  $\Delta S$  from emf data. (K1,K2,K3 & K4)
- 3.5 Standard cell – working of Weston saturated and unsaturated standard cells. (K1,K2,K3 & K4)
- 3.6 Electrochemical series and its applications. (K1, K2,K3 & K4)

**Unit IV:****(12 Hours)**

- 4.1 Chemical and concentration cells – chemical cells with and without transference and their applications. (K1,K2,K3 & K4)
- 4.2 Concentration cells – electrode concentration cells without transference. (K1,K2,K3 & K4)
- 4.3 Electrolytic concentration cells without transference- examples and derivation of expressions for their emf's. (K1,K2,K3 & K4)
- 4.4 Electrolytic concentration cells with transference - examples and derivation of expressions for their emf's – liquid junction potential. Functions of a salt bridge(K1,K2,K3 & K4)
- 4.5 Applications of emf measurements-determination of pH using hydrogen, quinhydrone and glass electrodes. (K1,K2,K3 & K4)
- 4.6 Potentiometric titrations- acid - base, redox and precipitation titrations- advantages of potentiometric titrations. Titration of polybasic acids versus a base. (K1,K2,K3 & K4)

**Unit V:****(12 Hours)**

- 5.1 Applications of concentration cells – determination of valency of ions and transport number. (K1,K2,K3 & K4)
- 5.2 Determination of ionic product of water and solubility product. (K1,K2,K3 & K4)
- 5.3 Polarization – decomposition potential, back emf, definition and experimental determination. (K1,K2,K3 & K4)
- 5.4 Hydrogen over voltage – definition, experimental determination and application. Electroplating. (K1,K2,K3 & K4)
- 5.5 Storage cells –lead acid battery – mechanism of discharging and recharging. (K1,K2,K3 & K4)
- 5.6 Fuel cells – types of fuel cells – low temperature fuel cells and high temperature fuel cells. Hydrogen – Oxygen fuel cell. (K1,K2,K3 & K4)

**Text Books:**

1. B. R. Puri, L. R Sharma and M.SPathania, Principles of Physical Chemistry, 47<sup>th</sup> Edition, Vishal Publishing Co., 2017.
2. P.L.Soni, Textbook of Physical Chemistry, Sultan Chand & Co., Reprint 2000.
3. Negi and Anand, Physical Chemistry, 2<sup>nd</sup> Edition, New Age copy right, Eastern Wiley Pvt. Ltd.,1985
4. Kundu and Jain, Physical Chemistry, 2<sup>nd</sup> Edition, S.Chand & Co.,1987.

**Reference Books:**

1. S.Glasstone, A Textbook of Physical Chemistry, 5<sup>th</sup> Edition, MacMillan (India) Ltd, New Delhi, Reprint 1978.
2. G.W.Castellan, Physical Chemistry, 3<sup>rd</sup> Edition., Addison-Wesley, Mass 1983.
3. Walter J.Moore, Physical Chemistry,-5<sup>th</sup> Edition Prentice-Hall, 1972.

4. Dogra, S. K., and Dogra S., Physical Chemistry Through Problems, Wiley Eastern Ltd., 1984.
5. Samuel H Maron and Carl F. Prutton., Principles of Physical Chemistry, 4<sup>th</sup> Edition, Oxford and IBH Publishing Company, New Delhi, 1985.
6. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd., New Delhi, 2001.
7. B.K Sharma, Electrochemistry, 4<sup>th</sup> Edition, Goel Publishing House, 1990.

### **Open Educational Resources (OER)**

1. <https://www.khanacademy.org/science/chemistry/oxidation-reduction>
2. <https://www.khanacademy.org/science/chemistry/std cell potential>
3. [http://www.freebookcentre.net/chemistry-books-download/An-Introduction-To-Electrochemistry-\(PDF-577P\).html](http://www.freebookcentre.net/chemistry-books-download/An-Introduction-To-Electrochemistry-(PDF-577P).html)

## SEMESTER VI

### UECHC20 – ELECTIVE II A: CHEMISTRY OF NATURAL PRODUCTS

<b>Year: III</b> <b>SEM: VI</b>	<b>Course Code</b> UECHC20	<b>Title of the Course</b> Chemistry of Natural Products	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Learning Objectives:

To impart knowledge on natural products such as carbohydrates, amino acids, proteins, terpenes, alkaloids, vitamins, carotenoids, anthocyanins and flavones.

#### Course Outcomes:

The Learners will be able to

1. Explain the structural elucidation, properties and reactions of glucose, fructose, sucrose, maltose, starch and cellulose.
2. Elaborate the preparation, properties and reactions of alpha aminoacids, synthesis of peptides and classification and structure of proteins.
3. Explain the structure and applications DNA, RNA and processes like transcription and translation in protein synthesis.
4. Illustrate the sources, properties and structural elucidation of alkaloids and terpenoids.
5. Elaborate the sources, properties, structural elucidation and synthesis of flavonoids, carotenoids, anthocyanins and vitamins.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:****(15 Hours)**

- 1.1 Carbohydrates - classification, configuration-D,L, Ascending of carbon chain in sugars- Kiliani-Fischer synthesis, descending of carbon chain in sugars- Ruff's synthesis.(K1, K2, K3 & K4)
- 1.2 Constitution of glucose and fructose. (K1, K2, K3 & K4)
- 1.3 Reactions of glucose and fructose - osazone formation. Mutarotation and its mechanism. (K1, K2, K3 & K4)
- 1.4 Cyclic structure - pyranose and furanose forms, determination of ring size - Haworth projection formula. (K1, K2, K3 & K4)
- 1.5 Epimerisation, inter conversion of aldoses and ketoses. (K1, K2, K3 & K4)
- 1.6 Sucrose, maltose, starch and cellulose - structural elucidation. (K1, K2, K3 & K4)

**Unit II:****(15 Hours)**

- 2.1 Amino acids and proteins - classification of amino acids - essential and non-essential amino acids. (K1, K2, K3 & K4)
- 2.2 Preparation of alpha amino acids- Strecker's synthesis, Gabriel Phthalimide synthesis. (K1, K2, K3 & K4)
- 2.3 Properties - zwitter ions, isoelectric points, reactions of amino group. (K1, K2, K3 & K4)
- 2.4 Reactions of carboxyl and both amino and carboxyl groups. (K1, K2, K3 & K4)
- 2.5 Peptide bond, Peptide synthesis, Proteins - classification based on physical and chemical properties and on physiological functions. (K1, K2, K3 & K4)
- 2.6 Primary and secondary structures of proteins - Helical and sheet structures, tertiary and quaternary structure. Denaturation and renaturation of proteins. (K1, K2, K3 & K4)

**Unit III:****(15 Hours)**

- 3.1 Nucleic acids – nucleoside, nucleotide, types of nucleic acids. (K1, K2, K3 & K4)
- 3.2 RNA and DNA – structures and differences. (K1, K2, K3 & K4)
- 3.3 Sequencing of DNA, synthesizing an oligonucleotide array.(K1, K2, K3 & K4)
- 3.4 DNA replication, transcription and translation - protein synthesis.(K1, K2, K3 & K4)
- 3.5 Introduction to lipids, classification, oils and fats.(K1, K2, K3 & K4)
- 3.6 Common fatty acids present in oils and fats, trans fats.(K1, K2, K3 & K4)

**Unit IV:****(15 Hours)**

- 4.1 Terpenes - classification, isoprene rule, source and structural elucidation of citral.(K1, K2, K3 & K4)
- 4.2 Source and structural elucidation of geraniol. (K1, K2, K3 & K4)
- 4.3 Source and structural elucidation of  $\alpha$  – pinene. (K1, K2, K3 & K4)
- 4.4 Alkaloids - classification, general methods of isolation and general methods of structural determination, source and structural elucidation of coniine. (K1, K2, K3 & K4)
- 4.5 Source and structural elucidation of piperine. (K1, K2, K3 & K4)
- 4.6 Source and structural elucidation of nicotine. (K1, K2, K3 & K4)

**Unit V :****(15 Hours)**

- 5.1 Carotenoids- introduction and general methods of structural determination. (K1, K2, K3 & K4)
- 5.2 Anthocyanins- introduction and general methods of structural determination. (K1, K2, K3 & K4)
- 5.3 Flavones- source, isolation, separation, purification. (K1, K2, K3 & K4)
- 5.4 Properties and structural elucidation of flavones. (K1, K2, K3 & K4)
- 5.5 Vitamins- source, classification, structural elucidation of Ascorbic acid. (K1, K2, K3 & K4)
- 5.6 Structural elucidation of thiamine. (K1, K2, K3 & K4)

**Text Books:**

1. B.S. Bahl and Arun Bahl, Advanced Organic Chemistry, 5<sup>th</sup> Edition, Sultan Chand &Co., 2014.
2. K.S.Tewari, S.N.Mehrotra, K.Vishnoi, A Text book of Organic Chemistry, Vikas Publishing House, Reprint, 2017.
3. Gurdeep Chatwal, Organic Chemistry of Natural Products, Vol. I, Himalaya Publishing House, 4<sup>th</sup> edition, 2015.
4. Gurdeep Chatwal, Organic Chemistry of Natural Products, Vol. II, Himalaya Publishing House, 4<sup>th</sup> edition, 2015.

**Reference Books:**

1. O.P.Agarwal, Chemistry of Natural Products Vol I, 26<sup>th</sup> Edition, Goel Publication House, 2014.
2. O.P.Agarwal, Chemistry of Natural Products Vol II, 24<sup>th</sup> Edition, Goel Publication House, 2015.
3. P.L.Soni, Text book of Organic Chemistry, Sultan and Chand, Reprint, 2019.
4. M.K. Jain and S.C.Sharma, Modern Organic Chemistry, S. Chand & Co, Reprint, 2019.
5. A.K.Bansal, A Textbook of Organic Chemistry, New Age International Pvt. Ltd., 1990.
6. David L. Nelson and Michael M. Cox, Lehninge Principles of Biochemistry, 3<sup>rd</sup> Edition, Macmillan Worth Publishers, 2002.
7. Stryer, Jeremy M. Berg, John. L Tymoczko, Lubert, Biochemistry, 5<sup>th</sup> edition, International Edition, 2002.
8. I.L. Finar, Organic Chemistry, Vol II, 5<sup>th</sup> Edition, Addison Wesley, 2000.
9. R.T.Morrison and Boyd, Organic Chemistry, 6<sup>th</sup> edition, Prentice Hall India Pvt. Ltd., 2001.

**Open Educational Resources (OER)**

1. <https://nroer.gov.in/55ab34ff81fccb4f1d806025/file/5d43eea016b51c016943e6b6>  
(Nucleic acids)
2. <http://vidymitra.inflibnet.ac.in/index.php/content/index/5523b9e7e413015c2d65f7a3>  
(Nucleic acids and proteins)
3. <http://vidymitra.inflibnet.ac.in/index.php/content/index/5523b9e7e413015c2d65f7a1>  
(Carbohydrates and lipids)
4. <http://vidymitra.inflibnet.ac.in/index.php/content/index/5a3a11bf8007bea53365cb7a>  
(Alkaloids)

## SEMESTER VI

### UECHD20 - ELECTIVE II B: POLYMER CHEMISTRY

<b>Year: III SEM: VI</b>	<b>Course Code</b> UECHD20	<b>Title of the Course</b> Polymer Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core-Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Learning Objectives:

1. To expose the students to the fascinating trends in the field of polymer chemistry.
2. To study in detail the mechanisms, techniques, characterization and applications of polymers.

#### Course Outcomes:

The Learners will be able to

1. Classify polymers and determine the molecular weights of polymers by physical and chemical methods.
2. Describe the mechanisms of different types of polymerization reactions.
3. Summarize the types and techniques involved in polymer degradation.
4. Demonstrate the applications of industrial polymers and explain the role of conducting polymers.
5. Illustrate the various polymer processing techniques.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

#### Unit I:

(15 Hours)

- 1.1 Introduction to Polymer Science: monomers and oligomers. (K1, K2, K3 & K4)
- 1.2 Polymers and their characteristics. (K1, K2, K3 & K4)
- 1.3 Polymer structure: copolymers, tacticity, geometric isomers. (K1, K2, K3 & K4)

- 1.4 Classification of polymers: Natural, synthetic, linear, cross-linked and network, plastics, elastomers, fibres, homopolymers and co-polymers. (K1, K2,K3 &K4)
- 1.5 Bonding in Polymers: Primary and secondary bond forces in polymers: cohesive energy and decomposition of polymers. (K1, K2,K3 &K4)
- 1.6 Molecular weight and its determination –Chemical and physical methods. (K1, K2,K3 &K4)

**Unit II:**

**(15 Hours)**

- 2.1 Mechanism of Polymerization, chain growth polymerization, cationic and anionic.(K1,K2,K3 & K4)
- 2.2 Free radical polymerization- initiation, propagation and termination steps.(K1,K2,K3 & K4)
- 2.3 Coordination polymerization, solution and template polymerization.(K1,K2,K3 & K4)
- 2.4 Stereo regular polymers - Ziegler Natta polymers.(K1,K2,K3 & K4)
- 2.5 Step growth polymers – Polycondensation and Polyaddition polymerization.(K1,K2,K3 & K4)
- 2.6 Bulk and block polymerization, electrochemical polymerization.(K1,K2,K3 & K4)

**Unit III:**

**(15 Hours)**

- 3.1 Polymerization Technique –Bulk and Solution polymerization.(K1,K2,K3 & K4)
- 3.2 Suspension and emulsion polymerization.(K1,K2,K3 & K4)
- 3.3 Interfacial, plasma and gas phase polymerization.(K1,K2,K3 & K4)
- 3.4 Polymer Degradation -Types of Polymer Degradation- Thermal degradation, mechanical degradation.(K1,K2,K3 & K4)
- 3.5 Photodegradation and Photo stabilizers.(K1,K2,K3 & K4)
- 3.6 Chemical structure determination: Vibrational spectroscopy, Nuclear Magnetic Resonance Spectroscopy.(K1,K2,K3 & K4)

**Unit IV:**

**(15 Hours)**

- 4.1 Industrial Polymers: Raw material, preparation, fibre forming polymers, elastomeric material.(K1,K2,K3 & K4)
- 4.2 Thermoplastics- Polyethylene, Polypropylene, Polystyrene, Polyacrylonitrile, Poly Vinyl Chloride, Poly tetrafluoro ethylene, Nylon and Polyester.(K1,K2,K3 & K4)
- 4.3 Thermosetting Plastics: Phenol formaldehyde and epoxide resin.(K1,K2,K3 & K4)
- 4.4 Elastomers- Natural rubber and synthetic rubber, Buna -N, Buna-S and Neoprene.(K1,K2,K3 & K4)
- 4.5 Conducting Polymers - Elementary ideas; examples: poly sulphur nitriles, poly phenylene, poly aniline, poly pyrrole and poly acetylene.(K1,K2,K3 & K4)
- 4.6 Biodegradable Polymers.(K1,K2,K3 & K4)

**Unit V:****(15 Hours)**

- 5.1 Introduction to Polymer Processing –Processes: Mixing, Rolling and kneading, Pelletizing, Shredding and Grinding, Storage and transportation.(K1,K2,K3 & K4)
- 5.2 Pressureless Processing Techniques – casting, dipping, coating and foaming.(K1,K2,K3 & K4)
- 5.3 Polymer processing under pressure – Calendaring, Moulding – Compression, injection, extrusion, blow moulding.(K1,K2,K3 & K4)
- 5.4 Polymer additives- definition, requirement of additives, classification of additives.(K1,K2,K3 & K4)
- 5.5 Stabilizers – Antioxidants and thermal stabilizers.(K1,K2,K3 & K4)
- 5.6 Other additives: Fillers, plasticizers, fire retardants and colourants.(K1,K2,K3 & K4)

**Reference Books:**

1. R. J. Young and P.A. Lovell., Nelson thornes, Introduction to Polymers, 3<sup>rd</sup> Edition, 2011.
2. P.Bahadur& N. V. Sastry, Principles of Polymer Science, 2<sup>nd</sup> Edition, Narosa Publishing House, 2005.
3. G.S. Misra, Introductory Polymer Chemistry, 1<sup>st</sup> Edition, New Age International Publishers, 2018.
4. Bhatnagar M., A Textbook of Polymers, Vol. I, II & III, S. 1<sup>st</sup> Edition, S. Chand & Co., 2014.
5. Banerji (Samir K), A Textbook of Polymers, Vol I, 2<sup>nd</sup> Edition, 2003.
6. V.R. Gowarikar, Viswanathan J. Sridhar - Polymer Science - Wiley Eastern, Reprint 2019.

**Open Educational Resources (OER)**

1. [https://chem.libretexts.org/Bookshelves/Organic\\_Chemistry/Supplemental\\_Modules\\_\(Organic\\_Chemistry\)/Polymers](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Polymers)
2. [https://eng.libretexts.org/Bookshelves/Materials\\_Science/Supplemental\\_Modules\\_\(Materials\\_Science\)/Polymer\\_Chemistry/Polymer\\_Chemistry%3A\\_Chemical\\_Composition/Polymer\\_Chemistry%3A\\_Polymerization\\_Reactions](https://eng.libretexts.org/Bookshelves/Materials_Science/Supplemental_Modules_(Materials_Science)/Polymer_Chemistry/Polymer_Chemistry%3A_Chemical_Composition/Polymer_Chemistry%3A_Polymerization_Reactions)
3. <https://nptel.ac.in/content/storage2/courses/103103029/pdf/mod7.pdf>

**SEMESTER VI****UECHE20 - ELECTIVE III A: APPLIED CHEMISTRY**

<b>Year: III SEM: VI</b>	<b>Course Code</b> UECHE20	<b>Title of the Course</b> Applied Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core-Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Learning Objectives:**

1. To impart knowledge on biological, dairy, leather, soil and dye chemistry.

**Course Outcomes:**

The Learners will be able to

1. Describe the digestion and absorption of carbohydrates, proteins and fats and describe the role of enzymes and physiological functions of hormones.
2. Recall the definition, constituents and physico-chemical properties of milk and indicate the composition of creams, butter, ghee and ice creams.
3. Demonstrate the chief processes involved in leather manufacture and treatment of tannery effluents
4. Classify and enumerate the properties of soils.
5. Determine the physico-chemical properties of water and illustrate reverse osmosis and ion-exchange methods.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**Unit I:** (15 Hours)

- 1.1 Biological Chemistry:Elementary treatment of digestion and absorption of carbohydrates, proteins and fats. (K1, K2, K3 &K4)
- 1.2 Elementary treatment of enzymes, cofactors, prosthetic groups and theory of enzyme action.(K1, K2, K3 &K4)
- 1.3 Physiological functions of adrenaline and thyroxin.(K1, K2,K3 &K4)
- 1.4 Physiological functions of oxytocin and insulin. (K1, K2, K3& K4)
- 1.5 Physiological functions of sex harmones.(K1, K2,K3 & K4)
- 1.6 Micronutrients and their biological role in human systems.(K1, K2, K3 & K4)

**Unit II:** (15 Hours)

- 2.1 Dairy Chemistry: Milk- Definition, Physicochemical properties of milk.(K1, K2,K3 &K4)
- 2.2 Constituents of milk and their physicochemical properties.(K1, K2,K3 & K4)
- 2.3 Chemical change taking place in milk due to processing parameters- boiling, pasteurization, sterilization and homogenization.(K1, K2, K3 &K4)
- 2.4 Definition and composition of creams, butter, ghee and icecreams. (K1, K2,K3 &K4)
- 2.5 Milk powder-definition, need for making powder. (K1, K2,K3 & K4)
- 2.6 Principles involved in drying process- spray drying and drum drying.(K1, K2,K3 & K4)

**Unit III:** (15 Hours)

- 3.1 Leather Chemistry: Introduction, chief process used in leather manufacture.(K1,K2,K3 & K4)
- 3.2 Structure of hide and skin.(K1, K2,K3 & K4)
- 3.3 Leather processing-process before tannage. (K1, K2, K3 & K4)
- 3.4 Tanning process- vegetable tanning and chrome tanning. (K1, K2, K3& K4)
- 3.5 Finishing process - dyeing and fat liquoring. (K1, K2, K3& K4)
- 3.6 Tannery effluent and by product problems and treatment. (K1, K2, K3 & K4)

**Unit IV:** (15 Hours)

- 4.1 Soil Chemistry: Introduction-soil classification. (K1, K2,K3 & K4)
- 4.2 Properties of soil, soil water, soil air, soil temperature, soil minerals, soil colloids, soil reaction and buffering. (K1,K2,K3 & K4)
- 4.3 Soil pH, soil acidity, soil salinity and alkalinity. (K1, K2,K3 & K4)
- 4.4 Cation Exchange Capacity and its significance. (K1, K2, K3 &K4)
- 4.5 Soil fertility and soil formation. (K1, K2,K3 &K4)
- 4.6 Nutrient cycle –Biological nitrogen fixation. (K1, K2, K3 & K4)

**Unit V:****(15 Hours)**

- 5.1 Water Chemistry: Sources of water. (K1, K2, K3 &K4)
- 5.2 Physical characteristics-colour, temperature, turbidity, Total solids, Total Dissolved Solids.(K1, K2, K3 &K4)
- 5.3 Chemical characteristics - Hardness, degree of hardness, temporary and permanent hardness, Scale formation, removal of hardness.(K1, K2, K3 &K4)
- 5.4 pH, Alkalinity, Dissolved Oxygen. .(K1, K2, K3 &K4)
- 5.5 Biological characteristics – Biological Oxygen Demand. (K1, K2, K3 &K4)
- 5.6 Reverse osmosis and ion exchange methods – principle and functions.(K1, K2, K3 &K4)

**Reference Books:**

1. G.R. Agarwal, Kiran Agarwal and O.P. Agarwal, Agarwal's Text Book of Biochemistry, 18<sup>th</sup> Edition, Goel Publishing House, 2015.
2. Jayashree Ghosh, Fundamental Concepts of Applied Chemistry, 1<sup>st</sup> Edition, S.Chand& Co. Ltd, New Delhi, 2013.
3. Clarence Henry Eckles, Willes Barnes Combs, Harold Macy, Milk and Milk Products, 4<sup>th</sup> Edition, Tata McGraw Hill Publishing Company Ltd, Reprint 2002.
4. B.K.Sharma, Industrial Chemistry, 13<sup>th</sup> Edition, Goel Publishing House, Reprint 2016.
5. Dilip Kumar Das, Introductory Soil Science, 4<sup>th</sup> Edition, Kalyani Publishers, Reprint 2017.
6. Gurdeep Chatwal, Organic Chemistry of Natural Products, Vol. 2, Himalaya Publishing House, Reprint, 2018.
7. M. Satake, Y. Mido, Chemistry of Colour, 1<sup>st</sup> Edition, Discovery Publishing House, Reprint 2003.

**Open Educational Resources (OER)**

1. <http://ecoursesonline.iasri.res.in/course/view.php?id=92>
2. <http://wwwchem.uwimona.edu.jm/courses/CHEM2402/Textiles/Leather.html>
3. [http://mimoza.marmara.edu.tr/~kyapsakli/enve202/Lecture12\\_Soil%20Chemistry.pdf](http://mimoza.marmara.edu.tr/~kyapsakli/enve202/Lecture12_Soil%20Chemistry.pdf)  
<http://inside.mines.edu/~epoeter/GW/21WaterChem5/WaterChem5pdf.pdf>

## SEMESTER VI

### UECHF20 - ELECTIVE III B - PHARMACEUTICAL CHEMISTRY

<b>Year : III</b> <b>SEM :VI</b>	<b>Course Code</b> UECHF20	<b>Title of the Course</b> Pharmaceutical Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Learning Objectives:

1. To give basic knowledge of the different terms used in pharmaceutical chemistry.
2. To know the examples, their actions, chemical compositions and uses of various drugs.
3. To study in detail the causes, symptoms and preventive measures of certain diseases.

#### Course Outcomes:

The Learners will be able to

1. Explain the basic pharmacological terms are used in pharmaceutical chemistry. Illustrate the selected Indian Medicinal plants and their uses.
2. Elaborate the definition, properties and therapeutic uses of sulphonamides, antibiotics, antiseptics and disinfectants.
3. Explain the role of analgesics and anesthetics.
4. Analyse the causes, symptoms and drugs used for the treatment of Cancer, AIDS, Epilepsy and Hypertension
5. Summarize the characteristics and classifications of cardiovascular drugs. Identify the common organic pharmaceutical aids.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:****(15 hours)**

- 1.1 Definition of the following terms -drug, nature and sources of drugs, pharmacy, pharmacodynamics, pharmacokinetics, pharmacology, molecular pharmacology, pharmacophore, toxicology. (K1,K2, K3 & K4)
- 1.2 Bacteria, virus, difference between bacteria and virus, fungi, vaccine. (K1,K2, K3 & K4)
- 1.3 Causes, symptoms and drugs for anaemia, jaundice, cholera, malaria and filarial. (K1,K2, K3 & K4)
- 1.4 Causes, symptoms and drugs for dengue fever, chikungunya, typhoid. (K1,K2, K3 & K4)
- 1.5 Diagnostic test for sugar, salt and cholesterol in blood and urine. (K1,K2, K3 & K4)
- 1.6 Indian medicinal plants - medicinal uses and chemical present in neem, keezhanelli, mango, adathoda, thoothuvalai, hibiscus,rose, tulsi, turmeric, curry leaves, ficus. (K1,K2, K3 & K4)

**Unit II:****(15 hours)**

- 2.1 Sulphonamides – definition, synthesis and therapeutic uses of prontosil, sulphathiozole. (K1,K2, K3 & K4)
- 2.2 Definition, synthesis and therapeutic uses of sulphafurazole and sulphapyridine. (K1,K2, K3 & K4)
- 2.3 SAR of prontosil. (K1,K2, K3 & K4)
- 2.4 Antibiotics – definition, conditions, classifications. Properties, therapeutic uses and structure activity relationship of penicillin. (K1,K2, K3 & K4)
- 2.5 Properties, therapeutic uses and structural activity relationship of chloramphenicol, tetracyclines. (K1,K2, K3 & K4)
- 2.6 Antiseptics and disinfectants-definition and distinction, phenolic and chlorocompounds(K1,K2, K3 & K4)

**Unit III:****(15 hours)**

- 3.1 Analgesics – definition, narcotic: natural, morphine and its derivatives, uses, SAR of morphine. (K1,K2, K3 & K4)
- 3.2 Synthetic - pethidine, methadone, morphinan, benzomorphan – disadvantages and uses. (K1,K2, K3 & K4)
- 3.3 Non-narcotic analgesics - salicylic acid and its derivatives, para-aminophenol derivatives, pyrazole derivative, indolyl and aryl acetic acid derivatives, ibuprofen, ketoprofen - therapeutic uses and adverse effects. (K1,K2, K3 & K4)
- 3.4 Anaesthetics – definition, characteristics, classifications. (K1,K2, K3 & K4)
- 3.5 Volatile general anaesthetics - ether, vinyl ether, chloroform, halothane, trichloroethylene, ethylchloride, nitrous oxide, cyclopropane – uses and disadvantages. (K1,K2, K3 & K4)
- 3.6 Non-volatile general anesthetics - thiopental sodium, methohexitone, propanidid. Local anesthetics: requisites, natural- cocaine. Synthetic - benzocaine, procaine-uses, side effects. (K1,K2, K3 & K4)

**Unit IV:****(15 hours)**

- 4.1 Cancer: definition, causes, treatment, drugs used (antineoplastics), alkylating agents, antimetabolites, plant products. (K1,K2, K3 & K4)
- 4.2 AIDS - causes, symptoms, prevention, AZT, DDC. (K1,K2, K3 & K4)
- 4.3 Hypoglycemic drugs, diabetes - types -causes, control, insulin- preparation, uses. Oral hypoglycemic agents. (K1,K2, K3 & K4)
- 4.4 Anticonvulsant agents - definition, types. Barbiturates, hydantoins, oxazolidene diones, succinimides. (K1,K2, K3 & K4)
- 4.5 Blood - grouping, composition, R<sub>n</sub> factor. (K1,K2, K3 & K4)
- 4.6 Blood pressure - hypertension and hypotension, treatment. (K1,K2, K3 & K4)

**Unit V:****(15 hours)**

- 5.1 Cardiovascular drugs – definition, action, cardiac glycosides, anti arrhythmic drugs- characteristics, classification, example - quinidine, propranolol hydrochloride and uses. (K1,K2, K3 & K4)
- 5.2 Anti hypertensive agents – aldomet, pentolinium tartrate, reserpine. (K1,K2, K3 & K4)
- 5.3 Anti anginal agents – nitrites, dipyridamole, vasodilator, tolazoline hydrochloride, isoxsuprine hydrochloride, sodium nitroprusside, hydralazine hydrochloride and papaverine. (K1,K2, K3 & K4)
- 5.4 Organic pharmaceutical aids- preservatives, properties, common preservatives used. (K1,K2, K3 & K4)
- 5.5 Colouring agents- properties, common colouring agents used. Sweetening agents- properties, common sweetening agents used. (K1,K2, K3 & K4)
- 5.6 Flavouring agents- properties and common flavouring agents used. (K1,K2, K3 & K4)

**Textbook**

1. Jayashree Ghosh, A Textbook of Pharmaceutical Chemistry, 1<sup>st</sup> Edition, S.Chand & Co. Ltd., New Delhi, 2006.
2. Jayashree Ghosh, Fundamental concepts of Applied Chemistry, S.Chand & Co. Ltd., New Delhi, 2006.

**Reference Books:**

1. S. Lakshmi - Pharmaceutical Chemistry, Sultan Chand & Sons, 2<sup>nd</sup> Edition, 1998.
2. P. Sasikala and D. Gajapathy, Pharmaceutical Chemistry, 1990.
3. Gurdeep Chatwal, Organic Chemistry of Natural Products, Vol. 2 - Himalaya Publishing House, Reprint, 2000.

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=UXaXwDuUNfM> (Pharmaceutical Aids)
2. <https://carrington.edu/blog/how-to-test-blood-type/> ( Blood Groups & Rh factors)

## SEMESTER VI

### USCHD620 - SKILL BASED ELECTIVE: FOOD CHEMISTRY

<b>Year: III</b> <b>SEM: VI</b>	<b>Course Code</b> USCHD620	<b>Title of the Course</b> Food Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

1. To impart elementary ideas of various types of food, food additives, food poisons, food adulteration.
2. To emphasize the importance of vegetable and fruits.

#### Course Outcomes:

The Learners will be able to

1. Apply simple analytical techniques for detecting food adulterants.
2. Describe the role of food additives, preservatives, flavours, colours and antioxidants.
3. Detect food poisons and apply first aid techniques.
4. Distinguish between alcoholic and nonalcoholic beverages.
5. Describe the importance of saturated and unsaturated fats in edible oils and the nutritive value of fruits and vegetables.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:** (6 Hours)

- 1.1 Food and food adulteration, food types, advantages and disadvantages. (K1 & K2).
- 1.2 Food adulteration- adulteration in food grains, milk and butter. (K1 & K2)
- 1.3 Food adulteration- adulteration in ghee, ice creams and cakes. (K1 & K2)
- 1.4 Food adulteration- adulteration in pepper, turmeric and chilli powder. (K1 & K2)
- 1.5 Food adulteration- adulteration in edible oils, coffee and tea powder. (K1 & K2)
- 1.6 Detection of adulterants by simple analytical techniques, FSSAI and HACCP laws. (K1 & K2)

**Unit II:** (6 Hours)

- 2.1 Food additives - Definition, structure , advantages and disadvantages of artificial sweeteners – sucralose, saccharin, cyclamate and aspartate. (K1 & K2)
- 2.2 Food flavours-esters, aldehydes and heterocyclic compounds (K1 & K2)
- 2.3 Food flavours -spices - ajwain, aniseed, asafoetida, bay leaves, cardamom, cinnamon, cloves. (K1 & K2)
- 2.4 Food colours, emulsifying agents and preservatives . (K1 & K2)
- 2.5 Leavening agents- baking powder, baking soda, yeast. (K1 & K2)
- 2.6 Antioxidants- propyl gallate, butylated hydroxyl anisole and butylated hydroxyl toluene. (K1 & K2)

**Unit III:** (6 Hours)

- 3.1 Food poison - pesticides and chemical poisons. (K1 & K2)
- 3.2 First aid for poison consumed victims. (K1 & K2)
- 3.3 Beverages - soft drinks- soda, carbonated drinks, fruit juices. (K1 & K2)
- 3.4 Alcoholic beverages- examples and composition. (K1 & K2)
- 3.5 Addiction to alcohol- diseases of liver. (K1 & K2)
- 3.6 Deaddiction measures. (K1 & K2)

**Unit IV:** (6 Hours)

- 4.1 Edible oils - fats, oils, sources of oils, saturated and unsaturated fats. (K1 & K2)
- 4.2 Importance of MUFA and PUFA. (K1 & K2)
- 4.3 Iodine value, RM value, saponification values and their significance. (K1 & K2)
- 4.4 Rancidity- types, hydrolytic and oxidative. (K1 & K2)
- 4.5 Test for rancidity (K1 & K2)
- 4.6 Prevention of rancidity. (K1 & K2)

**Unit V:** (6 Hours)

- 5.1 Vegetables and Fruits – classification and composition. (K1 & K2)
- 5.2 Nutritive value of green leafy vegetables, roots and tubers, other vegetables. (K1 & K2)
- 5.3 Pigments- water insoluble and water soluble pigments. (K1 & K2)
- 5.4 Vegetable cookery- preparation, changes during cooking, loss of nutrients during cooking. (K1 & K2)
- 5.5 Fruits- classification and composition. (K1 & K2)
- 5.6 Ripening of fruits, chemical fruit ripening and storage of fruits. (K1 & K2)

**Reference Books:**

1. Lillian Hoagland Meyer, Food Chemistry, 1<sup>st</sup> Indian Edition, CBS Publishers and Distributors, 2004.
2. Norman W. Desrosier, James N. Desrosier, The technology of food preservation, 4<sup>th</sup> Indian Edition, CBS Publishers and Distributors, 1987.
3. Norman N. Potter, Joseph H. Hotchkiss, Food science, 5<sup>th</sup> Edition, CBS Publishers and Distributors, 1999.
4. Vijay Kaushik., Dietotherapy, 1<sup>st</sup> Edition, Mangal Deep Publications, 2008.
5. B.Srilakshmi, Food Science, 7<sup>th</sup> Edition, New Age International publishers, 2018.
6. Seema Yadav, Food Chemistry, 1<sup>st</sup> Edition, Anmol publications, 2006

**Open Educational Resources:**

1. <https://freevidelectures.com/course/4443/nptel-dairy-food-process-products-technology/7>
2. <https://nptel.ac.in/content/storage2/courses/103103029/pdf/mod6.pdf>
3. <https://nptel.ac.in/courses/126/105/126105013/>

## SEMESTER VI

### UCCHL20 - PRACTICAL III: PHYSICAL CHEMISTRY PRACTICAL

<b>Year: III</b> <b>SEM: VI</b>	<b>Course Code</b> UCCHL20	<b>Title of the Course</b> Physical Chemistry Practical	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 2	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Outcomes:

The Learners will be able to

1. Demonstrate practical skills in carrying out chemical reactions of different orders to arrive at reaction kinetics.
2. Estimate quantitatively using conductometric and potentiometric titrations
3. Assess the meaning of values and calculations in experiments and learn the techniques of getting rate constants through graphical methods.
4. Understand laboratory practices and safety/First aid rules.
5. Handle electronic equipments with technical skills

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

#### 1. Kinetics

Determination of the order of the following reactions:

- a) Acid catalysed hydrolysis of an ester (methyl or ethyl acetate)
- b) Persulphate – Potassium iodide reaction kinetics
- c) Iodination of acetone

#### 2. Polarimetry

\* Inversion of Sucrose

3. Molecular weight of a solute  
Rast's method using naphthalene, metadinitrobenzene and diphenyl as solvents
4. Heterogeneous equilibria
  - a) \* Phenol- water system- CST
5. Effect of impurity – 2% NaCl or succinic acid solutions on CST of phenol-water system-  
determination of the concentration of the given solution.
6. Determination of transition temperature of the given salt hydrate  
 $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ ,  $\text{CH}_3\text{COONa} \cdot 3\text{H}_2\text{O}$ ,  $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$ ,  $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$
7. Electrochemistry  
Conductivity
  - a) Conductometric titration of a strong acid against a strong base.
8. Potentiometry
  - a) Titration of a strong acid against a strong base
  - b) Determination of pH
9. To construct the phase diagram of a two-component system (Naphthalene-Biphenyl system)  
by cooling curve method.

\* Not to be given for examination

**Continuous Assessment – 40 marks**

I C.A. - 50

II C.A. - 50

Average - 25

Performance during regular practicals-10

Regularity in submission of observation note-book and Record –5

**Semester Practical examination – 60 marks**

Principle writing – 5 marks

Viva-voce – 5marks

Record – 10 marks

**1. Kinetics**

Graph – 5 marks

Below a factor of 10 – 35 marks

By a factor of 10 – 25 marks

More than the above – 10 mark

**2. Molecular weight & Effect of electrolyte**

Error up to 10 % - 40 marks

10 – 20 % - 35 marks

21 – 30 % - 20 marks

Above 30% - 10 marks

**3. Transition Temperature**

Error up to 2°C difference – 40 marks

Error up to 7°C difference –25 marks

Error above 7°C difference – 10 marks

#### **4. Conductivity / Potentiometric titrations /pH**

Error up to 10 % - 40 marks

Error up to 15 % - 30 marks

Error up to 20 % - 20 marks

Error above 20 % - 10 marks

(Proportionate marks are reduced for in between % of error)

#### **Reference Books:**

1. Departmental Lab Manual, 2018, Reprint 2020.
2. O.P. Pandey, D.N. Bajpai & S. Giri, Practical Chemistry, S. Chand & Company Ltd.,2001.
3. B. D. Khosla, V. C. Garg & A. Gulati, Senior Practical Physical Chemistry, S. Chand & Co., New Delhi, 2011.
4. C. W. Garland, J.W. Nibler, & D.P. Shoemaker, Experiments in Physical Chemistry 8th Ed.; McGrawHill: New York, 2003.
5. P.K. Mani and A.O. Thomas, A Textbook of Practical Chemistry, Scientific Publication, 1973.

#### **Open Educational Resources (OER):**

1. <https://www.sciencebysimulation.com/chemreax/AnalyzerAB.asp> (Kinetics)
2. <https://pages.uoregon.edu/tgreenbo/colligative.html> (Rast Method)

## SEMESTER VI

### UCCHM20 -PRACTICAL IV: GRAVIMETRIC ESTIMATION

<b>Year:</b> III <b>SEM:</b> VI	<b>Course Code</b> UCCHM20	<b>Title of the Course</b> Gravimetric Estimation	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 2	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Learning Outcomes:

The Learners will be able to

1. Quantitatively estimate metal ions using gravimetric analysis.
2. Gain knowledge on the choice of precipitating methods, reagents, crucibles and filtration.
3. Identify common errors in gravimetric analysis.
4. Outline the favourable conditions for precipitation and factors affecting the particle size of the precipitate.
5. Relate particle size of the precipitates with choice of crucibles used in gravimetric estimations.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

1. Estimation of sulphate as barium sulphate
2. Estimation of barium as barium sulphate
3. Estimation of barium as barium chromate
4. Estimation of lead as lead chromate
5. Estimation of lead as lead sulphate
6. Estimation of nickel as DMG complex

**Continuous Assessment – 40 marks**

I C.A. - 50

II C.A. - 50

Average - 25

Performance during regular practicals-10

Regularity in submission of observation note-book and Record –5

**Semester Practical examination – 60 marks**

Viva-voce -5

Record -10

≤ 2% -45 marks

> 2 up to 3% -35 marks

> 3 up to 4% -25 marks

>4 % -15 marks

**Open Educational Resources:**

1. <https://www.khanacademy.org/science/chemistry/chemical-reactions-stoichiome/limiting-reagent-stoichiometry/a/gravimetric-analysis-and-precipitation-gravimetry>

## SEMESTER VI

### UCCHN20 – PRACTICAL V: MICRO SCALE ORGANIC ANALYSIS & PREPARATION

<b>Year:</b> <b>III</b> <b>SEM:</b> <b>VI</b>	<b>Course Code</b> UCCHN20	<b>Title of the Course</b> Micro Scale Organic Analysis & Preparation	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 2	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Learning Outcomes:

The Learners will be able to

1. Apply the concepts of micro scale analysis in organic qualitative analysis.
2. Develop skill to analyse systematically the given organic mixture and identify the functional group and special elements.
3. Prepare simple organic compounds.
4. Discuss the importance of laboratory practices and safety/First aid rules for handling the organic chemicals.
5. Explain the significance of organic reactions to understand the theory concepts of organic chemistry.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

#### 1. Organic Preparations

- a) Oxidation ( benzaldehyde to benzoic acid)
- b) Hydrolysis ( methyl salicylate or ethyl benzoate or benzamide to acid)
- c) Nitration ( nitrobenzene to m-dinitrobenzene)
- d) Bromination ( parabromoacetanilide from acetanilide)
- e) Benzoylation ( betanaphthol to betanaphthyl benzoate)
- f) Acetylation (salicylic acid to aspirin)

2. Organic analysis: Reactions of the following functional groups:  
Aldehyde, ketone, carboxylic acid (mono and di), ester, carbohydrate (reducing and non reducing), phenol, aromatic primary amine, amide (mono and di), nitrocompound and anilide.

Analysis of organic compounds containing one or two functional groups and characterization with a derivative.

**Continuous Assessment – 40 marks**

I C.A.	- 50
II C.A.	- 50
Average	- 25
Performance during regular practicals	-10
Regularity in submission of observation note-book and Record	-5

**Semester Practical examination – 60 marks**

Viva-voce	-5
Record	-10
Preparation	- 10 (Quantity-5, Quality-5)
Organic Analysis	- 35
Preliminary Tests	- 3
Special element	- 6
Aliphatic/Aromatic	- 4
Saturated/unsaturated	- 4
Functional group	- 8
Other tests	- 6
Derivative	- 4

**References:**

1. A.I. Vogel, A.R. Tatchell, B.S. Furnis, A.J. Hannaford and P.W.G. Smith, Vogel's Textbook of Practical Organic Chemistry, 5 th Edition, Pearson,2005.
2. Darshan V. Chaudhary, Organic Chemistry Practicals and Important Reagents, 1<sup>st</sup> Edition, Createspace Independent Pub, 2016.

**Open Educational Resources (OER):**

1. <https://www.toppr.com/guides/chemistry/organic-chemistry/qualitative-analysis-of-organic-compounds/>
2. <https://vlab.amrita.edu/?sub=2&brch=191&sim=345&cnt=1>

**SEMESTER – V/VI****UGCHA520/620 – NON MAJOR ELECTIVE: FOOD AND NUTRITION CHEMISTRY**

<b>Year : III</b> <b>SEM :</b> <b>V&amp;VI</b>	<b>Course Code</b> UGCHA520/ UGCHA620	<b>Title of the Course</b> Food & Nutrition Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> NME	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 100
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**Learning Objectives:**

1. To impart knowledge about the importance of food and its impact on human health.
2. To highlight the nutritive value of fruits and vegetables and the importance of balanced diet.

**Course Outcomes:**

The Learners will be able to

1. Explain the sources, classification, functions, deficiency diseases and metabolism of carbohydrates.
2. Explain the sources, classification, functions, deficiency diseases and metabolism of proteins and fats.
3. Outline the sources, functions and deficiency diseases of fat soluble and water soluble vitamins.
4. Describe the sources, functions, and deficiency diseases and RDA of essential and trace minerals.
5. Appreciate the nutritive values and evaluate the chemical changes and loss of nutrients during cooking and storage of fruits and vegetables.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:** (9 Hours)

- 1.1. Nutrition and Health – concept. (K1, K2)
- 1.2. Classification of food. (K1, K2)
- 1.3. Nutrients - macro and micro nutrients. (K1, K2)
- 1.4. Carbohydrates - sources, classification, functions, deficiency diseases, energy requirements. (K1, K2)
- 1.5. Blood sugar level. (K1, K2)
- 1.6. Carbohydrates metabolism - Glycolysis, Glyconeogenesis, Glycogenolysis. (K1, K2&K3)

**Unit II:** (9 Hours)

- 2.1. Proteins - sources, classification, functions. (K1, K2)
- 2.2. Deficiency diseases, energy requirements. (K1, K2)
- 2.3. Protein metabolism. (K1, K2&K3)
- 2.4. Fats - Sources, classification, functions. (K1, K2)
- 2.5. Deficiency diseases, energy requirements. (K1, K2)
- 2.6. Fat metabolism. (K1, K2&K3)

**Unit III:** (9 Hours)

- 3.1. Vitamins – classification, difference between fat soluble and water soluble vitamins. (K1, K2)
- 3.2. Fat soluble vitamins (A and D) (K1, K2)
- 3.3. Fat soluble vitamins (E and K) (K1, K2)
- 3.4. Water soluble vitamins (Thiamine, Riboflavin, Niacin Pyridoxine, Pantothenic acid,) sources, functions, deficiency diseases and daily requirements. (K1, K2)
- 3.5. Water soluble vitamins (Folate, Choline, Biotin, Cyanocobalamin) sources, functions, deficiency diseases and daily requirements. (K1, K2)
- 3.6. Ascorbic acid - sources, functions, deficiency diseases and daily requirements. (K1, K2)

**Unit IV:** (9 Hours)

- 4.1. Minerals – classification. (K1, K2)
- 4.2. Major elements (Ca, P, Na, K) sources, functions, deficiency diseases and recommended requirements. (K1, K2)
- 4.3. Major elements (Fe, Mg, I and F), sources, functions, deficiency diseases and recommended requirements. (K1, K2)
- 4.4. Trace elements (Zn, Cu, Co, Se, Mo) - sources, functions, deficiency diseases and recommended requirements. (K1, K2)
- 4.5. Balanced diet - Recommended diet for adult - Indian men and women. (K1, K2)
- 4.6. Diet in pregnancy and lactation. (K1, K2)

**Unit V:** (9 Hours)

- 5.1. Vegetables – Nutritive value of green leafy vegetables, roots and tubers. (K1, K2)
- 5.2. Vegetable cookery (preliminary preparation, changes during cooking, loss of nutrients during cooking). (K1, K2)
- 5.3. Fruits – Nutritive value of fruits, pigments, water, cellulose and pectic substances, flavour constituents, polyphenols, bitterness in fruits. (K1, K2)
- 5.4. Ripening of fruits – chemical ripening. (K1, K2)
- 5.5. Storage of fruits. (K1, K2)

## 5.6. Antioxidants - antioxidant properties of vegetables and fruits. (K1, K2)

### **Text Books:**

1. B.Srilakshmi, Food Sciences, 5<sup>th</sup> Edition, New Age International Publishers, 2010.
2. Shrinandan Bansal, Food and Nutrition, 2<sup>nd</sup> Edition, A.I.T.B.S Publishers, India, 2010.

### **Reference Books:**

1. K. Park - Park's Text Book of Preventive and Social Medicine, 20<sup>th</sup> Edition, Banarsidas Bhanot Publishers, Jabalpur, 2009.
2. G.R.Agarwal, Kiran Agarwal and O.P.Agarwal, Agarwal's Textbook of Biochemistry, 11<sup>th</sup> Edition, Goel Publishing House, 2000.
3. Ambiga Shanmugam, Fundamentals of Biochemistry for Medical Students, 8<sup>th</sup> Edition, Reprint 2016.

### **Open Educational Resources (OER):**

1. <http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=444> (Different methods of cooking)
2. <http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=444> (Classification of carbohydrates)
3. <http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=444> (Functions of food)

## SEMESTER VI

### UGCHB520/620 - NON-MAJOR ELECTIVE: COSMETICS AND DYES

<b>Year: III</b> <b>SEM:</b> <b>V/VI</b>	<b>Course Code:</b> UGCHB520/ UGCHB620	<b>Title of the Course:</b> Cosmetics and Dyes	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> <b>3</b>	<b>Credits</b> <b>2</b>	<b>Marks</b> <b>100</b>
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#### Learning Objectives:

1. To give a basic introduction to cosmetics, their classification and uses.
2. To give a broad overview on the disadvantages of using synthetic cosmetics over herbal cosmetics, cosmetic safety and evaluation method, etc.
3. To give an introduction to dyes and their applications in various industries from textile to pharmacy and food, contribution of various industries to environmental pollution and its effect on human health.

#### Course Outcomes:

The learners will be able to

1. Define and classify cosmetics, deodorants, antiperspirants, perfumes, aerosols and identify the pros and cons of synthetic cosmetics.
2. Describe the safety assessment methods used by FDA.
3. Prepare and use fruits and vegetables based herbal cosmetics and evaluate the significance of aromatherapy and apply it to human health and beauty.
4. Explain the properties of natural and synthetic dyes.
5. Understand the impact of dyes used in textile and leather industry to environmental pollution and analyse the importance of dyes in pharmaceutical and food industry.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:** (9 hours)

- 1.1 Cosmetics – definition & classification based on use. (K1, K2)
- 1.2 Components of cosmetics. (K1, K2)
- 1.3 Deodorants, antiperspirants. (K1, K2)
- 1.4 Aerosols, perfumes and fragrances. (K1, K2)
- 1.5 Pros and cons of synthetic cosmetics. (K1, K2, K3)

**Unit II:** (9 hours)

- 2.1 Safety of Cosmetics. (K1, K2)
- 2.2 Basic concept of cosmetic safety. (K1, K2)
- 2.3 Safety test items. (K1,K2,K3)
- 2.4 Evaluation method. (K1, K2, K3)
- 2.5 Skin irritation, sensitization. (K1, K2)
- 2.6 Testing on human (Patch test, Usage test). (K1, K2)

**Unit III:** (9 hours)

- 3.1 Herbal cosmetics. (K1, K2)
- 3.2 Fruits and vegetables as hair care and skin care (apple, apricot, banana, carrot, cucumber, honey, lemon, tomato). (K1, K2)
- 3.3 Herbal Perfumes and fragrance. (K1, K2)
- 3.4 Skin care herbs – olive oil, sesame oil, black pepper, Amla. (K1, K2, K3)
- 3.5 Aromatherapy – various oils used in aromatherapy and their significance. (K1,K2, K3)
- 3.6 Standardization of herbs – importance, methods employed for standardization of herbal extracts. (K1, K2)

**Unit IV:** (9 hours)

- 4.1 Dyes - definition of dyes and types. (K1, K2)
- 4.2 Requirements of a good dye i.e.Colour, chromophore and auxochrome, solubility, linearity, coplanarity, fastness, substantivity, definition of fastness and its properties. (K1, K2,K3)
- 4.3 Mordants Definition with examples. (K1, K2)
- 4.4 Natural dyes - Definition; Advantages and limitations of natural dyes. (K1, K2)
- 4.5 Examples and uses of natural dyes with respect to henna, turmeric, saffron, indigo, chlorophyll –names of the chief dyeing material/s in each of the natural dye (structures not expected) (K1, K2)
- 4.6 Synthetic dyes - definition of synthetic dyes, primaries and intermediates. (K1, K2)

**Unit V: (9 hours)**

- 5.1 Textile uses of dyes - impact of the textile and leather dye Industry on the environment with special emphasis on water pollution. (K1, K2, K3, K4)

- 5.2 Non textile uses of dyes - biomedical uses – Tablets, syrups and capsules. (K1, K2, K3, K4)
- 5.3 DNA markers and therapeutics. (K1, K2, K3)
- 5.4 Dyes in food and cosmetics - commonly used food colors and their limits. (K1, K2, K3)
- 5.5 Properties of dyes used in food and cosmetics. (K1, K2, K3)
- 5.6 Dyes sensitized solar cells – A tool to overcome the future energy crisis. (K1, K2)

### Reference Books:

1. Venkatraman K, Chemistry of Synthetic Dyes, Vol I – VIII, Academic Press 1972.
2. Lubs H.A., Robert E . The Chemistry of Synthetic Dyes and Pigments, Krieger Publishing Company, NY 1995.
3. Shenai V.A., Chemistry of Dyes and Principles of Dyeing, Sevak Publications, 1973.
4. Sodhi. G. S., Fundamental Concepts of Environmental Chemistry, 3rd Edition, Narosa Publishers, 2013.
5. Kirpal Singh, Chemistry in Daily Life, 3rd Edition, Prentice Hall of India Pvt., Ltd., 2012.
6. Dr. J. C. Kurian, Plants that heal, Vol 1., P.H. Lall, Oriental Watchman Publishing House, 1995.
7. C P Khare, Indian Medicinal plants: An illustrated Dictionary, Springer Science, 2007.
8. BehlPN, Srivatsava G., Herbs useful in dermatological Therapy, 2<sup>nd</sup> Edition, CBS Publishers & Distributors, 2002.
9. H. Panda, Herbal Soaps and Detergents Handbook, NIIR project consultancy services, 2011.
10. Jayashree Ghosh, Fundamental Concepts of Applied Chemistry, 2<sup>nd</sup> Edition, S. Chand & Company Ltd., New Delhi, 2006.
11. B C Maumdar, P C Mukhopadhyay, Principles and Practice of Herbal Garden, Daya Publishing House, New Delhi, 2006.

### Open Educational Resources (OER)

1. <http://fsdaup.gov.in/reg-drug-and-costmetic.htm>
2. <https://www.theherbarie.com/The-Herbarie-Formulary.html>
3. [https://www.medicalnewstoday.com/articles/10884#essential\\_oils](https://www.medicalnewstoday.com/articles/10884#essential_oils)
4. <https://www.britannica.com/technology/dye>

## SEMESTER I

### UACHA20 –ALLIED: CHEMISTRY I

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code</b> UACHA20	<b>Title of the Course</b> Allied Chemistry I	<b>Course Type</b> Theory	<b>Course Category</b> Allied	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

1. To help the students understand the concepts in industrial and polymer chemistry.
2. To impart knowledge on aromatic compounds and heterocyclic compounds.
3. To highlight the importance of chemical kinetics.
4. To learn the methods of separation through chromatographic techniques.

#### Course Outcomes:

The Learners will be able to:

1. Understand and apply the concept of aromaticity, mechanism of electrophilic substitution reaction, and chemistry of heterocyclic compounds.
2. Explain the terms involved in kinetics and methods of determination of order of the reaction, and understand the theories of reaction rates.
3. Classify polymers and explain its preparation, properties and uses.
4. Understand the concepts, types of chromatographic techniques, principles of volumetric analysis, and describe the separation and purification techniques.
5. Understand the composition and uses of fuel gases, cement, glass, explosives and dyes.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit I:** (12 hours)

- 1.1 Aromatic compounds-aromaticity, Huckel's rule. (K1, K2, K3 & K4)
- 1.2 Application of Huckel's rule for benzenoid and nonbenzenoid compounds (benzene, naphthalene, anthracene, pyridine and quinoline, azulene and ferrocene). (K1, K2, K3 & K4)
- 1.3 Preparation, properties and uses of naphthalene. (K1, K2, K3 & K4)
- 1.4 Heterocyclic compounds-preparation, properties and uses of furan, thiophene, and pyrrole. (K1, K2, K3 & K4)
- 1.5 Electrophilic substitution in benzene-mechanism of nitration, halogenation, and sulphonation. (K1, K2, K3 & K4)
- 1.6 Electrophilic substitution in benzene-mechanism of alkylation and acylation (K1, K2, K3 & K4)

**Unit II:** (12 hours)

- 2.1 Chemical kinetics-rate of reaction, rate law (K1, K2, K3 & K4)
- 2.2 Factors affecting rate of the reaction. (K1, K2, K3 & K4)
- 2.3 Molecularity and Order of the reaction, methods of determining the order of a reaction. (K1, K2, K3 & K4)
- 2.4 Derivation of rate constant of a first order reaction and half life period. (K1, K2, K3 & K4)
- 2.5 Arrhenius theory- effect of temperature on reaction rate. (K1, K2, K3 & K4)
- 2.6 Collision theory for a bimolecular reaction. (K1, K2, K3 & K4)

**Unit III:** (12 hours)

- 3.1 Polymer chemistry- classification of polymers. (K1, K2, K3 & K4)
- 3.2 Natural and synthetic rubbers with examples. (K1, K2, K3 & K4)
- 3.3 Preparation and uses of nylon 6, 6 and terylene. (K1, K2, K3 & K4)
- 3.4 Preparation and uses of polyethylene and PVC. (K1, K2, K3 & K4)
- 3.5 Protein fibers- chemical composition(K1, K2, K3 & K4)
- 3.6 Properties of wool and silk(K1, K2, K3 & K4)

**Unit IV:** (12 hours)

- 4.1 Introduction to qualitative and quantitative analysis(K1, K2, K3 & K4)
- 4.2 Principles of volumetric analysis. (K1, K2, K3 & K4)
- 4.3 Separation and purification techniques – extraction, distillation and crystallization. (K1, K2, K3 & K4)
- 4.4 Chromatography- column chromatography - principle, packing of columns, method of separation, identification of compounds and applications. (K1, K2, K3 & K4)
- 4.5 Paper chromatography – principle, procedure,  $R_f$  value and applications. (K1, K2, K3 & K4)
- 4.6 Thin layer chromatography - principle, procedure,  $R_f$  value and applications. (K1, K2, K3 & K4)

**Unit V:****(12 hours)**

- 5.1 Industrial chemistry-fuel gases - natural gas, water gas, semi water gas, carburetted water gas, oil gas and producer gas (composition and uses only). (K1, K2, K3 & K4)
- 5.2 Cement-composition, setting of cement and uses (K1, K2, K3 & K4)
- 5.3 Types of glasses(K1, K2, K3 & K4)
- 5.4 Dye chemistry- terms - chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyperchromic shift. (K1, K2, K3 & K4)
- 5.5 Azo and triphenylmethane dyes - preparation of methyl orange. (K1, K2, K3 & K4)
- 5.6 Explosives – TNT, nitroglycerine and dynamite (K1, K2, K3 & K4)

**References:**

1. B.R Puri, L. R Sharma, and Kalia K. C., Principles of Inorganic Chemistry,Shoban Lal, Nagin Chand and Co, 29<sup>th</sup> Edition, 2004.
2. B.S.Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd., Reprint 2007.
3. B. R. Puri, L. R Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., January 2019.
4. V.Veeraiyan and A.N.S. Vasudevan, Textbook of Allied Chemistry, High Mount Publishing House, 2003.
5. G.S.Misra, Introduction to Polymer Chemistry, New Age International Publishers, 2005.

**Open Educational Resources (OER):**

1. <https://www.pslc.ws/macrog/kidsmac/wiap.htm> - Basics of Polymers
2. <http://ecoursesonline.iasri.res.in/mod/page/view.php?id=997> - Polymer
3. <https://microbenotes.com/chromatography-principle-types-and-applications/-chromatography>

## SEMESTER II

### UACHB20 –ALLIED: CHEMISTRY- II

<b>Year: I SEM: II</b>	<b>Course Code</b> UACHB20	<b>Title of the Course</b> Allied Chemistry II	<b>Course Type</b> Theory	<b>Course Category</b> Allied	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

1. To help the students understand the concepts in coordination and medicinal chemistry.
2. To throw light on stereochemistry.
3. To highlight the importance of electrochemistry and photochemistry.
4. To impart knowledge on medicinal chemistry.

#### Course Outcomes:

The Learners will be able to

1. Understand the nomenclature and theories of coordination compounds.
2. Understand the concepts of isomerism and tautomerism.
3. Explain the concepts of electrolytes and its types, buffer solutions, separation techniques, and construction of electrochemical cell.
4. Understand the basic principles of photochemistry and kinetics of hydrogen-chlorine reaction.
5. Recall the basic terms in medicinal chemistry, and discuss the causes, symptoms and treatment of cancer, diabetes and AIDS.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

**Unit I:** (12 hours)

- 1.1 Co-ordination chemistry – definition of the terms - ligands, chelate, chelation. (K1,K2,K3 & K4)
- 1.2 Nomenclature of mononuclear complexes. (K1,K2,K3 & K4)
- 1.3 Werner's and Pauling theory, Sidgwick's theory. (K1,K2,K3 & K4)
- 1.4 Effective Atomic Number rule. (K1,K2,K3 & K4)
- 1.5 Chemistry of EDTA. (K1,K2,K3 & K4)
- 1.6 Chemistry of haemoglobin and chlorophyll. (K1,K2,K3 & K4)

**Unit II:** (12 hours)

- 2.1 Isomerism- types of isomerism. (K1,K2,K3 & K4)
- 2.2 Stereoisomerism-optical isomerism - cause of optical activity. (K1,K2,K3 & K4)
- 2.3 Optical isomerism of lactic acid and tartaric acid, R- S notation (one asymmetric carbon atom). (K1,K2,K3 & K4)
- 2.4 Racemisation and resolution. (K1,K2,K3 & K4)
- 2.5 Geometrical isomerism of maleic and fumaric acids, E-Z notation. (K1,K2,K3 & K4)
- 2.6 Tautomerism – keto-enol tautomerism. (K1,K2,K3 & K4)

**Unit III:** (12 hours)

- 3.1 Ionic equilibria- strong and weak electrolytes, common ion effect. (K1,K2,K3 & K4)
- 3.2 Definition of pH, pKa, pKb and pKw. Buffer solution. (K1,K2,K3 & K4)
- 3.3 Electrochemical cells – construction, definition of emf, standard electrode potentials. (K1,K2,K3 & K4)
- 3.4 Types of cells- primary and secondary. (K1,K2,K3 & K4)
- 3.5 Principle of Standard hydrogen electrode and calomel electrode. (K1,K2,K3 & K4)
- 3.6 Principle of Electrophoresis, electro-dialysis and electro-osmosis. (K1,K2,K3 & K4)

**Unit IV:** (12 hours)

- 4.1 Photochemistry-Laws of light absorption- Lamberts law and Lamberts-Beer's law. (K1,K2,K3 & K4)
- 4.2 Grotthus – Draper's law and Stark – Einstein's law of photochemical equivalence. (K1,K2,K3 & K4)
- 4.3 Quantum yield (Definition) (K1,K2,K3 & K4)
- 4.4 Photochemical reactions, kinetics of hydrogen and chlorine reaction. (K1,K2,K3 & K4)
- 4.5 Jablonski diagram. (K1,K2,K3 & K4)
- 4.6 Fluorescence, phosphorescence, photosensitization and chemiluminescence (definition, examples and applications). (K1,K2,K3 & K4)

**Unit V:** (12 hours)

- 5.1 Medicinal chemistry - definition and one example each for analgesics, antipyretics antiseptics, tranquilizers, sedatives and hypnotics. (K1,K2,K3 & K4)

- 5.2 Local anesthetics and general anesthetics. (K1,K2,K3 & K4)
- 5.3 Antibiotics – structure and uses of Penicillin, Streptomycin and Chloramphenicol. (K1,K2,K3 & K4)
- 5.4 Causes and treatment of diabetes. (K1,K2,K3 & K4)
- 5.5 Causes and treatment of cancer. (K1,K2,K3 & K4)
- 5.6 Causes and treatment of AIDS. (K1,K2,K3 & K4)

### References:

1. R.D.Madan, Modern Inorganic Chemistry, S.Chand and Co., Reprint 2004.
2. B.R Puri, L. R Sharma and Kalia K. C., Principles of Inorganic Chemistry, Shoban Lal, Nagin Chand and Co., 29<sup>th</sup> Edition, 2004.
3. B.S.Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co. Ltd., Reprint 2007.
4. K.S.Tewari, A Textbook of Organic Chemistry, Vikas Publishing House Pvt. Ltd., Reprint 2001.
5. B. R. Puri, L. R Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., January 2019.
6. V.Veeraiyan and A.N.S. Vasudevan, Textbook of Allied Chemistry, High Mount Publishing House, 2003.
7. Jayashree Ghosh, A Textbook of Pharmaceutical Chemistry, S.Chand and Company Ltd., Reprint 2005.

### Open Educational Resources (OER)

1. [https://chem.libretexts.org/Bookshelves/Organic\\_Chemistry/Map%3A\\_Organic\\_Chemistry\\_\(McMurry\)/22%3A\\_Carbonyl\\_Alpha-Substitution\\_Reactions/22.03%3A\\_Keto-Enol\\_Tautomerism](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Map%3A_Organic_Chemistry_(McMurry)/22%3A_Carbonyl_Alpha-Substitution_Reactions/22.03%3A_Keto-Enol_Tautomerism)
2. <https://www.askiitians.com/revision-notes/chemistry/coordination-compounds/>
3. <http://www.ecs.umass.edu/cee/reckhow/courses/Etreat/slides/597t101p.pdf> - Electrochemistry basics.

## SEMESTER II

### UACHC20 – ALLIED PRACTICAL: CHEMISTRY

<b>Year: I SEM: II</b>	<b>Course Code</b> UACHC20	<b>Title of the Course</b> Allied Chemistry Practicals	<b>Course Type</b> Practicals	<b>Course Category</b> Allied	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Outcomes:

The Learners will be able to

1. Acquire skills in acid-base titrations.
2. Acquire skill in Permanganometry
3. Acquire skill in determining hardness of water
4. Analyse the elements presents in organic compounds.
5. Analyse the functional groups presents in organic compounds

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

#### I Volumetric Analysis:

1. Estimation of sodium hydroxide using standard sodium carbonate.
2. Estimation of Hydrochloric acid using standard oxalic acid.
3. Estimation of borax using standard sodium carbonate.
4. Estimation of ferrous sulphate using standard Mohr's salt
5. Estimation of oxalic acid using standard ferrous sulphate.
6. \*Estimation of temporary and permanent hardness of water.

## II Organic Analysis:

Reactions of aldehyde (aromatic), \*ketone (aliphatic and aromatic), carbohydrate, carboxylic acid (mono and dicarboxylic), phenol, aromatic primary amine, amide and diamide.

Systematic analysis of organic compounds containing one functional group and characterization by confirmatory tests or derivatives.

### References:

1. A R Kulandaivelu, R Veeraswamy & V Venkateswaran - Allied Practical Chemistry, 1/eS. Chand Publishers, ISBN – 9788121920575, 2001.
2. Alwin David - Allied Chemistry laboratory manual – I, ISBN: 978-93-5311-785-6, 2018.

**Question Paper Pattern**  
**Department of Chemistry**  
**2020-2021**

**Main Semester Examination (100 Marks)**

Section A: Answer **all** questions (10 x 2 = 20 marks)

Two questions from each unit

Section B: Answer **all** questions (5 x 7 = 35 marks)

Either-or choice

One question from each unit

Section C: Answer any **three** questions out of five (3x15=45 marks)

Atleast one question from each unit

**SBE (60 Marks)**

Section A: Answer **all** questions (10x2=20 marks)

Section B: Answer any **four** (4x5=20 marks)

Section C: Answer any **two** questions (2x10=20 marks)

**Main- Continuous Assessment Examinations (50 Marks)**

Section A: Answer **all** questions (7x2=14 marks)

Section B: Answer any **three** questions out of five (3x7=21 marks)

Section C: Answer any **one** question out of two (1x15=15 marks)

Atleast one question from each unit

**SBE-Continuous Assessment Examinations ( 30 Marks)**

Section A: Answer **all** questions (5x2=10 marks)

Section B: Answer any **two** questions out of four (2x5= 10 marks)

Section C: Answer any **one** question out of two (1x10=10 marks)

# Department of Computer Science (UG)

## SYLLABUS AND REGULATIONS

Under

### OUTCOME-BASED EDUCATION

2020

(Effective for the Students Admitted from the Academic  
year 2020-2021)



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

## D) LIST OF COURSES

Sem	Part	Paper Code	Title	Hours	Exam Hours		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper – I	6	3	-	3	40+60
	II	UENGA20	English Paper – I	6	3	-	3	40+60
	III	UCCSA20	Programming in C	4	3	-	4	40+60
	III	UCCSB20	Practical – I : C	2	-	3	2	40+60
	III	UCCSC20	Practical – II: Digital Logics and Fundamentals	3	-	3	2	40+60
	III	UAMAA20	Allied I : Mathematics-I	6	3	-	5	40+60
	IV	-	Skill-Based Elective – I	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
<b>Total</b>							<b>21</b>	<b>700</b>
II	I	ULTAB20	Tamil Paper – II	6	3	-	3	40+60
	II	UENGB20	English Paper – II	6	3	-	3	40+60
	III	UCCSD20	Data Structures with C++	4	3	-	4	40+60
	III	UAMAB20	Allied II: Mathematics-II	6	3	-	5	40+60
	III	UCCSE20	Practical III: Data Structures with C++	2	-	3	2	40+60
	III	UCCSF20	Practical IV: Microprocessor	3	-	3	2	40+60
	IV	-	Skill-Based Elective – II	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
<b>Total</b>							<b>21</b>	<b>700</b>
III	I	ULTAC20	Tamil Paper III	6	3	-	3	40+60
	II	UENGC20	English Paper III	5	3	-	3	40+60
	III	UCCSG20	Java Programming	4	3	-	4	40+60
	III	UCCSH20	Practical V: Programming in Java	2	3	-	2	40+60
	III	UANAA20	Allied III: Numerical Analysis I	6	3	-	5	40+60
	III	UCCSI20	Practical VI: Windows Programming with VB.NET	4	-	3	2	40+60
	IV	-	Skill-Based Elective III	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
<b>Total</b>							<b>21</b>	<b>700</b>
IV	I	ULTAD20	Tamil Paper IV	5	3	-	3	40+60
	II	UENGD20	English Paper IV	5	3	-	3	40+60
	III	UCCSJ20	Operating System	4	3	-	4	40+60
	III	UANAB20	Allied IV: Numerical Analysis II	6	3	-	5	40+60

	III	UCCSK20	Practical VII :Linux	2	-	3	2	40+60	
	III	UCCSL20	Practical VIII: Python Programming	3	-	3	2	40+60	
	IV	UNEVS17	Environmental Studies	2	2	-	2	40+60	
	IV	-	Skill-Based Elective IV	2	2	-	2	40+60	
	IV	UVEDA15	Value Education	1	-	-	-	-	
<b>Total</b>							<b>23</b>	<b>800</b>	
V	III	UCCSM20	Relational Database Management Systems	5	3	-	4	40+60	
	III	UCCSN20	.NET Programming in C#	5	3	-	4	40+60	
	III	UCCSO20	Data Communications and Networks	5	3	-	4	40+60	
	III	UECSA20	Elective - I A: Software Engineering	5	3	-	4	40+60	
	III	UECSB20	Elective - I B: Data Mining						
	III	UCCSP20	Practical IX: RDBMS	2	-	3	2	40+60	
			UCCSQ20	Practical X: .NET Programming in C#	2	-	3	2	
	IV	-	Non-Major Elective - I	3	3	-	2	40+60	
	IV	-	Skill-Based Elective -V	2	2	-	2	40+60	
	IV	UVEDA15	Value Education	1	-	-	-	-	
<b>Total</b>							<b>24</b>	<b>700</b>	
VI	III	UCCSR20	Internet and Web Programming	5	3	-	4	40+60	
	III	UCCSS20	Cloud Computing	4	3	-	4	40+60	
	III	UECSC20	Elective - II A: Software Testing	5	3	-	4	40+60	
	III	UECSD20	Elective - II B: Data Science						
	III	UECSE20	Elective - III A: Artificial Intelligence	5	3	-	4	40+60	
	III	UECSF20	Elective - III B: Computer Graphics						
	IV	UCCST20	Practical XI: Internet and Web Programming	2	-	2	2	40+60	
	IV	UCCSU20	Practical XII: Project	3	-	2	3	40+60	
	IV	-	Non-Major Elective - II	3	2	-	2	40+60	
	IV	-	Skill-Based Elective - VI	2	2	-	2	40+60	
	IV	UVEDA15	Value Education	1	2	-	2	40+60	
<b>Total</b>							<b>27</b>	<b>900</b>	
	V	Extension Activities (90 Hours)					1		
<b>Grand Total</b>							<b>138</b>	<b>4500</b>	

## **F) PROGRAM OUTCOMES (POs)**

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:** Emulate positive social values and exercise leadership qualities and team work.

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

## **G) PROGRAMME SPECIFIC OUTCOMES (PSOs)**

**PSO 1:** Ability to attain knowledge and understand the mathematical and logical concepts, algorithmic principles and computer fundamentals.

**PSO 2:** Understand the basic concepts of system software, hardware and evolution of computer graphics.

**PSO 3:** Demonstrate the knowledge on appropriate theory, practices and tools for the specification, design and implementation.

**PSO 4:** Utilize the practical skill to examine, plan and engineer the applications of technology using computing tools and techniques.

**PSO 5:** Apply the recent technology in multidisciplinary domains and evaluate the methods to implement it, to create high level design and implement robust software applications using latest technological skills.

**PSO 6:** Be ethically and professionally responsible with the ability to relate IT applications to broader social context for the growth of the nation.

## SEMESTER I

### UCCSA20 - PROGRAMMING IN C

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code:</b> UCCSA20	<b>Title of the Course:</b> Programming in C	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Learning Objectives (CLO)

1. To learn the fundamental programming concepts and methodologies which are essential to build good C programs.
2. Develop a greater understanding of the issues involved in programming language design and implementation.
3. To practice the fundamental programming methodologies in the C/C++ programming language via laboratory experiences.
4. Develop an in-depth understanding of functional, logic and object-oriented programming paradigms.
5. To code, document, test, and implement a well-structured, robust computer program using the C/C++ programming language.

#### Course Outcomes (COs)

The Learners will be able to

1. Introduce the students to understand the concept of basic programming - thereby reducing the design complexity and increasing the reusability of a component.
2. Construct the basic structure of C programming, declaration and usage of variable.
3. Understand and develop conditional and iterative statements to write programs.
4. Exercise C programs that uses array and string.
5. Develop user defined functions to solve real time problems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	L	M	M	L	M
CO2	M	M	L	L	M	M
CO3	M	L	L	M	M	M
CO4	H	H	L	L	L	M
CO5	H	L	M	M	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	H	L	L	M	L
CO2	L	M	H	M	M	M
CO3	M	H	M	H	L	L
CO4	L	L	M	H	L	L
CO5	L	M	M	L	H	L

**Unit I****(Hour 12)**

- 1.1 Algorithm and Flowchart. (K2)
- 1.2 Basic Technique - Sum of Two Given Numbers. (K2)
- 1.3 Swapping Two Numbers - Simple Interest Calculation. (K2)
- 1.4 Overview of C. (K2)
- 1.5 Constants and Variables. (K2)
- 1.6 Data Types. (K2)

**Unit II****(Hour 12)**

- 2.1 Operators. (K1,K2)
- 2.2 Expressions. (K1,K2)
- 2.3 Managing Input and Output Operations. (K1,K2)
- 2.4 Decision Making and Branching. (K1,K2)
- 2.5 Decision Making and Looping. (K1,K2)
- 2.6 Decision Making and Looping. (K1,K2)

**Unit III****(Hour 12)**

- 3.1 Arrays – One Dimensional Array – Predefined Streams. (K2)
- 3.2 Introduction - Reading and Writing String. (K2)
- 3.3 Arithmetic Operation on Characters. (K2)
- 3.4 Putting String Together - Comparison of Two Strings - String Handling. (K2)
- 3.5 Functions. (K2)
- 3.6 Other Features of Strings. (K2)

**Unit IV****(Hour 12)**

- 4.1 User defined Function Introduction. (K2,K4)
- 4.2 Defining and Accessing Functions. (K2,K4)
- 4.3 Function Prototypes. (K2,K4)
- 4.4 Categories of Function. (K2,K4)
- 4.5 Passing Arguments. (K2,K4)
- 4.6 Nesting of Functions. (K2,K4)

**Unit V****(Hour 12)**

- 5.1 Recursion. (K2)
- 5.2 Passing Array to Functions. (K2)
- 5.3 Passing Strings to Functions. (K2)
- 5.4 Scope - Visibility and Lifetime of Variables. (K2)
- 5.5 Visibility and Lifetime of Variables. (K2)
- 5.6 Structures and Unions. (K2)

### **Text Books**

1. Balagurusamy, “Programming in C”, 6<sup>th</sup> Edition, Tata McGraw Hill Publication, 2012.
2. M. G. Venkateshmurthy, “Programming Techniques through C: A Beginner's Companion”, 1<sup>st</sup> Edition, Pearson India, 2006.

### **Reference Book**

1. Ashok N. Kamathane, “Programming with C”, 3<sup>rd</sup> Edition, Pearson Publication, 2011.

### **Open Educational Resources (OER)**

1. [http://www.freebookcentre.net/programming-books-download/C-Language-Tutorial-\(PDF-124P\).html](http://www.freebookcentre.net/programming-books-download/C-Language-Tutorial-(PDF-124P).html)
2. <http://www2.cs.uregina.ca/~hilder/cs833/Other%20Reference%20Materials/The%20C%20Programming%20Language.pdf>
3. <http://www-personal.acfr.usyd.edu.au/tbailey/ctext/ctext.pdf>
4. <http://www.slideshare.net/gauravjuneja11/c-language-ppt>
5. <http://www.iitg.ac.in/physics/fac/charu/courses/ph508/lecture2.ppt>

## SEMESTER I

### UCCSB20 - PRACTICAL I: C

<b>Year:</b> I <b>SEM:</b> I	<b>Course Code:</b> UCCSB20	<b>Title of the Course:</b> Practical I: C	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
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#### Course Learning Objectives (CLO)

1. To make the student learn a programming language.
2. Develop a greater understanding of the issues involved in programming language design and implementation.
3. To learn problem solving techniques.
4. Develop an in-depth understanding of functional, logic and object-oriented programming paradigms.
5. To teach the student to write programs in C and to solve the problems.

#### Course Outcomes (COs)

The Learners will be able to

1. Exercise with basic structure of the C program, declaration and usage of variable.
2. Resolve mathematical and scientific problem.
3. Develop the programs using conditional and iterative statements.
4. Implement array and string concept in C program.
5. Write real time problems using user defined functions

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	L	M	M	L	M
CO2	H	M	H	L	M	M
CO3	L	L	L	H	M	M
CO4	H	H	L	M	L	H
CO5	H	L	M	M	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	M	L	M
CO2	L	L	L	L	M	L
CO3	H	H	H	M	L	H
CO4	M	M	M	M	H	M
CO5	L	L	L	M	L	L

**Practical Programs****(Hour 30)**

1. Input and Output Operations. (K1,K2)
2. Decision Making Statements. (K1,K2)
3. Arrays and Looping Statements. (K1,K2)
4. Two Dimensional Arrays. (K2,K6)
5. The Concept of Functions. (K2,K6)
6. Recursion. (K1,K6)
7. Character Arrays. (K1,K6)
8. Structures and Unions. (K1,K6)

**SEMESTER I**  
**UCCSC20 –PRACTICAL II: DIGITAL LOGICS AND FUNDAMENTALS**

<b>Year:</b> I	<b>Course Code:</b> UCCSC20	<b>Title of the Course:</b> Practical II: Digital Logics and Fundamentals	<b>Course Type:</b> Practical	<b>Course Category</b> : Core	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 100
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**Course Learning Objectives (CLO)**

1. The objective of this course is to provide the fundamental concepts associated with the digital logic and Circuit design.
2. To introduce the basic concepts and laws involved in the Boolean algebra and logic families and digital circuits.
3. To familiarize with the different number systems, logic gates and combinational and sequential circuits utilized in the different digital circuits and systems.
4. The course will help in design and analysis of the digital circuit and system.
5. The course will help in design and analysis of the Combinational circuits and system.

**Course Outcomes (COs)**

The Learners will be able to

1. Understand working of logic families and logic gates.
2. To minimize the Boolean expression using Boolean algebra.
3. Design and analyze the combinational and sequential logic circuits.
4. Simulate digital circuits and implement them using hardware component.
5. Design and implementation of combinational circuits.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	M	M	M	L	M
<b>CO2</b>	H	M	H	L	M	M
<b>CO3</b>	L	L	M	H	M	M
<b>CO4</b>	H	H	L	L	M	H
<b>CO5</b>	H	L	M	M	M	L

**(Low -L, Medium -M, High-H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	L	H	L	L
CO2	M	H	L	H	L	M
CO3	H	H	H	H	M	M
CO4	H	M	H	H	M	L
CO5	H	M	H	H	H	L

(Low -L, Medium -M, High-H)

### Unit I

(Hour 9)

- 1.1 Number System - Binary Numbers - Conversion from one number system to other – Number Base Conversion. (K2)
- 1.2 Octal and Hexadecimal Numbers – Complements - Binary Arithmetic. (K3)
- 1.3 Binary Codes - Binary Logics - Logic gates. (K3)
- 1.4 Truth Table - Boolean Algebra - Basic Definition. (K2,K3)
- 1.5 Axiomatic Definition of Boolean Algebra. (K2)
- 1.6 Basic Theorems and properties of Boolean Algebra – Duality - Basic theorems. (K3)

### Unit II

(Hour 9)

- 2.1 Simplification of Boolean Function - The Map method. (K3,K4)
- 2.2 Two and Three Variable Maps - Four Variable Maps. (K5)
- 2.3 Five and Six Variable Maps - Tabulation Methods - McClausky Tabulation Methods. (K4, K5)
- 2.4 Combinational Logic – Adders - Half Adder - Full Adder. (K2)
- 2.5 Subtractor – Half Subtractor – Full Subtractor. (K2)
- 2.6 Encoders – Decoders – Multiplexer - Demultiplexer. (K1, K2)

### Unit III

(Hour 9)

- 3.1 Design of Circuits using Decoders/ Multiplexer, Demultiplexer. (K6)
- 3.2 Sequential Logic – Introduction - Flip Flops - Basic Flip Flop Circuits. (K2)
- 3.3 Closed RS Flip flops - JK Flip flops - D Flip flops - T Flip flops. (K2)
- 3.4 Registers - Registers with parallel load. (K3)
- 3.5 Shift Registers - Serial transfer - Bidirectional shift Register with parallel Load. (K3)
- 3.6 Serial Addition using sequential logic. (K3)

### Unit IV

(K6)

(Hour 9)

1. Verify the truth table of logic gates AND, OR and NOT gate.
2. Construct the Half Adder Circuit using Logic Gates.
3. Construct the Full Adder Circuits using Logic Gates.
4. Construct the Half Subtractor Circuit using Logic Gates.

**Unit V**

(K6)

**(Hour 9)**

5. Construct the Full Subtractor Circuit using Logic Gates.
6. Implement the Karnaugh Map method as Sum of Product (SOP) using NAND Gate.
7. Implement the Karnaugh Map method as Product of Sum (POS) using NOR Gate.

**Text Books**

1. Morris M.Mano, "Digital Logic Fundamentals" - Pearson's Education- 5<sup>th</sup> edition, 2015.

**Reference Books**

1. Vijendran, "Digital Computer Fundamentals", 1<sup>st</sup> Edition - Lakshmi Publications, 2001.
2. Thomas M.Floyd, "Digital Fundamentals", 8<sup>th</sup> Edition-USB Publications, 2009.

**Open Educational Resources (OER)**

1. Karnaugh Map video Tutorial- [http// Youtube/ wjM2RDG5Yti](http://Youtube/wjM2RDG5Yti).
2. Full Adder and Half AddER Video Tutorial-[http//youtube/FSFNefbKckM](http://youtube/FSFNefbKckM).
3. Karnaugh Map – NAND Gate - <https://www.youtube.com/watch?v=LuXdFI8iK1U>

## SEMESTER II

### UCCSD20 – DATA STRUCTURES WITH C++

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> UCCSD20	<b>Title of the Course:</b> Data Structures with C++	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 40+60
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#### Course Learning Objectives (CLO)

1. To understand how C++ expands C with object-oriented features.
2. To learn how to implement copy constructors and class member functions.
3. To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
4. To identify problem involving trees and binary search trees.
5. To apply Algorithm for solving problems like sorting, searching, insertion and deletion of data using linked list.

#### Course Outcomes (COs)

1. Describe the procedural and object-oriented paradigm with concepts of streams, classes, functions, data and objects.
2. Understand dynamic memory management techniques using pointers, constructors, destructors, etc.
3. Describe the concept of function overloading, operator overloading, virtual functions.
4. Identify problem involving trees and binary search trees.
5. Analyse graphs and describe the hash function and concepts of collision and its resolution methods.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	L	H
CO2	M	L	H	L	M	M
CO3	L	L	M	H	L	M
CO4	M	M	L	M	M	M
CO5	H	L	M	M	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	M	M	H
CO2	M	H	M	H	H	L
CO3	H	M	H	L	L	H
CO4	M	H	L	M	H	M
CO5	L	M	H	H	M	M

(Low -L, Medium -M, High-H)

### Unit I

(Hour 12)

- 1.1 Principles of OOP – Basic concepts - Benefits – Applications (K2, K4)
- 1.2 Introduction to C++ –Tokens-Keywords – Identifiers – Variables (K1, K2)
- 1.3 Operators – Expressions and Control structures. (K1, K2, K4)
- 1.4 Function Function Prototyping (K4, K5, K6)
- 1.5 Parameter Passing in Function – Values Returned by Functions (K4, K6)
- 1.6 Inline Functions – Function Overloading. (K2, K4, K6)

### Unit II

(Hour 12)

- 2.1 Classes and Objects - Constructors and Destructors - Introduction (K2, K4, K6)
- 2.2 Types of Constructors - Destructors - Operator Overloading (K2, K3, K6)
- 2.3 Inheritance: Introduction – Types - Virtual Base Classes (K3, K4, K5, K6)
- 2.4 Abstract Classes - Constructors in Inheritance (K2, K4)
- 2.5 Virtual functions and Polymorphism (K2, K6)
- 2.6 Pointers to Objects - this Pointer (K2, K6)

### Unit III

(Hour 11)

- 3.1 Virtual functions and Polymorphism: Pointers to Objects - this Pointer(K2, K6)
- 3.2 Pointers to Derived Classes - Virtual Functions- Pure Virtual Functions. (K2, K4)
- 3.3 Mapping Console I/O Operations - File File streams (K2, K5, K6)
- 3.4 File operations - File pointers (K2)
- 3.5 Command Line Arguments (K4, K6)
- 3.6 Exception handling. (K2, K4, K5, K6)

### Unit IV

(Hour 13)

- 4.1 Introduction - Basic Terminology - Data structures - Data structure operation (K2)
- 4.3 Traversing Linear Arrays - Inserting and Deleting – Searching - Linear Search - Binary Search - Multidimensional Arrays – Pointers - Pointer Arrays(K2)
- 4.4 Introduction- Linked list - Traversing a linked list - Searching a linked list (K3)

4.5 Single Linked List - Doubly Linked List – Stacks - Arithmetic Expression- Polish Notation – Recursion - Queues. (K2, K3)

4.6 Trees – Introduction - Binary Trees - Traversing Binary Trees – Preorder - In order - Post order. (K3)

## **Unit V**

**(Hour 12)**

5.1 Graphs - Warshall Algorithm Shortest paths. (K2)

5.2 Adjacency - First Search - Depth First Search. (K3, K4)

5.4 Warshall Algorithm Matrix - Path Matrix - Heap Sort. (K2)

5.3 Traversing on Graphs - Breadth Shortest paths - Linked Representation of Graphs. (K3)

5.5 Hashing- Hash Function - Collision Resolution. (K2)

5.6 Open Addressing: Linear Probing and Modifications – Chaining. (K3)

## **Text Book**

1. Balagurusamy E., “Object Oriented Programming with C++”, Sixth Edition, Tata McGraw Hill Publication, 2014.
2. Seymour Lipschutz, “Data Structure Schaum’s Outline Series”, Revised Edition, McGraw Hill Publication, 2011.

## **Reference Books**

1. Herbert Schildt, “The complete Reference C++”, 4<sup>th</sup> Edition, Tata McGraw Hill Publication, 2015.
2. Yashawant P. Kanetkar, ” Let Us C++”, 2<sup>nd</sup> Edition, BPB Publication, 2003.
3. John R. Hubbard, “Programming with C++”, 2<sup>nd</sup> EditionI, Schaum’s Outlines, Tata McGraw Hill Publication, 2009.
4. Ellis Horowitz, Sartaj Sahni, Susan Andeson Freed, “Fundamentals of Data Structures in C&quot, 2<sup>nd</sup> Edition, Universities Press Pvt Ltd, 2018.
5. YashavantP.Kanetkar, “ Data Structures through C” , 2<sup>nd</sup> Edition, BPB Publications, 2003.
6. Alfred V.Aho, John E.Hopcroft, Jeffrey D.Ullman , “Data Structures and Algorithms”, 1<sup>st</sup> Edition, Pearson Education, 2004.

## **Open Educational Resources (OER)**

- 1.<http://beginnersbook.com/2017/08/cpp-oops-concepts/>
- 2.[http://www.tutorialspoint.com/cplusplus/cpp\\_object\\_oriented.htm](http://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm)
3. [http://www.youtube.com/watch?v=h4kUiFOb\\_v0](http://www.youtube.com/watch?v=h4kUiFOb_v0)
4. <http://www.ddegjust.ac.in/studymaterial/mca-3/ms-17.pdf>

**SEMESTER II**  
**UCCSE20- PRACTICAL III: DATA STRUCTURES WITH C++**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>SEM: II</b>	UCCSE20	Practical III: Data Structures with C++	Practical	Core	2	2	40+60

**Course Learning Objectives (CLO)**

1. To build an understanding of basic concepts of object-oriented programming techniques.
2. To develop programming skills in programming language.
3. To write a program to solve various problems.
4. To implement object-oriented techniques using C++ language features.
5. To develop software using object-oriented programming paradigms.

**Course Outcomes (COs)**

1. Identify the appropriate data structure and algorithm for solving the real world problems.
2. Implement stack and queue techniques using arrays and pointers.
3. Implement the data structure algorithm for polynomial addition.
4. To know the concept of singly linked list.
5. To implement the concept of tree traversals using the algorithm.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	L	H
CO2	L	M	L	M	M	M
CO3	H	L	M	H	M	L
CO4	H	H	H	H	M	H
CO5	H	M	M	M	M	L

**(Low -L, Medium -M, High-H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	L
CO2	M	H	H	M	H	M
CO3	L	M	M	H	H	L
CO4	H	H	H	H	H	H
CO5	M	M	M	L	H	M

**(Low -L, Medium -M, High-H)**

**Practical Programs (K6)****(Hour 30)**

1. Stack using Array in C++.
2. Queue using Array in C++.
3. Stack using pointers in C++.
4. Queue using pointers in C++.
5. Polynomial Addition using Array in C++.
6. Singly Linked List in C++.
7. Depth First Search for Graph in C++.
8. Binary Tree Traversal using Recursion in C++.

## SEMESTER II

### UCCSF20 - PRACTICAL IV: MICROPROCESSOR

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> UCCSF20	<b>Title of the Course:</b> Practical IV: Microprocessor	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 40+60
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#### Course Learning Objectives (CLO)

1. To develop background knowledge and core expertise of microprocessor.
2. To know the importance of different peripheral devices and addressing modes.
3. To know the design aspects of Instruction Set.
4. To know the concept of Data Manipulation.
5. To understand and implement the concept of Assembly Code.

#### Course Outcomes (COs)

The Learners will be able to

1. Understand the Architecture of a typical microprocessor.
2. Understand different addressing modes and instructions of 8086 design and to develop assembly language programs using software interrupts.
3. Understand the concepts of Instruction sets.
4. Write the assembly code for 8 bit and 16 bit data manipulation.
5. Write the assembly code for Sorting and reversing elements.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	L	H
CO2	L	M	L	M	M	M
CO3	M	L	M	H	L	L
CO4	M	M	H	H	M	M
CO5	H	M	M	M	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	H	M	M
CO2	H	H	H	H	M	L
CO3	H	H	M	M	M	M
CO4	H	H	H	H	H	L
CO5	H	H	H	H	H	M

**Unit I****(Hour 9)**

- 1.1 Introduction – Introduction to Intel processors. (K2,K4)
- 1.2 Minimum mode. (K2,K4)
- 1.3 Maximum mode. (K2,K4)
- 1.4 Pin layouts of 8086. (K2,K4)
- 1.5 Pin functions of 8086. (K2,K4)
- 1.6 8086 Architecture. (K2,K4)

**Unit II****(Hour 9)**

- 2.1 Machine language and Assembly language. (K1,K2)
- 2.2 Programmer's model of 8086 – The 8086 addressing modes. (K1,K2)
- 2.3 Data transfer instructions. (K1,K2)
- 2.4 Arithmetic instructions. (K1,K2)
- 2.5 Logic Instructions - Shift Instructions. (K1,K2)
- 2.6 Rotate Instructions. (K1,K2)

**Unit III****(Hour 9)**

- 3.1 Compare instructions. (K2)
- 3.2 Jump instructions. (K2)
- 3.3 Loop Instructions. (K2)
- 3.4 Loop Instructions. (K2)
- 3.5 String Instructions. (K2)
- 3.6 String Instructions. (K2)

**Unit IV****(Hour 9)**

1. Write the assembly code in Data Manipulation using 8 Bit. (K2,K3)
2. Write the assembly code in Data Manipulation using 16 Bit. (K2,K3)
3. Write the assembly code to find the largest number in an array. (K2,K3)

**Unit V (Hour 9)**

4. Write the assembly code to sort the data in ascending order. (K2,K3)
5. Write the assembly code for Block Move. (K2,K3)
6. Write the assembly code to reverse array elements. (K2,K3)

**Text Books**

1. V.Viyaendran, "Fundamentals of Microprocessor 8086: Architecture, Programming and Interfacing", Viswanathan, S., Printers & Publishers Pvt Ltd, 2009.
2. Ramesh Gaonkar, "Microprocessor Architecture: Programming and Applications with 8085" – 6<sup>th</sup> Edition –Penram International Publishing Limited, 2013.

**Reference Books**

1. Dr. D. K. Kaushik, “An Introduction to Microprocessor 8085” – DhanpatRai Publishing Company, 2014.
2. Nagoor Kani, “Microprocessor 8086 Programming & Interfacing” – RBA Publications, 2004.

**Open Educational Resources (OER)**

1. <http://www.pdfdrive.com/the-intel-microprocessors-80868088-8018680188-80286-80386-80486-pentium-pentium-pro-e89806753.html>
2. <http://www.slideshare.net/gpkm/microprocessor-8086>
3. <http://vardhaman.org/wp-content/uploads/2018/03/Unit-1%20MPMC.pdf>
4. <http://gbcramgarh.in/e-learning-study-materials/BCA/computer/THE%208086%20MICROPROCESSOR/9780198079064.pdf>

**SEMESTER- III**  
**UCCSG20 - JAVA PROGRAMMING**

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> UCCSG20	<b>Title of the Course:</b> Java Programming	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 40+60
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**Course Learning Objectives (CLO)**

1. To give the knowledge of the structure and model of the Java programming language.
2. Use the Java programming language for various programming technology.
3. To develop software in the Java programming.
4. Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirement.
5. To decide whether the Java programming language provides the required solutions.

**Course Outcomes (COs)**

The Learners will be able to

1. Able to understand the use of OOPs concepts.
2. Able to solve real world problems using OOP techniques and to understand the use of polymorphism and Inheritance.
3. Able to understand the use of Packages and Interface in Java.
4. Able to develop and understand exception handling, multithreaded applications with synchronization.
5. Able to design GUI based applications and develop AWT and applets for web applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	M	M	M	M	H
<b>CO2</b>	L	M	L	M	M	M
<b>CO3</b>	M	L	L	M	L	M
<b>CO4</b>	L	L	M	H	M	L
<b>CO5</b>	H	M	M	M	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	M	M	M	M
<b>CO2</b>	H	H	M	L	M	M
<b>CO3</b>	L	L	H	H	H	H
<b>CO4</b>	H	H	H	L	H	H
<b>CO5</b>	L	L	H	M	H	H

**Unit I****(Hour 12)**

- 1.1 Introduction to Java (K2)
- 1.2 Features of Java (K4)
- 1.3 Lexical issues (K2, K5)
- 1.4 Data types – Variables (K2)
- 1.5 Operators - Type conversion and casting (K2, K3, K4)
- 1.6 Control Statements (K2, K4)

**Unit II****(Hour 12)**

- 2.1 Arrays – Strings (K2, K4)
- 2.2 Classes and Objects – Constructors (K2, K3, K4)
- 2.3 Overloading method – Access Control - Static and Fixed method (K2, K4)
- 2.4 Inner Class - String class (K2, K3, K4)
- 2.5 Inheritance (K2, K3)
- 2.6 Overriding Method - Using Super Class. (K2, K3, K6)

**Unit III****(Hour 12)**

- 3.1 Input/Output: Exploring Java I/O: The Java I/O classes and Interfaces (K2, K3, K5)
- 3.2 File (K2, K4, K6)
- 3.3 The Stream Classes (K2, K4)
- 3.4 Packages - Access Protection (K2, K3, K4)
- 3.5 Importing Packages (K2, K4)
- 3.6 Interfaces. (K2, K4, K5)

**Unit IV****(Hour 12)**

- 4.1 Exception Handling: try, catch (K2, K4)
- 4.2 Throw and Throws (K2, K4)
- 4.3 Finally (K2, K4)
- 4.4 Thread (K2, K3, K6)
- 4.5 Multithreading: Creating a Thread. (K2, K3, K6)
- 4.6 Executing threads (K5)

**Unit V****(Hour 12)**

- 5.1 The Java Applet and Interface (K2)
- 5.2 HTML Interface (K2)
- 5.3 getDocumentBase() and getCodeBase() (K4)
- 5.4 Event Handling (K4, K6)
- 5.5 Working with Windows (K4)
- 5.6 AWT Classes. (K5, K6)

**Text Book**

1. Herbert Schildt (2018). The Complete Reference: Java 2, Tata McGraw Hill Publication, 10<sup>th</sup> Edition.

**Reference Books**

1. C. Muthu, “Programming with Java”, 2<sup>nd</sup> Edition, Tata McGraw Hill Publishing, 2015.
2. E.Balagurusamy, “Programming with Java: A Primer”, 4<sup>th</sup> Edition, Tata McGraw Hill Publication, 2015.

**Open Educational Resources (OER)**

1. <http://www.tutorialspoint.com/java/index.htm>
2. <http://www.geeksforgeeks.org/java-programming-basics/>
3. <http://www.youtube.com/watch?v=eIrMbaQSU34>

## SEMESTER III

### UCCSH20 – PRACTICAL -V: PROGRAMMING IN JAVA

<b>Year: II</b> <b>Sem:III</b>	<b>Course Code:</b> UCCSH20	<b>Title of the Course:</b> Practical - V: programming in Java	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Learning Objectives (CLO)

1. To introduce the object-oriented programming concepts.
2. To understand object-oriented programming concepts and apply them in solving problems.
3. To introduce the principles of inheritance and polymorphism and demonstrate how they relate to the design of abstract classes.
4. To introduce the concept of exception handling and multi-threading.
5. To introduce the design of graphical user interface using applets and AWT controls.

#### Course Outcomes (COs)

The Learners will be able to

1. Explain about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods and I/O Streams.
3. Demonstrate the concepts of Packages and Interface.
4. Evaluate the Java programs to implement error handling techniques using exception handling.
5. Design GUI based applications and develop applets for web applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	L	M	L	M	M	M
CO3	M	H	L	H	L	H
CO4	L	L	M	H	M	L
CO5	H	H	M	M	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	M
CO2	L	H	M	M	H	H
CO3	M	H	H	M	H	H
CO4	M	M	H	H	M	M
CO5	L	M	M	H	M	M

**Practical Programs****(Hour 30)**

1. Implementing String manipulation using character Array. (K1, K3, K5)
2. Implementing Input and Output Stream. (K1, K3, K5)
3. Implementing Packages and Interface. (K3, K5)
4. Implementing Exception handling. (K3, K5)
5. Implementing Real time application using multithread. (K3, K5)
6. Implementing Applet using Graphics class. (K3, K5)
7. Implementing AWT controls. (K3, K5)
8. Implementing Colors and fonts. (K3, K5)
9. To create any applications using Applets and AWT. (K5)

### SEMESTER III

#### UCCSI20 – PRACTICAL-VI: WINDOWS PROGRAMMING WITH VB.NET

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: III</b>	UCCSI20	Practical VI: Windows Programming with VB.NET	Practical	Core	4	2	40+60

#### Course Learning Objectives (CLO)

1. To understand the concepts of Windows Programming.
2. To understand VB.NET syntax, program structure, properties and modules.
3. Prepare students theoretically and practically to apply acquired knowledge and skills in producing programs in VB.NET.
4. Prepare students to create applications using GUI concepts.
5. To create simple applications.

#### Course Outcomes (COs)

The Learners will be able to

1. Explain the concepts of windows programming.
2. Create windows by using different basic elements and resources.
3. Develop real time applications using VB.NET.
4. Understand the impact of VB.NET on business.
5. Create a user interface following good GUI design guidelines.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	L	L	L	M	M	M
CO3	M	M	M	L	H	H
CO4	L	L	M	M	M	L
CO5	H	H	M	M	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	M
CO2	H	H	M	M	H	H
CO3	H	H	H	M	H	H
CO4	M	M	H	H	M	M
CO5	M	M	M	H	M	M

**Unit I**

(Hour 10)

- 1.1 Introduction about the .NET Framework. (K1,K2)
- 1.2 Visual Studio Integrated Development Environment – Introduction to VB.NET. (K1,K2)
- 1.3 VB.NET Fundamentals – Variables – Data Types. (K1,K2)
- 1.4 Arrays – Control Flow Statements. (K1,K2)
- 1.5 Function and Procedures. (K1,K2)

**Unit II**

(Hour 10)

- 2.1 Implementing OOPS in VB.NET – Classes. (K2,K6)
- 2.2 Constructors – Inheritance – Static classes. (K2,K6)
- 2.3 Interfaces - Exception Handling – Collections. (K2,K6)
- 2.4 Arrays – Array list Collection. (K2,K6)
- 2.5 Handling Characters, Strings and Dates. (K2,K6)
- 2.6 File I/O Operations. (K2,K6)

**Unit III**

(Hour 10)

- 3.1 Overview of Windows Programming. (K2)
- 3.2 Event driven programming – GUI concepts. (K2)
- 3.3 Data Types – Resources – Windows Messages. (K2)
- 3.4 Basic Drawing GDI – Device Context. (K2)
- 3.5 Dots and Lines - Creating the window – Displaying the window. (K2)
- 3.6 Text Output – Scroll Bars – Keyboard– Mouse – Menus. (K2)

**Unit IV**

(Hour 15)

1. Write a VB.NET program to accept a character from keyboard and check whether it is vowel or not. Also display the case of that character. (K1,K6)
2. Write a Vb.net program to add the elements of an array. (K1,K6)
3. Design a form and event handler for keyboard and mouse events. (K1,K6)
4. Console Application to handle exceptions. (K1,K6)

**Unit V**

(Hour 15)

5. Window Application to use various controls in VB.NET. (K1,K6)
6. Window Application to create Notepad using Menu. (K1,K6)
7. Window Application to perform file operations. (K1,K6)
8. Design Digital Clock in VB.NET. (K1,K6)

**J) Text Book**

1. Steven Holzner, “Visual Basic.Net, Black Book Series”, Dreamtech Press, 1<sup>st</sup> Edition, 2005.
2. Charles Petzold, "Programming Windows", 6<sup>th</sup> Edition, 2012, Microsoft Press.

**K) Reference Books**

1. David I. Schneider , "Introduction to Programming Using Visual Basic", University of Maryland, Pearson, 10<sup>th</sup> Edition, 2017
2. Jeffery R. Shapiro, "The Complete Reference Visual Basic .NET", Tata McGraw Hills, 1<sup>st</sup> Edition, 2002.
3. Evangelos Petroustos, Ali Bilgin, "Mastering Visual Basic. NET Database Programming", BPB Publications, 1<sup>st</sup> Edition, 2002.

**SEMESTER IV**  
**UCCSJ20 – OPERATING SYSTEM**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: IV</b>	UCCSJ20	Operating system	Theory	Core	4	4	40+60

**Course Learning Objectives (CLO)**

1. To describe basic components of operating system.
2. To understand basic principles used in the design of modern operating systems.
3. To illustrate the general architecture of computers.
4. To Understand and analyze theory.
5. To analyze, processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O.

**Course Outcomes (COs)**

The Learners will be able to

1. Acquire the Knowledge of important computer system resources and the role of operating system in their management policies and algorithms.
2. Understand the process management policies and scheduling of processes by CPU.
3. Evaluate the requirement for process synchronization and coordination handled by operating system.
4. Describe and analyze the memory management and its allocation policies.
5. Edify and evaluate the storage management policies with respect to different storage management technologies.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	M	M	M	M	M	H
<b>CO2</b>	H	L	L	M	L	M
<b>CO3</b>	M	L	L	L	H	L
<b>CO4</b>	L	L	M	H	M	L
<b>CO5</b>	H	H	M	M	L	L

**(Low -L, Medium -M, High-H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	L
CO2	L	M	M	H	L	M
CO3	M	L	H	M	M	H
CO4	M	M	L	M	L	M
CO5	M	L	H	M	H	L

(Low -L, Medium -M, High-H)

## Course Syllabus

### Unit I

(Hour 12)

- 1.1 Linux: Introduction, Brief history. Unix Components/Architecture - Features of Unix. (K1)
- 1.2 Basic Command Directory and File. (K1)
- 1.3 Command pwd, ls, cd, cp, mv, rm, mkdir, rmdir, chmod. (K1)
- 1.4 Full and Relative Pathnames, File and Directory Naming Conventions. (K1)
- 1.5 Wildcard Characters (K1)
- 1.6 Ownership and Permission: chmod, chgrp, chown. (K1)

### Unit II

(Hour 12)

- 2.1 Shell Programming Language: Naming Shell Programs. (K2)
- 2.2 Shell Variables and Arguments. (K2)
- 2.3 Command Line Arguments. (K2)
- 2.4 Looping and Conditional Execution: if..then..else..elseif..fi. (K2)
- 2.5 while...do, for..do..done, for, while, until and case statements. (K2)
- 2.6 break and continue, true and false commands. (K2)

### Unit III

(Hour 12)

- 3.1 System calls - Types of System calls (K5)
- 3.2 Process Management: Process Concepts - Inter Process Communication (K5)
- 3.3 Multithreaded Programming: Multithreading Models. (K5)
- 3.4 Process Scheduling: Basic Concepts. (K5)
- 3.5 Scheduling Criteria - Scheduling Algorithms. (K5)
- 3.6 Deadlock: Deadlock Characterization - Deadlock Avoidance. (K5)

### Unit IV

(Hour 12)

- 4.1 Memory Management: Background. (K4)
- 4.2 Swapping - Contiguous Memory Allocation. (K4)
- 4.3 Paging - Structure of the Page Table. (K4)
- 4.4 Segmentation. (K4)
- 4.5 Virtual Memory Management: Demand Paging. (K4)

#### 4.6 Page Replacement - Thrashing. (K4)

### Unit V

(Hour 12)

5.1 File System: File Concept. (K1, K2, K4)

5.2 Access methods - Directory Structure. (K1, K2, K4)

5.3 Implementing File System File System Structure and Implementation. (K1, K2, K4)

5.4 Allocation Methods. (K1, K2, K4)

5.5 Free Space Management. (K1, K2, K4)

5.6 Secondary Storage Structure Disk Structure - Disk Scheduling. (K1, K2, K4)

### J) Text Books

1. Behrouz A. Forouzan, Richard F. Gilberg.Thomson, “Unix and shell Programming”, 1<sup>st</sup> Edition, 2002.
2. Silberschatz Galvin Gagne, “Operating System Principles”, 7<sup>th</sup> Edition, Prentice Hall, 2011.

### K) Reference Books

1. Sumitabha Das, “Your UNIX the ultimate guide”, 2<sup>nd</sup> Edition, TMH, 2007.
2. Graham Glass, King Ables, “UNIX for programmers and users”, 3rd edition, Pearson Education.
3. Richard Rosinski, Douglas Host, Kenneth Rosen, Rachel Klee, “UNIX: The Complete Reference”, 2<sup>nd</sup> Edition, 2007.
4. Andrew S. Tanenbaum, “Operating Systems, Design and Implementation”, 2nd Edition, Prentice Hall of India, 2012.

### Open Educational Resources (OER)

1. [http://www.amazon.in/UNIX-Shell-Programming-Behrouz-Forouzan/dp/8131503259/ref=asc\\_df\\_8131503259/?tag=googleshopdes-21&linkCode=df0&hvadid=413541290540&hvpos=&hvnetw=g&hvrnd=10951669279431710762&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=20469&hvtargid=pla-870900476121&psc=1&ext\\_vrnc=hi](http://www.amazon.in/UNIX-Shell-Programming-Behrouz-Forouzan/dp/8131503259/ref=asc_df_8131503259/?tag=googleshopdes-21&linkCode=df0&hvadid=413541290540&hvpos=&hvnetw=g&hvrnd=10951669279431710762&hvpone=&hvptwo=&hvqmt=&hvdev=c&hvdvcmdl=&hvlocint=&hvlocphy=20469&hvtargid=pla-870900476121&psc=1&ext_vrnc=hi)
2. <http://www.amazon.in/Operating-Systems-Implementation-Prentice-Hall-Software/dp/0136374069>
3. [https://www.youtube.com/watch?v=vBURTt97EkA&list=PLBlnK6fEyqRiVhbXDGLXDk\\_OQAeuVcp2O](https://www.youtube.com/watch?v=vBURTt97EkA&list=PLBlnK6fEyqRiVhbXDGLXDk_OQAeuVcp2O)

**SEMESTER IV**  
**UCCSK20 – PRACTICAL VII: LINUX**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: IV</b>	UCCSK20	Practical VII: Linux	Practical	Core	2	2	40+60

**Course Learning Objectives (CLO)**

1. To provide the skills in Linux Shell Script.
2. To learn programmatically to implement simple OS mechanisms.
3. To understand shell script in files.
4. To learn about standard I/O and system calls.
5. To learn suspending and resuming process.

**Course Outcomes (COs)**

The Learners will be able to

1. Get familiar with the GCC compiler and files.
2. Understand the high-level structure of the Linux kernel both in concept and source code.
3. Acquire a detailed understanding of one aspect (the scheduler) of the Linux kernel.
4. Learn to develop software for Linux systems.
5. Obtain a foundation for an advanced course in operating systems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	M	M	M	M	M	H
<b>CO2</b>	L	L	L	M	H	M
<b>CO3</b>	M	M	L	L	H	L
<b>CO4</b>	L	L	M	H	M	H
<b>CO5</b>	H	M	L	H	L	L

**(Low -L, Medium -M, High-H)**

CO	PO					
	1	2	3	4	5	6
<b>CO1</b>	H	M	L	L	L	M
<b>CO2</b>	H	M	M	L	L	M
<b>CO3</b>	M	H	M	M	L	L
<b>CO4</b>	L	M	L	M	L	M
<b>CO5</b>	M	L	H	M	H	L

**(Low -L, Medium -M, High-H)**

**Practical Programs (K6)****(Hour 30)**

1. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
2. Write a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions.
3. Write a shell script to find the factorial of a given number.
4. Write a C program that makes a copy of a file using standard I/O and system calls.
5. Implement in C the following Linux commands using system call  
(a) cat (b) ls (c) mv.
6. Write a C program to list every file in a directory, its inode number and file name.
7. Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex: `ls -l | sort`.
8. Write a C program that illustrates suspending and resuming processes using signals.
9. Write a C program that implements a producer-consumer system with two processes (using semaphores).
10. Write a C program that illustrates two processes communicating using shared memory.

## SEMESTER IV

### UCCSL20 – PRACTICAL VIII: PYTHON PROGRAMMING

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: IV</b>	UCCSL20	Practical VIII: Python Programming	Practical	Core	3	2	40+60

#### Course Learning Objectives (CLO)

1. To Learn Syntax and Semantics and create Functions in Python.
2. To Handle Strings and Files in Python.
3. To Understand Lists, Dictionaries in Python.
4. To Implement Object Oriented Programming concepts in Python.
5. To Build GUI applications.

#### Course Outcomes (COs)

The Learners will be able to

1. Understand and comprehend the basics of python programming.
2. Understand and implement modular approach using Python.
3. Learn and implement various data structures provided by python library including string, list, dictionary and its operations etc.
4. Understand about files and its applications.
5. Develop real-world applications using oops, files and exception handling provided by python.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	L	L	L	M	H	L
CO3	M	L	M	H	H	L
CO4	M	L	M	H	L	H
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	L
CO2	H	M	M	L	H	M
CO3	M	H	M	M	M	L
CO4	L	H	L	M	L	L
CO5	H	L	H	M	H	L

(Low -L, Medium -M, High-H)

## **Course Syllabus**

### **Unit I**

**(Hour 9)**

- 1.1 Introduction - Numbers and Expression Large Integers – Hexadecimals and Octal. (K1)
- 1.2 Variables – Statements – Functions - Modules, List and Tuples. (K1)
- 1.3 Working with String Single - Quoted Strings and Escaping Quotes. (K1)
- 1.4 Concatenating Strings - String Representations, str and repr. (K1)
- 1.5 input vs. raw\_input - Long Strings. (K1)
- 1.6 Raw Strings, and Unicode String Operations, String Methods. (K1)

### **Unit II**

**(Hour 9)**

- 2.1 Dictionary: Dictionary Uses - Creating and Using Dictionaries. (K1)
- 2.2 The dict Function - Basic Dictionary Operations. (K1)
- 2.3 String Formatting with Dictionaries - Dictionary Methods Conditionals. (K1)
- 2.4 Loop while Loops - for Loops - Treating Over Dictionaries - Some Iteration. (K1)
- 2.5 Utilities - Breaking Out of Loops. (K1)
- 2.6 else Clauses in Loops Abstraction: Abstraction, Object Classes, and Exceptions. (K1)

### **Unit III**

**(Hour 9)**

- 3.1 Files and Staff: Opening Files - File Modes – Buffering. (K1)
- 3.2 Basic File Method Reading and Writing - Piping Output. (K1)
- 3.3 Reading and Writing Lines - Closing Files - Using the Basic File Methods. (K1)
- 3.4 Iteration over file content Doing It Byte by Byte - One Line at a Time. (K1)
- 3.5 Reading Everything - Lazy Line Iteration with fileinput - File Iterators. (K1)
- 3.6: Graphical user Interface Basic concepts. (K1)

### **Unit IV**

**(Hour 9)**

1. Write a Program to implement Calendar, Date and Time. (K6)
2. Write a Program to accept the User's first and last name and prints them in reverse order with a space between them. (K6)
3. Write a program to iterate over dictionary. (K6)
  - a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure. (K6)
  - b) Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure. (K6)
- c) Write a program combine lists that combines these lists into a dictionary. (K6)
4. Write a unique function to find all the unique elements of a list. (K6)

### **Unit V**

**(Hour 9)**

5. Write a program read first n lines of a file. (K6)
6. Write a program using class variables and instance variable and illustration of the self-variable. (K6)
  - a) Robot. b) ATM.

7. Write a program for Graphical user Interfaces. (K6)
  - a) Write a GUI for an Expression Calculator using tk.
  - b) Write a program to implement the following figures using turtle.

### **Text Book**

1. Ljubomir Perkovic, "Introduction to Computing Using Python: An Application Development Focus", John Wiley & Sons, 2012.

### **Reference Books**

1. Martin C. Brown, "Python: The Complete Reference" , McGraw Hill Education, 4<sup>th</sup> edition March 2018.
2. N. Ryan Marvin, Amo S. Omondi , "<http://www.packtpub.com/in/tech/python>
3. Magnus Lie Hetland , "Beginning Python from Novice to professional", A press Publishers, 3<sup>rd</sup> Edition, 2008.

### **Open Educational Resources (OER)**

1. <http://www.amazon.in/Introduction-Computing-Using-Python-Application/dp/0470618469>.
2. <http://www.amazon.in/Python-Complete-Reference-Martin-Brown/dp/9387572943>.
3. <http://www.packtpub.com/in/tech/python>.

## SEMESTER V

### UCCSM20 -RELATIONAL DATABASE MANAGEMENT SYSTEMS

<b>Year: III  Sem: V</b>	<b>Course Code: UCCSM20</b>	<b>Title of the Course: Relational Database Management Systems</b>	<b>Course Type: Theory</b>	<b>Course Category: Core</b>	<b>H/W  5</b>	<b>Credits  4</b>	<b>Marks  40+60</b>
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#### Course Learning Objectives (CLO)

1. The objective of this course is to expose the students to the fundamentals and basic concepts in relational Data Base Management Systems.
2. This course discusses architecture of Database Systems with concept of relational model and ER model.
3. This course explains techniques for database design, normalization and database recovery and protection.
4. To understand and apply database normalization principles.
5. To analyze the database transaction management, database recovery, security.

#### Course Outcomes (COs)

The Learners will be able to

1. Demonstrate an understanding of the elementary and advanced features of RDBMS.
2. Apply the SQL commands to create tables and Triggers, insert/update/delete data, and query data in a relational DBMS.
3. Analyze and Design a database based on a data model considering the normalization to a specified level.
4. Apply the storage size of the database and design appropriate storage techniques.
5. Analyze the requirements of transaction processing, concurrency control and avoid redundancy.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	L	L	M	H	L
CO3	M	M	H	H	H	M
CO4	M	L	M	M	M	H
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	M	M	L
CO2	H	H	H	M	M	M
CO3	H	H	H	H	H	L
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	L

(Low -L, Medium -M, High-H)

## Course Syllabus

### Unit I

(Hour 15)

- 1.1 File System vs. DBMS Database System Application View of Data Database language. (K1, K4)
- 1.2 Data Storage & Querying Data Architecture. (K3)
- 1.3 Database Users and Administrators. (K2)
- 1.4 Relational Model - Structure of Relational Databases. (K3)
- 1.5 Database Schemas -Relational Query Languages. (K4)
- 1.6 Relational Operations. (K3)

### Unit II

(Hour 15)

- 2.1 Introduction to SQL: SQL Data Definition Basic Structure. (K1, K2)
- 2.2 Additional Basic Operations - Set Operations. (K3)
- 2.3 Aggregate Functions - Null Values - Nested Sub queries. (K2, K3)
- 2.4 Modification of the Database; Intermediate SQL Join Expressions. (K6)
- 2.5 Views Transactions - Integrity Constraints SQL Data Types and Schemas. (K3, K4)
- 2.6 Advanced SQL Triggers. (K4)

### Unit III

(Hour 15)

- 3.1 Database Design and the E\_R Model: Entity Relationship Model. (K1, K6)
- 3.2 Constraints Removing - Redundant Attributes ER Diagrams - Reduction to Relational Schemas. (K3, K4)
- 3.3 ER Design Issues - Extended ER Features Alternative Notations for Modeling Data. (K6)
- 3.4 Functional Dependencies - Features of Relational designs. (K5, K6)
- 3.5 Decomposition. (K4, K5)
- 3.6 Normalization. (K4, K5)

### Unit IV

(Hour 15)

- 4.1 Storage and File Structure: Overview of Physical Storage Media. (K2, K3)
- 4.2 Magnetic disks. (K3)
- 4.3 RAID Tertiary Storage. (K3, K4)
- 4.4 File Organization - Organization of records in Files. (K6)
- 4.5 Data Dictionary. (K1, K3)

4.6 Storage Ordered Indices. (K3)

## **Unit V**

**(Hour 15)**

5.1 Distributed Database Homogeneous and Heterogeneous Databases. (K1, K3)

5.2 Distributed Data Storage - Distributed Transactions – Commit. (K3)

5.3 Protocols - Concurrency Control. (K1, K2)

5.4 Object Based Databases - Complex Data types. (K3)

5.5 Structured Types and Inheritance in SQL. (K2)

5.6 Object identity and Reference types in SQL. (K1)

## **Text Book**

1. Abraham Silberschatz, Henry F.Korth and S.Sundarshan - “Database System Concepts”, 6<sup>th</sup> Edition, McGraw Hill, 2010.

## **Reference Books**

1. R Elmasri, S.B. Navathe - “Fundamentals of Database Systems”, 7<sup>th</sup> Edition - Pearson Education, Addison Wesley, 2011.
2. C.J.Date, A. Kannan and S.Swamynathan - “An Introduction to Database System”, 8<sup>th</sup> Edition - Pearson Education, 2006.

## **Open Educational Resources (OER)**

1. [http://itbook.download/topic/database\\_system\\_concepts\\_7th\\_edition\\_Oi](http://itbook.download/topic/database_system_concepts_7th_edition_Oi)
2. <http://beginnersbook.com/2015/04/rdbms-concepts/>
3. <http://www.youtube.com/watch?v=KaIRmVD-v3U>
4. <http://www.youtube.com/watch?v=hIh5-Y1QwFw>
5. <http://www.youtube.com/watch?v=obb7SIUmKQE>
6. <http://www.youtube.com/watch?v=aUyqZxn12sY>

## SEMESTER V

### UCCSN20 .NET PROGRAMMING IN C#

<b>Year: III Sem: V</b>	<b>Course Code:</b> UCCSN20	<b>Title of the Course:</b> .NET Programming in C#	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 40+60
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#### Course Learning Objectives (CLO)

1. Understand code solutions and compile C# projects within the .NET framework.
2. Design and develop professional Console and Window based .NET application.
3. Demonstrate knowledge of object-oriented concepts design user experience and functional requirements C#.NET application.
4. Understand and implement string manipulation, events and exception handling within .NET application environment.
5. Identify and resolve problems in C#.NET window based application.

#### Course Outcomes (COs)

The Learners will be able to

1. Understand the concepts of .NET Framework and C#.
2. Apply the usage of Methods, Arrays and Strings.
3. Interpret the concepts of Constructors, Inheritance and Interfaces.
4. Analyze Operator Overloading, Delegates, Events and Exceptions.
5. Create Windows Applications and Web - based Applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	M	H	L	M	H	L
CO3	H	M	L	L	H	L
CO4	M	L	M	M	M	M
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	M	M	H	H	H	M
CO3	M	H	M	M	M	M
CO4	M	M	H	M	H	L
CO5	M	M	H	H	H	L

## **Course Syllabus**

### **Unit I**

**(Hour15)**

- 1.1 Introduction – Evolution of C# – Characteristics of C# – Applications of C#. (K2)
- 1.2 Origins of .NET Technology – .NET Framework – Common Language Runtime. (K2)
- 1.3 User and Program Interfaces – .NET Languages. (K2)
- 1.4 Benefits of the .NET Approach – Simple C# Program(K6)
- 1.5 Namespaces – Providing Interactive Input. (K2)
- 1.6 Literals, Variables and Data Types – Decision Making and Branching Statements. (K1)

### **Unit II**

**(Hour 15)**

- 1.1 Decision Making and Looping Statements – Methods in C#. (K1, K2)
- 2.2 Declaring Methods – Invoking Methods – Nesting of Methods. (K2)
- 2.3 Method Parameters-Pass by Value – Pass by Reference – Output Parameters – Method Overloading. (K2)
- 2.4 One Dimensional Arrays – Creating an Array – Two Dimensional Arrays. (K1)
- 2.5 Array List Class –Manipulating Strings – Creating Strings – String Methods. (K2,K3)
- 2.6 Inserting strings – Comparing Strings – Finding Substrings – Array of Strings. (K2,K3)

### **Unit III**

**(Hour 15)**

- 3.1 Classes and Objects – Defining a Class – Adding variables and methods. (K2).
- 3.2 Creating objects – Constructors – Member Initialization – this Reference. (K2)
- 3.3 Nesting of Classes – Indexers – Classical Inheritance – Containment Inheritance. (K1.K2)
- 3.4 Defining a subclass – Defining Subclass Constructors – Multilevel Inheritance – Hierarchical Inheritance (K1.K2)
- 3.5 Overriding Methods – Defining an interface – Implementing interfaces. (K3)
- 3.6 Interfaces and Inheritance – Explicit interface implementation. (K2)

### **Unit IV**

**(Hour 15)**

- 4.1 Need for Operator Overloading – Defining Operator Overloading. K2)
- 4.2 Overloading Binary Operators Overloading Comparison Operators – Delegate Declaration Delegate Methods. (K3)
- 4.3 Delegate Instantiation – Delegate Invocation. (K3)
- 4.4 Using Delegate - Events – Exceptions. (K3,K4)
- 4.5 Types of errors – Multiple Catch Statements – Exception Hierarchy. (K2)
- 4.6 General Catch Handler – Using Finally Statement. (K2)

### **Unit V**

**(Hour15)**

- 5.1 Creating Window Forms. (K6)
- 5.2 Customizing a Form. (K6)
- 5.3 Creating a Windows Application. (K6)
- 5.4 Running a Windows Application. (K6)

5.5 Creating Web – based Application on .NET. (K6)

5.6 Creating a .NET application to send SMS to mobile phones. (K6)

### **Text Book**

1. E. Balagurusamy, “Programming in C#”, 4<sup>th</sup> Edition, Tata McGraw Hill Education, 2017.

### **Reference Books**

1. Herbert Schildt, “Complete Reference C#”, Tata McGraw-Hill, 2010.

2. John Sharp, “Microsoft Visual C# Step by Step”, 8<sup>th</sup> Edition, PHI Publications, 2016.

3. Harsh Bhasin, “Programming in C#”, 1<sup>st</sup> Edition, Oxford University Press, 2014.

### **Open Educational Resources (OER)**

1. <https://www.youtube.com/watch?v=SXmVym6L8dw&list=PLAC325451207E3105>

2. <https://learn.microsoft.com/en-us/dotnet/csharp/>

3. <https://www.tutorialspoint.com/csharp/index.htm>

## SEMESTER V

### UCCSO20 - DATA COMMUNICATION AND NETWORKING

<b>Year: III</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: V</b>	UCCSO20	Data Communication and Networking	Theory	Core	5	4	40+60

#### Course Learning Objectives (CLO)

1. To discuss and explain about basics of data communication and networking concepts.
2. To introduce analysis and design of computer and communication networks.
3. Understand the network layered architecture and the protocol stack.
4. Design the basic configuration of routers and switches.
5. Resource sharing in the computer network to provide high Reliability.

#### Course Outcomes (COs)

The Learners will be able to

1. To gain expertise in some specific areas of networking such as the design and maintenance of individual networks.
2. Explain the types of Transmission Media with Real-Time Applications.
3. Apply Time and Frequency concept of analysis.
4. Manage Network functions for an Organization.
5. Analyze various Routing Algorithms and Protocols.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	H	M	M	H	L
CO3	M	L	L	L	M	M
CO4	M	H	M	M	M	M
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	L
CO2	H	H	H	L	L	M
CO3	M	H	H	M	M	L
CO4	H	M	L	M	M	H
CO5	H	L	L	M	H	L

## **Course Syllabus**

### **Unit I**

**(Hour14)**

- 1.1 Data Communication Data Networking and the Internet - Data Communications and Networking for Today's Enterprise. (K1, K2)
- 1.2 Communications Model - Data Communications Networks. (K1, K2)
- 1.3 The Internet Protocol Architecture - TCP/IP and Internet Based Applications the Need for a Protocol Architecture - The TCP/IP Protocol Architecture. (K1, K2)
- 1.4 The OSI Model Standardization within Protocol Architecture - Traditional Internet Based Applications. (K1, K2)
- 1.5 Multimedia Data Transmission - Concepts and Terminology. (K1, K2)
- 1.6 Analog and Digital Data Transmission -Transmission Impairments - Channel Capacity. (K1, K2)

### **Unit II**

**(Hour16)**

- 2.1 Transmission Media - Guided Transmission Media. (K2, K3)
- 2.2 Wireless Transmission - Wireless Propagation. (K2, K3)
- 2.3 Line of Sight Transmission - Signal Encoding Techniques. (K2, K3)
- 2.4 Digital Data Digital Signals - Digital Data Analog Signals – Analog Data Digital Signals – Analog Data Analog Signals. (K2, K3)
- 2.5 Digital Data Communication Techniques - Asynchronous and Synchronous Transmission. (K2, K3)
- 2.6 Types of Errors - Error Detection - Error Correction - Line Configurations. (K2, K3)

### **Unit III**

**(Hour14)**

- 3.1 Data Link Control Protocols - Flow Control Error Control. (K3, K4, K5)
- 3.2 High Level Data Link Control (HDLC) - Multiplexing. (K3, K4, K5)
- 3.3 Frequency Division Multiplexing - Synchronous Time Division Multiplexing. (K3, K4, K5)
- 3.4 Statistical Time Division Multiplexing - Asymmetric Digital Subscriber Line – xDSL. (K3, K4, K5)
- 3.5 Spread Spectrum - The Concept of Spread Spectrum - Frequency Hopping. (K3, K4, K5)
- 3.6 Spread Spectrum - Direct Sequence Spread Spectrum – Code Division Multiple Access. (K3, K4, K5)

### **Unit IV**

**(Hour16)**

- 4.1 Circuit Switching and Packet Switching - Switched Communications Networks. (K5, K6)
- 4.2 Circuit Switching Networks - Circuit Switching Concepts. (K5, K6)
- 4.3 Soft switch Architecture - Packet Switching Principles - X.25 - Frame Relay. (K5, K6)
- 4.4 Asynchronous Transfer Mode - Protocol Architecture. (K5, K6)
- 4.5 ATM Logical Connections - ATM Cells. (K5, K6)
- 4.6 Transmission of ATM Cells - ATM Service Categories. (K5, K6)

**Unit V****(Hour15)**

- 5.1 Routing in Switched Networks - Routing in Packet Switching Networks. (K4, K5, K6)
- 5.2 Example Routing in ARPANET. (K4, K5, K6)
- 5.3 Least Cost Algorithms - Congestion Control in Data Networks. (K4, K5, K6)
- 5.4 Effects of Congestion - Congestion Control – Traffic Management. (K4, K5, K6)
- 5.5 Congestion Control in Packet Switching Networks - Frame Relay Congestion Control.  
(K4, K5, K6)
- 5.6 ATM Traffic Management-ATMGFR Traffic Management. (K4, K5, K6)

**Text Book**

1. William Stallings, “Data and Computer Communications”, 8<sup>th</sup> Edition, Pearson Education, Inc., 2016.

**Reference Books**

1. Andrews S. Tanenbaum, “Computer Networks”, 4th Edition, Prentice Hall of India Private Limited, 2011
2. Leon Garcia and Widjaja, “Communication Networks, Fundamental Concepts and Key Architecture”, 2<sup>nd</sup> Edition, Tata McGraw Hill, 2001.
3. Behrouz A. Forouzan, “Data Communications and Networking”, 4<sup>th</sup> Edition, Tata McGraw Hill, 2017.

**Open Educational Resources (OER)**

1. [http://www.amazon.in/Computer-Communications-William-Stallings Books/dp/0133506487](http://www.amazon.in/Computer-Communications-William-Stallings-Books/dp/0133506487).
2. <http://theswissbay.ch/pdf/Gentoomen%20Library/Networking/Prentice%20Hall%20-%20Computer%20Networks%20Tanenbaum%204ed.pdf>
3. <https://www.youtube.com/watch?v=-HIJ4psu5aU>

## SEMESTER V

### UECSA20 - ELECTIVE - I A: SOFTWARE ENGINEERING

<b>Year:</b> <b>III</b>	<b>Course Code:</b> UECSA20	<b>Title of the Course:</b> Elective - I A:Software Engineering	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 40+60
<b>Sem: V</b>							

#### Course Learning Objectives (CLO)

1. On learning this paper students will gain the knowledge of developing software with its techniques.
2. Be successful professionals in the field with solid fundamental knowledge of software engineering.
3. Capable of team and organizational leadership in computing project settings and have a broad understanding of ethical application of computing-based solutions to societal and organizational problems.
4. Be agile software developers with a comprehensive set of skills appropriate to the needs of the dynamic global computing-based society.
5. Acquire skills and knowledge to advance their career, including continually upgrading professional, communication, analytic and technical skills.

#### Course Outcomes (COs)

The Learners will be able to

1. Apply the software engineering life cycle by demonstrating competence in communication, planning, analysis, design, construction and deployment.
2. Discuss the function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives.
3. Manage the time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals Identify and analyzes the common threats in each domain
4. Understand architectural design in order to minimize the risks and errors.
5. Test the techniques for ensuring high quality software and understand the capabilities of cost estimation.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	M	H	M	M	H	L
CO3	M	L	L	H	M	M
CO4	L	L	M	M	M	M
CO5	H	M	L	H	M	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	L
CO2	H	M	M	L	L	M
CO3	M	H	M	M	M	L
CO4	L	M	L	M	M	M
CO5	M	L	H	M	H	L

(Low -L, Medium -M, High-H)

## Course Syllabus

### Unit I

(Hour 15)

- 1.1 Introduction - Computer Based System Engineering - Emergent System Properties. (K3, K4, K5)
- 1.2 System and Their Environment - System Modeling. (K3, K4, K5)
- 1.3 System Engineering Process - System Procurement. (K3, K4, K5)
- 1.4 Software Process - Software Process Models. (K3, K4, K5)
- 1.5 Process Iteration Software Design and Implementation-Software Validation. (K3, K4, K5)
- 1.6 Software Evolution- Automated Process Support. (K3, K4, K5)

### Unit II

(Hour 15)

- 2.1 Project Management: Management Activities. (K2)
- 2.2 Project Planning. (K2)
- 2.3 Project Scheduling - Risk Management. (K2)
- 2.4 Software Requirement: Functional and Non\_Functional. (K2)
- 2.5 Functional Requirements. (K2)
- 2.6 User Requirements - System Requirements Software Requirements Documents. (K2)

### Unit III

(Hour 15)

- 3.1 Requirement Engineering Processes - Feasibility Study. (K4)
- 3.2 Requirement Elicitation and Analysis. (K4)
- 3.3 Requirement Validation - Requirements Management. (K4)
- 3.4 System Model: Context Models. (K4)
- 3.5 Behavioural Models. (K4)
- 3.6 Data Models – Object Models. (K4)

### Unit IV

(Hour15)

- 4.1 Architectural Design: Architectural Design Decisions. (K2)
- 4.2 System Organization - Modular Decomposition Styles.
- 4.3 Control Styles - User Interface Design. (K2)

4.4 Design Issues-User Interface Design Process. (K2)

4.5 User Analysis. (K2)

4.6 User Interface Prototyping. (K2)

## **Unit V**

**(Hour15)**

5.1 Software Testing: System Testing - Component Testing. (K2, K6)

5.2 Test Case Design - Test Automation. (K2, K6)

5.3 Software Cos Estimation: Productivity. (K2, K6)

5.4 Estimation Techniques. (K2, K6)

5.5 Algorithmic Cost Modelling. (K2, K6)

5.6 Project Duration and Staffing. (K2, K6)

## **Text Book**

1. Ian Sommerville, “Software Engineering”, 10<sup>th</sup> Edition, Pearson Education, 2011.

## **Reference Books**

1. Roger S. Pressman, “Software Engineering: A Practitioner’s Approach”, 7<sup>th</sup> Edition, McGraw Hill, New York, 2016.

2. Pankaj Jalote, “An Integrated Approach to Software Engineering”, 3<sup>rd</sup> Edition, Narosa Publication, 2018.

## **Open Educational Resources (OER)**

1. [http://ff.tusofia.bg/~bogi/knigi/SE/Software%20Engineering%209th%20ed%20\(intro%20txt\)%20-%20I.%20Sommerville%20\(Pearson,%202011\)%20BBS.pdf](http://ff.tusofia.bg/~bogi/knigi/SE/Software%20Engineering%209th%20ed%20(intro%20txt)%20-%20I.%20Sommerville%20(Pearson,%202011)%20BBS.pdf).

2. <http://inspirit.net.in/books/academic/Ian%20Sommerville%20Software%20Engineering,%209th%20Edition%20%20%20%202011.pdf>.

3. <http://www.amazon.in/Integrated-Approach-Software-Engineering/dp/8173197024>.

## SEMESTER V

### UECSB20- ELECTIVE I B: DATA MINING

<b>Year:</b> <b>III</b>	<b>Course Code:</b> UECSB20	<b>Title of the Course:</b> Elective I B: Data Mining	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 40+60
<b>Sem: V</b>							

#### Course Objectives

- 1.To study the methodology of engineering legacy databases for data warehouse and data mining to derive business rules for decision support systems.
- 2.To analyze the data, identify the problems, and choose the relevant models and algorithms to apply.
- 3.To develop research interest towards advances in data mining.
- 4.To impart the knowledge of how Data Mining could be used to solve scientific and social problems.
- 5.To expose to various Data Mining techniques.

#### Course Outcomes (COs)

The Learners will be able to

1. Understand Data Warehouse fundamentals and Data Mining Principles
2. Understand and implement classical algorithms in data mining and identify the application area of algorithms.
3. Compare and evaluate different data mining techniques like, prediction, clustering and association rule mining.
4. Describe complex data types with respect to spatial and web mining.
5. Analyze the temporal mining techniques to detect patterns in the e-world.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	M	M	M	H	M
CO3	M	L	M	L	M	M
CO4	L	L	M	M	M	M
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	M	M	L
CO2	M	M	M	M	M	L
CO3	H	H	H	H	H	H
CO4	H	H	H	H	M	L
CO5	M	M	M	M	M	M

(Low – L, Medium – M, High – H)

## Course Syllabus

### Unit I

(Hour 14)

- 1.1 Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery In Databases. (K1, K2)
- 1.2 Data Mining Issues – Social Implications of Data Mining. (K2)
- 1.3 Data Mining from A Database Perspective. Data Mining Technique Introduction – A Statistical Perspective on Data Mining. (K2, K3)
- 1.4 Similarity Measures. (K1, K2, K3)
- 1.5 Decision Trees. (K2, K3)
- 1.6 Neural Networks – Genetic Algorithms. (K1, K2, K3)

### Unit II

(Hour 16)

- 2.1 Classification: Introduction. (K1, K2, K3)
- 2.2 Statistical Based Algorithms. (K2, K3, K5)
- 2.3 Distance Based Algorithms. (K2, K3, K5)
- 2.4 Decision Tree Based Algorithms. (K2, K3, K5)
- 2.5 Neural Network Based Algorithms. (K2, K3, K5)
- 2.6 Rule Based Algorithms. (K2, K3, K5)

### Unit III

(Hour 15)

- 3.1 Clustering: Introduction – Similarity and Distance Measures – Outliers. (K2, K3, K5)
- 3.2 Hierarchical Algorithms – Partitional Algorithms. (K3, K4, K5)
- 3.3 Association Rule Introduction - Large Item Sets – Basic Algorithms. (K2, K3, K5)
- 3.4 Parallel and Distributed Algorithms. (K2, K3, K5)
- 3.5 Comparing Approaches – Incremental Rules. (K3, K5, K6)
- 3.6 Advanced Association Rules Techniques – Measuring the quality of Rules. (K3, K5, K6)

### Unit IV

(Hour 15)

- 4.1 Web mining: Introduction – Web content Mining Crawlers. (K2, K3)
- 4.2 Web Structure Mining. (K2, K3)
- 4.3 Web Usage Mining. (K2, K3)
- 4.4 Spatial Mining: Overview – Primitives. (K2, K3, K5)

- 4.5 Generalization and specialization. (K2, K3, K5)  
4.6 Spatial Rules- Spatial Classification Algorithm. (K2, K3, K5)

## **Unit V**

**(Hour 15)**

- 5.1 Temporal Mining: Introduction. (K2)  
5.2 Modeling temporal events. (K2, K3)  
5.3 Time series. (K2, K3, K5)  
5.4 Pattern detection. (K2, K3, K4, K5, K6)  
5.5 Sequences. (K2, K3, K5, K6)  
5.6 Temporal Associations Rules. (K2, K3, K5)

### **Text Books**

1. Margaret H. Dunham, “Data Mining: Introductory and Advanced Topics”, 1<sup>st</sup> Edition, Pearson Education 2012.
2. Jiawei Han and Micheline Kamber, “Data Mining Concepts and Techniques” - Elsevier 5<sup>th</sup> Edition, 2009.

### **Reference Books**

1. Soumendra Mohanty, “Data Warehousing DesignDevelopment and best practices”, 1<sup>st</sup> Edition, TataMcGraw Hill, 2005.
2. William H. Inmon, “Building the Datas warehousing”, 4<sup>th</sup> Edition, Wiley India.
3. Rajan Chattamvelli, “Data Mining Methods”, 2<sup>nd</sup> Edition, Narosa Publishing House Pvt. Ltd. New Delhi, 2016 .

### **Open Educational Resources (OER)**

1. <http://www.slideshare.net/akannshat/data-mining-15329899>
2. <http://myweb.sabanciuniv.edu/rdehkharghani/files/2016/02/The-Morgan-Kaufmann-Series-in-Data-Management-Systems-Jiawei-Han-Micheline-Kamber-Jian-Pei-Data-Mining.-Concepts-and-Techniques-3rd-Edition-Morgan-Kaufmann-2011.pdf>
3. [http://www.youtube.com/watch?v=f7NfO16l04U&list=PL8eNk\\_zTBST-gN6Y5E-5FZdARXjglYpyT](http://www.youtube.com/watch?v=f7NfO16l04U&list=PL8eNk_zTBST-gN6Y5E-5FZdARXjglYpyT)

## SEMESTER V

### UCCSP20 - PRACTICAL - IX: RDBMS

<b>Year:</b> <b>III</b>	<b>Course Code:</b> UCCSP20	<b>Title of the Course:</b> Practical - IX: RDBMS	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
<b>Sem: V</b>							

#### Course Learning Objectives (CLO)

1. The objective of this course is to expose the students to the fundamentals and basic concepts in relational Data Base Management Systems.
2. To analyze various aggregate functions using SQL commands.
3. To use an SQL interface of a relational DBMS package to create, populate, maintain and query a database.
4. To apply relational database theory and be able to describe relational algebra expression, tuple and domain relation expression from queries.

#### Course Outcomes (COs)

The Learners will be able to

1. Understand, Appreciate and effectively explain the underlying concepts of Database technologies. Programming PL/SQL including stored procedures, stored functions, cursors, package.
2. Attain a good practical understanding of the Oracle.
3. Design and implement a database schema for a given problem-domain.
4. Prepare various database tables and joins them using SQL commands. Analyze various aggregate functions using SQL commands.
5. Design and develop forms to select, insert, delete and update using Data Source Binding with the front end tool VB .NET.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	M	M	M	H	M
CO3	M	L	M	L	M	M
CO4	L	L	M	M	M	M
CO5	H	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	L
CO4	H	H	H	H	H	L
CO5	H	H	H	H	H	L

(Low -L, Medium -M, High-H)

### Practical Programs

(Hour 30)

1. Creating data base tables and using data types. Create table Modify table Drop table (K1, K6)
2. Practical Based on Data Manipulation Adding data with Insert Modify data with Update Deleting records with Delete. (K2, K5)
3. Practical Based on Implementing the Constraints NULL and NOT NULL Primary Key and Foreign Key Constraint Unique, Check and Default Constraint. (K1, K3)
4. Practical for Retrieving Data Using following clauses Simple select clause Accessing specific data with Where Ordered By Distinct and Group By. (K1, K3)
5. Practical Based on Aggregate Functions AVG -COUNT - MAX -MIN -SUM CUBE. (K2, K4)
6. Practical Based on implementing all String functions and Date and Time Functions, union, intersection, set difference. (K3)
7. Implement Nested Queries & JOIN operation. (K3, K6)
8. Practical Based on implementing use of triggers, cursors & procedures. (K1, K3)
9. Make Database connectivity with front end tool VB.NET and Oracle as back end and perform Insertion, Deletion and Updation for the following:
  - Staff Information System
  - Electricity Bill Processing System (K3,K5)

## SEMESTER V

### UCCSQ20- PRACTICAL X: .NET PROGRAMMING IN C#

<b>Year: III</b>	<b>Course Code:</b> UCCSQ20	<b>Title of the Course:</b> Practical X: .Net Programming in C#	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
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#### Course Learning Objectives (CLO)

1. Understand code solutions and compile C# projects within the .NET framework.
2. Design and develop professional Console and Window based .NET application.
3. Demonstrate knowledge of object-oriented concepts design user experience and functional requirements C#.NET application.
4. Understand and implement string manipulation, events and exception handling within .NET application environment.
5. Identify and resolve problems in C#.NET window based application.

#### Course Outcomes (COs)

The Learners will be able to

1. Create user interactive web pages using .NET. Understanding different types of AI Agents and its Environments.
2. Develop, implement and create applications with C#.
3. Debug, compile and run a simple application.
4. Create Mobile Application using .NET compact Framework.
5. Design and develop Web based applications on .NET.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	M	M	M	H
CO2	M	H	L	M	L	M
CO3	H	L	M	M	M	L
CO4	L	L	M	M	M	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	M	H	H	H	L
CO2	M	M	M	H	H	H
CO3	H	H	H	H	M	M
CO4	M	M	M	M	L	H
CO5	M	M	H	H	H	L

(Low -L, Medium -M, High-H)

### Practical Programs (K6)

(Hour 30)

1. Program using Decision Statements.
2. Program using Iteration Statements.
3. Program using Method Overloading.
4. Program using One Dimensional and Two-Dimensional Arrays.
5. Program using Strings.
6. Program using Classes and Objects.
7. Program using Constructors.
8. Program using Inheritance.
9. Program using Binary Operator Overloading.
10. Program using Exception Handling with Multiple Catch Statements.
11. Designing a Windows Application using Window Forms.
12. Creating a .NET application to send SMS to Mobile Phones using Web.

## SEMESTER VI

### UCCSR20-INTERNET AND WEB PROGRAMMING

<b>Year:</b> III	<b>Course Code:</b> UCCSR20	<b>Title of the Course:</b> Internet and Web Programming	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 40+60
<b>Sem:</b> VI							

#### Course Objectives

1. Enhance the programming experience with the help of tools like editors and debuggers that makes JavaScript coding easier and more interactive.
2. Understand the concepts commonly used in dynamic language programming such as higher-order functions and closures.
3. Understand the server-side programming works on the web.
4. Develop dynamic and interactive web pages using the powerful tool and server scripting language like PHP.
5. Understanding File handling concepts to connect, access, and update a MySQL database.

#### Course Outcomes (COs)

The Learners will be able to

1. Acquire the basic concept of JavaScript.
2. Use operators, variables, arrays, control structures, functions and objects in JavaScript.
3. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
4. Design a responsive web site using HTML, PHP, MySQL and Apache.
5. Build dynamic web pages using JavaScript (Client Side Programming) and apply their knowledge to create interactive websites.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	H
CO2	M	M	M	L	M	L
CO3	M	L	M	M	M	L
CO4	L	L	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	H
CO2	M	L	L	L	H	L
CO3	H	H	H	H	H	L
CO4	L	H	H	H	M	M
CO5	L	M	M	L	M	L

(Low -L, Medium -M, High-H)

## Course Syllabus

### Unit I

(Hour 15)

- 1.1 JavaScript: Introduction - Values - Numbers - Strings - Unary Operators. (K1, K2)
- 1.2 Boolean Values - Empty Values - Automatic Type Conversion. (K2)
- 1.3 Program Structure: Expressions and Statements- Bindings - Binding Names - The Environment. (K2, K3)
- 1.4 Functions - The Console Log Function - Return Values - Control Flow - Conditional Execution - While and Do Loops. (K2, K3)
- 1.5 Indenting Code - For Loops - Breaking out of a Loop - Updating Bindings Succinctly. (K2, K3)
- 1.6 Dispatching on a Value with Switch – Capitalization – Comments. (K3)

### Unit II

(Hour 15)

- 2.1 Functions - Bindings and Scopes - Functions as Values. (K2)
- 2.2 Declaration Notation - Arrow Functions - The Call Stack. (K3)
- 2.3 Optional Arguments - Closure – Recursion - Growing Functions. (K3, K4)
- 2.4 Data Structure Objects and Array - The Were Squirrel - Data Sets – Properties – Methods Objects. (K3, K4)
- 2.5 Mutability - The Lycanthrope’s Log - Computing Correlation - Array Loops - The Final Analysis - Further Arrayology - Strings and their Properties. (K5)
- 2.6 Rest Parameters - The Math Object - Destructuring – JSON. (K2, K3, K4)

### Unit III

(Hour 15)

- 3.1 PHP Programming: Web Server – Apache - PHP Introduction - PHP Install - PHP Syntax - PHP Variables. (K1, K2)
- 3.2 PHP Echo / Print - PHP Data Types - PHP Strings - PHP Constants - PHP Operators. (K1, K2)
- 3.3 Control Structures - PHP Functions - Directory Functions - File System Functions. (K2, K3)

3.4 PHP Arrays - PHP Sorting Arrays - PHP Super Global. (K3, K4)

3.5 String Functions - Date and Time Functions. (K4)

3.6 Mathematical Functions - Miscellaneous Functions. (K3, K4)

#### **Unit IV**

**(Hour 15)**

4.1 Basic Form Processing (GET And POST Method) - PHP Form Handling. (K1, K2)

4.2 PHP Form Validation - PHP Form Required- URL - E-Mail. (K1, K2)

4.3 PHP Form Complete PHP MYSQL Functions -Connect- Create DB. (K4, K6)

4.4 Create Table- Insert Data - Get Last ID - Insert Multiple. (K3, K4, K5)

4.5 Prepared-Select Data - Delete Data - Update Data - Limit Data. (K3, K4, K5)

4.6 Table Join - Database Driven Application. (K3, K4)

#### **Unit V**

**(Hour 15)**

5.1 PHP Arrays Multi-PHP Date and Time - PHP Include. (K2, K3)

5.2 PHP File Handling- PHP File Open/Read. (K3)

5.3 PHP File Create/Write - PHP File Upload-PHP Cookies. (K4, K5)

5.4 PHP Sessions-PHP Filters - PHP Filters Advanced. (K4)

5.5 PHP Error Handling - PHP Exception. (K4, K5)

5.6 COM-DOM-CURL-SOAP. (K5, K6)

#### **Text Books**

1. MarijiHaverbeke, “Eloquent Javascript, A Modern Introduction to Programming”, 3<sup>rd</sup> Edition, Published by No Starch Press, 2018.
2. Julie C Meloni, Sams “Teach yourself PHP, MySQL and Apache”, 6<sup>th</sup> edition, Sams Publishing, 2012.

#### **Reference Books**

1. Phil Ballard , JavaScript in 24 Hours, 6<sup>th</sup> Edition, Sams Teach Yourself, 2015.
2. Ed LeckyThompson Steven D. Nowicki Thomas Myer, “Professional PHP6”, Wrox Press, Paperback Edition, 2011.

#### **Open Educational Resources (OER)**

1. [http://www.google.com/url?sa=t&source=web&rct=j&url=http://eloquentjavascript.net/Eloquent\\_JavaScript.pdf&ved=2ahUKEwjEhbu95qnrAhVo8XMBHb4VBXEQFjAQegQIDBAB&usg=AOvVaw1\\_3Ap2aatDU0qxPmbiCRbI&cshid=1598184133112](http://www.google.com/url?sa=t&source=web&rct=j&url=http://eloquentjavascript.net/Eloquent_JavaScript.pdf&ved=2ahUKEwjEhbu95qnrAhVo8XMBHb4VBXEQFjAQegQIDBAB&usg=AOvVaw1_3Ap2aatDU0qxPmbiCRbI&cshid=1598184133112)
2. <http://youtu.be/W6NZfCO5SIk>
3. [http://youtu.be/ZK2UXI9\\_f54](http://youtu.be/ZK2UXI9_f54)
4. <http://youtu.be/5QHBj4brHNM>

**SEMESTER VI**  
**UCCSS20 CLOUD COMPUTING**

<b>Year:</b> <b>III</b>	<b>Course Code:</b> UCCSS20	<b>Title of the Course:</b> Cloud Computing	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 40+60
<b>Sem:</b> <b>VI</b>							

**Course Learning Objectives (CLO)**

1. Discuss the fundamental concepts in cloud computing technologies.
2. Understand the various technologies.
3. Explain the architecture and concept of different cloud model IaaS, PaaS, SaaS
4. Analyze the fundamental and Cloud Deployment Models Course Outcomes.
5. Understand the concepts of Challenges in Cloud security.

**Course Outcomes (COs)**

The Learners will be able to

1. Understand the fundamental concepts in cloud computing technologies.
2. Analyze and integrate the cloud enabling services.
3. Analyze the architecture and concept of different cloud model IaaS, PaaS, SaaS.
4. Understand and familiar with the deployment models.
5. Comprehend the Cloud Data Security concepts and how they are addressed with the security mechanisms.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	M	H	M	M	M	H
<b>CO2</b>	M	M	H	L	M	L
<b>CO3</b>	M	L	M	L	L	H
<b>CO4</b>	L	M	M	M	L	M
<b>CO5</b>	L	M	L	H	L	L

**(Low -L, Medium -M, High-H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	M	H	H	H	H	M
CO3	L	H	M	H	H	M
CO4	H	L	L	M	L	L
CO5	M	H	H	H	H	L

(Low -L, Medium -M, High-H)

## Course Syllabus

### Unit I

(Hour15)

- 1.1 Introduction to Cloud Computing: Cloud Computing in Nutt shell. (K2, K4)
- 1.2 Roots of Cloud Computing- Types of Clouds. (K4, K6)
- 1.3 Features of a Cloud. (K5)
- 1.4 Cloud Infrastructure Management. (K4, K6)
- 1.5 Challenges and Risks. (K4, K6)
- 1.6 Migrating in to a Cloud. (K4)

### Unit II

(Hour 15)

- 2.1 Integration as a Service-Introduction. (K2)
- 2.2 Onset of Knowledge Era- Evolution of SaaS. (K4, K5)
- 2.3 Challenges. (K4, K5)
- 2.4 Approaching the SaaS Integration- New Integration Scenarios. (K4)
- 2.5 Integration Methodologies-SaaS Integration Services. (K4, K5)
- 2.6 B2B Services. (K4, K6)

### Unit III

(Hour 15)

- 3.1 Cloud Service Model Infrastructure as a Service (IaaS): Introduction to IaaS, Resource Virtualization. (K2, K4)
- 3.2 Server, Storage, Network. (K2, K4)
- 3.3 Case studies. (K4, K5, K6)
- 3.4 Platform as a Service (PaaS): Introduction to PaaS. (K2, K4)
- 3.5 Cloud platform and Management, Computation, (K3, K4)
- 3.6 Storage. (K5)

### Unit IV

(Hour 15)

- 4.1 Cloud Deployment Model Introduction. (K2)
- 4.2 Public Deployment Model. (K2, K4, K5)
- 4.3 Private Deployment Model. (K2, K4, K5)
- 4.4 Virtual Private Deployment Model. (K4, K5)

4.5 Hybrid Deployment Model. (K4, K5)

4.6 Community Deployment Model. (K4, K5)

## **Unit V**

**(Hour 15)**

5.1 Cloud Challenge. (K2, K4)

5.2 Organizational Readiness. (K2, K4)

5.3 Change management in cloud. (K2, K4)

5.4 Data Security in the Cloud. (K4, K5)

5.5 Legal Issues in Cloud Computing. (K4)

5.6 Production - Readiness for Cloud Services. (K4, K5)

### **Text Book**

1. Rajkumar Buyya, James Broberg and AndrzejM.goscinski, “Cloud Computing: Principles and Paradigms”, John Wiley & Sons, 2010.

### **Reference Books**

1. Antony T.Ve1te, Toby J.Velte, Robert Elsen Peter, “Cloud Computing: A Practical Approach”, Tata McGraw- Hill Pub, 2010.
2. Haley beard, “Cloud Computing best practices for managing and measuring processes for on-demand computing, applications and Data centers in the cloud with SLAs”, Emereo Pvt.Limited,2009.

### **Open Educational Resources (OER)**

1. <http://www.mb.net/resources/cloud-computing-resources.aspx>.
2. <http://www.mastertheboss.com/cloud-computing/in-the-cloud-computing-a-beginners-tutorial>.
3. [http://www.tutorialspoint.com/cloud\\_computing/cloud\\_computing\\_tutorial.pdf](http://www.tutorialspoint.com/cloud_computing/cloud_computing_tutorial.pdf).

**SEMESTER VI**  
**UECSC20 –ELECTIVE II A: SOFTWARE TESTING**

<b>Year:</b> III	<b>Course Code:</b> UECSC20	<b>Title of the Course:</b> Elective – II A: Software Testing	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 40+60
<b>Sem:</b> VI							

**Course Learning Objectives (CLO)**

1. Define the characteristics of testing and software development life cycle models.
2. Recognize the facts of software development models to adopt with product characteristics.
3. Understand different types of testing, their objectives and challenges.
4. Interpret the software products to execute and report test cases.
5. Apply software testing methods and to perform various types of testing in a software project.

**Course Outcomes (COs)**

The Learners will be able to

1. Test various processes and continue quality improvement.
2. Verify types of errors and fault models.
3. Analyze methods of test generation from requirements.
4. Input space modeling using combinatorial designs.
5. Test adequacy assessment using control flow, data flow and program mutations.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	L	H	M	L	M	L
CO2	M	L	L	L	M	L
CO3	M	L	M	L	L	H
CO4	L	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	H	L
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	L
CO5	H	H	M	H	M	H

(Low -L, Medium -M, High-H)

## **Course Syllabus**

### **Unit I**

**(Hours 15)**

- 1.1 A Perspective on Testing - Basic Definitions. (K1)
- 1.2 Test Cases- Insights from a Venn Diagram. (K1, K2)
- 1.3 Identifying Test Cases – Specification - Based Testing - Code-Based Testing. (K2)
- 1.4 Fault Taxonomies- Levels of Testing – Examples - Generalized Pseudocode. (K1, K2, K3)
- 1.5 The Triangle Problem - Problem Statement- Discussion. (K2, K4)
- 1.6 Traditional Implementation - Structured Implementations. (K2)

### **Unit II**

**(Hours 15)**

- 2.1 Role of Testing - Verification and Validation. (K1, K2)
- 2.2 Failure, Error, Fault, and Defect -Notion of Software Reliability. (K2, K3)
- 2.3 Objectives of Testing - What Is a Test Case? (K2)
- 2.4 Expected Outcome - Concept of Complete Testing. (K1,K2)
- 2.5 Central Issue in Testing - Testing Activities. (K2, K4)
- 2.6 Test Levels - Sources of Information for Test Case Selection. (K1, K2, K3)

### **Unit III**

**(Hours 15)**

- 3.1 White-Box and Black-Box Testing - Test Planning and Design. (K1, K2)
- 3.2 Monitoring and Measuring Test Execution - Test Tools and Automation- Test Team Organization and Management. (K2, K3)
- 3.3 Unit Testing- Concept of Unit Testing - Static Unit Testing- Defect Prevention - Dynamic Unit Testing. (K1, K2)
- 3.4 Debugging- Tools for Unit Testing - Control Flow Testing. (K4, K5)
- 3.5 Basic Idea- Outline of Control Flow Testing - Control Flow Graph- Paths in a Control Flow Graph. (K2, K3)
- 3.6 Life Cycle Based Testing - Traditional Waterfall Testing- Waterfall Testing - Pros and Cons of the Waterfall Model. (K2, K6)

### **Unit IV**

**(Hours 15)**

- 4.1 Integration Testing – Decomposition-Based Integration - Top–Down Integration - Bottom–Up Integration - Sandwich Integration - Pros and Cons. (K2,K4)
- 4.2 Data flow testing -System integration testing - Functional testing - Acceptance testing - Domain testing - Exploratory testing. (K4)
- 4.3 System Test Planning and Automation - Structure of a System Test Plan - Introduction and Feature Description. (K4)
- 4.4 Assumptions - Test Approach - Test Suite Structure - Test Environment - System Test Execution- Basic Ideas - Modeling Defects. (K4,K6)
- 4.5 Preparedness to Start System Testing - Metrics for Tracking System Test - Metrics for Monitoring Test Execution. (K6)
- 4.6 Test Execution Metric Examples - Metrics for Monitoring Defect Reports - Defect Report Metric Examples. (K4,K5)

## **Unit V**

**(Hours 15)**

- 5.1 Software Reliability - What Is Reliability?(K1,K2)
- 5.2 Definitions of Software Reliability - Factors Influencing Software Reliability. (K2)
- 5.3 Applications of Software Reliability - Test Team Organization - Test Groups. (K1,K2)
- 5.4 Software Quality Assurance Group - System Test Team Hierarchy- Effective Staffing of Test Engineers. (K1,K2)
- 5.5 Recruiting Test Engineers - Retaining Test Engineers - Team Building. (K2,K4)
- 5.6 Software Testing Excellence – Craftsmanship - Best Practices of Software Testing. (K2,K5,K6)

### **Text Book**

1. Kshirasagar Naik, Priyadarshi Tripathy, "Quality Assurance Theory and Practice" John Wiley & Sons, Inc., Publication, 2008.
2. Paul C.Jorgensen, "Software Testing A Craftsman's Approach" CRC Press, 2014.

### **Reference Books**

1. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing Principles and Practice", Dorling Kindersley (India), 2008, ISBN 9788177581218, 817758121X
2. Nageshwar Rao Pusuluri, "Software Testing Concepts And Tools", Dreamtech Publishers, 2008.

### **Open Educational Resources (OER)**

1. <https://www.javatpoint.com/software-testing-tutorial>
2. [https://en.wikipedia.org/wiki/Software\\_testing](https://en.wikipedia.org/wiki/Software_testing)
3. <https://www.youtube.com/watch?v=sO8eGL6SFsA>

**SEMESTER VI**  
**UECSD20 - ELECTIVE – II B: DATA SCIENCE**

<b>Year:</b> III	<b>Course Code:</b> UECSD20	<b>Title of the Course:</b> Elective – II B: Data Science	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 40+60
<b>Sem:</b> VI							

**Course Learning Objectives (CLO)**

1. Understand the key concepts of data science and its applications.
2. Gain in-depth knowledge on data collection and management techniques.
3. Implement simple applications and analyze the results using relevant tools.
4. Apply the relevant techniques for implementing simple applications.
5. Critically evaluate data visualization based on their design and use for communication from data.

**Course Outcomes (COs)**

The Learners will be able to

1. Understand the key concepts in data science, its applications and the toolkit used by data scientists.
2. Explain how data is collected, managed and stored for data science.
3. Implement data collection and management.
4. Use visualization tools for data visualization.
5. Possess the required knowledge and expertise to become a proficient data scientist.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	M	L	M	L
CO2	M	L	M	M	M	M
CO3	M	M	M	L	M	H
CO4	H	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	L
CO2	H	M	M	H	H	M
CO3	H	H	M	M	M	M
CO4	H	H	M	L	L	L
CO5	H	H	H	H	M	M

## **Course Syllabus**

### **Unit I**

**(Hour 15)**

- 1.1 Basics of Data Science: Properties of Data. (K2, K3)
- 1.2 Structured Data - Unstructured Data. (K2)
- 1.3 Quantitative Data – Categorical Data. (K2)
- 1.4 Big Data – Little Data. (K2)
- 1.5 Data Visualization. (K2, K3)
- 1.6 Tool Boxes for Data Scientists. (K2, K3)

### **Unit II**

**(Hour 15)**

- 2.1 Introduction to core concepts and technologieIntroduction. (K2)
- 2.2 Terminology. (K2)
- 2.3 Data science process. (K2)
- 2.4 Data Science toolkits. (K2, K3)
- 2.5 Types of data. (K2)
- 2.6 Example applications. (K2)

### **Unit III**

**(Hour 15)**

- 3.1 Data collection and management: Introduction. (K2)
- 3.2 Sources of data. (K2)
- 3.3 Data collection and APIs. (K2)
- 3.4 Exploring and fixing data. (K2, K4)
- 3.5 Data storage and management. (K2)
- 3.6 Using multiple data sources. (K2)

### **Unit IV**

**(Hour 15)**

- 4.1 Data visualization: Introduction - Types of data visualization. (K2)
- 4.2 Data for visualization: Data types. (K2)
- 4.3 Data encodings. (K2, K3)
- 4.4 Retinal variables. (K2, K3)
- 4.5 Mapping variables to encodings. (K2)
- 4.6 Visual encodings. (K2)

### **Unit V**

**(Hour 15)**

- 5.1 Recent Technologies. (K2)
- 5.2 Recent trends in various data collection. (K2)
- 5.3 Recent trends in analysis techniques. (K2)
- 5.4 Various visualization techniques. (K2, K5)
- 5.5 Application development methods used in data science. (K2, K5)

### Text Books

1. Laura Igual, SantiSeguí, “Introduction to Data Science: A Python Approach to Concepts, Techniques and Applications”, 1<sup>st</sup> Edition, 2017, Springer, ISBN 978-3-319-50016-4e-ISBN 978-3-319-50017-1.
2. Davy Cielen. Arno D.B Meysman, Mohamed Ali, “Introducing Data Science”, Dreamtech Press, 2016. ISBN: 978-93-5119-937-3

### Reference Books

1. Cathy O’Neil and Rachel Schutt, Doing Data Science, Straight Talk from the Frontline.O’Reilly, 2014. ISBN: 978-1-449-35865-5.
2. Joel Grus, Data Science from Scratch, O’Reilly, 2015, ISBN: 978-1-491-90142-7
3. John W. Foreman, Using Data Science to Transform Information into Insight – Data Smart, Wiley, 2014. ISBN: 978-81-265-4614-5.

### Open Educational Resources (OER)

1. [https://en.wikipedia.org/wiki/Data\\_science](https://en.wikipedia.org/wiki/Data_science)
2. <https://www.coursera.org/browse/data-science>
3. <https://www.youtube.com/watch?v=jtn-hRJjl68>

## SEMESTER VI

### UECSE20- ELECTIVE – III A: ARTIFICIAL INTELLIGENCE

Year:	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
III	UECSE20	Elective – III	Theory	Elective	5	5	40+60
Sem:		A: Artificial Intelligence					
VI							

### Course Learning Objectives (CLO)

1. Gain a historical perspective of AI and its foundations.
2. Become familiar with basic principles of AI toward problem solving inference, perception, knowledge representation, and learning.
3. Investigate applications of AI techniques in intelligent agents, expert systems, artificial neural networks and other machine learning models.
4. To understand the concept of learning techniques.
5. To know about Context Free Grammars.

## Course Outcomes (COs)

The Learners will be able to

1. Understand different types of AI Agents and its Environments.
2. Know Various AI Search Algorithms (uninformed, informed, heuristic search).
3. Understand the fundamentals of Knowledge representation (logic based, frame based).
4. Understand the different types of Learning.
5. Ability to apply knowledge representation, reasoning, and machine learning Techniques.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	L	M	L
CO2	M	L	M	L	L	M
CO3	M	L	L	L	M	L
CO4	H	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	L
CO2	H	M	M	H	H	M
CO3	H	H	M	M	M	M
CO4	H	H	M	L	L	L
CO5	H	H	H	H	M	M

(Low -L, Medium -M, High-H)

## Course Syllabus

### Unit I

(Hour 15)

- 1.1 Artificial Intelligence – Introduction - Foundation of Artificial Intelligence. (K2)
- 1.2 History of Artificial Intelligence - Intelligent Agents - Agents and Environment. (K1)
- 1.3 Good Behavior - The Concept of Rationality - Performance Measures- Rationality. (K1,K4)
- 1.4 Problem Solving- Solving Problem by searching - Problem Solve Agents. (K5)
- 1.5 Well Defined Problems and Solutions - Formulating Problems. (K5)
- 1.6 Uniformed Search Strategies - Breadth First Search - Depth First Search. (K3, K4)

**Unit II****(Hour 15)**

- 2.1 Informed Search - Greedy Best First Search - A\* Search Minimizing the total estimated Solution Cost. (K3, K4)
- 2.2 Hill Climbing Search - Genetic Algorithm. (K3, K4)
- 2.3 Local Search in Continuous space - Online Search Agents and Unknown environments - Online Search problems - Online Search Agents. (K5, K6)
- 2.4 Online Local Search - Learning in Online Search. (K6)
- 2.5 Constraint Satisfaction Problems - Backtracking Search for CSPs. (K4, K5)
- 2.6 Backtracking and Local Search (K5, K6)

**Unit III****(Hour 15)**

- 3.1 Logical Agents - Knowledge Based Agents. (K2, K3)
- 3.2 Logic - Propositional Logic, a very simple logic. (K3)
- 3.3 Reasoning Pattern in Propositional Logic - Resolution Forward and Backward Chaining. (K2)
- 3.4 Syntax and Semantics of First order Logic - Models for First Order Logic. (K3)
- 3.5 Symbol and Interpretations - Terms. (K2)
- 3.6 First Order Logic - Assertions and queries in First order Logic. (K3)

**Unit IV****(Hour 15)**

- 4.1 Learning from Observations - Forms of Learning. (K2)
- 4.2 Inductive Learning - Knowledge in Learning- A logical Formulation of Learning. (K1, K2)
- 4.3 Examples and hypotheses - Current best hypothesis search. (K3)
- 4.4 Least Commitment Search - Explanation Based Learning - Extracting General rules from Examples. (K2)
- 4.5 Improving Efficiency - Learning using Relevance Information. (K2)
- 4.6 Inductive Logic Programming - An Example Top down inductive Learning Methods - Inductive learning with inverse deduction. (K1, K2)

**Unit V****(Hour 15)**

- 5.1 Communication – Communication as Action- Fundamentals of Language. (K2)
- 5.2 Formal Grammar for a Fragment of English - Lexicon of  $\epsilon_0$ - Grammar of  $\epsilon_0$ . (K3)
- 5.3 Syntactic Analysis Parsing - Efficient Parsing. (K3, K4)
- 5.4 Augmented Grammars - Semantic Interpretation. (K4)
- 5.5 The semantics of a English Fragment - Time and Tense - Quantification- Pragmatic Interpretation. (K5)
- 5.6 Languages and generation with DCG'S - Ambiguity and Disambiguation. (K5)

**Text Book**

1. Stuart Russel Peter Norvig, “Artificial Intelligence- A Modern Approach” 2<sup>nd</sup> Edition Pearson Education/ Prentice Hall of India 2010.

**Reference Books**

1. Nils J.Nilsson,” Artificial Intelligence: A new Synthesis”, 1<sup>st</sup> Edition, Harcourt Asia Pvt. Ltd., 1998.
2. Elaine Rich and Kevin Knight, “Artificial Intelligence”, 3<sup>rd</sup> Edition, Tata McGraw Hill, 2017.
3. George F.Luger “Artificial Intelligence Structures and Strategies for Complex Problem solving”, 3<sup>rd</sup> Edition, Pearson Education/PHI 1997.

**Open Educational Resources (OER)**

1. <https://www.techtarget.com/searchenterpriseai/definition/AI-Artificial-Intelligence>
2. <https://github.com/touretzkyds/ai4k12/wiki/Book%3A-Artificial-Intelligence%3A-A-Modern-Approach>
3. <https://github.com/touretzkyds/ai4k12/wiki/Book%3A-Artificial-Intelligence%3A-A-Guide-For-Thinking-Humans>
4. <https://github.com/touretzkyds/ai4k12/wiki/Book%3A-The-Future-Computed%3A-Artificial-Intelligence-and-Its-Role-in-Society>

**SEMESTER VI**  
**UECSF20 - ELECTIVE III B: COMPUTER GRAPHICS**

<b>Year:</b> <b>III</b>	<b>Course Code:</b> UECSF20	<b>Title of the Course:</b> Elective III B: Computer Graphics	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 40+60
<b>Sem:</b> <b>VI</b>							

**Course Learning Objectives (CLO)**

1. Understand two dimensional graphics and their transformations.
2. Gain knowledge about graphics hardware devices and software used.
3. Understand three dimensional graphics and their transformations and to become familiar with clipping techniques.
4. Extract scene with different clipping methods and its transformation to graphics display device.
5. Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.

**Course Outcomes (COs)**

The Learners will be able to

1. Understand the basics of computer graphics, different graphics systems and applications of computer graphics.
2. Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.
3. Use of geometric transformations on graphics objects and their application in composite form.
4. Apply clipping methods and its transformation to graphics display device.
5. Use suitable projections and visible surface detection techniques for display of 3D scene on 2D screen.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	L	H	M	L	M	L
<b>CO2</b>	M	M	M	L	M	L
<b>CO3</b>	L	L	M	M	M	L
<b>CO4</b>	H	M	M	M	L	M
<b>CO5</b>	L	M	L	H	L	L

**(Low -L, Medium -M, High-H)**

CO	PO					
	1	2	3	4	5	6
CO1	M	H	M	L	M	M
CO2	H	H	L	L	L	L
CO3	M	H	H	L	L	H
CO4	M	H	H	H	M	H
CO5	M	H	M	H	M	M

(Low -L, Medium -M, High-H)

## Course Syllabus

### Unit I

(14 Hours)

- 1.1 Overview of graphics System Video Display Device. (K1)
- 1.2 Refresh Cathode-Ray tubes. (K1)
- 1.3 Raster - Scan Displays. (K1, K3)
- 1.4 Random - Scan Displays. (K1, K3)
- 1.5 Color CRT Monitors -Direct view Storage tubes Flat - Panel Displays. (K1, K3)
- 1.6 Three - Dimensional Viewing Devices - Stereoscopic and Virtual - Reality Systems. (K1, K2)

### Unit II

(16 Hours)

- 2.1 Raster - Scan Systems Video Controller. (K1, K3)
- 2.2 Random Scan Systems Video Controller. (K1, K3)
- 2.3 Random-Scan Systems. (K1, K3)
- 2.4 Input device - Keyboard Mouse - Trackball and Space ball-Joysticks - Data Glove – Digitizers - Image Scanners - Touch Panels - Light pens. Voice Systems – Hard – Copy Devices. (K1)
- 2.5 Line Drawing Algorithms DDA Algorithms. (K1, K3, K5)
- 2.6 Circle generating Algorithm Properties of Ellipses. (K1, K3, K5)

### Unit III

(14 Hours)

- 3.1 Two Dimensional Geometric Transformation: Basic Transformations – Translation. (K1, K2, K3)
- 3.2 Rotation. (K1, K2, K3)
- 3.3 Scaling. (K1, K2, K3)
- 3.4 Matrix Representations and Homogeneous Coordinates. (K1, K3)
- 3.5 Other Transformations Reflections. (K1, K2, K3)
- 3.6 Two Dimensional Viewing. (K1)

**Unit IV****(16 Hours)**

- 4.1 Three Dimensional Concept Three Dimensional Display method. (K1)
- 4.2 Parallel projection - Depth cueing visible line and surface. (K1, K3)
- 4.3 Three Dimensional Geometric and modeling Transformation Translation - Rotation – Scaling. (K1, K2, K3)
- 4.4 Composite Transformations. (K1, K3)
- 4.5 Three Dimensional Viewing: Viewing pipeline - Viewing Coordinates. (K1, K3)
- 4.6 Projections - Parallel Projections - Perspective Projections. (K2, K3)

**Unit V****(15 Hours)**

- 5.1 Windows to view point coordinate Transformations. (K1, K2)
- 5.2 Clipping Operations - Point Clipping - Line Clipping - Curve Clipping - Text Clipping - Exterior Clipping. (K1, K3)
- 5.3 Visible Surface Detection Method Classification Visible Surface Detection Algorithms. (K1, K2)
- 5.4 Back Face Detection. (K1, K2)
- 5.5 Depth - Buffer Method - A-Buffer Method. (K1, K2)
- 5.6 Scan line method. (K1, K3)

**Text Books**

1. Donald Hearn, M. Pauline Baker, “Computer Graphics”, 2<sup>nd</sup> Edition, Prentice Hall of India Publication, 2011.
2. Donald Hearn, M. Pauline Baker Warren Carithers, “Computer Graphics with Open GL”, 4<sup>th</sup> Edition, Pearson Publication, 2014.

**Reference Books**

1. Apurva A. Desai - “Computer Graphics”, 1<sup>st</sup> Edition, Prentice Hall of India Publication, 2008.
2. ISRD Group - “Computer Graphics”, 2<sup>nd</sup> Edition, McGraw Hill Book Company, 2008.

**Open Educational Resources (OER)**

1. <http://archive.org/details/DonaldHearnM.PaulineBakerComputerGraphicsBookFi.org/page/n7/mode/2up>
2. [http://www.academia.edu/5750589/Computer\\_Graphics\\_C\\_Version\\_by\\_Donald\\_Hearn\\_and\\_M\\_Pauline\\_Baker\\_II\\_Edition](http://www.academia.edu/5750589/Computer_Graphics_C_Version_by_Donald_Hearn_and_M_Pauline_Baker_II_Edition)
3. [http://www.youtube.com/watch?v=xIFc0HFh\\_Wg](http://www.youtube.com/watch?v=xIFc0HFh_Wg)
4. [http://www.youtube.com/watch?v=sHsmE\\_5HPDY](http://www.youtube.com/watch?v=sHsmE_5HPDY)
5. <http://www.youtube.com/watch?v=jQvRA-GiwwA>

## SEMESTER VI

### UCCST20 - PRACTICAL XI: INTERNET AND WEB PROGRAMMING

<b>Year:</b> III	<b>Course Code:</b> UCCST20	<b>Title of the Course:</b> Practical XI: Internet and Web Programming	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
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#### Course Learning Objectives (CLO)

1. Comprehend the usage of PHP and JavaScript in dynamic web development.
2. Understand PHP language data types, logic controls, built-in and user-defined functions.
3. Describe Object oriented programming paradigm in PHP.
4. Understand user validation techniques and cookies.
5. Build a simple, yet functional web application using PHP/MySQL.

#### Course Outcomes (COs)

The Learners will be able to

1. Know variable naming rules and JavaScript data types.
2. Use operators, variables, arrays, control structures, functions and objects in JavaScript.
3. Demonstrate objects and arrays usage.
4. Create PHP programs that use various PHP library functions, and that manipulate files and directories.
5. Validate user input and create cookies in PHP.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	L
CO2	M	M	L	L	M	L
CO3	L	M	M	M	M	L
CO4	M	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	L
CO2	H	H	H	M	M	M
CO3	M	M	M	H	H	H
CO4	H	H	H	H	M	H
CO5	M	M	M	L	L	L

**Practical Programs (K6)****(Hour 30)**

1. Implement factorial of a number in JavaScript. (K2, K3)
2. Animation in JavaScript. (K3, K4)
3. Addition and Multiplication of two numbers in JavaScript. (K1, K2)
4. Convert the first letter of each word of the string to Uppercase in JavaScript. (K1, K2)
5. Implementing Arrays in JavaScript. (K4, K5)
6. Implementing Control Statements and Looping in PHP. (K3, K4)
7. Implementing Functions in PHP. (K4, K5)
8. Implementing Form Processing (GET & POST) in PHP. (K5, K6)
9. Implementing Validation in PHP. (K4)
10. Implementing Cookies in PHP. (K3, K4, K5)

## SEMESTER VI

### UCCSU20 - PRACTICAL XII: PROJECT WORK

Year: III	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: VI	UCCSU20	Practical XII: Project Work	Practical	Core	2	2	40+60

#### Course Learning Objectives (CLO)

1. Acquire practical knowledge on the implementation of the programming concepts learnt.
2. Motivate the Students to work in emerging/latest technologies.
3. Help the students to develop ability, to apply theoretical and practical tools/techniques.
4. To solve real life problems related to industry, academic institutions and research laboratories.
5. Help the students to gain Self-confidence.

#### GUIDELINES FOR PROJECT WORK

- Each student should carry out individually one project work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea focusing on application oriented concepts.
- The project work should be compulsorily done in the college only under the supervision of the department staff concerned.
- The project is of 3 hours/week for one (semester VI) semester duration and a student is expected to plan, analyze, design, code and implement the project. The initiation of project should be with the project proposal. The synopsis approval will be given by the project guides.
- For the project work, the guide(internal) will evaluate the work for 40 marks based on the performance of the candidates during the development of the project and the external examiner will evaluate the project work as follow
  - Project Report -40 marks
  - Viva Voce -20 marks

**SEMESTER V/VI**  
**USCSEn20 - SKILL BASED ELECTIVE: DATA ANALYTICS USING DATA**  
**VISUALIZATION TOOLS**

<b>Year:</b> III/ V	<b>Course Code:</b> USCSEn20	<b>Title of the Course:</b> Data Analytics using Data Visualization Tools	<b>Course Type:</b> Practical	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
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**Course Learning Objectives (CLO)**

1. Understand the behavior of data.
2. To extend the current state of the art in data visualization.
3. To present data effectively through chart, map and dashboard.
4. Represent data graphically.
5. To implement Data Analytics efficiently.

**Course Outcomes (COs)**

The learners will be able to

1. Identify the various data visualizations tools in the market and its features.
2. Understand the different data format and its graphical representation
3. Develop skills to present data effectively through chart, map and dashboard.
4. Demonstrate to design visual presentations of data for decision making.
5. Apply data visualizations on real-time data.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	M	M	M	L
CO2	M	L	L	L	M	M
CO3	L	L	M	L	L	M
CO4	M	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	H	H	H	M	L
CO4	H	H	H	H	H	M
CO5	H	M	H	H	H	M

## **Course Syllabus**

### **Unit I**

**(Hour 5)**

- 1.1 Data Visualization: Introduction. (K1)
- 1.2 Benefits of Data Visualization. (K2)
- 1.3 Data Visualization Tools. (K2)
- 1.4 Features. (K2)
- 1.5 Data access from data sources. (K2)

### **Unit II**

**(Hour 5)**

- 2.1 Data Transformation. (K1, K2)
- 2.2 Types of charts. (K2)
- 2.3 Bar Chart. (K1, K2)
- 2.4 Pie Chart. (K2)
- 2.5 Data Tables. (K2)
- 2.6 Scatter Chart. (K2)

### **Unit III**

**(Hour 5)**

- 3.1 Time series Chart. (K2)
- 3.2 Score card. (K2)
- 3.3 Scatter Chart. (K2)
- 3.4 Bullet Chart. (K2)
- 3.5 Area Chart. (K2)
- 3.6 Heat Map(K2)

### **Unit IV (K6)**

**(Hour 8)**

1. Create a bar chart for the given data.
2. Create a pie chart for the given data.
3. Create a scatter chart for the given data.
4. Create a time series chart for the given data.

### **Unit V (K6)**

**(Hour 7)**

5. Create a bullet chart for the given data.
6. Create area chart for the given data.
7. Create a heat map for the given data.

### **Text Book**

1. Nathan Yau Visualize Thi, “The Flowing Data Guide to Design, Visualization, and Statistics”, Wiley, 1<sup>st</sup> Edition 2011.

## **Reference Books**

1. Cole Nussbaumer Knaflic, “Storytelling with Data: A Data Visualization Guide for Business Professionals”, John Wiley & Sons 2015.

## **Open Educational Resources (OER)**

1. [http://www.tutorialspoint.com/tableau/tableau\\_tutorial.pdf](http://www.tutorialspoint.com/tableau/tableau_tutorial.pdf)
2. <http://www.pdfdrive.com/tableau-books.html>
3. <http://projanco.com/Library/Learning%20Tableau%202019%20Tools%20for%20Business%20Intelligence,%20data%20prep,%20and%20visual%20analytics.pdf>
4. <http://www.youtube.com/watch?v=Tc8VenUN4n8>

**SEMESTER V / VI**  
**USCSFn20 - SKILL BASED ELECTIVE: R PROGRAMMING**

<b>Year:</b> III/ V	<b>Course Code:</b> USCSFn20	<b>Title of the Course:</b> Skill Based Elective: R Programming	<b>Course Type:</b> Practical	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
<b>Sem:</b> VI							

**Course Learning Objectives (CLO)**

1. Understand the usage of R programming interactive environment.
2. Understand R programming language which includes functions, arrays and dataframes.
3. Describe statistical computing which includes programming in R, reading and accessing data in R.
4. Understand the concept of Meta Programming.
5. Build a simple sorting algorithm.

**Course Outcomes (COs)**

The Learners will be able to

1. Understand the basics in R and Studio Programming.
2. Use Vector, Arrays, Matrix and Data frames.
3. Demonstrate Math functions, Statistical functions and Family functions.
4. Create R programs that use various library functions, and that manipulate files and directories.
5. Learn to apply R programming for Text processing.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	L
CO2	M	L	L	L	M	M
CO3	L	M	M	L	M	M
CO4	M	M	M	M	L	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	M	L	M	M	M	L
CO2	M	M	L	L	L	M
CO3	L	M	H	H	H	H
CO4	H	M	H	H	H	M
CO5	L	M	M	M	L	M

## **Course Syllabus**

### **Unit I**

**(Hour 5)**

- 1.1 Introduction to R and R Studio. (K1, K2)
- 1.2 Basic Object Vector. (K2)
- 1.3 Matrix, Array. (K2, K3)
- 1.4 Lists. (K2)
- 1.5 Data Frames. (K3)
- 1.6 Functions. (K2, K3)

### **Unit II**

**(Hour 5)**

- 2.1 Basic Expression Assignment Expressions. (K1, K2)
- 2.2 Conditional Expressions. (K3, K4)
- 2.3 Loop Expressions. (K3, K4)
- 2.4 Basic Object Functions - Logical Functions. (K2, K3)
- 2.5 Math functions, Numeric Methods Statistical function - Apply. (K3, K5)
- 2.6 Family Functions. (K3, K4)

### **Unit III**

**(Hour 5)**

- 3.1 Working with Strings. (K4, K5)
- 3.2 Working with Data. (K4, K5)
- 3.3 Meta programming. (K6)
- 3.4 Object Oriented Programming. (K3, K4)

### **Unit IV**

**(Hour 7)**

- 4.1 Write a program that prints 'Hello World' to the screen. (K2)
- 4.2 Write a program that asks the user for a number n and prints the sum of the numbers 1 to n. (K4, K5)
- 4.3 Write a program that prints a multiplication table for numbers up to 12. (K4)
- 4.4 Write a function that returns the largest element in a list. (K5)

### **Unit V**

**(Hour 8)**

- 5.1 Write a function that computes the running total of a list. (K5, K6)
- 5.2 Write a function that tests whether a string is a palindrome. (K5)
- 5.3 Implement the following sorting algorithm Selection sort, Insertion sort, Bubble Sort. (K3, K5, K6)
- 5.4 Implement linear search. (K3, K4,)
- 5.5 Implement binary search. (K3, K4)
- 5.6 Implement Matrices Addition, Subtraction and Multiplication. (K3, K4)

### **Text Books**

1. Kun Ren, “Learning R. Programming, Packt Publishing” - ebooks Account (October 28, 2016).
2. Dr. Mark Gardener, “Beginning R: The Statistical Programming Language”, Paperback, 2013.

### **Reference Books**

1. Colin Gillespie, Robin Lovelace, “Efficient R Programming: A Practical Guide to Smarter Programming”, O'Reilly Media, 1<sup>st</sup> Edition (October 25, 2016); eBook (2017-04-10).
2. Daniel Navarro, “Learning Statistics with R”, lulu.com (2015); eBook (University of Adelaide, 2018. Updated Continuously)

### **Open Educational Resources (OER)**

1. <https://www.tutorialspoint.com/r/index.htm>
2. <https://www.programiz.com/r>
3. <https://www.youtube.com/watch?v=Q5g6lYUn6Q4>

**SEMESTER III**  
**USCSAn20 - SKILL BASED ELECTIVE: BASICS OF WEB DESIGN**

<b>Year:</b> II	<b>Course Code:</b> USCSAn20	<b>Title of the Course:</b> SBE: Basics of Web Design	<b>Course Type:</b> Practical	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
<b>Sem:</b> III							

**Course Learning Objectives (CLO)**

1. To impart knowledge in designing web pages with text and images.
2. Analyze a web page and identify its elements and attributes.
3. To learn and implement XML Concepts.
4. Write codes to create website.
5. Write programs in XML.

**Course Outcomes (COs)**

The Learners will be able to

1. Demonstrate competency in the use of common HTML code.
2. Support the development of web pages.
3. Create XML documents and Schemas.
4. Create website using HTML.
5. Write programs using XML.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	M	H	M	M	M	L
<b>CO2</b>	M	L	L	L	M	M
<b>CO3</b>	L	M	M	L	L	L
<b>CO4</b>	M	L	M	M	L	M
<b>CO5</b>	L	M	L	H	L	L

**(Low -L, Medium -M, High-H)**

CO	PO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	H	L	M
<b>CO2</b>	H	H	H	H	L	M
<b>CO3</b>	H	L	H	H	M	L
<b>CO4</b>	H	L	H	H	H	M
<b>CO5</b>	H	M	H	H	H	M

**(Low -L, Medium -M, High-H)**

## Course Syllabus

### Unit I

(Hour 5)

- 1.1 Introduction: HTML - Understanding HTML Tags. (K2)
- 1.2 Creating the HTML, Head, and Body Sections. (K6)
- 1.3 Creating Paragraphs and Line Breaks. (K6)
- 1.4 Formatting Text by Using Tags. (K6)
- 1.5 Creating Headings. (K6)
- 1.6 Applying Bold and Italic Formatting - Applying Superscript and Subscript Formatting. (K3)

### Unit II

(Hour 5)

- 2.1 Using Lists and Backgrounds - Creating Bulleted and Numbered Lists. (K2)
- 2.2 Creating Definition Lists. (K6)
- 2.3 Choosing Background and Foreground Colors. (K6)
- 2.4 Creating Hyperlinks and Anchors-(K6)
- 2.5 Introduction to Style Sheets-(K6)
- 2.6 Creating tables. (K6)

### Unit III

(Hour 5)

- 3.1 XML Overview: Working with Basics of XML- (K1)
- 3.2 XML Namespaces – XML Tree-XML Syntax- (K1)
- 3.3 XML Elements - DTD – (K1)
- 3.4 XML Schema – (K1)
- 3.5 Extensible Style Sheets (K1)
- 3.6 XSL Transformation. (K1)

### Unit IV

(K6)

(Hour 8)

1. Write a program to change the Font style, Font colour, Font Sizes and Background Image.
2. Write a program to design Bio-data using Basic HTML tags.
3. Write a program in HTML to develop a College Website.
4. Write a HTML program to create Time Table preparation using HTML tags.
5. Write a HTML program using links.

### Unit V

(K6)

(Hour 7)

6. Write a HTML program for Lists.
7. Write a program to apply Style Sheet in a webpage.
8. Write a program to flip the text using XML.
9. Write a XML program using elements.
10. Write a XML program using DTD.

**Text Books**

1. Faithe Wempen, “Step by Step HTML5”, Published with the O’Reilly Media, Inc. 2012.
2. Kogent Learning Solutions Inc, ”Html5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and jQuery”, Dreamtech Press, 2011.

**Books for Reference**

1. HTML by Tutorials point, Published by Tutorials Point Pvt. Ltd, 2015.
2. Heather Williamson, “XML: The Complete reference”, Indian Edition, Tata McGraw Hill Pub, 2001.
3. Deitel, Nieto, Lin, Sadhu, “XML HOW TO PROGRAM”, 1<sup>st</sup> Edition, Pearson Education, 2002.

**Open Educational Resources (OER)**

1. <https://www.tutorialspoint.com/html/index.htm>
2. <https://www.javatpoint.com/html-tutorial>
3. <https://www.youtube.com/watch?v=qz0aGYrrlhU>

## SEMESTER IV

### USCSBn20 - SKILL BASED ELECTIVE: DESIGN AND ANIMATION

<b>Year:</b> II	<b>Course Code:</b> USCSBn20	<b>Title of the Course:</b> Skill Based Elective: Design and Animation	<b>Course Type:</b> Practical	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
<b>Sem:</b> IV							

#### Course Learning Objectives (CLO)

1. To learn the basics and fundamentals of Multimedia.
2. To introduce Multimedia components and tools.
3. To understand how multimedia can be incorporated.
4. To study the various applications of design techniques.
5. Demonstrate in depth knowledge of multimedia development tools.

#### Course Outcomes (COs)

The Learners will be able to

1. Understand Multimedia components using various tools and techniques.
2. Analyze and Interpret Multimedia Data.
3. Discuss about different types of media format and their properties.
4. Understand and apply principles of design into given projects.
5. Acquire and analyze different ideas about designs and its implementation.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	L
CO2	M	L	L	L	H	H
CO3	L	M	M	L	L	L
CO4	M	L	M	M	M	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	L
CO2	H	H	M	M	M	M
CO3	H	H	H	M	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	L

## Course Syllabus

### Unit I

(Hour 5)

- 1.1 Introduction to Multimedia – The Elements of Multimedia System. (K2)
- 1.2 Using Multimedia: Benefits of using Multimedia. (K1, K2)
- 1.3 Multimedia Platform Multimedia Hardware. (K2, K3)
- 1.4 System Software. (K2, K3)
- 1.5 Future Directions. (K2)
- 1.6 Storage for Multimedia: Choice of Storage – Magnetic Media – Optical Media. (K2)

### Unit II

(Hour 5)

- 2.1 Introduction – Bitmaps and Vectors Toolbox. (K2)
- 2.2 Selection tools – Painting tools – Editing tools – Retouching Tool( K2)
- 2.3 Colors setting. (K1, K2)
- 2.4 Layer Working with Layers. (K1, K2)
- 2.5 Layer Styles – Locking Layers. (K2)
- 2.6 Merging Layers – Managing Layers Components – Palette. (K3)

### Unit II

(Hour 5)

- 3.1 Introduction flash – Basics. (K2)
- 3.2 Creating objects – Editing objects. (K3, K6)
- 3.3 Color and text – Symbols and instances. (K2)
- 3.4 Library – Text Animation – Motion Tweening. (K2, K3)
- 3.5 Shape Tweening – Motion Guide. (K3)
- 3.6 Movie Clip – Working with Action Script. (K3)

### Unit IV

(K6)

(Hour 8)

1. Create an Action in Photoshop.
2. Color Transformation Using Photoshop.
3. Design a Book Cover in Photoshop.
4. Create an Animation using Photoshop.

### Unit V

(K6)

(Hour 7)

5. Traffic Light Control Using Action Script in Flash.
6. Create a Slide Show Presentation in Flash.
7. Design a Greeting Card Using Button in Flash.
8. Create a Public Service Awareness Using Action Script in Flash.

### Text Books

1. “Photoshop CS6 in Simple Steps”, Paperback, Kogent Learning Solutions Inc., 2012.
2. “Flash CS5 in Simple Steps”, Kogent Learning Solutions Inc., Dreamtech Press Publication, 2011.

### **Books for Reference**

1. Chris Grover with E.A.Vander Veer, "Flash CS4", Pogue Press O'Reilly,2008.
2. Jeffcoate Judith, "Multimedia in Practice", Pearson Education, 2009.

### **Open Educational Resources (OER)**

1. <https://www.javatpoint.com/what-is-multimedia>
2. <https://users.cs.cf.ac.uk/dave/Multimedia/node10.html>
3. [https://www.youtube.com/watch?v=Syeu\\_l3sAJE&pp=ygUJbXVsdGltZWlh](https://www.youtube.com/watch?v=Syeu_l3sAJE&pp=ygUJbXVsdGltZWlh)

**SEMESTER V/VI**  
**UGCSAn20: NON MAJOR ELECTIVE: STATISTICAL PACKAGE FOR SOCIAL  
 SICENCE**

<b>Year: III</b>	<b>Course Code:</b> UGCSAn20	<b>Title of the Course:</b> Non Major Elective: Statistical Package For Social Science	<b>Course Type:</b> Practical	<b>Course Category:</b> Non Major Elective	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 40+60
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**Course Learning Objectives (CLO)**

1. The students will understand the data analysis, define variables and perform variable manipulation and transformation.
2. Understand the basic workings of SPSS and perform basic statistical analysis.
3. To perform a wide range of data management in SPSS.
4. To introduce the basic practice of statistics by using SPSS statistics.
5. To perform advanced analysis of SPSS.

**Course Outcomes (COs)**

The Learners will be able to

1. Understand the basic workings of SPSS software using menus and buttons and perform basic statistical analysis.
2. Analyze data and create simple tables, charts and frequencies.
3. Introduce data analysis and perform basic statistical analysis.
4. Analyze data for reporting descriptive statistics, graphics and correlations
5. Perform simple analysis of Two way sample and Chi-square tests.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	M	M	M	M	M	L
<b>CO2</b>	M	L	L	L	H	H
<b>CO3</b>	L	M	H	L	M	L
<b>CO4</b>	M	L	M	M	M	M
<b>CO5</b>	L	M	L	H	L	L

**(Low -L, Medium -M, High-H)**

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	M	M	L
CO2	M	M	M	M	M	L
CO3	H	H	H	H	H	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	M	L

(Low -L, Medium -M, High-H)

## Course Syllabus

### Unit I

(Hour 10)

- 1.1 SPSS Introduction (K1)
- 1.2 Task Bar and Start Menu (K2)
- 1.3 Common Buttons – Commonly used Windows (K2)
- 1.4 Creating and Editing a Data File (K6)
- 1.5 Select Case – Sort Case – Merging Files (K5)
- 1.6 Printing Results. (K5)

### Unit II

(Hour 10)

- 2.1 Graphs and Chart Producing Graphs and Charts (K6)
- 2.2 Bar Charts – Line Graphs (K6)
- 2.3 Pie Chart – Box Plots (K6)
- 2.4 Error Bar Charts (K1, K6)
- 2.5 Histograms – Scatter Plots (K1.K6)
- 2.6 Understanding Frequencies. (K2)

### Unit III

(Hour 10)

- 3.1 Descriptive Statistic Normal Distribution Mean, Median, Mode (K2. K6)
- 3.2 Variance & Standard Deviation (K1.K6)
- 3.3 Skewness (K2. K6)
- 3.4 Kurtosis (K2. K6)
- 3.5 Maximum, Minimum, Range and Sum (K2. K6)
- 3.6 Standard Error. (K2)

### Unit IV

(Hour 8)

1. Creating data file, assigning names and value to variables and saving it.(K1,K6)
2. Creating data file and find the percentage of subjects in each group. (K2, K6)
3. Running a simple analysis to create a frequency table. (K4)
4. Creating a new variable based on an existing variable. (K6)
5. Creating charts for different Variables. (K2, K5)

**Unit V****(Hour 7)**

6. Statistical application to obtain central tendency or dispersion values. (K3)
7. Editing of tables & charts, fixing tables and charts in word document. (K5)
8. Running a simple analysis to create different correlation (K5, K6)
9. Running a simple analysis to create different 't' tests. (K5, K6)
10. Creating two-way tables and to obtain Chi – Square values. (K6)

**Text Book**

1. Darren George & Paul Mallery, "SPSS for Windows step by step", Pearson Education in South Asia, 8<sup>th</sup> Edition.

**Books for Reference**

1. Sabine Landau & Brain S.Everitt, "A Handbook of Statistical Analyses using SPSS", A CRC Press Company, 2004
2. Jesus Salcedo, Keith McCormick, "SPSS Statistics for Data Analysis and Visualization", 2017.

**Open Educational Resources (OER)**

1. <https://lo.unisa.edu.au/mod/book/view.php?id=646443&chapterid=106605>
2. [https://fac.ksu.edu.sa/sites/default/files/spss\\_beginners\\_0.ppt](https://fac.ksu.edu.sa/sites/default/files/spss_beginners_0.ppt)
3. <https://slideplayer.com/slide/13316515/>

**SEMESTER V/VI**  
**UGCSBn20 - NON-MAJOR ELECTIVE: WEB DESIGNING USING**  
**DREAMWEAVER**

<b>Year:</b> <b>III</b>	<b>Course Code:</b> UGCSBn20	<b>Title of the Course:</b> Non-Major Elective : Web Designing Using Dreamweaver	<b>Course Type:</b> Practical	<b>Course Category:</b> Non Major Elective	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 40+60
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**Course Learning Objectives (CLO)**

1. To build an understanding of basic concepts of web site.
2. To develop programming skills in analyzing the usability of a web site.
3. Learn techniques of responsive web design software.
4. To be able to create different kind of web page based on the user requirements.
5. To implement text based, audio and video based object techniques using Dreamweaver software.
6. To develop software using different kind of web page based on the user requirements.

**Course Outcomes (COs)**

The Learners will be able to

1. Understand the basic concept of Web designing using Dreamweaver software.
2. Creating the web pages using background colors, property inspector tools in HTML.
3. Develop how to create web page links.
4. Create tables, frames and frameset using Dreamweaver tools.
5. Apply style sheet, adding forms to a web page.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	M	L
CO2	M	H	L	L	H	H
CO3	L	M	H	L	H	M
CO4	M	L	M	M	M	M
CO5	L	M	L	H	L	L

(Low -L, Medium -M, High-H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	L
CO3	H	H	M	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	M	L	M	M

(Low -L, Medium -M, High-H)

## Course Syllabus

### Unit I

(Hour 10)

- 1.1 Opening the Document Window – Locating the Little Bar (K2)
- 1.2 Menu Bar Components – Menu Bar – Toolbar – Status Bar (K2)
- 1.3 Design View – Object Panel – Launchers (K2, K4)
- 1.4 Property Inspector – Creating a New Site (K4, K6)
- 1.5 Local Vs. Remote Site – Designing a Local Site (K2, K4)
- 1.6 Creating and Opening a Site – Setting up the Sitting Window – Accessing the Site. (K5, K6)

### Unit II

(Hour 10)

- 2.1 Working with HTML Tags - Code Inspector (K2, K4)
- 2.2 Quick Tag Editor – Importing HTML (K2, K5)
- 2.3 Creating Web Page Opening and Closing Pages – Copying and Pasting Test (K4, K6)
- 2.4 Working with Text and Property Inspector – Working with Background Colors (K3,K4)
- 2.5 Leaving Links – Working with Anchors (K4, K5)
- 2.6 Working with Image Link – Creating an Email Links. (K5, K6)

### Unit III

(Hour 10)

- 3.1 Definition of Tables – Creating and Editing Tables – Preformatted Tables ( K2, K4)
- 3.2 Frames and Frameset: Creating and Editing Frames (K4, K6)
- 3.3 Adding Multimedia to a Website - CSS (K3, K5)
- 3.4 Applying Style Sheet to a Webpage – CGI (K3, K5)
- 3.5 Form – Adding Form in the Project (K2, K3)
- 3.6 Creating Layers – Customizing Dreamweaver. (K6)

### Unit IV

(Hour 8)

#### Practical Programs

(K3, K4, K5, K6)

1. Create and design a webpage for Clipart Gallery.
2. Create a webpage for online shopping.
3. Create a banner using various tools (College day, Graduate day).
4. Create a webpage for sports day.

## **Unit V**

**(Hour 7)**

### **Practical Programs**

(K3, K4, K5, K6)

5. Create a web page for Class time tables using table properties.
6. Design an E-Book with appropriate navigation.
7. Create a webpage for advertising a product using rollover image.
8. Create a webpage using layers.

### **Text Books**

1. Candace Garrod, “Dreamweaver Rapid Web Design”, Prentice Hall of India, 2001.
2. Jim Maivald Publisher, “Adobe Dreamweaver CC Classroom in a Book”, (2019 Release), 1<sup>st</sup> Edition, Adobe Press, 2018.

### **Books for Reference**

1. Hirdesh Bhardwaj, “Web Designing”, 1<sup>st</sup> Edition, Pothi.com, 2016.

### **Open Educational Resources (OER)**

1. <http://makeawebsitehub.com/dreamweaver-tutorial/>
2. <http://www.uis.edu/informationtechnologyservices/wp-content/uploads/sites/106/2013/04/DWIntro.pdf>
3. <http://www.egr.msu.edu/classes/ece480/capstone/fall12/group05/Documents/Application%20Note%20-%20Nan%20Xia.pdf>

# Department of Mathematics (UG)

## SYLLABUS AND REGULATIONS

Under

**OUTCOME BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

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**AUXILIUM COLLEGE (Autonomous)**  
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**Department of Mathematics UG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighbouring districts.

**B) NAME OF THE PROGRAMME: B.Sc. Mathematics**

**Vision:**

To enhance the logical reasoning, analytical thinking and problem-solving skills of the students and prepare them to be lifelong learners who will be socially responsible to navigate the complexities of a rapidly changing society.

**C) ELIGIBILITY CRITERIA OF THE PROGRAMME**

A candidate who has qualified in Higher Secondary Examination conducted by Government of Tamil Nadu or an examination accepted as equivalent thereto by the Syndicate with Physics as one of the subjects is eligible for seeking admission to the B.Sc. Mathematics course.

### D) List of courses

Sem	Part	Paper Code	Title of Subject	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper – I	6	3	-	3	40+60
	II	UENGA20	English Paper – I	6	3	-	3	40+60
	III	UCMAA20	Algebra and Trigonometry	4	3	-	4	40+60
	III	UCMAB20	Calculus	5	3		4	40+60
	III	UBPHA20	Allied I: Physics - I	4	3	-	4	40+60
	III	UBPHC20	Allied Practical: Physics	2	-	-	-	-
	IV		Skill Based Elective – I	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
<b>Total</b>				<b>30</b>			<b>20</b>	<b>600</b>
II	I	ULTAB20	Tamil Paper – II	6	3	-	3	40+60
	II	UENGB20	English Paper – II	6	3	-	3	40+60
	III	UCMAC20	Vector Analysis and Fourier series	5	3	-	4	40+60
	III	UCMAD20	Differential equations and Laplace Transforms	4	3	-	4	40+60
	III	UBPHB20	Allied I: Physics - II	4	3	-	4	40+60
		UBPHC20	Allied Practical: Physics	2	-	3	2	40+60
	IV		Skill Based Elective – II	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
<b>Total</b>				<b>30</b>			<b>22</b>	<b>700</b>
III	I	ULTAC20	Tamil Paper - III	5	3	-	3	40+60
	II	UENGC20	English Paper - III	6	3	-	3	40+60
	III	UCMAE20	Solid Geometry	5	3	-	4	40+60
	III	UCMAF20	Statics	5	3	-	4	40+60
	III	UAMSA20	Allied II: Mathematical Statistics - I	6	3	-	5	40+60
	IV	USMAAn20	Skill Based Elective – III: Numerical Methods	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
<b>Total</b>				<b>30</b>			<b>21</b>	<b>600</b>

Sem	Part	Paper Code	Title of Subject	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
IV	I	ULTAD20	Tamil Paper - IV	5	3	-	3	40+60
	II	UENGD20	English Paper - IV	6	3	-	3	40+60
	III	UCMAG20	Operations Research	4	3	-	4	40+60
	III	UCMAH20	Dynamics	4	3	-	4	40+60
	III	UAMSB20	Allied II: Mathematical Statistics - II	6	3	-	5	40+60
	IV	USMABn20	Skill Based Elective – IV: R Programming Language	2	2	-	2	40+60
	IV	UNEVS20	Environmental Studies	2	3	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
<b>Total</b>				<b>30</b>			<b>23</b>	<b>700</b>
V	III	UCMAI20	Abstract Algebra	6	3	-	5	40+60
	III	UCMAJ20	Real Analysis - I	6	3	-	6	40+60
	III	UCMAK20	Complex Analysis	6	3	-	5	40+60
	III	UEMAA20	Elective I A: Programming in C	4	3	-	3	40+60
		UEMAC20	Elective I B: Number Theory					
	III	UEMAB20	Elective Practical I: C	2	-	3	2	40+60
	IV	-	Non-Major Elective - I	3	3	-	2	40+60
	IV	USMAC20	Skill Based Elective – V: Mathematics for Competitive Examinations	2	2	-	2	40+60
IV	UVEDA20	Value Education	1	-	-	-	-	
<b>Total</b>				<b>30</b>			<b>25</b>	<b>700</b>
VI	III	UCMAL20	Linear Algebra	6	3	-	6	40+60
	III	UCMAM20	Real Analysis - II	6	3	-	6	40+60
	III	UEMAD20	Elective II A: Graph Theory	6	3	-	5	40+60
		UEMAE20	Elective II B: Discrete Mathematics					
	III	UEMAF20	Elective III: Object Oriented Programming Using C++	4	3	-	3	40+60
	III	UEMAG20	Elective Practical II:C++	2	-	3	2	40+60
		-	Non-Major Elective - II	3	3	-	2	40+60
	IV	USMAD20	Skill Based Elective – VI: Fuzzy Set Theory	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	2	-	2	40+60
<b>Total</b>				<b>30</b>			<b>28</b>	<b>800</b>
V			Extension Activities				<b>1</b>	-
<b>Grand Total</b>							<b>140</b>	<b>4200</b>

## **E) Programme Outcomes (PO)**

On completion of the Undergraduate Programme (UG), students will be able to:

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:** Acquire and apply analytical, critical and creative thinking, and problem solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:** Emulate positive social values and exercise leadership qualities and team work.

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

## **F) Programme Specific Outcomes (PSO)**

### **PSO1: Disciplinary knowledge**

Capability to demonstrate comprehensive knowledge of Mathematics and understand one or more disciplines which form a part of an undergraduate programme of study.

### **PSO2: Communication skills**

- i. Ability to communicate various concepts of mathematics effectively using examples and their geometrical visualizations.
- ii. Ability to use mathematics as a precise language of communication in other branches of human knowledge and communicate long standing unsolved problems in mathematics.
- iii. Ability to show the importance of mathematics as precursor to various scientific developments since the beginning of the civilization.
- iv. Ability to explain the development of mathematics in the civilizational context and its role as queen of all sciences.

### **PSO3: Critical thinking**

Ability to employ critical thinking in understanding the concepts in every area of Mathematics.

### **PSO4: Analytical thinking**

Ability to analyze the results and apply them in various problems appearing in different branches of mathematics.

### **PSO5: Problem solving**

- i. Capability to solve problems in computer graphics using concepts of linear algebra.
- ii. Capability to solve various models such as growth and decay models, radioactive decay model, drug assimilation, LCR circuits and population models using techniques of differential equations.
- iii. Ability to solve linear system of equations, linear programming problems and network flow problems.
- iv. Ability to provide new solutions using the domain knowledge of mathematics.

**PSO6: Digital literacy**

- i. Capability to understand and apply the programming concepts of C and C++ to mathematical investigations and problem solving.
- ii. Capability to understand and apply the programming concepts of R to statistical investigations and problem solving.

<b>PSO</b>	<b>PO</b>					
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>PSO1</b>	H	H	H	M	L	H
<b>PSO2</b>	H	H	H	L	M	H
<b>PSO3</b>	H	H	H	L	M	H
<b>PSO4</b>	H	H	H	M	L	H
<b>PSO5</b>	H	H	H	M	L	H
<b>PSO6</b>	H	H	H	M	H	H

**(L-Low (1), M-Moderate (2), H-High (3))**

**SEMESTER – I**  
**UCMAA20 – Algebra and Trigonometry**

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code:</b> UCMAA20	<b>Title of the Course:</b> Algebra and Trigonometry	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To improve problem solving skills in Algebra
2. To deepen the knowledge in basic concepts of Trigonometry

**Course Outcomes (CO)**

The learners will be able to

1. Perceive the fundamental concepts in the theory of equations.
2. Solve various types of higher order equations.
3. Know about matrices and their applications.
4. Solve problems involving trigonometric functions.
5. Analyze and relate hyperbolic and circular functions.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	L	H	L
CO2	H	H	H	M	H	L
CO3	M	M	H	H	H	L
CO4	H	M	M	H	H	L
CO5	H	H	M	M	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	H
CO2	H	H	H	M	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I : Theory of Equations

(12 hours)

- 1.1 Basic definitions (K1)
- 1.2 Polynomial equation(K1, K2)
- 1.3 Imaginary and Irrational roots(K1, K2, K3)
- 1.4 Symmetric functions of roots (K1, K2, K3, K4)
- 1.5 Sum of the powers of the roots (K1, K2, K3, K4)
- 1.6 Transformation of equations (K1, K2, K3, K4)

### Unit II: Theory of Equations (Continued)

(12 hours)

- 2.1 Types of Reciprocal equations (K1, K2, K3, K4)
- 2.2 Descarte's rule of signs (K1, K2, K3, K4)
- 2.3 Horner's method (K1, K2, K3, K4)
- 2.4 Cardon's method (K1, K2, K3, K4)
- 2.5 Biquadratic equations (K1, K2, K3, K4)
- 2.6 Ferrari's method (K1, K2, K3, K4)

### Unit III: Series and Matrices

(12 hours)

- 3.1 Statement of Binomial, Exponential and Logarithm series (K1)
- 3.2 Summation and Approximation of Series (K1, K2, K3, K4)
- 3.3 Types of matrices (K1, K2)
- 3.4 Sums on Eigen values and Eigen vectors (K1, K2, K3, K4)
- 3.5 Sums on Cayley-Hamilton Theorem (K1, K2, K3, K4)
- 3.6 Diagonalisation of a matrix (K1, K2, K3, K4)

### Unit IV: Expansions of Trigonometric Functions

(12 hours)

- 4.1 Formulae of Trigonometric Functions (K1)
- 4.2 Expansion of  $\sin n\theta$ ,  $\cos n\theta$ ,  $\tan n\theta$  (K1, K2, K3, K4)
- 4.3 Expansion of  $\sin^n \theta$ ,  $\cos^n \theta$  (K1, K2, K3, K4)
- 4.4 Expansion of  $\sin\theta$ ,  $\cos\theta$ ,  $\tan\theta$  in terms of  $\theta$  (K1, K2, K3, K4)
- 4.5 Application of Trigonometric functions to limits (K1, K2, K3, K4)
- 4.6 Approximations of Trigonometric functions (K1, K2, K3, K4)

### Unit V: Hyperbolic Functions

(12 hours)

- 5.1 Formulae, properties of Hyperbolic Functions (K1, K2)
- 5.2 Sums on Hyperbolic Functions (K1, K2, K3, K4)
- 5.3 Formulae, properties of Inverse Hyperbolic functions (K1, K2)
- 5.4 Inverse hyperbolic functions (K1, K2, K3, K4)
- 5.5 Relation between hyperbolic and circular functions (K1, K2, K3, K4)
- 5.6 Logarithm of complex quantities (K1, K2, K3, K4)

**Text Books:**

1. T.K. Manickavachagom Pillay and others - Algebra -Volumes I and II – S.Viswanathan Printers and Publishers Pvt. Ltd., Chennai – Copyright 2013.
2. S. Narayanan and T. K. Manickavachagom Pillay – Trigonometry – S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai - Reprint 2006.

**Reference Books:**

1. P. Kandasamy and K. Thilagavathi – Mathematics for B.Sc. – Volume I and Volume IV, S. Chand and Co., New Delhi – First Edition, 2004.
2. Dr. S. Sudha - Algebra, Analytical Geometry and Trigonometry – Emerald Publishers – First Edition, 1998.
3. S. Arumugam and Thangapandi Issac– Classical Algebra – New Gamma Publishing House, Palayamkottai.

**e- Resources**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in/>

**SEMESTER – I**  
**UCMAB20 – Calculus**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: I</b>	UCMAB20	Calculus	Theory	Core	5	4	100

**Course Objectives**

1. To introduce basic properties of integrals
2. To understand the concepts of multiple integration
3. To improve analytical skills

**Course Outcomes (CO)**

The learners will be able to

1. Calculate the radius of curvature, center of curvature, evolutes and involutes.
2. Understand and find the asymptotes of rational curves.
3. Determine the area and volume by applying the technique of double and triple integrals.
4. Determine and use various techniques to solve the variety of integration problems.
5. Evaluate beta and gamma functions and apply beta and gamma functions in double and triple integrals.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	H	L
<b>CO2</b>	H	M	H	M	H	L
<b>CO3</b>	H	H	M	M	H	L
<b>CO4</b>	H	M	M	M	H	L
<b>CO5</b>	H	M	H	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	M	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Curvature

(15 hours)

- 1.1 Radius of curvature in Cartesian coordinates (K1, K2, K3, K4)
- 1.2 Radius of curvature in Polar coordinates (K1, K2, K3, K4)
- 1.3 Centre of curvature in Cartesian coordinates (K1, K2, K3, K4)
- 1.4 Centre of curvature in Polar coordinates (K1, K2, K3, K4)
- 1.5 Circle of curvature (K1, K2, K3, K4)
- 1.6 Evolutes and Involutives (K1, K2, K3, K4)

### Unit II: Asymptotes and Envelopes:

(15 hours)

- 2.1 Asymptotes- Definition (K1, K2)
- 2.2 Methods of finding asymptotes of rational algebraic curves with special cases (Without proof) (K1, K2)
- 2.3 Envelopes – Definition (K1, K2)
- 2.4 Envelope for one parameter family of curves (K1, K2, K3, K4)
- 2.5 Problems on Envelope for one parameter family of curves (K1, K2, K3, K4)
- 2.6 Envelope for two parameter family of curves (K1, K2, K3, K4)

### Unit III: Integration

(15 hours)

- 3.1 Integration of irrational functions (K1, K2, K3, K4)
- 3.2 Integration of trigonometric functions (K1, K2, K3, K4)
- 3.3 Bernoulli's formula (K1, K2)
- 3.4 problems on Bernoulli's formula (K1, K2, K3, K4)
- 3.5 Properties of definite integrals (K1, K2, K3, K4)
- 3.6 Problems on definite integrals (K1, K2, K3, K4)

### Unit IV: Multiple Integrals

(15 hours)

- 4.1 Line integrals (K1, K2, K3, K4)
- 4.2 Double integrals (K1, K2, K3, K4)
- 4.3 Triple integrals (K1, K2, K3, K4)
- 4.4 Change of order of integration (K1, K2, K3, K4)
- 4.5 Applications of double integrals in finding area (K1, K2, K3, K4)
- 4.6 Applications of triple integrals in finding volume. (K1, K2, K3, K4)

### Unit V: Improper Integrals

(15 hours)

- 5.1 Improper integrals (Type I-Type VI) (K1, K2, K3, K4)
- 5.2 Improper integrals (Type VII-Type XII) (K1, K2, K3, K4)
- 5.3 Beta functions (K1, K2)
- 5.4 Gamma functions (K1, K2)
- 5.5 Applications of Beta in evaluation of double and triple integrals (K1, K2, K3, K4)
- 5.6 Applications of Gamma functions in evaluation of double and triple integrals (K1, K2, K3, K4)

**Text Book:**

1. S. Narayanan and Manickavachagom Pillai T.K - Calculus - S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai - Reprint 2007

**Reference Books:**

1. N.P. Bali - Differential Calculus - Volume I - Lakshmi Publication - 3<sup>rd</sup> Edition 2000
2. N.P. Bali - Integral Calculus - Lakshmi Publication – Fifth Edition - 1985
3. P.R.Vittal - Calculus - Margham Publications - Reprint 2005.

**e-Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – II**  
**UCMAC20 – Vector Analysis and Fourier Series**

<b>Year: I</b> <b>SEM: II</b>	<b>Course Code:</b> UCMAC20	<b>Title of the Course:</b> Vector Analysis and Fourier Series	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To understand the fundamental concepts of vector analysis and apply the various techniques of vector integration in solving volume and surface integrals
2. To define Fourier series and express periodic functions as infinite series

**Course Outcomes (CO)**

The learners will be able to

1. Compute divergence, curl, directional derivatives and Gradients.
2. Calculate the unit normal and tangent to the surface.
3. Evaluate line integrals, surface integrals and volume integrals using vector integration.
4. Verify and Apply Green's Theorem, Gauss divergence Theorem, Stoke's Theorem.
5. Understand the nature of the Fourier series and find the Fourier coefficients.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	H	L
<b>CO2</b>	H	M	H	M	H	L
<b>CO3</b>	H	H	M	M	H	L
<b>CO4</b>	H	M	M	M	H	L
<b>CO5</b>	H	M	H	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	M	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Differentiation of Vectors (15 hours)

- 1.1 Scalar and vector point functions (K1, K2, K3, K4)
- 1.2 Derivative of product of vectors (K1, K2, K3, K4)
- 1.3 Definition of del operator and gradient of a scalar point function (K1, K2, K3, K4)
- 1.4 Determination of unit tangent and unit normal vectors (K1, K2, K3, K4)
- 1.5 Directional derivative – Angle between two surfaces (K1, K2, K3, K4)
- 1.6 Equation of tangent plane – Equation of normal to the given surface. (K1, K2, K3, K4)

### Unit II: Differentiation of Vectors (Continued) (15 hours)

- 2.1 Divergence of a vector (K1, K2, K3, K4)
- 2.2 Curl of a vector (K1, K2, K3, K4)
- 2.3 Solenoidal vectors (K1, K2, K3, K4)
- 2.4 Irrotational vectors (K1, K2, K3, K4)
- 2.5 Vector identities and their applications (K1, K2, K3, K4)
- 2.6 Laplacian differential operator and its applications. (K1, K2, K3, K4)

### Unit III: Integration of Vectors (15 hours)

- 3.1 Integration of point functions (K1, K2, K3, K4)
- 3.2 Line integrals (K1, K2, K3, K4)
- 3.3 Surface integrals (K1, K2, K3, K4)
- 3.4 Problems on Surface integrals (K1, K2, K3, K4)
- 3.5 Volume integrals (K1, K2, K3, K4)
- 3.6 Problems on Volume integrals (K1, K2, K3, K4)

### Unit IV: Integral Theorems (15 hours)

- 4.1 Statement of Gauss Divergence theorem (K1, K2)
- 4.2 Verification of Gauss Divergence theorem (K1, K2, K3, K4)
- 4.3 Applications of Gauss Divergence theorem (K1, K2, K3, K4)
- 4.4 Statement of Green's theorem – Verification of Green's theorem (K1, K2, K3, K4)
- 4.5 Application of Green's theorem – Statement of Stokes' theorem
- 4.6 Verification of Stokes' theorem – Applications of Stokes' theorem (K1, K2, K3, K4).

### Unit V: Fourier series (15 hours)

- 5.1 Fourier series – Definition (K1, K2)
- 5.2 Finding Fourier Coefficients for a given function (K1, K2, K3, K4)
- 5.3 Finding Fourier Coefficients for a given periodic function with period  $2\pi$  (K1, K2, K3, K4)
- 5.4 Finding Fourier Coefficients for odd functions (K1, K2, K3, K4)
- 5.5 Finding Fourier Coefficients even functions (K1, K2, K3, K4)
- 5.6 Half-range Series (K1, K2, K3, K4)

**Text Books:**

1. Duraipandian and Lakshmi Duraipandian – Vector Analysis – Emerald Publishers, Reprint 1998.
2. S. Naryanan and T.K. ManickavachagomPillai – Calculus vol. III – S. Viswanathan printers and publishers pvt. Ltd., Chennai, 2007.

**Reference Books:**

1. Murray R. Spiegel – Vector Analysis – Tata McGraw Hill Publishing Company Ltd., New Delhi, Copyright1974.
2. S.Narayanan and T.K. ManicakavachagomPillai – Vector Algebra and Analysis – S.Viswanathan Publishers, 1991.
3. P.R.Vittal - Differential equations, Fourier series and Laplace Transforms - Margham Publication – Third Edition, 2002.
4. M. D. Raisinghania, H. C. Saxena, H. K. Dass – Vector Calculus, S. Chand and Company Ltd., First Edition, 1999.

**e-Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – II**  
**UCMAD20 – Differential Equations and Laplace Transforms**

<b>Year: I</b> <b>SEM: II</b>	<b>Course Code:</b> UCMAD20	<b>Title of the Course:</b> Differential Equations and Laplace Transforms	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To improve problem solving skills in Differential Equations and Laplace Transforms
2. To expose students to different techniques of finding solution to these equations.

**Course Outcomes (CO)**

The learners will be able to

1. Solve the standard forms of first order differential equations.
2. Solve the second order differential equations with constant coefficients and variable coefficients.
3. Find the complete, singular and general integral of PDE.
4. Analyze the properties of Laplace Transforms.
5. Solve differential equations using Laplace Transforms.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	L	H	L
CO2	H	H	M	L	H	L
CO3	M	M	H	M	H	L
CO4	H	M	M	H	M	L
CO5	H	H	M	M	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	H
CO2	H	H	H	L	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: First Order Differential Equations (12 hours)

- 1.1 Introduction and Definitions of Differential Equations (K1, K2)
- 1.2 First order higher degree (K1, K2, K3, K4)
- 1.3 Solvable for p, x and y. (K1, K2, K3, K4)
- 1.4 Solving Clairaut's form (K1, K2, K3, K4)
- 1.5 Exact differential equations (K1, K2, K3, K4)
- 1.6 Total differential equations  $Pdx + Qdy + Rdz = 0$  (K1, K2, K3, K4)

### Unit II: Second Order Differential Equations (12 hours)

- 2.1 Introduction of Second order differential equations (K1)
- 2.2 Sums on Second order equations with constant coefficients (K1, K2, K3, K4)
- 2.3 Finding P.I for  $e^{ax}V$ , where V is  $x^m$ ,  $\cos mx$ ,  $\sin mx$  (m is a positive constant) (K1, K2, K3, K4)
- 2.4 Solving Second order differential equations (K1, K2, K3, K4)
- 2.5 Second order differential equations with variable coefficients (K1, K2, K3, K4)
- 2.6 Method of variation of parameters. (K1, K2, K3, K4)

### Unit III: Partial Differential Equations (12 hours)

- 3.1 Formation of P.D.E by eliminating arbitrary constants (K1, K2, K3, K4)
- 3.2 Formation of P.D.E by eliminating arbitrary functions (K1, K2, K3, K4)
- 3.3 Definition of Complete, Singular and general integral (K1, K2, K3, K4)
- 3.4 Solution of equations of standard types:  $f(p,q) = 0$ ;  $f(x,p,q) = 0$ ,  $f(y,p,q) = 0$ ,  $f(z,p,q) = 0$ ;  
 $f_1(x,p) = f_2(y,p)$  (K1, K2, K3, K4)
- 3.5 Solution of Clairaut's form (K1, K2, K3, K4)
- 3.6 Solution of Lagrange's method (K1, K2, K3, K4)

### Unit IV: Laplace Transforms (12 hours)

- 4.1 Definition of Laplace Transform (K1, K2)
- 4.2 Transforms of elementary functions (K1, K2, K3, K4)
- 4.3 Properties of Laplace Transform (K1, K2, K3)
- 4.4 Laplace Transforms of derivatives (K1, K2, K3, K4)
- 4.5 Laplace Transforms of integrals (K1, K2, K3, K4)
- 4.6 Periodic function of Laplace transforms. (K1, K2, K3, K4)

### Unit V: Applications of Laplace Transforms (12 hours)

- 5.1 Introduction of Inverse Laplace transforms (K1, K2)
- 5.2 Basic properties of Inverse Laplace Transform (K1, K2)
- 5.3 Sums on Inverse Laplace transform (K1, K2, K3, K4)
- 5.4 Introduction of linear Second order Differential equations (K1, K2)
- 5.5 Solution of linear ordinary differential equations of second order (K1, K2, K3, K4)
- 5.6 Solution of Second order differential equation with constant coefficients using Laplace Transformations (K1, K2, K3, K4)

**Text Books:**

1. S. Naryanan and T.K. Manickavachagom Pillai – Calculus Vol. III – S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai, 2012.
2. M. K. Venkataraman and Manorama Sridhar - Differential Equations and Laplace Transform - First Edition - 2004

**Reference Books:**

1. P.R.Vittal - Differential equations, Fourier and Laplace Transforms and Probability - Margham Publication – Third Edition, 2002.
2. D.A. Murray - Introduction course in Differential Equations, Orient and Longman publication, Chennai,2003.
3. Sundrapandian V – Ordinary and Partial Differential Equations, Tata McGraw Hill Education Pvt. Ltd, New Delhi,2013.

**e- Resources**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in/>

**SEMESTER – III**  
**UCMAE20 – Solid Geometry**

<b>Year: II</b> <b>SEM:III</b>	<b>Course Code:</b> UCMAE20	<b>Title of the Course:</b> Solid Geometry	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce various concepts of three-dimensional Analytical Solid Geometry.
2. To understand and deepen the knowledge related to three-dimensional Analytical Solid Geometry.

**Course Outcomes (CO)**

The learners will be able to

1. Comprehend the basic concepts of plane and find the equation of a plane under given conditions.
2. Understand the basic concepts of straight line and skew lines and also find the equation of a straight line under given conditions, find the length and equations of the shortest distance between two skew lines.
3. Understand the basic concepts of sphere and find the equation of a sphere under given conditions.
4. Familiarize with cone, right circular cone, enveloping cone and reciprocal cone and also find the respective equations under given conditions.
5. Familiarize with cylinder, enveloping cylinder and right circular cylinder and also find the respective equations under given conditions.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	M	H	H	M	L
<b>CO2</b>	H	M	H	H	M	L
<b>CO3</b>	H	M	H	H	M	L
<b>CO4</b>	H	M	H	H	M	L
<b>CO5</b>	H	M	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	L	L	M
<b>CO2</b>	H	H	H	L	L	M
<b>CO3</b>	H	H	H	L	L	M
<b>CO4</b>	H	H	H	L	L	M
<b>CO5</b>	H	H	H	L	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit 1: Plane (15 hours)

- 1.1 General equation of a plane (K1, K2, K3)
- 1.2 Equation of a plane in intercept form (K1, K2, K3, K4)
- 1.3 Equation of a plane in normal form (K1, K2, K3, K4)
- 1.4 Angle between two planes (K1, K2, K3)
- 1.5 Plane through the intersection of two given planes (K1, K2, K3, K4)
- 1.6 Condition for the homogenous equation of the second degree to represent a pair of planes (K1, K2, K3, K4)

### Unit 2: Straight Line (15 hours)

- 2.1 Symmetrical form of a straight line (K1, K2, K3)
- 2.2 Equation of a straight line passing through two given points (K1, K2, K3)
- 2.3 Expressing the equation of a line in symmetrical form (K1, K2, K3, K4)
- 2.4 Image of a point in the given plane (K1, K2, K3, K4)
- 2.5 Image of a line in the given plane (K1, K2, K3, K4)
- 2.6 Length and equations of the shortest distance between two skew lines (K1, K2, K3, K4)

### Unit 3: Sphere (15 hours)

- 3.1 Equation of a sphere (K1, K2, K3)
- 3.2 Length of the tangent from a point to the given sphere (K1, K2, K3)
- 3.3 Equation of the tangent plane at a point to the given sphere (K1, K2, K3, K4)
- 3.4 Section of a sphere by a plane (K1, K2, K3, K4)
- 3.5 Equation of a sphere passing through a given circle (K1, K2, K3, K4)
- 3.6 Condition for orthogonality of two spheres (K1, K2, K3, K4)

### Unit 4: Cone (15 hours)

- 4.1 Equation of a cone (K1, K2, K3, K4)
- 4.2 Condition for the general equation of the second degree to represent a cone (K1, K2, K3, K4)
- 4.3 Right Circular Cone (K1, K2, K3, K4)
- 4.4 Enveloping Cone (K1, K2, K3, K4)
- 4.5 Tangency of a plane to a cone (K1, K2, K3)
- 4.6 Reciprocal Cone (K1, K2, K3)

### Unit 5: Cylinder (15 hours)

- 5.1 Equation of a cylinder with a given generator and a given guiding curve (K1, K2, K3, K4)
- 5.2 Enveloping cylinder (K1, K2, K3, K4)
- 5.3 Enveloping cylinder as a limiting form of an enveloping cone (K1, K2, K3)
- 5.4 Equation of a right circular cylinder with a given axis and a given radius (K1, K2, K3, K4)
- 5.5 Equation of a right circular cylinder with a given axis and passing through a given point (K1, K2, K3, K4)
- 5.6. Equation of a right circular cylinder passing through a circle (K1, K2, K3, K4)

**Text Books:**

1. P. R. Vittal – Vector Analysis, Analytical Solid Geometry & Sequences and Series - Margham Publications – Reprint 2004.

**Reference Books:**

1. T.K. Manickavachagam Pillay and T. Natrajan – Analytical Geometry – S. Viswanathan Printers & Publishers Pvt. Ltd. 2012.
2. P. Durai Pandian – Analytical Geometry of Three Dimensions – Mugil Publishers – Revised Edition, 1983.
3. S. G. Venkatachalapathy – Analytical Geometry - Margham Publications – First Edition, 2008.

**e-Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – III**  
**UCMAF20 - Statics**

<b>Year: II</b> <b>SEM: III</b>	<b>Course Code:</b> UCMAF20	<b>Title of the Course:</b> Statics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To develop broad knowledge of Statics and understanding of definitions, concepts, principles and theorems.
2. To enhance the ability of learners to apply the knowledge and skills acquired by them during the course to solve specific theoretical and applied problems in Statics.

**Course Outcomes (CO)**

The learners will be able to

1. Familiarize with subject matter, which has been the single center, to which mathematicians, physicists, astronomers, and engineers were drawn together.
2. Understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a rigid body.
3. Understand the reduction of force system to a resultant force acting at a base point and a resultant couple, which is independent of the choice of base of reduction.
4. Understand static friction that exists between a stationary object and the surface on which it is resting and apply the knowledge and skills to solve specific theoretical and applied problems.
5. Construct center of gravity of some materialistic systems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	L
CO2	H	M	H	M	H	L
CO3	H	M	H	M	H	L
CO4	H	H	H	H	H	L
CO5	H	H	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	L
CO2	H	M	H	M	H	L
CO3	H	M	H	M	H	L
CO4	H	H	H	H	H	L
CO5	H	H	H	H	M	L

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Force

(15 hours)

- 1.1 Newton's Laws of motion (K1,K2)
  - 1.2 Force (K1,K2, K3)
  - 1.3 Resultant of two forces on a particle – Book works (K1,K2, K3)
  - 1.4 Resultant of two forces on a particle – Problems (K1,K2, K3, K4)
  - 1.5 Resultant of three forces related to a triangle acting at a point (K1,K2, K3, K4)
  - 1.6 Resultant of several forces acting on a particle (K1,K2, K3, K4)
- (Chapter 2: Sections 2.1, 2.1.1, 2.2, 2.2.1, 2.2.2; Omit 2.1.2)

### Unit II: Forces on a Rigid Body

(15 hours)

- 2.1 Equilibrium of a particle under three forces (K1, K2)
  - 2.2 Triangle of forces-Polygon of forces (K1, K2)
  - 2.3 Lami's theorem (K1, K2, K3)
  - 2.4 Equilibrium of a particle under several forces (K1, K2, K3)
  - 2.5 Equilibrium of a particle – Problems (K1, K2, K3, K4)
  - 2.6 Moment of a force – Moment of a force about a line – Scalar moment (K1, K2)
- (Chapter 3: Sections 3.1, 3.1.1, 3.1.2, Chapter 4: Sections 4.1, 4.1.1, 4.1.2.).

### Unit III: Forces on a Rigid Body (Continued)

(15 hours)

- 3.1 Parallel forces – Point of application of resultant of many parallel forces (K1, K2, K3, K4)
  - 3.2 Varignon's theorem (K1, K2, K3, K4)
  - 3.3 Parallel forces at the vertices of a triangle (K1, K2, K3, K4)
  - 3.4 Forces along the sides of a triangle (K1, K2, K3, K4)
  - 3.5 Couples – Moment of a couple – Arm and axis of a couple (K1, K2, K3, K4)
  - 3.6 Resultant of several coplanar forces-Moment of a certain couple as an area (K1, K2, K3, K4)
- (Chapter 4: Sections 4.4, 4.4.1, 4.4.2, 4.4.3, 4.5, 4.6, 4.6.1, 4.6.2, 4.7, 4.7.1)

### Unit IV: Friction

(15 hours)

- 4.1 Types of forces – Friction – Definitions (K1, K2)
  - 4.2 Laws of friction (K1, K2)
  - 4.3 Limiting equilibrium of a particle on an inclined plane – Book Works (K1, K2, K3)
  - 4.4 Limiting equilibrium of a particle on an inclined plane – Problems (K1, K2, K3, K4)
  - 4.5 Problems involving frictional forces (K1, K2, K3, K4)
  - 4.6 Problems involving frictional forces (K1, K2, K3, K4)
- (Chapter 2: Section 2.1.2, Chapter 3: Section 3.2, Chapter 5: Section 5.2; Omit 5.2.1)

### Unit V: Centre of Mass

(15 hours)

- 5.1 Centre of mass (K1, K2)
  - 5.2 Centre of gravity (K1, K2)
  - 5.3 Finding mass centre -Finding mass centre (not using integration) - Theory (K1, K2, K3, K4)
  - 5.4 Finding mass centre (not using integration) – Problems (K1, K2, K3, K4)
  - 5.5 Finding mass centre using integration (K1, K2, K3, K4)
  - 5.6 Finding mass centre using integration (K1, K2, K3, K4)
- (Chapter 6: Sections 6.1, 6.1.1, 6.2, 6.2.1, 6.2.2)

**Text Book:**

1. P.Duraipandian, Laxmi Durai Pandian, Muthamizh Jayapragasam – Mechanics –S.Chand and Co. Ltd. – Sixth Rep. Edition 2007 Edition.

**Reference Books:**

1. K. Viswanatha Naik, M.S. Kasi – Statics – Emerald Publication, 1<sup>st</sup> Edition, 1987.
2. M.K. Venkatraman – Statics – Agasthiar Publication, 9<sup>th</sup> Edition, 1999.
3. A Ruina and R. Pradap, Introduction to Statics and Dynamics, Oxford University Press, 2014

**e-Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – III**  
**UAMSA20 – Mathematical Statistics I**

<b>Year: II</b> <b>SEM: III</b>	<b>Course Code:</b> UAMSA20	<b>Title of the Course:</b> Mathematical Statistics-I	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 6	<b>CREDITS</b> 6	<b>MARKS</b> 100
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**Course Objectives**

1. To study Statistics from a purely mathematical standpoint using Probability theory as well as other branches of Mathematics.
2. To understand the concepts of random variables and probability functions.
3. To demonstrate knowledge of probability and the standard statistical distributions.
4. To recognize the fundamental meanings of correlation and regression.

**Course Outcomes (CO)**

The learners will be able to

1. Comprehend the fundamentals of probability.
2. Know about random variables of one and two dimensions.
3. Learn about the measures of central tendency and concepts of moments.
4. Acquire knowledge about discrete and continuous distributions.
5. Apply correlation and regression for the investigation of relationship between the variables.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	M	H	H	H	L
<b>CO2</b>	H	H	H	H	H	M
<b>CO3</b>	H	M	H	H	H	L
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	M	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	L	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### **Unit I: Theory of Probability** (18 hours)

- 1.1 Definition of probability and basics (K1, K2)
- 1.2 Independence of events (K1, K2, K3)
- 1.3 Addition theorem (K1, K2)
- 1.4 Conditional probability (K1, K2, K3)
- 1.5 Multiplication Law of probability (K1, K2, K3, K4)
- 1.6 Bayes' theorem (K2, K3, K4)

### **Unit II: Random Variables** (18 hours)

- 2.1 Discrete and continuous random variables - Probability distribution and distribution Function (K1, K2, K3)
- 2.2 Definition of two-dimensional random variable (K1K2)
- 2.3 Probability distribution (K2, K3, K4)
- 2.4 Probability density function (K2, K3, K4)
- 2.5 Marginal and conditional distributions (K1, K2, K3, K4)
- 2.6 Stochastic independence of random variables (K2, K3)

### **Unit III: Characteristics of Random Variables** (18 hours)

- 3.1 Mathematical Expectation and Properties (K1, K2, K3)
- 3.2 Variance, Standard deviation, Mean deviation (K1, K2, K3)
- 3.3 Tchebychev's inequality (K2, K3, K4)
- 3.4 Raw and central moments and relation between them (K1, K2, K3)
- 3.5 Moment generating function (mgf) and properties of mgf (K1, K2, K3, K4)
- 3.6 Uniqueness theorem (statement only), Characteristic function and properties (K1, K2, K3, K4)

### **Unit IV: Standard Distributions** (18 hours)

- 4.1 Binomial distribution (K1, K2, K3, K4)
- 4.2 Poisson distribution (K1, K2, K3, K4)
- 4.3 Normal distribution (K1, K2, K3,)
- 4.4 Normal distribution (continued) (K1, K2, K3, K4)
- 4.5 Uniform distribution (K1, K2, K3)
- 4.6 Rectangular distribution. (K1, K2, K3)

### **Unit V: Correlation and Regression** (18 hours)

- 5.1 Correlation, types of correlation and Karl Pearson's coefficient of correlation (K1, K2)
- 5.2 Properties of correlation coefficient (K1, K2)
- 5.3 Spearman's rank correlation coefficient (K1, K2)
- 5.4 Computation of correlation and rank correlation coefficient for raw and grouped data (K3, K4)
- 5.5 Regression lines definition, derivation, angle between regression lines, regression coefficient properties (K1, K2)
- 5.6 Computation of regression lines for raw and grouped data. (K3, K4)

**Text Book:**

1. S. C. Gupta, V.K. Kapoor - Fundamentals of Mathematical Statistics - Sultan Chand & Sons, New Delhi, Third Edition, 2004.

**Reference Books:**

1. Hogg R.V. and Craig, A.T.- Introduction to Mathematical Statistics – Macmillan, 4<sup>th</sup> Edition 1998.
2. Mood, A.M., Graybill, F.A. and Boes, D.G.- Introduction to Theory of Statistics - McGraw Hill Publication, 3<sup>rd</sup> Edition 1974.
3. Snedecor G.W., Cochran W.G. - Statistical Methods - Oxford and IBH - 6<sup>th</sup> Edition 1967.
4. Hoel P.G. - Introduction to Mathematical Statistics – Wiley, 4<sup>th</sup> Edition 1971.
5. Wilks S.S. - Elementary Statistical Analysis - Oxford and IBH. Reprint 1971.

**e-Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in/>

**SEMESTER – III**  
**USMAAn20 – Numerical Methods**

<b>Year: II</b> <b>SEM: III</b>	<b>Course Code:</b> USMAAn20	<b>Title of the Course:</b> Numerical Methods	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce various concepts of numerical methods.
2. To apply them and obtain the approximate solutions to mathematical problems.

**Course Outcomes (CO)**

The learners will be able to

1. Understand the operators of finite differences and express any value of  $y$  in terms of the forward differences of  $y_0$  and the backward differences of  $y_n$ .
2. Apply interpolating techniques for equal intervals by Newton's method.
3. Apply central difference formulae to get the intermediate values of given data.
4. Apply interpolating techniques for unequal intervals by divided difference formula and Lagrange's interpolation formula.
5. Evaluate the gradient at any point of a graph using numerical differentiation and find the area under curved surface, velocity, etc. using numerical integration.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	H	L
CO2	H	H	M	H	H	L
CO3	H	H	M	H	H	L
CO4	H	H	M	H	H	L
CO5	H	H	M	M	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	L	L	M
CO4	H	H	H	L	L	M
CO5	H	H	H	L	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Finite Differences

(6 hours)

First difference – Operators:  $\Delta, \nabla, \mu, \delta$ , E and D - Properties of operators – Relation between the operators - Express any value of y in terms of  $y_n$  and the backward differences of  $y_n$  - Differences of a polynomial – Factorial polynomial. (K1, K2, K3, K4)

### Unit II: Interpolation with Equal Intervals

(6 hours)

Gregory-Newton forward interpolation formula (for equal intervals) – Gregory-Newton Backward interpolation formula (for equal intervals) - Equidistant terms with one or more missing values (K1, K2, K3, K4)

### Unit III: Central Difference Interpolation Formulae

(6 hours)

Central differences and central differences table – Gauss's forward interpolation formula – Gauss's backward interpolation formula- Stirling's formula – Bessel's formula. (K1, K2, K3, K4)

### Unit IV: Interpolation with Unequal Intervals

(6 hours)

Divided differences – Properties of divided differences – Relation between divided differences and forward differences – Theorem: Newton's divided difference formula – Deduction: Deduce Gregory Newton interpolation forward formula for equal intervals- Lagrange's interpolation formula – Different form of Lagrange's interpolation formula. (K1, K2, K3, K4)

### Unit V: Numerical Differentiation and Integration

(6 hours)

Newton's forward difference formula to get the derivative – Newton's Backward difference formula to get the derivative – Derivative using Stirling's formula- A general quadrature formula for equidistant ordinates–Trapezoidal rule –Simpson's one-third rule – Simpson's three-eighth rule. (K1, K2, K3, K4)

### Text Book:

1. P.Kandasamy, K.Thilagavathy and K.Gunavathy- Numerical Methods-S.Chand publication- Revised Edition 2014.

### Reference Books:

1. S.G. Venkatachalapathy – Calculus of Finite Differences and Numerical Analysis, Margham Publications, First edition 2003.
2. S.Kalavathy – Numerical Methods - Thomson Learning – 5, Shenton Way, Singapore. Copy Right: 2004.
3. Dr.A.Singaravelu – Numerical Methods – Meenakshi Agency - 120, Pushpa Nagar Medavakkam, Chennai, Revised Edition: Dec 2007.

4. Dr. V.N.Vedamurthy, Dr.N.Ch.S.N. Iyengar – Numerical Methods, Vikas Publishing House Pvt. Ltd, New Delhi, Copy Right: 1998.
5. S.Arumugam, A.Thangapandi Isaac, A. Somasundaram – Numerical Methods, Second Edition - SciTech Publishing Pvt. Ltd; Chennai - Reprint: Sep 2005.
6. R.Gupta – Numerical Analysis, Laxmi Publishing Ltd., New Delhi - Revised Edition, 2001.

#### **e- Resources**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in/>

**SEMESTER – IV**  
**UCMAG20 – Operations Research**

<b>Year: II</b> <b>SEM: IV</b>	<b>Course Code:</b> UCMAG20	<b>Title of the Course:</b> Operations Research	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To apply problem solving skills to real life situations.
2. To develop logical and analytical skills.

**Course Outcomes (CO)**

The learners will be able to

1. Translate the real-world problems into linear programming problems and obtain solutions.
2. Apply the transportation problem techniques for the optimization of cost.
3. Solve the assignment problem which deals with the allocation of various sources to various destinations on one-to-one basis.
4. Find the optimum strategies of the players and the value of the 2-person games.
5. Perform network planning using PERT & CPM techniques which provide a methodology for planning and controlling of a project.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO 6
CO1	H	M	H	H	M	L
CO2	H	M	H	H	M	L
CO3	H	M	H	H	M	L
CO4	H	M	H	H	M	L
CO5	H	M	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO 6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	L	H
CO3	H	H	H	L	L	H
CO4	H	H	H	L	L	H
CO5	H	H	H	L	L	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Linear Programming

(12 hours)

- 1.1 Introduction (K1, K2)
- 1.2 Scope of OR (K1, K2)
- 1.3 Formulation a Linear Programming Problem (K1, K2, K3)
- 1.4 Graphical Method Standard Form of LPP – Simplex Method (K1, K2, K3, K4)
- 1.5 Standard Form of LPP – Simplex Method (K1, K2, K3, K4)
- 1.6 Simplex Method – Problems (K1, K2, K3, K4)

### Unit II: Transportation Model

(12 hours)

- 2.1 Introduction – Mathematical Formulation (K1, K2)
- 2.2 Finding Initial Basic Feasible Solution- North West Corner Rule (K1, K2, K3, K4)
- 2.3 Matrix Minima Method (K1, K2, K3, K4)
- 2.4 Vogel's Approximation Method – Optimality Test – MODI Method (K1, K2, K3, K4)
- 2.5 Unbalanced Transportation Problem (K1, K2, K3, K4)
- 2.6 Maximization Problem (K1, K2, K3, K4)

### Unit III: Assignment Model

(12 hours)

- 3.1 Assignment Model Formulation of Assignment Problem (K1, K2)
- 3.2 Hungarian Method (K1, K2, K3, K4)
- 3.3 Multiple optimal - Non Square Matrix (K1, K2, K3, K4)
- 3.4 Maximization of Assignment Problem (K1, K2, K3, K4)
- 3.5 Restrictions on Assignment (K1, K2, K3, K4)
- 3.6 Travelling Salesman Problem – Mathematical Formulation – Solutions to Travelling Salesman Problem (K1, K2, K3, K4)

### Unit IV: Game Theory

(12 hours)

- 4.1 Introduction – Characteristics of Games – Definitions (K1, K2)
- 4.2 Two Person Zero-sum game with saddle point (K1, K2, K3, K4)
- 4.3 Maxmin-Minimax Principle (K1, K2, K3, K4)
- 4.4 Game Problems of Mixed Strategies Arithmetic and Algebraic Methods (K1, K2, K3, K4)
- 4.5 Method of Dominance (K1, K2, K3, K4)
- 4.6 Graphical Method for  $2 \times n$  or  $m \times 2$  games (without saddle point) (K1, K2, K3, K4)

### Unit V: PERT and CPM

(12 hours)

- 5.1 Introduction – Network Diagram Representation (K1, K2)
- 5.2 Rules for Constructing the Network (K1, K2)
- 5.3 Calculation and Critical path in Network Analysis (K1, K2, K3, K4)
- 5.4 Determination of Floats or Slack Times (K1, K2, K3, K4)
- 5.5 Critical path Method – Procedure of Determining the Critical path (K1, K2, K3, K4)

## 5.6 Program Evaluation and Review Technique (PERT). (K1, K2, K3, K4)

### **Text Book:**

1. P.K. Gupta and D.S. Hira – Problems in Operations Research, 1<sup>st</sup> Edition – Chand and Company Ltd., 1995.

### **Reference Books:**

1. S. Kalavathy – Operations Research, 2<sup>nd</sup> Edition – Vikas Publications Ltd., 2002.
2. S. J. Venkatesan – Operations Research, 3<sup>rd</sup> Edition – J S Publication, Printed by Udayam Offsets, Chennai, 1999.
3. V.K. Kapoor – Operations Research, 5<sup>th</sup> Edition – Sultan Chand and Sons, Educational Publishers New Delhi, Revised Reprint, 1996.

### **e-Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – IV**  
**UCMAH20-Dynamics**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>HOURS</b>
<b>SEM: IV</b>	UCMAH20	Dynamics	Theory	Core	4	4	100

**Course Objectives**

1. To develop balanced knowledge of Dynamics and understanding of definitions, concepts, principles and theorems in Dynamics.
2. To enhance the ability of learners to apply the knowledge and skills acquired by them during the course to solve specific theoretical and applied problems in Dynamics.

**Course Outcomes (CO)**

The learners will be able to

1. Familiarize with subject matter, which has been the single centre, to which mathematicians, physicists, astronomers, and engineers were drawn together.
2. Understand behaviour of motion of objects.
3. Understand simple harmonic motion and projectiles.
4. Express the effects of impact of spheres.
5. Demonstrate methods to locate central orbits.
6. Apply the knowledge and skills to solve specific theoretical and applied problems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	H	L
<b>CO2</b>	H	M	H	M	H	L
<b>CO3</b>	H	M	H	M	H	L
<b>CO4</b>	H	H	H	H	H	L
<b>CO5</b>	H	H	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	H	H	L
<b>CO2</b>	H	M	H	M	H	L
<b>CO3</b>	H	M	H	M	H	L
<b>CO4</b>	H	H	H	H	H	L
<b>CO5</b>	H	H	H	H	M	L

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Velocity (12 hours)

- 1.1 Basic units – Velocity – Velocity of a particle describing a circle (K1, K2)
  - 1.2 Resultant Velocity (K1, K2, K3, K4)
  - 1.3 Relative Velocity (K1, K2, K3, K4)
  - 1.4 Acceleration (K1, K2)
  - 1.5 Coplanar motion - Velocity and acceleration in a coplanar motion (K1, K2, K3, K4)
  - 1.6 Angular velocity – Relative angular velocity (K1, K2, K3, K4)
- (Chapter I: Sections 1.1, 1.2, 1.2.1, 1.2.2, 1.2.3, 1.3, 1.4, 1.4.1, 1.4.2, 1.4.3; Omit 1.3.1, 1.3.2)

### Unit II: Simple Harmonic Motion (12 hours)

- 2.1 Simple Harmonic motion - Definitions (K1, K2)
  - 2.2 Simple Harmonic motion – Book works (K1, K2, K3)
  - 2.3 Projection of a particle having a uniform circular motion (K1, K2)
  - 2.4 Composition of two simple harmonic motions of same period. (K1, K2)
  - 2.5 Simple Harmonic motion – Problems (K1, K2, K3, K4)
  - 2.6 Simple Harmonic motion – Problems (K1, K2, K3, K4)
- (Chapter 12: Sections 12.1, 12.1.1, 12.1.2)

### Unit III: Projectiles (12 hours)

- 3.1 Forces on a projectile (K1, K2)
  - 3.2 Displacement as a combination of vertical and horizontal displacements (K1, K2)
  - 3.3 Nature of a trajectory – Results pertaining to the motion of a projectile -  
Maximum horizontal range for a given velocity (K1, K2, K3, K4)
  - 3.4 Projectiles- Problems (K1, K2, K3, K4)
  - 3.5 Projectile projected on an inclined plane (K1, K2, K3, K4)
  - 3.6 Maximum range on an inclined plane (K1, K2, K3, K4)
- (Chapter 13: Sections 13.1, 13.1.1, 13.1.2, 13.1.3, 13.1.4, 13.2, 13.2.1; Omit 13.1.5, 13.1.6)

### Unit IV: Impact (12 hours)

- 4.1 Impact of spheres - Laws of Impact (K1, K2)
  - 4.2 Impact of two smooth spheres (K1, K2)
  - 4.3 Direct impact of two smooth spheres – Book works (K1, K2, K3)
  - 4.4 Direct impact of two smooth spheres – Problems (K1, K2, K3, K4)
  - 4.5 Oblique impact of two smooth spheres – Book works (K1, K2, K3)
  - 4.6 Oblique impact of two smooth spheres – Problems (K1, K2, K3, K4)
- (Chapter 14: Sections 14.2, 14.2.1, 14.3, 14.3.1, 14.5; Omit 14.4)

### Unit V: Central Orbit (12 hours)

- 5.1 Central orbit (K1, K2)
  - 5.2 Differential Equation of a central orbit (K1, K2, K3, K4)
  - 5.3 Laws of a central force (K1, K2)
  - 5.4 Methods to find the central orbits (K1, K2, K3, K4)
  - 5.5 Central orbit - Problems (K1, K2, K3, K4)
  - 5.6 Central orbit - Problems (K1, K2, K3, K4)
- (Chapter 16: Sections 16.2, 16.2.1, 16.2.2, 16.2.3)

**Text Book:**

1. P. Durai Pandian, Laxmi Durai Pandian, Muthamizh Jayapragasam - Mechanics – S. Chand Publishing, 6<sup>th</sup> Edition, 2015.

**Reference Books:**

1. K. Viswanatha Naik & M. S. Kasi – Dynamics – Emerald Publication, 1<sup>st</sup> Edition, 1987.
2. M. K. Venkatraman – Dynamics – Agasthiar Publication, 9<sup>th</sup> Edition, 1999.
3. A Ruina and R. Pradap, Introduction to Statics and Dynamics, Oxford University Press, 2014

**e-Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – IV**  
**UAMSB20 – Mathematical Statistics II**

<b>Year: II</b> <b>SEM: IV</b>	<b>Course Code:</b> UAMSB20	<b>Title of the Course:</b> Mathematical Statistics-II	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 6	<b>CREDITS</b> 6	<b>MARKS</b> 100
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**Course Objectives**

1. To provide a sound foundation in basic topics of modern statistical inference.
2. To study the concept of likelihood and derive the likelihood and associated functions of interest for simple models.
3. To construct confidence intervals for unknown parameters.
4. To demonstrate understanding of how to design experiments and surveys for efficiency.

**Course Outcomes (CO)**

The learners will be able to

1. Know the basic concepts of some advanced distributions.
2. Apply estimation theory to estimate the values of parameters.
3. Use appropriate sampling distributions for testing of hypothesis.
4. Apply chi-square test to find out the significant difference between expected and observed frequencies in one or more categories.
5. Use F-test to compare statistical model that has been fitted to a data that best fits the population from which the data was sampled.

<b>CO</b>	<b>PSO</b>					
	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>CO1</b>	H	M	H	H	H	L
<b>CO2</b>	H	L	H	H	H	M
<b>CO3</b>	H	M	H	H	H	L
<b>CO4</b>	H	L	H	H	H	M
<b>CO5</b>	H	M	H	H	H	H

<b>CO</b>	<b>PO</b>					
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>CO1</b>	H	H	H	L	M	H
<b>CO2</b>	H	H	H	L	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Sampling Distributions

(18hours)

- 1.1 Parameter and statistic - sampling distribution - Standard error (K1, K2)
- 1.2 Sampling distribution of statistics (K1, K2)
- 1.3 Chi-square distribution -p.d.f derivation, moment generating function (K1, K2, K3, K4)
- 1.4 Chi-square distribution (continued) mean, variance, additive property (K1, K2, K3, K4)
- 1.5 Student's t distribution – moments - limiting form of t distribution (K1, K2, K3, K4)
- 1.6 F distribution – mean, variance (K1, K2, K3, K4)

### Unit II: Parametric Estimation

(18 hours)

- 2.1 Point estimation, Concept of unbiasedness, consistency, efficiency and sufficiency (K1, K2, K3)
- 2.2 Cramer Rao Inequality – Rao-Blackwell Theorem (K3, K4)
- 2.3 Methods of estimation - method of moments (K1, K2, K3, K4)
- 2.4 Method of maximum likelihood (K1, K2, K3, K4)
- 2.5 Interval Estimation - Confidence interval for mean - difference in means – proportion - difference in proportions (K1, K2, K3, K4)
- 2.6 Interval Estimation for variance using normal, t and Chi-square distributions (K1, K2, K3, K4)

### Unit III: Tests of Significance

(18 hours)

- 3.1 Tests of significance – definitions (K1, K2)
- 3.2 Tests of significance for large samples for mean and standard deviation (K1, K2, K3, K4)
- 3.3 Tests of significance for large samples for proportion and correlation coefficient (K1, K2, K3, K4)
- 3.4 Tests of significance for small samples – t,  $\chi^2$  test for mean and variance (K1, K2, K3, K4)
- 3.5 Test of significance for small samples - F test for mean, variance (K1, K2, K3, K4)
- 3.6 Tests of significance for small samples with regard to coefficient of correlation (K1, K2, K3, K4)

### Unit IV: Chi Square Tests

(18 hours)

- 4.1 Formula derivation for Chi-square test (K1, K2)
- 4.2 Chi-square test of goodness of fit (K3, K4)
- 4.3 Attribute (K1, K2, K3,)
- 4.4 coefficient of association (K1, K2, K3)
- 4.5 Contingency tables (K1, K2, K3)
- 4.6 Chi-square test for independence of attributes (K3, K4)

### Unit V: Analysis of Variance

(18hours)

- 5.1 Analysis of variance-one-way and two-way classification (K1, K2, K3, K4)
- 5.2 Basic principles of design of experiments (K1, K2)
- 5.3 Randomization – Replication - Randomized Block Design (K1, K2)
- 5.4 Randomized block design (K1, K2, K3, K4)
- 5.5 Completely Randomized block design (K1, K2, K3, K4)
- 5.6 Latin Square Design (K1, K2, K3, K4)

**Text Book:**

1. S. C. Gupta and V. K. Kapoor - Fundamentals of Mathematical Statistics - Sultan Chand & Sons, New Delhi, Second Edition, 2004.

**Reference Books:**

1. Hogg R.V. and Craig, A.T. - Introduction to Mathematical Statistics, Macmillan, 4<sup>th</sup> Edition 1998.
2. Mood, A.M., Graybill, F.A. and Boes, D.G.- Introduction to Theory of Statistics - McGraw Hill Publication, 3<sup>rd</sup> Edition 1974.
3. Snedecor G.W., Cochran W.G. - Statistical Methods - Oxford and IBH - 6<sup>th</sup> Edition 1967.
4. Hoel P.G. - Introduction to Mathematical Statistics – Wiley, 4<sup>th</sup> Edition 1971.
5. Wilks S.S. - Elementary Statistical Analysis - Oxford and IBH Reprint 1971.

**e- Resources:**

1. <https://nptel.ac.in/>
2. [https://www.cimt.org.uk/projects/mepres/alevel/fstats\\_ch4.pdf](https://www.cimt.org.uk/projects/mepres/alevel/fstats_ch4.pdf)
3. [www.coursera.org](http://www.coursera.org)

**SEMESTER – IV**  
**USMABn20 - R Programming Language**

<b>Year: II</b> <b>SEM: IV</b>	<b>Course Code:</b> USMABn20	<b>Title of the Course:</b> R Programming Language	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>CREDITS</b> 2	<b>HOURS</b> 100
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**Course Objectives**

1. To introduce students to the concept of basic R programming, thereby enhancing the logical thinking of the students with regard to programming.
2. To train the students to apply the programming concepts of R to statistical investigations and problem solving.

**Course Learning Outcomes (CLO)**

The learners will be able to

1. Familiarize the basics of programming in R such as vectors, arrays, data frames, etc.
2. Use the Decision making-branching and looping statements in R programming.
3. Represent data and Interpret results through graphical tools in R.
4. Calculate basic statistical measures and fit standard distributions using R.
5. Understand and apply the programming concepts of R to perform tests of significance.
6. Understand and apply the programming concepts of R to perform Analysis of Variance.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	L	H
<b>CO2</b>	H	M	H	M	L	H
<b>CO3</b>	H	M	H	M	L	H
<b>CO4</b>	H	H	H	H	L	H
<b>CO5</b>	H	M	H	H	L	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	M	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Basics of R (6 hours)

Introduction and Preliminaries-Simple Manipulations; Numbers and Vectors-Arrays and Matrices - Lists and Data Frames-Reading Data from files (K1, K2, K3, K4)

### Unit II: Decision Making and Graphical Procedures (6 hours)

Grouping-Loops and Conditional Execution-Graphics on R-Scatter Plot-Line Graphs-Pie Charts-Bar Plots-Histograms-Frequency Polygons (K1, K2, K3, K4)

### Unit III: Statistical Measures & Probability Distributions (6 hours)

Mean, Median and Mode-Variance, Standard Deviation and Mean Deviation -Correlation and Regression-Standard Distributions -Binomial, Poisson and Normal Distributions (K1, K2, K3, K4)

### Unit IV: Tests of significance (6 hours)

z-Test-Test for Mean-Test for Proportion-Comparing two Means-Comparing two proportions- Student t-test and t-test for two Means- Chi-Square Test-Test for Independence of Attributes (K1, K2, K3, K4)

### Unit V: Analysis of Variance (6 hours)

Comparing more than two Means-Completely Randomized Design - One-Way Classification-Randomized Block Design-Two-Way Classification-Latin Square Design (K1, K2, K3, K4)

#### Text Books:

1. The R Book-Michael J. Crawley-Imperial College London at Silwood Park, UK, Second Edition, A John Wiley & Sons, Ltd., Publication, 2013.
2. An Introduction to R-Notes on R: A Programming Environment for Data Analysis and Graphics W. N. Venables, D. M. Smith and the R Core Team-(Version 3.6.3), 2020.

#### Reference Books:

1. The Art of R Programming A Tour of Statistical Software Design-Norman Matloff, No Starch Press, San Francisco, 2011.
2. Introduction to Statistics with R - Anne Segonds-Pichon, Babraham Bioinformatics, 2015.
3. R for Dummies, Andrie de Vries and Joris Meys, 2<sup>nd</sup> Edition, John Wiley & Sons, Inc., 2015.

#### e-Resources:

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://spoken-tutorial.org>

**SEMESTER – V**  
**UCMAI20 – Abstract Algebra**

<b>Year : III</b> <b>SEM : V</b>	<b>Course Code :</b> UCMAI20	<b>Title Of The Course :</b> Abstract Algebra	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the concepts of abstract algebra.
2. To enable understanding of fundamental algebraic structures.

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concepts of groups and sub groups.
2. Know about normal subgroups, quotient groups, homomorphisms and isomorphisms.
3. Understand the concepts of automorphisms for constructing new groups from the given groups.
4. Have knowledge on concepts of ring theory.
5. Understand the concepts of maximal ideals, Euclidean rings and particular integral domain.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	H	M	L
CO2	H	M	H	H	M	L
CO3	H	M	H	H	M	L
CO4	H	M	H	H	M	L
CO5	H	M	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	L	L	M
CO4	H	H	H	L	L	M
CO5	H	H	H	L	L	M

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Group Theory

(18 hours)

- 1.1 Definition of a group (K1, K2)
  - 1.2 Examples of groups (K1, K2, K3)
  - 1.3 Some preliminary lemmas (K2, K3)
  - 1.4 Subgroups (K1, K2, K3)
  - 1.5 Lagrange's theorem, corollaries to Lagrange's theorem (K1, K2, K3, K4)
  - 1.6 A Counting Principle (K1, K2, K3, K4)
- (Chapter 2: Sections 2.1, 2.2, 2.3, 2.4, 2.5)

### Unit II: Group Theory (Continued)

(18 hours)

- 2.1 Normal subgroups (K1, K2, K3)
  - 2.2 Quotient groups (K1, K2, K3)
  - 2.3 Homomorphisms (K1, K2, K3)
  - 2.4 Kernel of a homomorphism (K1, K2, K3)
  - 2.5 Isomorphisms (K1, K2, K3)
  - 2.6 Theorems on isomorphisms (K1, K2, K3, K4)
- (Chapter 2: Sections 2.6, 2.7; Omitting applications 1 and 2)

### Unit III: Group Theory (Continued)

(18 hours)

- 3.1 Automorphisms (K1, K2, K3)
  - 3.2 Inner automorphisms (K1, K2, K3)
  - 3.3 Cayley's theorem (K1, K2, K3)
  - 3.4 Permutation groups (K1, K2, K3)
  - 3.5 Cycles and Transpositions (K1, K2, K3, K4)
  - 3.6 Even and odd permutations (K1, K2, K3, K4)
- (Chapter 2: Section 2.8, 2.9, 2.10)

### Unit IV: Ring Theory

(18 hours)

- 4.1 Definition of a ring (K1, K2)
  - 4.2 Examples of rings (K1, K2, K3)
  - 4.3 Some special classes of rings (K1, K2)
  - 4.4 Integral domain (K1, K2, K3, K4)
  - 4.5 Homomorphisms and isomorphisms (K1, K2, K3, K4)
  - 4.6 Ideals and Quotients Rings. (K1, K2, K3, K4)
- (Chapter 3: Section 3.1, 3.2, 3.3, 3.4)

### Unit V: Ring Theory (Contd.)

(18 hours)

- 5.1 More Ideals and Maximal Ideals (K1, K2, K3)
  - 5.2 Quotient Rings (K1, K2, K3)
  - 5.3 The field of Quotients of an Integral Domain (K1, K2, K3, K4)
  - 5.4 Euclidean Rings (K1, K2, K3)
  - 5.5 Unique Factorisation Theorem (K1, K2, K3)
  - 5.6 A particular Euclidean Ring (K1, K2, K3, K4)
- (Chapter 3: Section 3.5, 3.6, 3.7, 3.8)

**Text Book:**

1. I.N. Herstein – Topics in Algebra – John Wiley & Sons, Inc, Second Edition, 2006

**Reference Books:**

1. S. Arumugam and A. Thangapandi Issac – Modern Algebra - Scitech Publications (India) Pvt. Ltd., 3<sup>rd</sup> Edition, Reprint, 2005.
2. S.G. Venkatachalapathy – Modern Algebra – Margham Publications, 2003.
3. M.L.Santiago -Modern Algebra, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2002.

**e-Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – V**  
**UCMAJ20 – Real Analysis I**

<b>Year: III</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: V</b>	UCMAJ20	Real Analysis – I	Theory	Core	6	6	100

**Course Objectives**

1. To create an interest and to deepen the knowledge of students in concepts of real analysis.
2. To familiarize the students to concepts of sequences, limits of sequences, limits of functions and continuity.
3. To introduce the concepts of convergent, divergent and bounded sets.

**Course Outcomes (CO)**

The learners will be able to

1. Know the basic properties of the real line and real number system.
2. Understand the fundamentals of sequences and to calculate their limits.
3. Recognize the arithmetic properties of convergence and divergence of sequence and series.
4. Learn the properties of metric space and its type.
5. Know about continuous function and its reformulation.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	L	H	L
CO2	H	H	M	M	H	L
CO3	H	M	H	H	H	L
CO4	H	M	H	H	H	L
CO5	H	H	H	M	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	H
CO2	H	H	H	L	M	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

- Unit I: Functions and Real Numbers** (18 hours)
- 1.1 Functions (K1, K2)
  - 1.2 Real valued functions (K1, K2, K3, K4)
  - 1.3 Equivalence – Countability (K1, K2, K3, K4)
  - 1.4 Real Numbers (K1, K2)
  - 1.5 Least upper bounds (K1, K2, K3, K4)
  - 1.6 Simple problems. (K1, K2, K3, K4)
- (Chapter 1: Sections 1.3, 1.4, 1.5, 1.6, 1.7)
- Unit II: Sequences of Real numbers** (18 hours)
- 2.1 Definition of sequence and subsequence (K1, K2)
  - 2.2 Limit of sequence (K1, K2, K3, K4)
  - 2.3 Convergent sequences (K1, K2, K3, K4)
  - 2.4 Divergent sequence (K1, K2, K3, K4)
  - 2.5 Bounded sequences (K1, K2, K3, K4)
  - 2.6 Monotone sequences – Simple problems (K1, K2, K3, K4)
- (Chapter 2: Sections 2.1, 2.2, 2.3, 2.4, 2.5, 2.6)
- Unit III: Sequences (continued) and Series of Real Numbers** (18 hours)
- 3.1 Operations on convergent sequences (K1, K2, K3, K4)
  - 3.2 Operations on divergent sequences (K1, K2, K3, K4)
  - 3.3 Convergence and divergence of Series (K1, K2, K3, K4)
  - 3.4 Series with non-negative terms (K1, K2, K3, K4)
  - 3.5 Alternating series (K1, K2, K3, K4)
  - 3.6 Simple problems (K1, K2, K3)
- (Chapter 2: Sections 2.7, 2.8, Chapter 3: 3.1, 3.2, 3.3)
- Unit IV: Limits and Continuity of Metric Spaces** (18 hours)
- 4.1 Conditional convergence and absolute convergence (K1, K2, K3, K4)
  - 4.2 Limits and continuity of metric space (K1, K2, K3, K4)
  - 4.3 Limit of a function on the real line (K1, K2, K3, K4)
  - 4.4 Metric spaces (K1, K2, K3, K4)
  - 4.5 Limits in metric spaces (K1, K2, K3, K4)
  - 4.6 Simple problems (K1, K2, K3)
- (Chapter 3: Section 3.4; Chapter 4: Section 4.1, 4.2, 4.3)
- Unit V: Continuous Functions on Metric Spaces** (18 hours)
- 5.1 Functions continuous at a point on the real line (K1, K2, K3, K4)
  - 5.2 Theorems on continuous function (K1, K2, K3, K4)
  - 5.3 Reformulation (K1, K2, K3, K4)
  - 5.4 Simple problems (K1, K2, K3, K4)
  - 5.5 Functions continuous on metric space (K1, K2, K3)
  - 5.6 Theorems on continuity of metric space (K1, K2, K3, K4)
- (Chapter 5: Sections 5.1, 5.2, 5.3)

**Text Book:**

1. Richard R. Goldberg – Methods of Real Analysis – Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, Indian Edition, 1970.

**Reference Books:**

1. Tom M., Apostol - Mathematics Analysis , 2<sup>nd</sup> Edition – Narosa Publishing House – 1997.
2. Dr. K. ChandrasekarRao, Dr. K.S. Narayanan – Real Analysis Volume II, 2<sup>nd</sup> Edition – Viswanathan Publishers, 2008.
3. D. Somasundaram and B. Choudhry – A First Course in Mathematical Analysis, 1<sup>st</sup> Edition – Narosa Publishing House, 1999.

**e- Resources**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in/>

**SEMESTER – V**  
**UCMAK20 – Complex Analysis**

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code:</b> UCMAK20	<b>Title of the Course:</b> Complex Analysis	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the fundamental ideas of the functions of complex variable
2. To impart the basic knowledge of holomorphic functions, Cauchy's integral formula and the residue theorem.

**Course Outcomes (CO)**

The learners will be able to

1. Know to define and give some of the important properties of complex analytic functions.
2. Learn certain elementary functions with special reference to the correspondence between certain portions of the z-plane and w-plane as determined by the relation between the function w and the independent variable z.
3. Become familiar with the integrals of analytic functions where many properties from calculus is carried over to complex case.
4. Expand the concept of sequence and series which plays a major part of calculus to the complex domain.
5. Learn to compute residues, which allow the determination of general contour integrals.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	L
CO2	H	M	L	H	H	L
CO3	H	H	M	H	H	L
CO4	H	H	M	H	H	L
CO5	H	L	M	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	L	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Analytic Functions

(18 hours)

- 1.1 Regions in the Complex Plane (K1, K2)
  - 1.2 Limits (K1, K2)
  - 1.3 Theorems on limits (K1, K2, K3)
  - 1.4 Continuity (K1, K2, K3)
  - 1.5 Derivatives (K1, K2, K3)
  - 1.6 C-R Equations (K1, K2, K3, K4)
- (Chapter 1: Section: 8, Chapter: 2 Section: 11-17)

### Unit II: Mappings by Elementary Functions

(18 hours)

- 2.1 Mapping (K1, K2)
  - 2.2 Bilinear transformations (K1, K2)
  - 2.3 Cross-Ratio -Theorems and problems (K1, K2, K3, K4)
  - 2.4 Linear Transformation  $w = \frac{1}{z}$ , problems (K1, K2, K3, K4)
  - 2.5 Transformation  $W = \sqrt{z}$ ,  $W = e^z$ ,  $W = \sin z$  and  $W = \cos z$  (K1, K2, K3, K4)
  - 2.6 Linear fractional transformations – An Implicit Form (K1, K2)
- (Chapter 8: Sections: 68-71, 73-75)

### Unit III: Complex Integration

(18 hours)

- 3.1 Definite integrals, Line and Contour Integrals – Examples (K1, K2)
  - 3.2 Cauchy's Theorem Cauchy – Goursat Theorem (K1, K2, K3)
  - 3.3 Cauchy integral formula (K1, K2, K3)
  - 3.4 Derivatives of analytic functions – Morera's Theorem (K1, K2, K3)
  - 3.5 Cauchy's in-equality (K1, K2, K3)
  - 3.6 Liouville's theorem and the Fundamental theorem of algebra (K1, K2, K3, K4)
- (Chapter: 4, Sections: 32, 33, 36-41, omit 39)

### Unit IV: Series

(18 hours)

- 4.1 Convergence of sequence and series (K1, K2)
  - 4.2 Convergence of series (K1, K2)
  - 4.3 Taylor series – Examples (K1, K2, K3)
  - 4.4 Laurent series – Examples (K1, K2, K3, K4)
  - 4.5 Absolute and uniform convergence of power series (K1, K2, K3, K4)
  - 4.6 uniform convergence of power series (K1, K2, K3, K4)
- (Chapter 5: Sections: 43-48)

### Unit V: Residues and Poles

(18 hours)

- 5.1 Zeros of analytic functions (K1, K2)
  - 5.2 Singularities, Types of Singularities (K1, K2)
  - 5.3 Theorem Riemann's Theorem – Weistrass (K1, K2, K3)
  - 5.4 Residues – Residue theorems (K1, K2, K3, K4)
  - 5.5 Residues at poles – Zeros and poles of order m (K1, K2, K3, K4)
  - 5.6 Two types of integrals involving Sines and Cosines (K1, K2, K3, K4)
- (Chapter 6: Sections: 53-57)

**Text Book:**

1. R. V.Churchill and J.W. Brown- Complex Variables and Applications- Mc Graw Hill Publishing Company, New york, 6th Edition, 1996.

**Reference Books:**

1. P. Duraipandian & Lakshmi Durai Pandian- Complex Analysis, The National publishing Co., 1980, Reprint 2001.
2. S. Narayanan & Manicavachagom Pillay- Complex Analysis, S.V. Publications, 3rd Edition. 1985.
3. J.N. Sharma - Functions of a Complex Variable - Krishna Prakashan Mandir, Meerut, U.P. Revised Edition 1978.

**e-Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – V**  
**UEMAA20 – Programming in C**

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code:</b> UEMAA20	<b>Title of the Course:</b> Elective-I A: Programming in C	<b>Course Type:</b> Theory	<b>Course Category:</b> Core Elective	<b>H/W</b> 4	<b>CREDITS</b> 3	<b>HOURS</b> 100
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**Course Objectives**

1. To introduce students to the concept of basic programming, thereby enhancing the logical thinking of the students with regard to programming.
2. To train the students to apply the programming concepts of C to mathematical investigations and problem solving.
3. To enhance the ability of students to work independently and do in-depth study of various notions of programming.

**Course Outcomes (CO)**

The learners will be able to

1. Understand the basics of programming in C such as tokens, data types, operators etc.
2. Use the Decision making-branching and looping statements in C programming.
3. Handle the concept of arrays and the concept of the user defined functions.
4. Express the uses of structures and pointers
5. Understand and apply the programming concepts of C to problem solving.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	L	H
CO2	H	M	H	M	M	H
CO3	H	M	H	M	M	H
CO4	H	H	H	H	L	H
CO5	H	M	H	H	L	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## **Course Syllabus**

### **Unit I: Overview of C, Constants, Variables and Data types (12 hours)**

- 1.1 Basic Structure of C programs – Character set (K1, K2)
- 1.2 C tokens – Keywords and Identifiers (K1, K2, K3, K4)
- 1.3 Constants – Variables (K1, K2, K3, K4)
- 1.4 Data types – Declaration of variables (K1, K2, K3, K4)
- 1.5 Assigning values to variables (K1, K2, K3, K4)
- 1.6 Defining symbolic constants – Declaring a variable as constant (K1, K2, K3, K4)  
(Chapter 2: Sections 2.8; Chapter 3: Sections 3.2 – 3.8, 3.10 – 3.12)

### **Unit II: Operators, Expressions, Managing Input and Output Operations (12 hours)**

- 2.1 Introduction-Arithmetic Operators-Relational Operators-Logical Operators (K1, K2, K3, K4)
- 2.2 Assignment Operators - Increment and Decrement Operators (K1, K2, K3, K4)
- 2.3 Conditional Operators - Bitwise Operators – Special Operators (K1, K2, K3, K4)
- 2.4 Arithmetic Expression-Evaluation of Expression-Precedence of Arithmetic Operators (K1, K2, K3, K4)
- 2.5 Type Conversions in Expressions – Operator Precedence and Associativity (K1, K2, K3, K4)
- 2.6 Reading a Character-Writing a Character-Formatted Input-Formatted Output (K1, K2, K3, K4)  
(Chapter 4: Sections 4.1- 4.12, 4.14, 4.15; Chapter 5: Sections 5.2 – 5.5)

### **Unit III: Decision Making and Branching, Decision Making and Looping (12 hours)**

- 3.1 Introduction - Decision Making with IF Statement (K1, K2, K3, K4)
- 3.2 Simple IF – IF ELSE - Nesting of IF ELSE statements (K1, K2, K3, K4)
- 3.3 The ELSE IF Ladder - The SWITCH statement (K1, K2, K3, K4)
- 3.4 The conditional (? : ) operator- The GOTO statement (K1, K2, K3, K4)
- 3.5 Introduction - The WHILE statement – The DO statement (K1, K2, K3, K4)
- 3.6 The FOR statement - Jumps in LOOPS (K1, K2, K3, K4)  
(Chapter 6: Sections 6.1 – 6. 9; Chapter 7: Sections 7.1 – 7.5.)

### **Unit IV: Arrays and User-Defined Functions (12 hours)**

- 4.1 Introduction – One Dimensional Array (K1, K2, K3, K4)
- 4.2 Declaration and Initialization of One Dimensional Array (K1, K2, K3, K4)
- 4.3 Two Dimensional Arrays - Initializing Two Dimensional Arrays – Multi Dimensional Arrays (K1, K2, K3, K4)
- 4.4 Introduction – Need for User-defined functions – A Multi-function Program (K1, K2, K3, K4)
- 4.5 Elements of user-defined functions – Definition of functions – Return values and their types (K1, K2, K3, K4)
- 4.6 Function calls – Function declaration - Nesting of functions – Recursion. (K1, K2, K3, K4)  
(Chapter 8: Sections 8.1- 8.7; Chapter 10: Sections 10.1 – 10.8, 10. 15, 10.16)

### **Unit V: Structures and Unions, Pointers (12 hours)**

- 5.1 Introduction-Defining a structure-Declaring structure variables-Accessing structure members (K1, K2, K3, K4)
- 5.2 Structure initialization-copying and comparing structure variables-Operations on individual members (K1, K2, K3, K4)
- 5.3 Arrays of structures - Arrays within Structures - Structures within Structures - Unions (K1, K2, K3, K4)
- 5.4 Understanding Pointers – Accessing the address of a variable – Declaring pointer variables (K1, K2, K3, K4)
- 5.5 Initialization of pointer variables-Accessing a variable through its pointer-Chain of pointers (K1, K2, K3, K4)
- 5.6 Pointer expressions-Pointer increments and scale factor-Pointers and Arrays (K1, K2, K3, K4)  
(Chapter 11: Sections 11. 1 - 11. 10, 11.12; Chapter 12: Sections 12. 2 – 12. 10.)

**Text Book:**

1. E. Balagurusamy, Programming in ANSI C, 8<sup>th</sup> Edition, McGraw Hill Education Private Limited, New Delhi, India, 2019.

**Reference Book:**

1. Ashok N. Kamathne, Programming with C, Pearson Publication, 2009.
2. C: The Complete Reference, Herb Schildt, 4<sup>th</sup> Edition, Tata McGraw Hill Publishers, 2017
3. Let Us C: Authentic guide to C programming language, Yashavant Kanetkar, (18th Edition), BPB Publications, 2021

**e-Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – V**  
**UEMAB20 - Elective Practical I: C**

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code:</b> UEMAB20	<b>Title of the Course:</b> Elective Practical I : C	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 2	<b>CREDITS</b> 2	<b>HOURS</b> 100
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**Course Objectives**

1. To introduce students to the concept of basic programming, thereby enhancing the logical thinking of the students with regard to programming.
2. To train the students to apply the programming concepts of C to mathematical investigations and problem solving.
3. To construct the ability of students to work independently and do in-depth study of various notions of programming.

**Course Outcomes (CO)**

The learners will be able to

1. Implement programs with branching and looping statements.
2. Write programs that perform operations using derived data types and functions.
3. Demonstrate a thorough understanding of arrays by designing and implementing programs that search and sort arrays.
4. Perform Matrix operations using C.
5. Use structures and pointers in C programs.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	L	H
<b>CO2</b>	H	M	H	M	M	H
<b>CO3</b>	H	M	H	M	M	H
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	M	H	H	L	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	M	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## 1. Simple Programs:

- a) Sum of 'n' natural numbers.
- b) Quadratic Equation
- c) Simple Interest
- d) Mean, Standard deviation and Variance.
- e) Generating Prime numbers.
- f) Largest of three numbers.

## 2. Summation of Series:

- a)  $\sin(x)$
- b)  $\cos(x)$

## 3. Recursion:

- a)  $nPr$  and  $nCr$
- b) GCD of two numbers.

## 4. Matrix Manipulation:

- a) Addition and Subtraction
- b) Transpose.

## 5. Sorting and Searching:

- a) Bubble sort (simple program)
- b) Binary search and Median

## 6. Structures:

Grades of students of a class using structure

## Text Book:

1. E. Balagurusamy, Programming in ANSI C, 4<sup>th</sup> Edition, Tata McGraw – Hill Education Private Ltd. New Delhi, India, 2008.

## Reference Books:

1. Ashok N. Kamathne –Programming with C- Pearson publication, 2009.
2. C: The Complete Reference, Herb Schildt, 4<sup>th</sup> Edition, Tata McGraw Hill Publishers, 2017
3. Let Us C: Authentic guide to C programming language, Yashavant Kanetkar, (18th Edition), BPB Publications, 2021

## e-Resources:

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER - V**  
**UEMAC20 - Number Theory**

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code:</b> UEMAC20	<b>Title of the Course:</b> Elective - I B: Number Theory	<b>Course Type:</b> Theory	<b>Course Category:</b> Core Elective	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>HOURS</b> 100
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**Course Objectives**

1. To introduce students to the concept of number theory, thereby enhancing the logical thinking of the students with regard to applications in security systems.
2. To construct the ability of students to work independently and do in-depth study of various notions of number theory.

**Course Outcomes (CO)**

The learners will be able to

1. Learn about some important results in the theory of numbers including the prime number theorem, Chinese remainder theorem, Wilson's theorem and their consequences.
2. Learn about number theoretic functions, modular arithmetic and their applications.
3. Familiarize with modular arithmetic and find primitive roots of prime and composite numbers.
4. Know about open problems in number theory, namely, the Goldbach conjecture and twin-prime conjecture.
5. Apply public crypto systems, in particular, RSA.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	L
CO2	H	H	M	M	H	L
CO3	H	H	M	H	H	L
CO4	H	H	M	H	M	L
CO5	H	H	M	M	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	L	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### **Unit I: Distribution of Primes and Theory of Congruencies** (18 hours)

- 1.1 Linear Diophantine equation, Prime counting function (K1,K2)
- 1.2 Prime number theorem, Goldbach conjecture (K1,K2)
- 1.3 Twin-prime conjecture, Odd perfect numbers conjecture (K1,K2,K3)
- 1.4 Fermat and Mersenne primes, Congruence relation and its properties (K1, K2, K3, K4)
- 1.5 Linear congruence and Chinese remainder theorem (K1, K2, K3)
- 1.6 Fermat's little theorem, Wilson's theorem. (K1, K2, K3)

### **Unit II: Number Theoretic Functions** (18 hours)

- 2.1 Number theoretic functions for sum and number of divisors (K1, K2, K3)
- 2.2 Multiplicative function (K1, K2)
- 2.3 The Möbius inversion formula (K1, K2)
- 2.4 Greatest integer function (K1, K2)
- 2.5 Euler's phi-function and properties (K1, K2, K3, K4)
- 2.6 Euler's theorem. (K1, K2)

### **Unit III: Primitive Roots** (18 hours)

- 3.1 Order of an integer modulo  $n$  (K1, K2)
- 3.2 Primitive roots for primes (K1, K2, K3)
- 3.3 Composite numbers having primitive roots (K1, K2, K3)
- 3.4 Definition of quadratic residue of an odd prime (K1, K2)
- 3.5 Euler's criterion (K1, K2)
- 3.6 Problems (K1, K2, K3, K4)

### **Unit IV: Quadratic Reciprocity Law** (18 hours)

- 4.1 The Legendre symbol and its properties (K1, K2)
- 4.1 The Legendre symbol and its properties-problems (K1, K2, K3, K4)
- 4.2 Quadratic reciprocity (K1, K2)
- 4.4 Quadratic reciprocity – problems (K1, K2, K3, K4)
- 4.5 Quadratic congruencies with composite moduli (K1, K2, K3)
- 4.6 Quadratic congruencies with composite moduli –problems (K1, K2, K3, K4)

### **Unit-V: Applications** (18 hours)

- 5.1 Public key encryption (K1, K2, K3, K4)
- 5.2 Public key encryption (continued) (K1, K2, K3, K4)
- 5.3 RSA encryption and decryption with applications in security systems (K1, K2, K3, K4)
- 5.4 RSA encryption and decryption with applications in security systems (K1, K2, K3, K4)
- 5.5 RSA encryption and decryption with applications in security systems (K1, K2, K3, K4)
- 5.6 RSA encryption and decryption with applications in security systems (K1, K2, K3, K4)

**Text Book:**

1. David M. Burton -Elementary Number Theory, 7th edition, McGraw-Hill., 2007.

**Reference Books:**

1. Gareth A. Jones & J. Mary Jones -Elementary Number Theory. Springer, 2005.
2. Neville Robbins - Beginning Number Theory, 2nd edition, Narosa, 2007.
3. I.Niven - An Introduction to the Theory of Numbers, 5th edition, John Wiley & Sons, 2012.
4. 5. Neal Koblitz - A Course in Number Theory and Cryptography, 2nd edition, Springer-Verlag. 1994.

**e- Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in/>

**SEMESTER – V**  
**USMAC20 – Mathematics for Competitive Examinations**

<b>Year: III</b> <b>SEM: V</b>	<b>Course Code:</b> USMAC20	<b>Title of the Course:</b> Mathematics for Competitive Examinations	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To improve the numerical ability and logical thinking of the students.
2. To prepare the students for various competitive examinations.

**Course Outcomes (CO)**

The learners will be able to

1. Apply the concepts of average, percentage, ratio and proportion to solve real life problems.
2. Think critically and solve problems.
3. Improve their creative thinking and make decisions in real life situations.
4. Determine the number of possible outcomes in a problem and calculate the probability of events for more complex outcomes.
5. Analyse and compare the given data to use analytic techniques that are simple and effective to solve problems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	L
CO2	H	H	H	M	H	L
CO3	M	M	H	H	H	L
CO4	H	M	H	H	H	L
CO5	H	H	M	M	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	H
CO2	H	H	H	M	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Arithmetical Ability (6 hours)

Number system, Progression, Average, Ratio and Proportion (K1, K2, K3, K4)

### Unit II: Arithmetical Ability (Continued) (6 hours)

Percentage, Profit and Loss, Interest, Time and Work, Time, Speed and Distance, Work and Wages (K1, K2, K3, K4)

### Unit III: Arithmetical Ability (Continued) (6 hours)

Ages, Boats and Streams, Clocks and Calendar, Logarithms, Simplifications, Height and Distance (K1, K2, K3, K4)

### Unit IV: Probability (6 hours)

Permutations and Combinations, Probability (K1, K2, K3, K4)

### Unit V: Data Interpretation (6 hours)

Tabulation, Bar graph, Pie chart, Line graph (K1, K2, K3, K4)

#### Text Book:

1. Dr. R.S. Aggarwal, Quantitative Aptitude, S. Chand Publication, Revised Edition, Year 2018.

#### Reference Books:

1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, McGraw Education Series, 5<sup>th</sup> Edition 2019
2. Dinesh Khattar, Quantitative Aptitude for Competitive Examinations, Pearson India, Edition 2019.
3. Sarvesh K. Verma, Quantitative Aptitude Quantum CAT 2018, Arihant publication, Edition 2018.

#### e- Resources

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. [www.indiabix.com](http://www.indiabix.com)

**SEMESTER – VI**  
**UCMAL20 – Linear Algebra**

<b>Year :</b> III	<b>Course Code :</b> UCMAL20	<b>Title Of The Course :</b> Linear Algebra	<b>Course Type :</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 6	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the concepts of linear algebra.
2. To familiarize the concepts of linear transformation and their matrices.

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concepts of basis, linear dependence and independence.
2. Analyze the concepts of dual spaces in vector space and inner product space.
3. Understand the concepts of linear transformation, characteristic roots and characteristic vectors.
4. Obtain the matrix for linear transformations.
5. Acquire knowledge about determinants, trace and transpose by linear transformations.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	H	M	L
CO2	H	M	H	H	M	L
CO3	H	M	H	H	M	L
CO4	H	M	H	H	M	L
CO5	H	M	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	L	L	M
CO4	H	H	H	L	L	M
CO5	H	H	H	L	L	M

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I Vector Spaces (18 hours)

- 1.1 Definition and examples of vector spaces (K1, K2, K3)
  - 1.2 Subspaces and homomorphisms (K1, K2, K3,)
  - 1.3 Quotient Spaces, Internal and External direct sum (K1, K2, K3, K4)
  - 1.4 Linear span, Linear independence (K1, K2, K3)
  - 1.5 Basis, Properties of basis (K1, K2, K3)
  - 1.6 Dimensions of a vector space. (K1, K2, K3, K4)
- (Chapter 4: Sections 4.1, 4.2)

### Unit II: Vector Spaces (Continued) (18 hours)

- 2.1 Dual Spaces –  $\text{Hom}(V, W)$ ,  $\text{Hom}(V, V)$  and  $\text{Hom}(V, F)$  (K1, K2, K3)
  - 2.2 Definition and examples of Inner Product Spaces (K1, K2, K3)
  - 2.3 Norm of a vector and Schwarz inequality (K1, K2, K3)
  - 2.4 Orthogonal vectors and Orthogonal complement (K1, K2,)
  - 2.5 Orthonormal sets (K1, K2, K3)
  - 2.6 Gram-Schmidt orthogonalization process. (K1, K2, K3, K4)
- (Chapter 4: Sections 4.3, 4.4)

### Unit III: Linear Transformations (18 hours)

- 3.1 Definition of algebra and linear transformations (K1, K2,)
  - 3.2 Minimal polynomial for linear transformations (K1, K2, K3)
  - 3.3 Regular and Singular linear transformations (K1, K2, K3)
  - 3.4 Range and rank of a linear transformation (K1, K2, K3)
  - 3.5 Characteristic roots of a linear transformation (K1, K2, K3)
  - 3.6 Characteristic vectors (K1, K2, K3, K4)
- (Chapter 6: Sections 6.1, 6.2)

### Unit IV Linear Transformations (Continued) (18 hours)

- 4.1 Definition of matrix of a linear transformation (K1, K2,)
  - 4.2 Computation of matrices of linear transformation (K1, K2, K3, K4)
  - 4.2 Isomorphism of  $A(V)$  onto  $F_n$  (K1, K2, K3)
  - 4.3 Computation of the matrix of linear transformations from a known basis (K1, K2, K3, K4)
  - 4.4 Similar linear transformations (K1, K2, K3)
  - 4.5 Triangular form (K1, K2, K3, K4)
- (Chapter 6: Sections 6.3, 6.4)

### Unit V Linear Transformations (Contd.) (18 hours)

- 5.1 Trace of a matrix and properties (K1, K2)
  - 5.2 Trace of a linear transformation (K1, K2, K3)
  - 5.3 Transpose of a matrix and properties (K1, K2, K3)
  - 5.4 Determinants – definition and properties (K1, K2, K3)
  - 5.5 Cramer's Rule (K3, K4)
  - 5.6 Cayley-Hamilton theorem (K3, K4)
- (Chapter 6: Sections 6.8, 6.9)

**Text Book:**

1. I.N. Herstein – Topics in Algebra – John Wiley & Sons, Inc, Second Edition, 2006

**Reference Books:**

1. J.N. Sharma and A.R. Vashistha – Linear Algebra, Krishna Prakash Nanda, 1981.
2. Lloyd R.Jaisingh, Frank Ayres – Abstract Algebra - Schaum's outlines – Tata McGraw Hill Publishing Company Limited, New Delhi, 2005.
3. M.L.Santiago – Modern Algebra, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2002.

**e-Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – VI**  
**UCMAM20 – Real Analysis II**

<b>Year: III</b> <b>SEM: VI</b>	<b>Course Code:</b> UCMAM20	<b>Title of the Course:</b> Real Analysis-II	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 6	<b>MARKS</b> 100
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**Course Objectives**

1. To create an interest and to deepen the knowledge of students in concepts of real analysis.
2. To make the students think logically and objectively.
3. To make the students understand the difference between the Riemann and Lebesgue integrability.

**Course Outcomes (CO)**

The learners will be able to

1. Understand some properties of metric spaces like openness, closedness, boundedness and totally boundedness.
2. Know the fundamental concepts of complete and compact metric space.
3. Apply the properties of Riemann integrable functions.
4. Assimilate the concept of partition on an interval in  $\mathbb{R}$  and understand about lebesgue integrability.
5. Acquire knowledge about measurable functions and their properties.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	L
CO2	H	H	H	M	H	L
CO3	H	M	H	M	H	L
CO4	H	M	M	H	H	L
CO5	H	H	M	M	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	L	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**Course Syllabus**

**Unit I: Connectedness and Completeness**

**(18 hours)**

- 1.1 Open sets (K1, K2)
  - 1.2 Closed sets (K1, K2)
  - 1.3 Simple problems based on open and closed sets. (K1, K2, K3)
  - 1.4 Theorems on open sets and closed sets (K1, K2, K3, K4)
  - 1.5 Bounded sets (K1, K2, K3, K4)
  - 1.6 Totally bounded sets (K1, K2, K3, K4)
- (Chapter 5 – 5.4, 5.5, Chapter 6 – Sections 6.3)

**Unit II: Compactness and Continuity**

**(18 hours)**

- 2.1 Definition of Complete metric space (K1, K2)
  - 2.2 Examples of Complete metric space (K1, K2, K3)
  - 2.3 Theorems on Complete metric space (K1, K2, K3, K4)
  - 2.4 Contraction (K1, K2, K3, K4)
  - 2.5 Definition and example of Compact metric spaces (K1, K2, K3)
  - 2.6 Theorems on Compact metric space (K1, K2, K3, K4)
- (Chapter 6 – Section 6.4, 6.5)

**Unit III: The Riemann Integral**

**(18 hours)**

- 3.1 Sets of measure zero (K1, K2, K3, K4)
  - 3.2 Definition of the Riemann integral (K1, K2)
  - 3.3 Definition of Riemann upper sum and lower sum (K1, K2)
  - 3.4 Properties of the Riemann integral. (K1, K2, K3, K4)
  - 3.5 Theorems on Riemann integral (K1, K2, K3, K4)
  - 3.6 Simple problems (K1, K2, K3)
- (Chapter 7 – Sections 7.1, 7.2, 7.4)

**Unit IV: The Lebesgue Integral**

**(18 hours)**

- 4.1 Length of open sets and closed sets (K1, K2, K3, K4)
  - 4.2 Inner and Outer measure (K1, K2, K3, K4)
  - 4.3 Measurable sets (K1, K2)
  - 4.4 Properties of measurable sets. (K1, K2, K3, K4)
  - 4.5 Theorems on measurable sets (K1, K2, K3, K4)
  - 4.6 Symmetric difference and its theorem (K1, K2, K3, K4)
- (Chapter 11 – Sections 11.1, 11.2, 11.3)

**Unit V: The Lebesgue Integral (Continued)**

**(18 hours)**

- 5.1 Definition and example of Measurable functions (K1, K2, K3)
  - 5.2 Theorems on measurable functions (K1, K2, K3, K4)
  - 5.3 Definition and existence of the Lebesgue integral for bounded function (K1, K2, K3, K4)
  - 5.4 Theorems on Lebesgue integral (K1, K2, K3, K4)
  - 5.5 Properties of the Lebesgue integral for bounded measurable functions. (K1, K2, K3, K4)
  - 5.6 Relationship between Riemann and Lebesgue integral (K1, K2, K3, K4)
- (Chapter 11 – Sections 11.4, 11.5, 11.6)

**Text Book:**

1. Richard R. Goldberg – Methods of Real Analysis – Oxford & IBH Publishing Co. Pvt., Ltd., New Delhi, Indian Edition, 1970.

**Reference Book:**

1. Tom M., Apostol - Mathematics Analysis , 2<sup>nd</sup> Edition – Narosa Publishing House – 1997.
2. Dr. K. ChandrasekarRao, Dr. K.S. Narayanan – Real Analysis Valume II, 2<sup>nd</sup> Edition – Viswanathan Publishers, 2008.
3. D. Somasundaram and B. Choudhry – A First Course in Mathematical Analysis, 1<sup>st</sup> Edition – Narosa Publishing House, 1999.

**e- Resources**

4. <https://nptel.ac.in>
5. [www.coursera.org](http://www.coursera.org)
6. <https://swayam.gov.in/>

**SEMESTER – VI**  
**UEMAD20 – Graph Theory**

<b>Year : III</b> <b>SEM : VI</b>	<b>Course Code:</b> UEMAD20	<b>Title Of The Course:</b> Elective - II A: Graph Theory	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Objectives**

1. To introduce the students to the beautiful and elegant theory of graphs.
2. To study and develop the concepts of different graphs

**Course Outcomes (CO)**

The learners will be able to

1. Understand the basic graph theory concepts
2. Analyse the connectedness in graphs using vertices and edges.
3. Identify the uniqueness of paths using tree concepts.
4. Acquire wide knowledge of mathematical principles of graphs
5. Understand the emerging research topics based on graphs

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	L
CO2	H	H	H	M	L	H
CO3	H	H	H	H	H	M
CO4	H	H	M	L	H	H
CO5	H	H	M	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	L	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Graphs and Subgraphs (18 hours)

- 1.1 Introduction to Graphs- subgraphs ( K1,K2)
- 1.2 Degree of a vertex ( K1,K2, K3, K4)
- 1.3 Isomorphism of graphs ( K1,K2, K3, K4)
- 1.4 Independent sets and coverings(simple theorems) ( K1,K2, K3, K4)
- 1.5 Intersection graphs and line graphs (definition and examples) ( K1,K2, K3, K4)
- 1.6 Operations on graphs. ( K1,K2, K3, K4)

### Unit II: Connectedness and components (18 hours)

- 2.1 Walks, Trails and Paths (problems and simple theorems) (K1, K2, K3, K4)
- 2.2 Connectedness and components - cut point (problems and simple theorems) (K1, K2, K3, K4)
- 2.3 Bridge (problems and simple theorems) (K1, K2, K3, K4)
- 2.4 Block (problems and simple theorems) (K1, K2, K3, K4)
- 2.5 Vertex Connectivity (K1, K2, K3, K4)
- 2.6 Edge Connectivity(K1, K2, K3, K4)

### Unit III: Trees (18 hours)

- 3.1 Tree – Introduction (K1, K2)
- 3.2 Forest (K1, K2)
- 3.3 Equivalent property of tree (K1, K2, K3, K4)
- 3.4 Spanning tree (K1, K2, K3, K4)
- 3.5 Centre of a tree (K1, K2, K3, K4)
- 3.6 Results in Centre of a tree (K1, K2, K3, K4)

### Unit IV: Eulerian and Hamiltonian Graphs (18 hours)

- 4.1 Eulerian graphs (K1, K2, K3, K4)
- 4.2 Equivalent property of Eulerian graphs (K1, K2, K3, K4)
- 4.3 Hamiltonian graphs (K1, K2, K3, K4)
- 4.4 Property of Hamiltonian graphs (K1, K2, K3, K4)
- 4.5 Simple problems in Hamiltonian graphs (K1, K2, K3, K4)
- 4.6 Algorithm (K1, K2, K3, K4)

### Unit V - Planarity and colourability (18 hours)

- 5.1 Planarity-definition (K1, K2)
- 5.2 Planarity properties (K1, K2, K3, K4)
- 5.3 Characterisation of planar graph (K1, K2, K3, K4)
- 5.4 Colourability (K1, K2, K3, K4)
- 5.5 Chromatic number (K1, K2, K3, K4)
- 5.6 Index (K1, K2, K3, K4)

**Text Books:**

1. S. Arumugam and S. Ramachandran, Invitation to Graph Theory, SITECH Publications, India Pvt. Ltd., 2006
2. J.A.Bondy and U.S.R. Murthy, Graph Theory with Applications, Macmillon, London, 2008.

**Reference Books:**

1. S.Kumaravelu, Susheela Kumaravelu, Graph Theory, SKV Publishers, Sivakasi, 1999.
2. S.A.Choudham, A First Course in Graph Theory, Macmillan India Ltd, 2000.
3. Robin J. Wilson, Introduction to Graph Theory, Prentice Hall, 2012.
4. Harray, Graph Theory, Narosa Publication, 1998.

**e-Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – VI**  
**UEMAE20 - Discrete Mathematics**

<b>Year: III</b> <b>SEM: VI</b>	<b>Course Code:</b> UEMAE20	<b>Title of the Course:</b> Elective - II B: Discrete Mathematics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core Elective	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>HOURS</b> 100
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**Course Objectives**

1. To introduce students to the concept of basic discrete mathematics, thereby enhancing the logical thinking of the students with regard to discrete domain.
2. To train the students in the applications of the discrete mathematical structures.
3. To construct the ability of students to work independently and do in-depth study of various notions of discrete mathematics.

**Course Outcomes (CO)**

The learners will be able to

1. Learn about partially ordered sets.
2. Understand lattices and their types.
3. Understand Boolean algebra and Boolean functions, logic gates, switching circuits and their applications.
4. Solve real-life problems using finite-state and Turing machines.
5. Assimilate various graph theoretic concepts and familiarize with their applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	L
CO2	H	H	H	M	H	L
CO3	H	M	H	M	H	L
CO4	H	M	M	H	H	L
CO5	H	H	M	M	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	L	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Partially Ordered Sets

(18 hours)

- 1.1 Definitions, examples and basic properties of partially ordered sets (poset) (K1,K2)
- 1.2 Order isomorphism, Hasse diagrams (K1, K2, K3, K4)
- 1.3 Dual of a poset, Duality principle (K1, K2, K3)
- 1.4 Maximal and minimal elements (K1, K2, K3)
- 1.5 Least upper bound and greatest upper bound (K1, K2, K3)
- 1.6 Building new poset, Maps between posets (K1, K2, K3, K4)

### Unit II: Lattices

(18 hours)

- 2.1 Lattices as posets (K1, K2, K3)
- 2.2 Lattices as algebraic structures (K1, K2, K3)
- 2.3 Sub lattices (K1, K2)
- 2.4 Products and homomorphisms – Definitions and examples (K1, K2, K3, K4)
- 2.5 Properties of modular and distributive lattices (K1, K2)
- 2.6 Complemented, relatively complemented and sectionally complemented lattices (K1, K2)

### Unit III: Boolean Algebras and Switching Circuits

(18 hours)

- 3.1 Boolean algebras, De Morgan's laws (K1, K2)
- 3.2 Boolean homomorphism, Representation theorem (K1, K2)
- 3.3 Boolean polynomials, Boolean polynomial functions (K1, K2, K3)
- 3.4 Disjunctive and conjunctive normal forms (K1, K2)
- 3.5 Minimal forms of Boolean polynomials (K1, K2, K3)
- 3.6 Quine-McCluskey method, Karnaugh diagrams, Switching circuits(K1, K2, K3, K4)

### Unit IV: Finite-State and Turing Machines

(18 hours)

- 4.1 Finite-state machines with outputs (K1, K2, K3)
- 4.2 Finite-state machines with no output (K1, K2, K3)
- 4.3 Deterministic finite-state automaton (K1, K2, K3)
- 4.4 Nondeterministic finite-state automaton (K1, K2, K3)
- 4.5 Turing machines – Definitions (K1, K2)
- 4.6 Turing machines - examples and computations (K1, K2, K3, K4)

### Unit V: Graphs

(18 hours)

- 5.1 Definition, examples and basic properties of graphs (K1, K2)
- 5.2 Königsberg bridge problem (K1, K2, K3)
- 5.3 Subgraphs – Pseudographs - Complete graphs - Bipartite graphs (K1, K2)
- 5.4 Isomorphism of graphs - Paths and circuits - Eulerian circuits - Hamiltonian cycles (K1, K2)
- 5.5 Adjacency matrix - Weighted graph - Travelling salesman problem (K1, K2, K3)

## 5.6 Shortest path and Dijkstra's algorithm (K1, K2, K3)

### **Text Books:**

1. B. A. Davey & H. A. Priestley (2002). Introduction to Lattices and Order (2nd edition). Cambridge University Press.
2. Edgar G. Goodaire & Michael M. Parmenter (2018). Discrete Mathematics with Graph Theory (3rd edition). Pearson Education.

### **Reference Books:**

1. Rudolf Lidl & Günter Pilz (1998). Applied Abstract Algebra (2nd edition). Springer.
2. Kenneth H. Rosen (2012). Discrete Mathematics and its Applications: With Combinatorics and Graph Theory (7th edition). McGraw-Hill.
3. C. L. Liu (1985). Elements of Discrete Mathematics (2nd edition). McGraw-Hill.

### **e- Resources**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in/>

**SEMESTER – VI**  
**UEMAF20 - Object Oriented Programming Using C++**

<b>Year: III</b> <b>SEM: VI</b>	<b>Course Code:</b> UEMAF20	<b>Title of the Course:</b> Elective - III: Object Oriented Programming Using C++	<b>Course Type:</b> Theory	<b>Course Category:</b> Core Elective	<b>H/W</b> 4	<b>CREDITS</b> 3	<b>HOURS</b> 100
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**Course Objectives**

1. To introduce students to the concept of object oriented programming with C++, thereby enhancing the logical thinking of the students with regard to programming.
2. To train the students to apply the programming concepts of C++ to mathematical investigations and problem solving.
3. To construct the ability of students to work independently and do in-depth study of various notions of programming.

**Course Outcomes (CO)**

The learners will be able to

1. Understand the basics of programming in C++ such as tokens, data types, operators etc.
2. Use the Decision making-branching and looping statements in C++ programming.
3. Handle the concept of arrays and the concept of the user define functions.
4. Express the uses of structures and pointers.
5. Understand and apply the programming concepts of C to problem solving.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	L	H
<b>CO2</b>	H	M	H	M	M	H
<b>CO3</b>	H	M	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	M	H	M	H	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	M	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Principles of OOP and Introduction to C++, Tokens

(12 hours)

- 1.1 Basic concepts of object oriented programming – Benefits of OOP (K1, K2)
  - 1.2 Structure of C++ Program - Tokens - Keywords (K1, K2, K3, K4)
  - 1.3 Identifiers and constants - Basic data types (K1, K2, K3, K4)
  - 1.4 User defined data types - Derived data types (K1, K2, K3, K4)
  - 1.5 Symbolic constants – Type compatibility - Declaration of variables (K1, K2, K3, K4)
  - 1.6 Dynamic Initialization of variables – Reference variables (K1, K2, K3, K4)
- (Chapter 1: Sections 1.5 -, 1.6; Chapter 2: Sections 2.6; Chapter 3: Sections 3.2 - 3.6, 3.8-3.13)

### Unit II: Operators, Expressions and Control Structures

(12 hours)

- 2.1 Operators in C++ - Scope Resolution Operator (K1, K2, K3, K4)
  - 2.2 Member Dereferencing operators – Memory management operators (K1, K2, K3, K4)
  - 2.3 Manipulators – Type cast operator (K1, K2, K3, K4)
  - 2.4 Expressions and their types – Special assignment expressions (K1, K2, K3, K4)
  - 2.5 Implicit conversions – Operator overloading (K1, K2, K3, K4)
  - 2.6 Operator precedence – Control structures (K1, K2, K3, K4)
- (Chapter 3: Sections 3.14 - 3. 25)

### Unit III: Functions in C++, Classes and Objects

(12 hours)

- 3.1 Introduction- Function prototyping-Call by reference-Return by reference (K1, K2, K3, K4)
  - 3.2 Inline functions-Default arguments-const arguments-Function overloading (K1, K2, K3, K4)
  - 3.3 Specifying a class-Defining member functions-A C++ program with class (K1, K2, K3, K4)
  - 3.4 Making an outside function inline-Nesting of member functions -Private member functions (K1, K2, K3, K4)
  - 3.5 Arrays within a class – Memory allocation for objects – Static data members – Static member functions – Arrays of objects (K1, K2, K3, K4)
  - 3.6 Objects as function arguments – Friendly functions – Returning objects – const member functions – Pointers to members (K1, K2, K3, K4)
- (Chapter 4: Sections 4.1, 4.3 – 4. 8, 4.10; Chapter 5: Sections 5.3- 5.18.)

### Unit IV: Constructors and Destructors, Operator Overloading

(12 hours)

- 4.1 Introduction – Constructors (K1, K2, K3, K4)
  - 4.2 Parameterized constructors – Multiple constructors in a class (K1, K2, K3, K4)
  - 4.3 Constructors with default arguments – Copy constructor (K1, K2, K3, K4)
  - 4.4 const objects – Destructors (K1, K2, K3, K4)
  - 4.5 Defining operator overloading – Overloading unary operators – Overloading binary operators (K1, K2, K3, K4)
  - 4.6 Overloading binary operators using friends-Rules for overloading operators (K1, K2, K3, K4)
- (Chapter 6: Sections 6.1- 6.5, 6.7, 6.10, 6.11; Chapter 7: Sections 7.2 – 7.5, 7.8)

## **Unit V: Inheritance, Pointers, Managing console I/O Operations**

**(12 hours)**

- 5.1 Introduction – Defining derived classes – Single inheritance (K1, K2, K3, K4)
- 5.2 Making a private member inheritable – Multilevel inheritance (K1, K2, K3, K4)
- 5.3 Multiple inheritance – Hierarchical inheritance (K1, K2, K3, K4)
- 5.4 Hybrid inheritance – Virtual base classes – Abstract classes (K1, K2, K3, K4)
- 5.5 Pointers – Pointers to Objects – this pointer (K1, K2, K3, K4)
- 5.6 Introduction – C++ streams – C++ stream classes – Unformatted I/O Operations – Formatted console I/O operations – Managing output with manipulators (K1, K2, K3, K4)  
(Chapter 8: Sections 8.1 – 8.10; Chapter 9: Sections 9.2 – 9. 4; Chapter 10: Sections 10.1– 10.6)

### **Text Book:**

1. E. Balagurusamy, Object Oriented Programming with C++, 7<sup>th</sup> Edition, McGraw Hill Education Private Ltd, New Delhi, India, 2018.

### **Reference Books:**

1. Robert Lafore – Object Oriented Programming in Microsoft C++ - Galgotia Publication, Fourth Edition, 2009.
2. Herbert Schildt – The Complete Reference C++, Tata McGraw Hill Publication, 4<sup>th</sup> Edition, 2002.
3. Object Oriented Programming in C++, Robert Lafore, 4<sup>th</sup> Edition, Pearson Publications, 2008.

### **e-Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – VI**  
**UEMAG20 - Elective Practical II: C++**

<b>Year: III</b> <b>SEM: VI</b>	<b>Course Code:</b> UEMAG20	<b>Title of the Course:</b> Elective Practical II : C++	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 2	<b>CREDITS</b> 2	<b>HOURS</b> 100
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**Course Objectives**

1. To introduce students to the concept of basic programming, thereby enhancing the logical thinking of the students with regard to programming.
2. To train the students to apply the programming concepts of C to mathematical investigations and problem solving.
3. To enhance the ability of students to work independently and do in-depth study of various notions of programming.

**Course Outcomes (CO)**

The learners will be able to

1. Implement programs with class and constructors.
2. Write programs that perform operations using derived data types and functions.
3. Demonstrate a thorough understanding of arrays by designing and implementing programs that search and sort arrays.
4. Use inheritance properties that promote code reuse in C++.
5. Overload functions and operators in C++.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	L	H
<b>CO2</b>	H	M	H	M	M	H
<b>CO3</b>	H	M	H	M	M	H
<b>CO4</b>	H	H	H	H	L	H
<b>CO5</b>	H	M	H	H	L	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	M	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

1. Simple program using class and object.
2. Find largest of three numbers using all types of constructors.
3. Calculation of Mean and Standard Deviation.
4. Selection sort.
5. Product of matrices.
6. String manipulation.
7. Operator overloading (Unary)
8. Arrays of Object.
9. Function Overloading.
10. Implementing Inheritance. (Multiple)

**Text Book:**

1. E. Balagurusamy, Object Oriented Programming with C++, 4<sup>th</sup> Edition, Tata McGraw – Hill Education Private Ltd. New Delhi, India, 2008.

**Reference Books:**

1. Robert Lafore – Object Oriented Programming in Microsoft C++ - Galgotia Publication, Fourth Edition, 2009.
2. Herbert Schildt – The Complete Reference C++, Tata McGraw Hill Publication, 4<sup>th</sup> Edition, 2002.
3. Object Oriented Programming in C++, Robert Lafore, 4<sup>th</sup> Edition, Pearson Publications, 2008.

**e-Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – VI**  
**USMAD20 - Fuzzy Set Theory**

<b>Year : III</b> <b>SEM : VI</b>	<b>Course Code :</b> USMAD20	<b>Title Of The Course :</b> Fuzzy Set Theory	<b>Course Type :</b> Theory	<b>Course Category :</b> SBE	<b>H/W</b> 2	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To explain the emergence of fuzzy set from an historical perspective.
2. To introduce the basic concepts of the existing research topic fuzzy sets.

**Course Outcomes (CO)**

The learners will be able to

1. Distinguish between classical crisp set and fuzzy set using characteristic function and membership function respectively.
2. Understand the operations on the fuzzy set which are generalization of crisp set operations.
3. Represent the notion of fuzzy relational equations based upon the max-min composition.
4. Model fuzzy graphs which provides provision to represent different types of relationships
5. Know about the fuzzy number which is a special form of a fuzzy set on the set of real numbers.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	L	H	L
CO2	H	H	M	M	H	L
CO3	H	H	M	H	H	L
CO4	H	H	H	H	H	L
CO5	H	H	L	M	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	L	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### UNIT I: Fuzzy Sets

(6 hours)

Sets - Operation of Sets - Characteristics of Crisp Set - Definition of fuzzy set - Expanding concepts of fuzzy set - Standard Operation of Fuzzy Set (K1, K2, K3, K4)  
(Chapter 1: Sections 1.1-1.6)

### UNIT II: The Operation of Fuzzy Set

(6 hours)

Standard operations of Fuzzy Set - Fuzzy Complement - Fuzzy Union - Fuzzy Intersection – Other Operations in Fuzzy Set - T-norms and T-conorms (K1, K2, K3, K4)  
(Chapter 2: Sections 2.1-2.6)

### UNIT III: Fuzzy Relation and Composition

(6 hours)

Crisp relation - Properties of Relation on a Single Set - Fuzzy relation - Extension of fuzzy set (K1, K2, K3, K4)  
(Chapter 3: Sections 3.1-3.4)

### UNIT IV: Fuzzy Graph and Relation

(6 hours)

Fuzzy Graph - Characteristics of fuzzy relation - Classification of fuzzy relation - Other Fuzzy Relations (K1, K2, K3, K4)  
(Chapter 4: Sections 4.1 - 4.4)

### UNIT V: Fuzzy Number

(6 hours)

Concept of fuzzy number - Operation of fuzzy number - Triangular fuzzy number - Other types of fuzzy numbers (K1, K2, K3, K4)  
(Chapter 5: Sections 5.1 – 5.4)

### Text Book:

1. Kwang H. Lee - First course on Fuzzy Theory and Applications – Springer-Verlag Berlin Heidelberg, New York, 2005.

### Reference Books:

1. George J. Klir and Bo Yuan -Fuzzy Sets and Fuzzy Logic: Theory and Applications, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.
2. Zimmerman H.J. - Fuzzy Set Theory and its Applications, Allied Publishers Ltd., Second Edition, 1996.

### e- Resources

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in/>

## ASSESSMENT METHODS

### 1. For Core/Elective Papers

**Semester Examination (100 Marks)**

**Time: 3 Hours**

**Section A – 10 x 2 = 20 marks**

Answer **all** questions

10 questions (2 questions from each unit)

**Section B – 5 x 7 = 35 marks**

Answer **all** questions

5 questions with internal choice (1 question from each unit)

**Section C – 3 x 15 = 45 marks**

Answer **any three** questions

5 questions (1 question from each unit)

**CA Examination (50 Marks)**

**Time: 1 Hour 30 Minutes**

**Section A – 7 x 2 = 14 marks**

Answer **all** questions

7 questions

**Section B – 3 x 7 = 21 marks**

Answer **any three** questions

3 out of 5 questions

**Section C – 1 x 15 = 15 marks**

Answer **any one** question

2 questions (1 question from each unit)

### 2. For Elective Practical: C and C++

**External Assessment (60 Marks)**

Record – 10 marks

Viva – 5 marks

Semester Practical – 45 marks (Time: 3 Hours)

**Internal Assessment (40 Marks)**

Observation – 10 marks

Perfection – 5 marks

CA practical – 25 marks (Time: 1 Hour 30 Minutes)

### 3. For Skill Based Electives

**For SBE III: Numerical Methods and SBE VI: Fuzzy Set Theory**

**Semester Examination (60 Marks)**

**Time: 2 Hours**

**Section A – 10 x 2 = 20 marks**

Answer **all** questions

10 questions (2 questions from each unit)

**Section B – 4 x 5 = 20 marks**

Answer **any four** questions

5 questions (1 question from each unit)

**Section C – 2 x 10 = 20 marks**

Answer **any two** questions

5 questions (1 question from each unit)

**CA Examination (30 Marks)**

**Time: 1 Hour**

**Section A – 5 x 2 = 10 marks**

Answer **all** questions

5 questions

**Section B – 2 x 5 = 10 marks**

Answer **any two** questions

4 questions (2 questions from each unit)

**Section C – 1 x 10 = 10 marks**

Answer **any one** question

2 questions (1 question from each unit)

**For SBE IV: R Programming Language**

**External Assessment (60 Marks)**

Record – 10 marks

Viva – 5 marks

Semester Practical – 45 marks (Time: 2 Hours)

**Internal Assessment (40 Marks)**

Observation – 10 marks

Perfection – 5 Marks

CA Practical – 25 marks (Time: 1 Hour)

**For SBE V: Mathematics for Competitive Examinations**

**Semester Examination (60 Marks)**

**Time: 2 Hours**

60 multiple choice questions (1 mark for each question)

**CA Examination (30 Marks)**

**Time: 1 Hour**

30 multiple choice questions (1 mark for each question)

## UG ALLIED PAPERS

### SEMESTER – I

#### UCBAB20 – Business Mathematics and Statistics I

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: I</b>	UCBAB20	Business Mathematics and Statistics - I	Theory	Core	5	4	100

#### Course Objectives

1. To introduce mathematical applications in business and management, thereby enhancing the logical thinking of the students with regard to problem solving.
2. To train the students to apply statistical techniques in business and management, thereby enhancing the decision making skills of the students.

#### Course Outcomes (CO)

The learners will be able to

1. Apply the concept of matrices in solving business problems.
2. Analyze and demonstrate differentiation skills in economics and business.
3. Apply graphical methods to interpret statistical data.
4. Apply the statistical techniques in business.
5. Solve a range of problems using the techniques covered.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	M	H	M	L
<b>CO2</b>	H	H	H	H	M	L
<b>CO3</b>	H	H	M	H	M	L
<b>CO4</b>	H	H	L	H	M	H
<b>CO5</b>	H	M	H	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	M	L	M	H
<b>CO2</b>	H	H	M	L	M	H
<b>CO3</b>	H	H	M	L	L	H
<b>CO4</b>	H	H	M	L	M	H
<b>CO5</b>	H	H	M	L	M	H

(Low-L, Medium - M, High - H)

## Course Syllabus

### Unit I: Matrices

(15 hours)

- 1.1. Definition, Types of matrices (K1, K2, K3, K4)
- 1.2 Matrix operations, Determinant of a matrix (K1, K2, K3, K4)
- 1.3 Singular and non-singular matrices (K1, K2, K3, K4)
- 1.4 Inverse of a matrix by co-factor method (K1, K2, K3, K4)
- 1.5 Rank of a matrix (K1, K2, K3, K4)
- 1.6 Solution of system of linear simultaneous equations using Cramer's rule (K1, K2, K3, K4)

### Unit II: Differentiation

(15 hours)

- 2.1 Differentiation (K1, K2, K3, K4)
- 2.2 Derivatives of standard functions  $x^n$ ,  $e^x$ ,  $\log x$ , constant ( without proof ) (K1, K2, K3, K4)
- 2.3 Rules of differentiation ( Addition, difference, product, quotient ) (K1, K2, K3, K4)
- 2.4 Chain rule, Successive differentiation (up to second derivative) (K1, K2, K3, K4)
- 2.5 Uses: Marginal Concepts, Elasticity of demand, Increasing and decreasing functions (K1, K2, K3, K4)
- 2.6 Maxima and minima, break - even point. (K1, K2, K3, K4)

### Unit III: Classification and Graphical Representation

(15 hours)

- 3.1 Introduction, meaning of classification, chief characteristics of classification, objects of classification rules of classification (K1, K2, K3, K4)
- 3.2 Frequency distribution, individual observations (K1, K2, K3, K4)
- 3.3 Discrete frequency distributions continuous frequency distribution (K1, K2, K3, K4)
- 3.4 Frequency distribution, graph of frequency distribution (K1, K2, K3, K4)
- 3.5 Histogram (K1, K2, K3, K4)
- 3.6 Frequency polygon, frequency curve. (K1, K2, K3, K4)

### Unit IV: Measures of Central Tendency

(15 hours)

- 4.1 Arithmetic mean (K1, K2, K3, K4)
- 4.2 Median (K1, K2, K3, K4)
- 4.3 Mode (K1, K2, K3, K4)
- 4.4 Empirical formulae, Combined and Weighted arithmetic mean (K1, K2, K3, K4)
- 4.5 Geometric mean (K1, K2, K3, K4)
- 4.6 Harmonic mean. (K1, K2, K3, K4)

### Unit V: Measures of Dispersion and Skewness

(15 hours)

- 5.1 Range (K1, K2, K3, K4)
- 5.2 Quartile deviation (K1, K2, K3, K4)
- 5.3 Mean deviation (K1, K2, K3, K4)
- 5.4 Standard deviation (K1, K2, K3, K4)
- 5.5 Karl Pearson's coefficient of skewness (K1, K2, K3, K4)
- 5.6 Bowley's coefficient of skewness. (K1, K2, K3, K4)

**Text Books:**

1. P. A. Navnitham - Business Mathematics and Statistics - Jai Publishers - Trichy 2007.
2. R. S. N. Pillai and Bagavathi - Statistics, 17<sup>th</sup> Edition, S. Chand and Company - New Delhi, 1984.

**Reference Books:**

1. Francis, Andy - Business mathematics and statistics. Cengage Learning EMEA, 2004.
2. Agarwal, B. M. - Business Mathematics & Statistics. Ane Books Pvt Ltd, 2009.
3. Asim Kumar Manna - Business Mathematics & Statistics. McGraw Hill Education (India) Pvt. Ltd., 2018.

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – II**  
**UCBAD20 - Business Mathematics and Statistics - II**

<b>Year: I</b> <b>SEM: II</b>	<b>Course Code:</b> UCBAD20	<b>Title of the Course:</b> Business Mathematics and Statistics – II	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce mathematical applications in business and management, thereby enhancing the logical thinking of the students with regard to problem solving.
2. To train the students to apply statistical techniques in business and management, thereby enhancing the decision making skills of the students.

**Course Outcomes (CO)**

The learners will be able to

1. Understand mathematical applications in finance.
2. Demonstrate mathematical skills like integration required in economics and business.
3. Comprehend critical thinking and problem solving skills in correlation and regression.
4. Interpret numerical information that forms the basis of index numbers in business.
5. Analyze the theoretical concepts, tools and methods of probability.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	L
CO2	H	H	H	H	M	L
CO3	H	H	M	H	M	L
CO4	H	H	L	H	M	H
CO5	H	M	H	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	M	H
CO2	H	H	M	L	M	H
CO3	H	H	M	L	L	H
CO4	H	H	M	L	M	H
CO5	H	H	H	L	H	H

**(Low - L, Medium - M, High - H)**

## Course Syllabus

### Unit I: Mathematics of Finance

(15 hours)

- 1.1 Mathematics of finance (K1, K2, K3, K4)
- 1.2 Simple and Compound interest (K1, K2, K3, K4)
- 1.3 Discount on bills (K1, K2, K3, K4)
- 1.4 Pay roll wages (K1, K2, K3, K4)
- 1.5 Commission (K1, K2, K3, K4)
- 1.6 Annuities (K1, K2, K3, K4)

### Unit II: Integration

(15 hours)

- 2.1 Integration, Indefinite integrals, Standard forms (K1, K2, K3, K4)
- 2.2 Integration of  $x^n$ ,  $\frac{1}{x}$ ,  $e^x$  (K1, K2, K3, K4)
- 2.3 Basic theorems on integration, Integration (K1, K2, K3, K4)
- 2.4 Integration by substitution ( $ax+b$ ,  $e^{ax+b}$ ,  $f'(x)/f(x)$ ) (K1, K2, K3, K4)
- 2.5 Integration by partial fractions (K1, K2, K3, K4)
- 2.6 Integration by parts, Uses of Economics. (K1, K2, K3, K4)

### Unit III: Correlation and Regression

(15 hours)

- 3.1 Correlation (K1, K2, K3, K4)
- 3.2 Karl Pearson's coefficient of correlation (K1, K2, K3, K4)
- 3.3 Spearman's rank correlation (K1, K2, K3, K4)
- 3.4 Regression (K1, K2, K3, K4)
- 3.5 Simple regression equations (K1, K2, K3, K4)
- 3.6 Regression coefficients. (K1, K2, K3, K4)

### Unit IV: Index Numbers

(15 hours)

- 4.1 Various methods of construction of index numbers, Unweighted index numbers. (K1, K2, K3, K4)
- 4.2 Weighted index numbers, Quantity index numbers, Value index numbers (K1, K2, K3, K4)
- 4.3 Test of consistency of index numbers, Time reversal test, Factor reversal test (K1, K2, K3, K4)
- 4.4 Chain base and fixed base index numbers (K1, K2, K3, K4)
- 4.5 Base shifting, Consumer price index (K1, K2, K3, K4)
- 4.6 Aggregate method, Family budget method. (K1, K2, K3, K4)

### Unit V: Probability

(15 hours)

- 5.1 Permutation and Combination (K1, K2, K3, K4)
- 5.2 Trial, Event, Sample space (K1, K2, K3, K4)
- 5.3 Mutually exclusive events, Exhaustive events, Independent events (K1, K2, K3, K4)
- 5.4 Classical definition of probability, Axiomatic definition of probability (K1, K2, K3, K4)
- 5.5 Addition and multiplication theorems (without proof) (K1, K2, K3, K4)
- 5.6 Problems (K1, K2, K3, K4)

**Text Books:**

1. P. A. Navnitham - Business Mathematics and Statistics - Jai Publishers - Trichy 2007.
2. R. S. N. Pillai and Bagavathi - Statistics, 17<sup>th</sup> Edition, S. Chand and Company, New Delhi, 1984
3. P. R. Vittal - Business Mathematics, 1<sup>st</sup> Edition - Margham Publications, Chennai, 1995.

**Reference Books:**

1. Francis, Andy - Business mathematics and statistics. Cengage Learning EMEA, 2004.
2. Agarwal, B. M. - Business Mathematics & Statistics. Ane Books Pvt. Ltd., 2009.
3. Asim Kumar Manna - Business Mathematics & Statistics. McGraw Hill Education (India) Pvt. Ltd., 2018.

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – III**  
**UCBAG20 – Operations Research I**

<b>Year: II</b> <b>SEM: III</b>	<b>Course Code:</b> UCBAG20	<b>Title of the Course:</b> <b>Operations Research I</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 6	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the use of quantitative methods and techniques for effective decision making
2. To provide a detailed knowledge about mathematical, transportation and assignment models.
3. To analyse any real life system with limited constraints and depict it in a model form.
4. To examine the aspects of business and marketing with respect to operations research.

**Course Outcomes (CO)**

The learners will be able to

1. Understand and solve linear programming problems.
2. Identify and develop the operational research models such as graphical and simplex method.
3. Comprehend advanced linear programming problems using Big M method.
4. Construct and solve transportation models and assignment models.
5. Analyze and evaluate assignment models.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	L
CO2	H	M	H	M	L	H
CO3	H	M	H	H	H	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	M	H
CO2	H	H	M	L	M	H
CO3	H	M	M	L	L	H
CO4	H	H	M	L	M	H
CO5	H	H	M	L	M	H

(Low-L, Medium - M, High - H)

## Course Syllabus

### **Unit I: Introduction and Mathematical Formulation (18 hours)**

- 1.1 Operations research: Definition (K1, K2, K3, K4)
- 1.2 Scope, Characteristics (K1, K2, K3, K4)
- 1.3 Models of operations research: Iconic (K1, K2, K3, K4)
- 1.4 Analogue, Symbolic model (K1, K2, K3, K4)
- 1.5 Linear programming (K1, K2, K3, K4)
- 1.6 Formulation. (K1, K2, K3, K4)

### **Unit II: Linear Programming (18 hours)**

- 2.1 Linear Programming: Graphical method (problems: part I) (K1, K2, K3, K4)
- 2.2 Graphical method (problems: part II) (K1, K2, K3, K4)
- 2.3 Graphical method (problems: part III) (K1, K2, K3, K4)
- 2.4 Regular simplex Method (problems: part I) (K1, K2, K3, K4)
- 2.5 Regular simplex Method (problems: part II) (K1, K2, K3, K4)
- 2.6 Regular simplex Method (problems: part III) (K1, K2, K3, K4)

### **Unit III: Linear Programming (18 hours)**

- 3.1 Linear programming: Big 'M' method (problems part I) (K1, K2, K3, K4)
- 3.2 Big 'M' method (problems part II) (K1, K2, K3, K4)
- 3.3 Big 'M' method (problems part III) (K1, K2, K3, K4)
- 3.4 Duality (problems part I) (K1, K2, K3, K4)
- 3.5 Duality (problems part II) (K1, K2, K3, K4)
- 3.6 Duality (problems part III) (K1, K2, K3, K4)

### **Unit IV: Transportation Model (18 hours)**

- 4.1 Transportation Problem (K1, K2, K3, K4)
- 4.2 Initial basic feasible solution using North West Corner rule(K1, K2, K3, K4)
- 4.3 Initial basic feasible solution using least cost method and Vogel's approximation method (K1, K2, K3, K4)
- 4.4 Degeneracy, Unbalanced Transportation problem (K1, K2, K3, K4)
- 4.5 Maximization problem(K1, K2, K3, K4)
- 4.6 Test of Optimality using MODI method (K1, K2, K3, K4)

### **Unit V: Assignment Model (18 hours)**

- 5.1 Assignment problems (K1, K2, K3, K4)
- 5.2 Minimal assignment problems (K1, K2, K3, K4)
- 5.3 Unbalanced Assignment problems (K1, K2, K3, K4)
- 5.4 Restricted Assignment problems (K1, K2, K3, K4)
- 5.5 Maximization problem in Assignment (K1, K2, K3, K4)
- 5.6 Maximization problems in Assignment Problems (K1, K2, K3, K4)

**Text Books:**

1. Premkumar Gupta and Hira D. S. - Introduction to Operations Research, 1<sup>st</sup> Edition – S.Chand Company Ltd., 1998.
2. Vittal P. R - Introduction to Operations Research, 1<sup>st</sup> Edition - Margham Publishers – 1999.

**Reference Books:**

1. Kalavathy. S - Operations Research, 2<sup>nd</sup> Edition - Vikas Publishing Ltd., 2002.
2. K. Pandian, C. Kayalvizhi - Applied Operations Research for Management, 2<sup>nd</sup> Edition, Thirumalaa Publications, 2004.

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – IV**  
**UCBAI20 – Operations Research II**

<b>Year: II</b> <b>SEM: IV</b>	<b>Course Code:</b> UCBAI20	<b>Title of the Course:</b> Operations Research - II	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 6	<b>MARKS</b> 100
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**Course Objectives**

1. To improve problem solving skills of students and make them to use the skills in daily life problems
2. To improve knowledge in Sequencing Problems, Queuing theory and Network Analysis.

**Course Outcomes (CO)**

The learners will be able to

1. Utilize the concepts of Operation research in real life experiments and plan the Sequencing of jobs through machines.
2. Evaluate the critical path and project duration in CPM.
3. Compute the Probability of meeting the scheduled dates in PERT and compare CPM and PERT.
4. Acquire the solutions for Game of two players in Game theory.
5. Analyze the queuing theory for single channel problems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	L
CO2	H	M	H	M	L	H
CO3	H	M	H	H	H	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	M	H
CO2	H	H	M	L	M	H
CO3	H	H	M	L	L	H
CO4	H	H	M	L	M	H
CO5	H	H	H	L	M	H

**(Low-L, Medium - M, High - H)**

## Course Syllabus

### Unit I: Sequencing Problems

(18 hours)

- 1.1 Introduction – Definition of Sequencing (K1, K2)
- 1.2 Basic steps – Job assigning through machines (K1, K2)
- 1.3 Processing n jobs through two machines (K1, K2, K3, K4)
- 1.4 Processing n jobs through three machines (K1, K2, K3, K4)
- 1.5 Processing two jobs through m machines (K1, K2, K3, K4)
- 1.6 Processing n jobs through m machines (K1, K2, K3, K4)

### Unit II: Network Analysis: CPM Computations

(18 hours)

- 2.1 Introduction – Network diagram representation (K1, K2)
- 2.2 Rules for constructing the network (K1, K2)
- 2.3 Numbering the events – Different time Calculation (K1, K2, K3, K4)
- 2.4 CPM representation in Tabular form (K1, K2, K3, K4)
- 2.5 Total, Independent and free float Calculations (K1, K2, K3, K4)
- 2.6 Calculation of CPM and Project duration (K1, K2, K3, K4)

### Unit III: Network Analysis: PERT Computations

(18 hours)

- 3.1 Network diagram representation (K1, K2)
- 3.2 Basic Steps in PERT (K1, K2)
- 3.3 Difference between PERT and CPM (K1, K2, K3, K4)
- 3.4 Calculation of Critical path and Project duration (K1, K2, K3, K4)
- 3.5 Probability of meeting the scheduled dates (K1, K2, K3, K4)
- 3.6 Calculation of project duration for the scheduled dates (K1, K2, K3, K4)

### Unit IV: Game Theory

(18 hours)

- 4.1 Introduction characteristic of Games- Definition (K1, K2)
- 4.2 Meaning for Saddle points (K1, K2)
- 4.3 Game without Saddle points (K1, K2, K3, K4)
- 4.4 Games without Saddle points – Mixed Strategy
- 4.5 Basic Steps -Dominance property (K1, K2)
- 4.6 Games problems using Dominance property (K1, K2, K3, K4)

### Unit V: Queuing Theory

(18 hours)

- 5.1 Introduction - Meaning – Queuing theory (K1, K2)
- 5.2 Various types of Queuing Model (K1, K2)
- 5.3 Single channel Queuing theory (infinite capacity only) (K1, K2, K3, K4)
- 5.4 Different formulae (without derivation) - Concepts
- 5.5 Calculation of Single Channel systems (K1, K2, K3, K4)
- 5.6 Problems solving using Queuing theory (K1, K2, K3, K4)

**Text Books:**

1. Kalavathy. S - Operations Research, 2<sup>nd</sup> Edition - Vikas Publishing Ltd., 2002.
2. Vittal P.R. - Introduction to Operations Research, 1<sup>st</sup> Edition - Margham Publishers – 1999.

**Reference Books:**

1. Premkumar Gupta and Hira D.S. - Introduction to Operations Research, 1<sup>st</sup> Edition – S.Chand Company Ltd., 1998.
2. K. Pandian, C.Kayalvizhi - Applied Operations Research for Management, 2<sup>nd</sup> Edition, Thirumalaa Publications, 2004

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – I**  
**UABMA20 – Business Mathematics and Statistics**

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code:</b> UABMA20	<b>Title of the Course:</b> Business Mathematics and Statistics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To provide an opportunity to master mathematical applications in Economics, Finance, Commerce and Management.
2. To develop the ability of students to deal with numerical and quantitative issues in business.
3. To have a strong understanding of statistical applications in Economics and Management.
4. To enable the use of statistical techniques wherever relevant.

**Course Outcomes (CO)**

The learners will be able to

1. Apply the knowledge in matrices in solving business problems.
2. Analyze and demonstrate differentiation skills in economics and business.
3. Apply statistical and graphical techniques wherever relevant.
4. Apply the concepts, tools and techniques in business statistical analysis.
5. Solve a range of problems using the techniques covered.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	M	H	H	M	L
<b>CO2</b>	H	M	H	H	M	L
<b>CO3</b>	H	M	H	H	M	L
<b>CO4</b>	H	M	H	H	M	L
<b>CO5</b>	H	M	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	M	L	M	H
<b>CO2</b>	H	H	M	L	M	H
<b>CO3</b>	H	H	M	L	L	H
<b>CO4</b>	H	H	M	L	M	H
<b>CO5</b>	H	H	M	L	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Matrices

(15 hours)

- 1.1 Definition, Types of matrices (K1, K2, K3, K4)
- 1.2 Matrix operations, Determinant of a matrix (K1, K2, K3, K4)
- 1.3 Singular and non-singular matrices (K1, K2, K3, K4)
- 1.4 Inverse of a matrix by co-factor method (K1, K2, K3, K4)
- 1.5 Rank of a matrix (K1, K2, K3, K4)
- 1.6 Solution of system of linear simultaneous equations using Cramer's rule (K1, K2, K3, K4)

### Unit II: Differentiation

(15 hours)

- 2.1 Differentiation (K1, K2, K3, K4)
- 2.2 Derivatives of standard functions  $x^n$ ,  $e^x$ ,  $\log x$ , constant (without proof) (K1, K2, K3, K4)
- 2.3 Rules of differentiation (Addition, difference, product, quotient) (K1, K2, K3, K4)
- 2.4 Chain rule, Successive differentiation (up to second derivative) (K1, K2, K3, K4)
- 2.5 Uses: Marginal Concepts, Elasticity of demand, Increasing and decreasing functions (K1, K2, K3, K4)
- 2.6 Maxima and minima, break - even point. (K1, K2, K3, K4)

### Unit III: Classification and Graphical Representation

(15 hours)

- 3.1 Introduction, meaning of classification, chief characteristics of classification, objects of classification rules of classification (K1, K2, K3, K4)
- 3.2 Frequency distribution, individual observations (K1, K2, K3, K4)
- 3.3 Discrete frequency distributions continuous frequency distribution (K1, K2, K3, K4)
- 3.4 Frequency distribution, graph of frequency distribution (K1, K2, K3, K4)
- 3.5 Histogram (K1, K2, K3, K4)
- 3.6 Frequency polygon, frequency curve. (K1, K2, K3, K4)

### Unit IV: Measures of Central Tendency

(15 hours)

- 4.1 Arithmetic mean (K1, K2, K3, K4)
- 4.2 Median (K1, K2, K3, K4)
- 4.3 Mode (K1, K2, K3, K4)
- 4.4 Empirical formulae, Combined and Weighted arithmetic mean (K1, K2, K3, K4)
- 4.5 Geometric mean (K1, K2, K3, K4)
- 4.6 Harmonic mean. (K1, K2, K3, K4)

### Unit V: Measures of Dispersion and Skewness

(15 hours)

- 5.1 Range (K1, K2, K3, K4)
- 5.2 Quartile deviation (K1, K2, K3, K4)
- 5.3 Mean deviation (K1, K2, K3, K4)
- 5.4 Standard deviation (K1, K2, K3, K4)
- 5.5 Karl Pearson's coefficient of skewness (K1, K2, K3, K4)
- 5.6 Bowley's coefficient of skewness. (K1, K2, K3, K4)

**Text Books:**

1. P. A. Navnitham - Business Mathematics and Statistics - Jai Publishers - Trichy 2007.
2. R. S. N. Pillai and Bagavathi - Statistics, 17<sup>th</sup> Edition, S. Chand and Company - New Delhi, 1984.

**Reference Books:**

1. Francis, Andy - Business Mathematics and Statistics. Cengage Learning EMEA, 2004.
2. Agarwal, B. M. - Business Mathematics & Statistics. Ane Books Pvt Ltd, 2009.
3. Asim Kumar Manna - Business Mathematics & Statistics. McGraw Hill Education (India) Pvt. Ltd., 2018.

**e-Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – II**  
**UASOR20 – Business Statistics and Operations Research**

<b>Year: I</b> <b>SEM: II</b>	<b>Course Code:</b> UASOR20	<b>Title of the Course:</b> Business Statistics and Operations Research	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To deepen the knowledge of statistical concepts and to introduce the concepts of Operations Research.
2. To demonstrate and apply the concepts of probability and game theory.

**Course Outcomes (CO)**

The learners will be able to

1. Gain practical knowledge of correlation and regression.
2. Understand the basic concepts of index numbers.
3. Learn the ideas of possible outcomes.
4. Develop mathematical skills to optimize transportation and assignment problem.
5. Propose the best strategy using decision making methods under uncertainty and game theory.

CO	PSO					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	H	M	H	H	M	L
CO2	H	M	H	H	M	L
CO3	H	M	H	H	M	L
CO4	H	M	H	H	M	L
CO5	H	M	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	M	H
CO2	H	H	M	L	M	H
CO3	H	H	M	L	L	H
CO4	H	H	M	L	M	H
CO5	H	H	M	L	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Correlation and Regression

(15 hours)

- 1.1 Introduction (K1,K2)
- 1.2 Scatter Diagram (K1,K2,K3)
- 1.3 Karl Pearson's coefficient of correlation (K1, K2, K3, K4)
- 1.4 Spearman's Rank correlation(K1, K2, K3)
- 1.5 Methods of forming the regression equations (K1, K2, K3)
- 1.6 Properties of regression lines and coefficients. (K1, K2, K3, K4)

### Unit II: Index Numbers

(15 hours)

- 2.1 Various methods of construction of index numbers (K1, K2)
- 2.2 Methods, Simple Aggregate, Weighted Aggregate (K1, K2, K3, K4)
- 2.3 Quantity Index numbers, Value Index numbers (K1, K2, K3, K4)
- 2.4 Test of consistency of index numbers, Time reversal test, Factor reversal test (K1, K2, K3, K4)
- 2.5 Base shifting (K1, K2, K3)
- 2.6 Consumer price index, Family budget method.(K1,K2,K3)

### Unit III: Probability

(15 hours)

- 3.1 Permutation, Combination (K1, K2)
- 3.2 Definitions of Trial, Event, Sample space, Mutually Exclusive Cases, Exhaustive events, Independent events (K1, K2, K3)
- 3.3 Classical definition of probability (K1, K2)
- 3.4 Axiomatic Definition of probability (K1, K2)
- 3.5 Addition and multiplication theorem (without proof) (K1, K2)
- 3.6 Problems (K1, K2, K3, K4)

### Unit IV: Transportation and Assignment model

(15 hours)

- 4.1 Transportation model: Initial basic feasible solution (K1, K2, K3, K4)
- 4.2 Test for Optimality (K1, K2, K3, K4)
- 4.3 MODI method (omit degeneracy) (K1, K2, K3, K4)
- 4.4 Assignment Model: Assignment problem (K1, K2, K3, K4)
- 4.5 Minimal assignment problem (K1, K2, K3, K4)
- 4.6 Hungarian method. (K1, K2, K3, K4)

### Unit V: Game Theory

(15 hours)

- 5.1 Introduction (K1)
- 5.2 Meaning (K1, K2)
- 5.3 The Maximin and Minimax principles (K1, K2, K3, K4)
- 5.4 Saddle point (K1, K2, K3, K4)
- 5.5 Games without saddle points (Mixed strategies) (K1, K2, K3, K4)
- 5.6 Dominance property (Excluding graphical and LPP methods) (K1, K2, K3, K4)

**Text Books:**

1. P. A. Navnitham - Business Statistics and Operations Research - Jai Publishers, Trichy 2007.
2. R. S. N. Pillai and Bhagavathi-Statistics, S.Chand and Company, New Delhi, 17<sup>th</sup> Edition 1984.
3. Kalavathy. S - Operations Research, 2<sup>nd</sup> Edition - Vikas Publishing Ltd., 4<sup>th</sup> edition 2013.

**Reference Books:**

1. Dr. P.R. Vittal - Mathematical Statistics, Margam Publications, 2015.
2. P.K. Gupta and D.S. Hira – Problems in Operations Research, 1<sup>st</sup> Edition – Chand and Company Ltd., 1995.
3. Dr. S. P. Gupta and Dr. M.P. Gupta – Business Statistics – Sultan Chand & Sons, New Delhi, 16<sup>th</sup> edition, 2010.

**E-Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – I**  
**UAMAA20 / UBMAA20 – Allied Mathematics I**

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code :</b> UAMAA20/ UBMAA20	<b>Title Of The Course :</b> Allied Mathematics I	<b>Course Type :</b> Theory	<b>Course Category :</b> Allied	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the basic concepts of matrices
2. To improve problem solving skills in Trigonometry
3. To introduce various methods to solve equations
4. To introduce differential and integral calculus

**Course Outcomes (CO)**

The learners will be able to

1. Understand the basic concepts of matrices
2. Apply the theory of equations and find roots using Newton's and Horner's method.
3. Acquire problem solving skills in trigonometry.
4. Compute radius of curvature, centre of curvature, evolutes and involutes.
5. Apply the techniques of integral calculus.

CO	PSO					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	M	L
CO3	H	H	H	H	L	L
CO4	H	H	H	H	H	L
CO5	H	H	H	H	L	L

CO	PO					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	M	L
CO3	H	H	H	H	L	L
CO4	H	H	H	H	H	L
CO5	H	H	H	H	L	L

## Course Syllabus

### Unit I: Matrices (18 hours)

- 1.1 Symmetric, Skew symmetric, Hermitian, Skew Hermitian (K1, K2, K3, K4)
- 1.2 Orthogonal, Unitary matrices (K1, K2, K3, K4)
- 1.3 Eigen values and Eigen vectors (K1, K2, K3, K4)
- 1.4 Cayley-Hamilton Theorem (without proof) (K1, K2, K3, K4)
- 1.5 Verification and computation of inverse (K1, K2, K3, K4)
- 1.6 Diagonalisation of a matrix (K1, K2, K3, K4)

### Unit II: Theory of Equations (18 hours)

- 2.1 Polynomial equations (K1, K2, K3, K4)
- 2.2 Irrational roots – Complex roots (K1, K2, K3, K4)
- 2.3 Reciprocal equations (K1, K2, K3, K4)
- 2.4 Descarte's Rule of signs (K1, K2, K3, K4)
- 2.5 Approximation of roots of polynomial equation by Newton's method (K1, K2, K3, K4)
- 2.6 Horner's methods (K1, K2, K3, K4)

### Unit III: Trigonometry (18 hours)

- 3.1 Expansions of  $\sin\theta$ ,  $\cos\theta$ ,  $\tan\theta$  (K1, K2, K3, K4)
- 3.2 Expansions of  $\sin\theta$ ,  $\cos\theta$ ,  $\tan\theta$  (continued) (K1, K2, K3, K4)
- 3.3 Expansion of  $\sin^n \theta$ ,  $\cos^n \theta$  (K1, K2, K3, K4)
- 3.4 Expansions of  $\sin\theta$ ,  $\cos\theta$ ,  $\tan\theta$  in terms of  $\theta$  (K1, K2, K3, K4)
- 3.5 Expansions of  $\sin\theta$ ,  $\cos\theta$ ,  $\tan\theta$  in terms of  $\theta$  (continued) (K1, K2, K3, K4)
- 3.6 Logarithm of a complex number (K1, K2, K3, K4)

### Unit IV: Differential Calculus (18 hours)

- 4.1 Curvature (K1, K2, K3, K4)
- 4.2 Radius of curvature in Cartesian Coordinates (K1, K2, K3, K4)
- 4.3 Polar Coordinates, (K1, K2, K3, K4)
- 4.4 p-r equations (K1, K2, K3, K4)
- 4.5 Evolutes (K1, K2, K3, K4)
- 4.6 Involutives (K1, K2, K3, K4)

### Unit V: Integral Calculus (18 hours)

- 5.1 Integration by parts (K1, K2, K3, K4)
- 5.2 Bernoulli's formula (K1, K2, K3, K4)
- 5.3 Reduction formulae  $\sin^n x$  (K1, K2, K3, K4)
- 5.4 Reduction formulae  $\cos^n x$  (K1, K2, K3, K4)
- 5.5 Reduction formulae  $\tan^n x$ ,  $\operatorname{cosec}^n x$  (K1, K2, K3, K4)
- 5.6 Reduction formulae  $\sec^n x$ ,  $\cot^n x$  (K1, K2, K3, K4)

**Text Books:**

1. S. Narayanan and others – Ancillary Mathematics – Volumes I, II, III and IV-S.Viswanathan Printers and Publishers Private Limited, 2007

**Reference Books:**

1. T.K.Manikavachogam Pillay and others – Algebra – Volume II – S. Viswanathan Printers and Publishers Private Limited, 2006
2. T.K.Manikavachogam Pillay and others – Differential Calculus - S.Viswanathan Printers and Publishers Private Limited – Volume I, 2007
3. T.K.Manikavachogom Pillay and others – Integral Calculus - S.Viswanathan Printers and Publishers Private Limited - Volume II, 2007
4. P.R. Vittal - Allied Mathematics – Margham Publications - Third Edition, 2002

**e-Resource:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – II**  
**UAMAB20 – Allied Mathematics II**

<b>Year : I SEM :II</b>	<b>Course Code :</b> UAMAB20	<b>Title Of The Course :</b> Allied Mathematics: II	<b>Course Type :</b> Theory	<b>Course Category :</b> Allied	<b>H/W 6</b>	<b>CREDITS 5</b>	<b>MARKS 100</b>
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**Course Objectives**

1. To introduce concepts of vector calculus
2. To teach methods of solving partial differential equations
3. To introduce Laplace transforms and Fourier Series

**Course Outcomes (CO)**

The learners will be able to

1. Understand the use of vector calculus in science and engineering.
2. Understand the applications of Green's, Gauss divergence and Stoke's Theorems.
3. Find the complete, singular and general integral of partial differential equations.
4. Understand the basic concepts of Laplace Transforms.
5. Determine the nature of the Fourier series and find its coefficients

CO	PSO					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	H	L
CO3	H	H	H	H	M	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	H	L

CO	PO					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	M	L
CO3	H	H	H	H	L	L
CO4	H	H	H	H	H	L
CO5	H	H	H	H	L	L

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Differentiation of vectors (18 hours)

- 1.1 Scalar and vector point functions (K1, K2, K3, K4)
- 1.2 Differentiation of vectors (K1, K2, K3, K4)
- 1.3 Differential operators (K1, K2, K3, K4)
- 1.4 Directional derivatives (K1, K2, K3, K4)
- 1.5 Gradient (K1, K2, K3, K4)
- 1.6 Divergence and Curl (K1, K2, K3, K4)

### Unit II: Integration of vectors (18 hours)

- 2.1 Line Integral (K1, K2, K3, K4)
- 2.2 Surface Integral (K1, K2, K3, K4)
- 2.3 Volume Integral (K1, K2, K3, K4)
- 2.4 Green's theorem statement and application (K1, K2, K3, K4)
- 2.5 Gauss's theorem statement and application (K1, K2, K3, K4)
- 2.6 Stoke's theorem statement and application (K1, K2, K3, K4)

### Unit III: Partial Differential Equations (18 hours)

- 3.1 Formation of Partial Differential equations by eliminating arbitrary constants (K1, K2, K3, K4)
- 3.2 Formation of Partial Differential equations by eliminating arbitrary functions (K1, K2, K3, K4)
- 3.3 Solutions of standard types of first order differential equations –  $f(p,q) = 0$  (K1, K2, K3, K4)
- 3.4 Solution of  $f(x,p,q) = 0$ ;  $f(y,p,q) = 0$ ;  $f(z,p,q) = 0$  (K1, K2, K3, K4)
- 3.5 Solution of  $f_1(x,p) = f_2(y,q)$  (K1, K2, K3, K4)
- 3.6 Solution of  $z = px+qy+f(p,q)$  (K1, K2, K3, K4)

### Unit IV: Laplace Transformations (18 hours)

- 4.1 Definition of Laplace transforms (K1, K2, K3, K4)
- 4.2 Laplace transforms of standard functions (K1, K2, K3, K4)
- 4.3 Laplace transforms – problems (K1, K2, K3, K4)
- 4.4 Laplace transforms – problems (continued) (K1, K2, K3, K4)
- 4.5 Inverse Laplace Transforms (K1, K2, K3, K4)
- 4.6 Solving ordinary differential equations of second order with constant coefficients using Laplace transforms (K1, K2, K3, K4)

### Unit V: Fourier Series (18 hours)

- 5.1 Definition of Fourier series (K1, K2, K3, K4)
- 5.2 Fourier series –Problems (K1, K2, K3, K4)
- 5.3 Finding Fourier coefficients for a given periodic function with period  $2\pi$  (K1, K2, K3, K4)
- 5.4 Odd functions (K1, K2, K3, K4)
- 5.5 Even function (K1, K2, K3, K4)
- 5.6 Half range series.(K1, K2, K3, K4)

**Text Books:**

1. S.Narayanan and others – Ancillary Mathematics – Volumes I, II, III and IV, S.Viswanathan Printers and Publishers Private Limited, 2007.

**Reference Books:**

1. P.R. Vittal - Allied Mathematics – Margham Publications - Third Edition, 2002
2. T.K.Manikavachagom Pillay and others – Ancillary Mathematics Volume I and Volume II - S.Viswanathan Printers and Publishers Private Limited, 2004
3. P.Kandasamy and K.Thilagavathi - Allied Mathematics Volume I and Volume II - S.Chand and Co, New Delhi, 2004.

**e-Resource:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – III**  
**UANAA20 – Numerical Analysis I**

<b>Year: II</b> <b>SEM:III</b>	<b>Course Code:</b> UANAA20	<b>Title of the Course:</b> Numerical Analysis I	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the concepts of Numerical Analysis.
2. To provide suitable and effective methods called numerical methods, for obtaining approximate representative numerical results of problems.

**Course Outcomes (CO)**

The learners will be able to

1. Understand the operators and their properties, form a forward and backward difference table.
2. Execute interpolation methods using forward and backward differences when the data is equally distributed.
3. Exhibit interpolation procedures using central differences when the data is equally distributed.
4. Use divided differences for interpolation when the data is unequally distributed.
5. Implement curve fitting and method of moments.

CO	PSO					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	H	H	M	L	M	H
CO2	H	H	M	L	M	H
CO3	H	H	M	L	M	H
CO4	H	H	M	L	M	H
CO5	H	H	M	L	M	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	H
CO2	H	H	H	L	M	H
CO3	H	H	H	L	M	H
CO4	H	H	H	L	M	H
CO5	H	H	H	L	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Finite Differences

(18 hours)

- 1.1 Forward Differences table and Backward differences table (K1,K2)
- 1.2 Differences of polynomial and factorial polynomial (K1,K2,K3)
- 1.3 Reciprocal factorial and Polynomial in Factorial Notation (K1,K2,K3)
- 1.4 Error propagation in difference table (K1, K2, K3, K4)
- 1.5 Other differences operators (K1,K2,K3,K4)
- 1.6 Summation of series (K1,K2,K3,K4)

### Unit II: Interpolation

(18 hours)

- 2.1 Introduction (K1, K2)
- 2.2 Newton's Forward interpolation formula (K1, K2, K3, K4)
- 2.3 Newton's backward interpolation formula (K1, K2, K3, K4)
- 2.4 Error in polynomial interpolation (K1, K2, K3, K4)
- 2.5 Equidistant terms with one or more missing terms (K1, K2, K3, K4)
- 2.6 Introduction and Form a central difference table (K1, K2)

### Unit III: Central Difference Table

(18 hours)

- 3.1 Gauss Forward Interpolation formula (K1, K2, K3, K4)
- 3.2 Gauss backward Interpolation formula (K1, K2, K3, K4)
- 3.3 Stirling's Formula (K1, K2, K3, K4)
- 3.4 Bessel's Formula (K1, K2, K3, K4)
- 3.5 Laplace – Everett's formula (K1, K2, K3, K4)
- 3.6 Relation between Bessel's and Laplace – Everett's formula (K1, K2, K3, K4)

### Unit IV: Interpolation with Unequal intervals

(18 hours)

- 4.1 Properties of divided difference (K1, K2, K3)
- 4.2 Relation between divided differences and forward differences (K1, K2, K3)
- 4.3 Newton's divided difference formula (K1, K2, K3, K4)
- 4.4 Lagrange's interpolation formula and its problem (K1, K2, K3, K4)
- 4.5 Inverse interpolation and Lagrange's method (K1, K2, K3, K4)
- 4.6 Iterative method (K1, K2, K3, K4)

### Unit 5: Empirical Laws and Curve Fitting

(18 hours)

- 5.1 The Linear law and Laws Reducible to linear law (K1, K2, K3)
- 5.2 Method of Group of Averages and Equations involving three constants (K1, K2, K3, K4)
- 5.3 Principles of least squares and Fitting a Straight line and Parabola (K1, K2, K3, K4)
- 5.4. Fitting the Exponential Curve and Curve  $y = a^x$  (K1, K2, K3, K4)

5.5 Sum of squares of Residuals (K1, K2, K3, K4)

5.6 Method of moments (K1, K2, K3, K4)

**Text Book:**

1. Dr. V.N.Vedamurthy, Dr. N.Ch.S.N. Iyengar – Numerical Methods, Vikas Publishing House Pvt. Ltd., New Delhi, 1998, Reprint 2011.

**Reference Books:**

1. S. Kalavathy- Numerical Methods – Thomson Learning – 5, Sheton way, Singapore, 2004.
2. Dr. A. Singaravelu – Numerical Methods – Meenakshi Agency – 120, Pushpa Nagar, Medavakkam, Chennai, Revised Edition, Dec 2007.
3. S. Arumugam, A. Thangapandi Isaac, A.Somasundaram – Numerical Methods, 2<sup>nd</sup> edition – SciTech Publishing Pvt. Ltd., Chennai – Reprint Sep 2005.
4. R. Gupta – Numerical Analysis, Revised Edition – Laxmi Publishing Ltd., New Delhi, 2001.
5. S. G. Venkatachalapathy – Calculus of Finite Differences and Numerical Analysis, 1<sup>st</sup> Edition, Margham Publications, 2003.

e - Resources:

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – IV**  
**UANAB20 – Numerical Analysis II**

<b>Year:II</b> <b>SEM: IV</b>	<b>Course Code:</b> UANAB20	<b>Title of the Course:</b> Numerical Analysis-II	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>MARKS</b> 100
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**Course Objectives**

1. To familiarize the students with finding root of equations, solving systems of linear algebraic equation, numerical integration and differentiation.
2. To solve differential equation with boundary value problems.

**Course Outcomes (CO)**

The learners will be able to

1. Obtain numerical solutions of algebraic and transcendental equations.
2. Find numerical solutions of system of linear equations.
3. Use numerical methods to do differentiation.
4. Use numerical methods to do integration.
5. Solve ordinary differential equations using numerical methods.

CO	PSO					
	PSO1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	H	H	M	L	M	H
CO2	H	H	M	L	M	H
CO3	H	H	M	L	M	H
CO4	H	H	M	L	M	H
CO5	H	H	M	L	M	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	H
CO2	H	H	H	L	M	H
CO3	H	H	H	L	M	H
CO4	H	H	H	L	M	H
CO5	H	H	H	L	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### **Unit I: Solutions of Algebraic and Transcendental Equations (18 hours)**

- 1.1 Bisection Method (K1, K2, K3, K4)
- 1.2 Iteration Method (K1, K2, K3, K4)
- 1.3 Newton Raphson Method (K1, K2, K3, K4)
- 1.4 Regular Falsi Method (K1, K2, K3, K4)
- 1.5 Horner's method (K1, K2, K3, K4)
- 1.6 Graffe's root squaring method (K1, K2, K3, K4)

### **Unit II: Solutions of Simultaneous Linear Algebraic Equations (18 hours)**

- 2.1 Gauss Elimination Method (K1, K2, K3, K4)
- 2.2 Gauss – Jordan Method (K1, K2, K3, K4)
- 2.3 Jacobi's Method (K1, K2, K3, K4)
- 2.4 Gauss- Seidel Method (K1, K2, K3, K4)
- 2.5 Crout's method (K1, K2, K3, K4)
- 2.6 Inverse Crout's method (K1, K2, K3, K4)

### **Unit III: Numerical Differentiation and Numerical Integration (18 hours)**

- 3.1 Newton's forward difference formula (K1, K2, K3, K4)
- 3.2 Newton's backward difference formula (K1, K2, K3, K4)
- 3.3 Derivatives using Stirling's formula (K1, K2, K3, K4)
- 3.4 Maxima and Minima (K1, K2, K3, K4)
- 3.5 Trapezoidal Rule, Simpson's One-Third Rule, Simpson's Three-Eight Rule (K1, K2, K3, K4)
- 3.6 Weddle's Rule and Romberg Method (K1, K2, K3, K4)

### **Unit IV: Numerical Solution of Ordinary Differential Equations (18 hours)**

- 4.1 Taylor's series Method for simultaneous first order and higher order differential equations (K1, K2, K3, K4)
- 4.2 Picard's method of successive approximations (K1, K2, K3, K4)
- 4.3 Picard's method for first order differential equations (K1, K2, K3, K4)
- 4.4 Picard's method for second order differential equations (K1, K2, K3, K4)
- 4.5 Euler's method and Improved Euler's method (K1, K2, K3, K4)
- 4.6 Modified Euler's method (K1, K2, K3, K4)

### **Unit V Numerical Solution of Ordinary Differential Equations (Continued) (18 hours)**

- 5.1 Runge – Kutta method and Higher order R-K methods (K1, K2, K3, K4)
- 5.2 Runge – Kutta methods for simultaneous first order Equations (K1, K2, K3, K4)
- 5.3 Runge – Kutta methods for simultaneous second order Equations (K1, K2, K3, K4)
- 5.4 Predictor – Corrector Method (K1, K2, K3, K4)
- 5.5 Milne's Method (K1, K2, K3, K4)
- 5.6 Adams – Bashforth Method (K1, K2, K3, K4)

**Text Book:**

1. Dr. V.N.Vedamurthy, Dr.N.Ch.S.N. Iyengar – Numerical Methods, Vikas Publishing House Pvt. Ltd., New Delhi, 1998, Reprint 2011.

**Reference Books:**

1. S.Kalavathy- Numerical Methods – Thomson Learning – 5, Sheton way, Singapore, 2004.
2. Dr.A.Singaravelu – Numerical Methods – Meenakshi Agency – 120, Pushpa Nagar, Medavakkam, Chennai, Revised Edition, Dec 2007.
3. S. Arumugam, A. Thangapandi Isaac, A.Somasundaram – Numerical Methods, 2<sup>nd</sup> edition, SciTech Publishing Pvt. Ltd., Chennai – Reprint Sep 2005.
4. R. Gupta – Numerical Analysis, Revised Edition – Laxmi Publishing Ltd., New Delhi, 2001.
5. S. G.Venkatachalapathy – Calculus of Finite Differences and Numerical Analysis, 1<sup>st</sup> Edition, Margham Publications, 2003.

**e- Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – III**  
**UACAA20 – Mathematical Foundations**

<b>Year : II</b> <b>SEM :III</b>	<b>Course Code :</b> UACAA20	<b>Title Of The Course :</b> Mathematical Foundations	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 6	<b>MARKS</b> 100
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**Course Objectives**

1. To provide basic mathematical concepts required for computer applications.
2. To introduce the notion of relations and functions
3. To learn simple methods in algebra

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concepts of Mathematical logic and compute the operators on Symbolic logic.
2. Acquire knowledge about relations and functions.
3. Assess real life simple problems with permutation, combination and probability.
4. Know about matrices and their types.
5. Differentiate standard trigonometric functions.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	L	H	H
CO2	H	H	H	M	L	H
CO3	M	L	H	H	H	H
CO4	M	L	H	H	H	H
CO5	H	H	M	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	M	M	L	H
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(Low-L, Medium - M, High - H)

## Course Syllabus

### Unit I: Symbolic logic (18 hours)

- 1.1 Symbolic logic (K1, K2, K3)
- 1.2 Logical operator (K1, K2, K3)
- 1.3 Conditional and bi-conditional operators (K1, K2, K3)
- 1.4 Converse, Inverse, Contra positive (K1, K2, K3)
- 1.5 Tautology and Contradiction (K1, K2, K3, K4)
- 1.6 Algebra of Propositions (K1, K2, K3, K4)

### Unit II: Relations and Functions (18 hours)

- 2.1 Relation (K1, K2, K3)
- 2.2 Equivalence relation (K1, K2, K3)
- 2.3 Partition, Partial order relation (K1, K2, K3, K4)
- 2.4 Functions, Inverse (K1, K2, K3, K4)
- 2.5 Composition of functions (K1, K2, K3)
- 2.6 Properties of functions (K1, K2, K3, K4)

### Unit III: Algebra (18 hours)

- 3.1 Probability (K1, K2, K3)
- 3.2 Probability (simple problems) (K1, K2, K3, K4)
- 3.3 Permutations (K1, K2, K3, K4)
- 3.4 combinations (K1, K2, K3, K4)
- 3.5 Combinatorial arguments (K1, K2, K3, K4)
- 3.6 Boolean algebra (K1, K2, K3)

### Unit IV: Matrices (18 hours)

- 4.1 Types of matrices (K1, K2, K3)
- 4.2 Matrix operations, Symmetric and skew symmetric, Hermitian and skew-Hermitian (K1, K2, K3)
- 4.3 Orthogonal and Unitary (K1, K2, K3, K4)
- 4.4 Rank of a matrix (K1, K2, K3, K4)
- 4.5 Solution of system of linear equations using matrices (K1, K2, K3, K4)
- 4.6 Cramer's rule (K1, K2, K3)

### Unit V: Differential calculus (18 hours)

- 5.1 Differentiation of standard function  $x^n$  (K1, K2, K3)
- 5.2 Differentiation of standard function  $e^x$  (K1, K2, K3)
- 5.3 Differentiation of standard function  $\log x$  (K1, K2, K3)
- 5.4 Differentiation of standard functions  $\sin x$ ,  $\cos x$ ,  $\tan x$  (K1, K2, K3)
- 5.5 Chain Rule (K1, K2, K3)

## 5.6 Successive differentiation (up to second derivative) (K1, K2, K3)

### **Text Books:**

1. P.R.Vittal-Mathematical Foundations-Margham Publications, Chennai, 2<sup>nd</sup> Edition – 2003.
2. PA.Navanitham-Business Statistics-jai publishers, Trichy-21.

### **Reference Books:**

1. P.R. Vittal - Allied Mathematics – Margham Publications - Third Edition, 2002
2. M.K.Venkataraman - Engineering Mathematics, Volumes I and II - The National Publication Co., Madras, 1992 and 1993

### **e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – IV**  
**UACAB20 – Statistical Methods**

<b>Year: II</b> <b>SEM: IV</b>	<b>Course Code:</b> UACAB20	<b>Title of the Course:</b> Statistical Methods	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To enrich the knowledge of students on statistical methods which play a major role in computer applications
2. To demonstrate sampling techniques and to employ statistical methods of analysis to make inference

**Course Outcomes (CO)**

The learners will be able to

1. Analyse the statistical data using measures of central tendency and graphs.
2. Provide an overall description of a set of data using measures of dispersion.
3. Apply the concept of regression and correlation in business problems.
4. Make decisions using hypothesis testing.
5. Apply the Chi-square test for independence as well as goodness of fit.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	H
CO2	H	H	M	L	H	H
CO3	M	L	H	H	H	H
CO4	M	H	H	H	H	L
CO5	H	H	H	M	L	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	H
CO2	H	H	M	L	M	H
CO3	H	H	H	H	L	M
CO4	H	H	M	L	L	H
CO5	H	H	H	M	L	H

**(Low- L, Medium - M, High - H)**

## Course Syllabus

### **Unit 1: Introduction of Statistics and Measurements of Central Tendency (18 hours)**

- 1.1 Definition of Statistics, Classification and Tabulation (K1, K2)
- 1.2 Graphical representation of numerical data (K1, K2, K3)
- 1.3 Formation of frequency distribution ( K1, K2, K3)
- 1.4 Mean and its types (K1, K2, K3, K4)
- 1.5 Median and its types( K1, K2, K3, K4)
- 1.6 Mode and its types ( K1, K2, K3, K4)

### **Unit II: Measures of Dispersion (18 hours)**

- 2.1 Basic definition of Measures of Dispersion (K1, K2)
- 2.2 Sums on range (K1, K2)
- 2.3 Sums on quartile deviation (K1, K2, K3)
- 2.4 Sums on Mean deviation about mean and median (K1, K2, K3, K4)
- 2.5 Sums on Standard deviation (K1, K2, K3, K4)
- 2.6 Sums on coefficient of Variation (K1, K2, K3, K4)

### **Unit III: Correlation and Regression (18 hours)**

- 3.1 Definitions of Correlation and its types (K1, K2)
- 3.2 Karl Pearson's Co-efficient of correlation (K1, K2, K3, K4)
- 3.3 Bivariate Correlation (K1, K2, K3, K4)
- 3.4 Spearman Rank Correlation (K1, K2, K3, K4)
- 3.5 Regression equations (K1, K2, K3, K4)
- 3.6 Regression Co-efficient (K1, K2, K3, K4)

### **Unit IV: Tests of Hypothesis (18 hours)**

- 4.1 Basic definition of hypothesis (K1, K2)
- 4.2 Test for single and difference between means (K1, K2, K3, K4)
- 4.3 Test for single standard deviation and difference standard deviation (K1, K2, K3, K4)
- 4.4 Test for small correlation coefficient (K1, K2, K3, K4)
- 4.5 Small samples-Test for single and difference between means (K1, K2, K3, K4)
- 4.6 Paired t-test (K1, K2, K3, K4)

### **Unit V: Chi-Square Test and Goodness of Fit (18 hours)**

- 5.1 Definitions of Chi-Square test (K1, K2)
- 5.2 Properties (K1, K2)
- 5.3 Sums on Chi-Square test (K1, K2, K3, K4)
- 5.4 Goodness of Fit (K1, K2, K3, K4)
- 5.5 Contingency table (K1, K2, K3, K4)
- 5.6 Test for Independence of Attributes (K1, K2)

**Text Book:**

1. P. R. Vittal and V. Malini - Statistical and Numerical Methods, 1<sup>st</sup> Edition - Margham Publications, 2002.

**Reference Books:**

1. P. R. Vittal-Mathematical Statistics, 1<sup>st</sup> Edition-Margham Publications, 2002.
2. S. C. Gupta and V. K. Kappor - Fundamentals of Mathematical Statistics, 3<sup>rd</sup> Edition, Sultan Chand and Sons, 2004.
3. P. Kandasamy and K. Thilagavathy - Calculus of Finite Differences and Numerical Analysis, 1<sup>st</sup> Edition - Margam Publications, 2003.

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – III**  
**UABSA20 – Biostatistics I**

<b>Year: II</b> <b>SEM: III</b>	<b>Course Code:</b> UABSA20	<b>Title of the Course:</b> Biostatistics – I	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>MARKS</b> 100
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**Course Objectives**

1. To deepen the knowledge in various statistical concepts which play an important role in the field of biological sciences.
2. Recognize the importance data collection and its role in determining scope of inference.
3. To apply appropriate statistical methods for analyzing one or two variables.

**Course Outcomes (CO)**

The learners will be able to

1. Frame a relevant frequency distribution for a given biological data.
2. Determine mean, median, mode for biological data.
3. Compute measures of dispersion.
4. Understand probability concepts.
5. Gain knowledge of correlation and regression and its applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	H	L
CO3	H	H	H	H	M	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	H
CO2	H	H	H	L	M	H
CO3	H	H	H	L	L	H
CO4	H	H	H	L	M	H
CO5	H	H	H	L	M	H

(Low-L, Medium - M, High - H)

## Course Syllabus

### **Unit I: Frequency Distributions** (18 hours)

- 1.1 Introduction (K1)
  - 1.2 Frequency distribution (K1, K2, K3)
  - 1.3 Univariate frequency distribution (K1, K2, K3, K4)
  - 1.4 Bivariate frequency distribution (K1, K2, K3, K4)
  - 1.5 Diagrams –Histogram – Frequency polygon – Frequency curve (K1, K2, K3, K4)
  - 1.6 Characteristics of a frequency distribution (K1, K2, K3, K4)
- (Chapter – 5: Section 5.1-5.4)

### **Unit II: Measures of Central Tendency and Location** (18 hours)

- 2.1 Introduction (K1)
  - 2.2 Mean, Median (K1, K2, K3, K4)
  - 2.3 Quartiles, Deciles, Percentiles and Mode (K1, K2, K3, K4)
  - 2.4 Position of averages - Selection of the Appropriate Measure of Central Tendency (K1, K2)
  - 2.5 Geometric mean (K1, K2, K3, K4)
  - 2.6 Harmonic mean. (K1, K2, K3, K4)
- (Chapter – 6: Section 6.1 – 6.9)

### **Unit III: Measures of Dispersion** (18 hours)

- 3.1 Introduction (K1)
  - 3.2 Range (K1, K2, K3, K4)
  - 3.3 Interquartile Range (K1, K2, K3, K4)
  - 3.4 Mean deviation (K1, K2, K3, K4)
  - 3.5 Variance and Standard deviation (K1, K2, K3, K4)
  - 3.6 Alternate methods to find Standard Deviation-Coefficient of Variation. (K1, K2, K3, K4)
- (Chapter – 7: Sections 7.1-7.7)

### **Unit IV: Probability** (18 hours)

- 4.1 Introduction (K1)
  - 4.2 The probability Scale (K1, K2)
  - 4.3 Measurement of Probability (K1, K2)
  - 4.4 Laws of probability for independent events (K1, K2, K3, K4)
  - 4.5 Problems on probability (K1, K2, K3, K4)
  - 4.6 Conditional probability (K1, K2, K3, K4)
- (Chapter -8: Sections 8.1-8.5)

### **Unit V: Linear Regression and Correlation** (18 hours)

- 5.1 Introduction (K1)
  - 5.2 Scatter diagram (K1, K2)
  - 5.3 Correlation and Regression (K1, K2)
  - 5.4 Properties of Correlation and Regression (K1, K2)
  - 5.5 Correlation Coefficient (Rank correlation coefficient) (K1, K2, K3, K4)
  - 5.6 Regression Equations. (K1, K2, K3, K4)
- (Chapter – 13: Sections 13.1 – 13.5)

**Text Book:**

1. P.S.S. Sundar Rao, J. Richard – An Introduction to Bio Statistics, 3<sup>rd</sup> Edition – Prentice Hall of India Pvt. Ltd., 2001.

**Reference Books:**

1. N. Gurumani – An introduction to Biostatistics, Second Edition – MJP Publishers, 2015.
2. Wayne W. Daniel, Chad L.Cross – Biostatistics, 10<sup>th</sup> Edition – Wiley India Pvt. Ltd., 2017.
3. P.Mariappan – Biostatistics, 1<sup>st</sup> Edition – Dorling Kindersley Pvt. Ltd., 2013.

**e-Resources:**

4. <https://nptel.ac.in>
5. [www.coursera.org](http://www.coursera.org)
6. <https://swayam.gov.in>

**SEMESTER – IV**  
**UABSB20 – Biostatistics II**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: IV</b>	UABSB20	Biostatistics – II	Theory	Allied	6	5	100

**Course Objectives**

1. To deepen the knowledge in various statistical concepts which play an important role in the field of biological sciences.
2. To understand interval estimation and hypothesis testing.
3. To interpret statistical results effectively in real life problems.

**Course Outcomes (CO)**

The learners will be able to

1. Apply probability distributions such as Binomial, Poisson and Normal to solve real life problems.
2. Recognize the importance of data collection and its role in determining scope of inference.
3. Execute the test of hypothesis for large and small samples drawn from a normal population.
4. Perform and apply Chi-square test
5. Carry out analysis of variance using F test.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	M	L
CO3	H	H	H	H	M	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	H
CO2	H	H	H	L	M	H
CO3	H	H	H	L	L	H
CO4	H	H	H	L	M	H
CO5	H	H	H	L	M	H

**(Low-L, Medium - M, High - H)**

## **Course Syllabus**

### **Unit I: Probability Distributions**

**(18 hours)**

- 1.1 Introduction (K1)
  - 1.2 Binomial distribution (K1, K2, K3, K4)
  - 1.3 Binomial frequency distribution (K1, K2, K3, K4)
  - 1.4 Poisson distribution (K1, K2, K3, K4)
  - 1.5 Poisson frequency distribution (K1, K2, K3, K4)
  - 1.6 Normal distribution. (K1, K2, K3, K4)
- (Chapter – 9: Sections 9.1-9.4)

### **Unit II: Sampling**

**(18 hours)**

- 2.1 Introduction (K1)
  - 2.2 Definitions (K1)
  - 2.3 Types of Population (K1, K2, K3)
  - 2.4 Sample (K1, K2, K3, K4)
  - 2.5 Sampling variation and Bias - Non-Probability Sampling Techniques (K1, K2, K3, K4)
  - 2.6 Probability Sampling Techniques – Listing of Population - Sample size (K1, K2, K3, K4)
- (Chapter – 10: Sections 10.1-10.9)

### **Unit III: Tests of significance and Estimation**

**(18 hours)**

- 3.1 Introduction (K1)
  - 3.2 Procedure for Large Samples (K1, K2)
  - 3.3 Problems based on large samples (K1, K2, K3, K4)
  - 3.4 Procedure for Small samples: Examples (K1, K2, K3, K4)
  - 3.5 Estimation: Example for Large Samples (K1, K2, K3, K4)
  - 3.6 Estimation: Examples for Small Samples. (K1, K2, K3, K4)
- (Chapter – 12: Sections 12.1-12.6)

### **Unit IV: The Chi Square Test**

**(18 hours)**

- 4.1 Introduction (K1)
  - 4.2 The formula for Chi Square (K1, K2)
  - 4.3 Distribution of Chi Square (K1, K2, K3)
  - 4.4 Degrees of freedom (K1, K2, K3)
  - 4.5 Some applications of Chi Square (K1, K2, K3, K4)
  - 4.6 Misuse of Chi Square Test. (K1, K2)
- (Chapter – 14: Sections 14.1-14.5)

### **Unit V: Analysis of Variance**

**(18 hours)**

- 5.1 Snedecor's F-Distribution (K1, K2, K3, K4)
  - 5.2 Analysis of Variance (K1, K2, K3, K4)
  - 5.3 One way classification - Completely Randomised Design (K1, K2, K3, K4)
  - 5.4 Two way classification - Randomised Block Design (K1, K2, K3, K4)
  - 5.5 Latin Square Design (K1, K2, K3, K4)
  - 5.6 Merits and demerits of analysis of variance (K1, K2)
- (Chapter - 13: Sections 13.19 – 13.20)

**Text Books:**

1. P. S. S. Sundar Rao, J. Richard – An Introduction to Bio Statistics, 3<sup>rd</sup> Edition – Prentice Hall of India Pvt. Ltd., 2001.
2. P. Mariappan – Biostatistics, 1<sup>st</sup> Edition – Dorling Kindersley Pvt. Ltd., 2013.

**Reference Books:**

1. N. Gurumani – An introduction to Biostatistics, Second Edition – MJP Publishers, 2015.
2. Wayne W. Daniel, Chad L. Cross – Biostatistics, 10<sup>th</sup> Edition – Wiley India Pvt. Ltd., 2017.

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – I**  
**UAMST20 – Medical Statistics**

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code:</b> UAMST20	<b>Title of The Course :</b> Medical Statistics	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Objectives**

1. To introduce the basic concepts of statistics.
2. To make decisions based on statistical representation related to hospital administration.

**Course Outcomes (CO)**

The learners will be able to

1. Solve basic mathematical problems using matrices
2. Use various differentiation techniques
3. Give graphical representation of statistical data
4. Understand the concepts related to statistics
5. Analyze problems related to statistical measures

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	L
CO2	H	M	H	H	H	L
CO3	H	H	H	M	H	H
CO4	H	M	H	H	H	L
CO5	H	H	M	H	L	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	H	L
CO2	H	H	H	H	H	L
CO3	H	H	H	M	H	H
CO4	H	M	H	H	H	L
CO5	H	H	M	H	L	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### **Unit I: Matrices** (15 hours)

- 1.1 Definition - Types of matrices (K1, K2)
- 1.2 Matrix operations - Determinant of a matrix (K1, K2, K3, K4)
- 1.3 Singular and non-singular matrices (K1, K2, K3, K4)
- 1.4 Inverse of a matrix by co-factor method (K1, K2, K3, K4)
- 1.5 Rank of a matrix (K1, K2, K3, K4)
- 1.6 Solution of system of linear simultaneous equations using Cramer's rule (K1, K2, K3, K4)

### **Unit II: Differentiation** (15 hours)

- 2.1 Derivatives of standard functions  $x^n$ ,  $e^x$ ,  $\log x$ , constant (without proof) (K1, K2, K3)
- 2.2 Rules of differentiation (Addition, difference, product, quotient) (K1, K2, K3, K4)
- 2.3 chain rule, Successive differentiation (up to 2<sup>nd</sup> derivative) (K1, K2, K3, K4)
- 2.4 Uses: Marginal Concepts, Elasticity of demand (K1, K2, K3, K4)
- 2.5 Increasing and decreasing functions (K1, K2, K3, K4)
- 2.6 maxima and minima – break - even point (K1, K2, K3, K4)

### **Unit III: Classification and Graphical Representation** (15 hours)

- 3.1 Introduction - meaning of classification - chief characteristics of classification (K1, K2)
- 3.2 Objects of classification - rules of classification (K1, K2)
- 3.3 Frequency distributions (K1, K2, K3, K4)
- 3.4 Cumulative frequency distribution - bivariate frequency distributions (K1, K2, K3, K4)
- 3.5 Graph of frequency distribution - histogram (K1, K2, K3, K4)
- 3.6 frequency polygon - frequency curve (K1, K2, K3, K4)

### **Unit IV: Measures of Central Tendency** (15 hours)

- 4.1 Arithmetic mean (K1, K2, K3, K4)
- 4.2 Median (K1, K2, K3, K4)
- 4.3 Mode – Empirical formulae (K1, K2, K3, K4)
- 4.4 Combined and Weighted arithmetic mean (K1, K2, K3, K4)
- 4.5 Geometric mean (K1, K2, K3, K4)
- 4.6 Harmonic mean (K1, K2, K3, K4)

### **Unit V: Measures of Dispersion and Skewness** (15 hours)

- 5.1 Range - quartile deviation (K1, K2, K3, K4)
- 5.2 mean deviation (K1, K2, K3, K4)
- 5.3 Standard deviation (K1, K2, K3, K4)
- 5.4 Karl Pearson's and Bowley's coefficient of Skewness (K1, K2, K3, K4)
- 5.5 Correlation (K1, K2, K3, K4)
- 5.6 Regression (K1, K2, K3, K4)

**Text Books:**

1. P.A. Navnitham - Business Mathematics and Statistics, Jai Publishers, Trichy, 2023.
2. R.S.N. Pillai and Bagavathi – Statistics, S. Chand and Company, New Delhi, 17<sup>th</sup> Edition

**Reference Books:**

1. Asim Kumar Manna - Business Mathematics & Statistics. McGraw Hill Education (India) Pvt. Ltd., 2018.
2. Statistical Methods - S.P. Gupta, Sultan Chand, 2012.
3. Francis, Andy - Business mathematics and statistics. Cengage Learning EMEA, 2004.
4. Agarwal, B. M. - Business Mathematics & Statistics. Ane Books Pvt Ltd, 2009.
5. Dr. P.R. Vittal - Mathematical Statistics, Margam Publications, 2015.

**e-Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – II**  
**UAORA20 – Operations Research**

<b>Year: I</b>	<b>Course Code:</b> UAORA20	<b>Title Of The Course :</b> Operations Research	<b>Course Type :</b> Theory	<b>Course Category:</b> Allied II	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>SEM: II</b>							

**Course Objectives**

1. To introduce the techniques of solving problems in the field of industry, marketing and finance
2. To create awareness about optimization in the utility of resources

**Course Outcomes (CO)**

The learners will be able to

1. Understand the basic operations research concepts and solve linear programming problems.
2. Analyze real-life situation using transportation models.
3. Assign jobs to different machines using assignment models.
4. Use knowledge of Network Analysis in Hospital Administration.
5. Acquire wide knowledge in Game Theory.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	L	H	H
CO2	H	H	H	M	L	H
CO3	M	L	H	H	H	H
CO4	M	L	H	H	H	H
CO5	H	H	M	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	M	H
CO2	H	H	H	M	L	H
CO3	M	L	H	M	L	H
CO4	M	L	H	L	M	H
CO5	H	H	M	M	L	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

- Unit I: Introduction and Linear Programming** (15 hours)
- 1.1 Operations research
  - 1.2 : Definition – Scope (K1, K2)
  - 1.3 Characteristics (K1, K2)
  - 1.4 Linear programming (K1,K2)
  - 1.5 Formulation (K1,K2, K3)
  - 1.5 Graphical method (K1, K2, K3, K4)
  - 1.6 Regular simplex method (Simple Problems) (K1, K2, K3, K4)
- Unit II: Transportation Model** (15 hours)
- 2.1 Transportation Problem – Introduction (K1, K2)
  - 2.2 Initial basic feasible solution (North West Corner) (K1, K2, K3, K4)
  - 2.3 Initial basic feasible solution (Least Cost VAM) (K1, K2, K3, K4)
  - 2.4 Unbalanced Transportation problem (K1, K2, K3, K4)
  - 2.5 Maximization problem (K1, K2, K3, K4)
  - 2.6 Test of Optimality using MODI method (excluding Degeneracy) (K1, K2, K3, K4)
- Unit III: Assignment Model** (15 hours)
- 3.1 Assignment problem – Introduction (K1, K2)
  - 3.2 Minimal assignment problem - Balanced (K1, K2, K3, K4)
  - 3.3 Minimal assignment problem - Unbalanced (K1, K2, K3, K4)
  - 3.4 Restricted Assignment problem (K1, K2, K3, K4)
  - 3.5 Maximization problem – Balanced (K1, K2, K3, K4)
  - 3.6 Maximization problem – Unbalanced (K1, K2, K3, K4)
- Unit IV: Network Analysis: CPM and PERT Computations** (15 hours)
- 4.1 Construction – The Network – Numbering the events (K1, K2)
  - 4.2 Different time calculations – representation in tabular form (K1, K2, K3, K4)
  - 4.3 Total, Independent and Free float (K1, K2, K3, K4)
  - 4.4 Calculation of critical path and project duration (K1, K2, K3, K4)
  - 4.5 Basic steps in PERT – Difference between CPM and PERT (K1, K2, K3, K4)
  - 4.6 Calculation of critical path and project duration (K1, K2, K3, K4)
- Unit V: Game Theory** (15 hours)
- 5.1 Game theory – Meaning – Saddle point (K1, K2)
  - 5.2 Pure Strategy (K1, K2, K3, K4)
  - 5.3 Mixed Strategy (K1, K2, K3, K4)
  - 5.4 Dominance property (K1, K2, K3, K4)
  - 5.5 Solving 2 x m game using graphical method (excluding L.P.P) (K1, K2, K3, K4)
  - 5.6 Solving n x 2 game using graphical method (excluding L.P.P) (K1, K2, K3, K4)

**Text Books:**

1. Premkumar Gupta and Hira D.S. - Introduction to Operations Research, 1<sup>st</sup> Edition – S.Chand Company Ltd., 1998.
2. Vittal P.R - Introduction to Operations Research, 1<sup>st</sup> Edition - Margham Publishers – 1999.
3. V. Sundaresan, K.S. Ganapathy Subramanian and K. Ganesan, “Resource Management Techniques” A.R. Publications, 2009.

**Reference Books:**

1. Kalavathy. S - Operations Research, 4<sup>th</sup> Edition, Vikas Publishing Ltd., 2013
2. K. Pandian, C.Kayalvizhi - Applied Operations Research for Management, 2<sup>nd</sup> Edition, Thirumalaa Publications, 2004
3. R.Paneerselvam - Operation Research, PHI Learning Pvt. Ltd., 2<sup>nd</sup> Edition 2006

**e -Resources:**

1. [www.coursera.org/](http://www.coursera.org/)
2. <https://nptel.ac.in/>
3. <https://swayam.gov.in/>

**SEMESTER – V / VI**  
**UGMAAn20 - Mathematics for Competitive Examinations**

<b>Year:</b> III	<b>Course Code:</b> UGMAAn20	<b>Title of the Course:</b> Mathematics for Competitive Examinations	<b>Course Type:</b> Theory	<b>Course Category:</b> Non-Major Elective	<b>H/W</b> 3	<b>CREDITS</b> 3	<b>MARKS</b> 100
<b>SEM:</b> V / VI							

**Course Objectives**

1. To revitalize the basic knowledge of mathematics and problem solving skills.
2. To enhance logical, analytical and critical thinking of learners.
3. To help the learners to acquire satisfactory competency using verbal and nonverbal reasoning
4. To help the students to prepare for various competitive examinations.

**Course Outcomes (CO)**

The learners will be able to

1. Gain critical thinking and numerical ability to solve problems.
2. Apply the concepts of quantitative aptitude to solve real life problems.
3. Interpret and use data represented in different forms
4. Reason out verbally and non-verbally
5. Write various competitive exams for higher studies and jobs

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	H	L
<b>CO2</b>	H	M	H	M	H	L
<b>CO3</b>	H	M	H	M	H	L
<b>CO4</b>	H	H	H	H	L	L
<b>CO5</b>	H	M	H	H	L	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	M	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### UNIT I: Numerical Ability (9 hours)

Numbers, H.C.F. & L.C.M. of Numbers, Simplification, Decimal Fractions, Square Roots & Cube Roots, Averages, Percentage, Ratio and Proportion. (K1, K2, K3, K4)

### UNIT II: Numerical Ability (Continued) (9 hours)

Ages, Time and Work, Time and Distance, Profit and Loss, Simple Interest, Compound Interest, Permutation & Combination, Probability (K1, K2, K3, K4)

### UNIT III: Data Interpretation (9 hours)

Tabulation, Bar Graphs, Pie Charts, Line graphs (K1, K2, K3, K4)

### UNIT IV: Verbal Reasoning (9 hours)

Series, Classification, Coding - Decoding, Blood Relations, Puzzles (K1, K2, K3, K4)

### UNIT V: Verbal Reasoning (Continued) (9 hours)

Direction Sense Test, Alphabet test, Ranking and Time sequence test, Statements & Arguments, Statements & Conclusions (K1, K2, K3, K4)

#### Text Books:

1. Dr. R. S. Aggarwal – A Modern Approach to Verbal and Non-Verbal Reasoning – Revised Edition – 2019 – S. Chand and Co.
2. Dr. R. S. Aggarwal – Quantitative Aptitude – Seventh Edition – S. Chand and Co., 2019

#### Reference Books:

1. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, McGraw Education Series, 5<sup>th</sup> Edition 2019
2. Dinesh Khattar, Quantitative Aptitude for Competitive Examinations, Pearson India, Edition 2019.
3. Sarvesh K. Verma, Quantitative Aptitude Quantum CAT 2018, Arihant publication, Edition 2018.

#### e-Resources:

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. [www.indiabix.com](http://www.indiabix.com)

## ASSESSMENT METHODS

### 1. For Allied Papers

#### Semester Examination (100 Marks)

Time: 3 Hours

##### Section A – $10 \times 2 = 20$ marks

Answer **all** questions

10 questions (2 questions from each unit)

##### Section B – $5 \times 7 = 35$ marks

Answer **all** questions

5 questions with internal choice (1 question from each unit)

##### Section C – $3 \times 15 = 45$ marks

Answer **any three** questions

5 questions (1 question from each unit)

#### CA Examination (50 Marks)

Time: 1 Hour 30 Minutes

##### Section A – $7 \times 2 = 14$ marks

Answer **all** questions

7 questions

##### Section B – $3 \times 7 = 21$ marks

Answer **any three** questions

3 out of 5 questions

##### Section C – $1 \times 15 = 15$ marks

Answer **any one** question

2 questions (1 question from each unit)

### For NME: Mathematics for Competitive Examinations

#### Semester Examination (100 Marks)

Time: 3 Hours

100 multiple choice questions (1 mark for each question)

#### CA Examination (50 Marks)

Time: 1 Hour 30 Minutes

50 multiple choice questions (1 mark for each question)

# Department of Microbiology (UG)

## SYLLABUS AND REGULATIONS

Under

### OUTCOME-BASED EDUCATION

2020

(Effective for the Batch of Students Admitted from 2020-2021)



### AUXILIUM COLLEGE (Autonomous)

*(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)*

**Gandhi Nagar, Vellore-632 006.**

**AUXILIUM COLLEGE (Autonomous)**(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)**Gandhi Nagar, Vellore – 632006****OUTCOME BASED EDUCATION****B.Sc. MICROBIOLOGY****(Effective for the students admitted from the academic year 2020-2021)****LIST OF COURSES****Structure of the course and scheme of Examination**

SEM	Part	Paper Code	Title	Hours/week	Exam		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper I	6	3	-	3	40+60
	II	UENGA20	English Paper I	6	3	-	3	40+60
	III	UCMBA20	Fundamentals of Microbiology	6	3	-	5	40+60
	III	UCMBC20	Core Practical I: Basic Techniques in Microbiology	3	-	-	-	-
	III	UABCA20	Allied I: Biochemistry I	4	3	-	4	40+60
	III	UABCC20	Allied Practical : Biochemistry	2	-	-	-	-
	IV		Skill- Based Elective I	2	2	-	2	40+60
	IV		Value Education	1	-	-	-	-
<b>Total</b>							<b>17</b>	<b>500</b>
II	I	ULTAB20	Tamil Paper II	6	3	-	3	40+60
	II	UENGB20	English Paper II	6	3	-	3	40+60
	III	UCMBB20	Microbial Physiology and Metabolism	6	3	-	5	40+60
	III	UCMBC20	Core Practical I: Basic Techniques in Microbiology	3	-	6	4	40+60
	III	UABCB20	Allied II: Biochemistry II	4	3	-	4	40+60
	III	UABCC20	Allied Practical : Biochemistry	2	-	3	2	40+60
	IV		Skill- Based Elective II	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
<b>Total</b>							<b>23</b>	<b>700</b>
III	I	ULTAC20	Tamil Paper III	6	3	-	3	40+60
	II	UENGC20	English Paper III	6	3	-	3	40+60
	III	UCMBD20	Basic Immunology and Microbial genetics- I	6	3	-	5	40+60
	III	UCMBF20	Core Practical II: Basic and Applied Immunology	3	-	-	-	-
	III	UABSA20	Allied III: Biostatistics I	6	3	-	5	40+60
	IV	USMBA20/ USMBB20	Skill- Based Elective III	2	2	-	2	40+60
	IV		Value Education	1	-	-	-	-
<b>Total</b>							<b>18</b>	<b>500</b>
IV	I	ULTAD20	Tamil Paper IV	6	3	-	3	40+60
	II	UENGD20	English Paper IV	6	3	-	3	40+60

	III	UCMBE20	Applied Immunology and Microbial genetics- II	5	3	-	5	40+60
	III	UCMBF20	Core Practical II: Basic and Applied Immunology	3	-	6	4	40+60
	III	UABSB20	Allied III: Biostatistics II	6	3	-	5	40+60
	IV	USMBA20/ USMBB20	Skill- Based Elective IV	2	2	-	2	40+60
	IV	UNEV20	Environmental studies	2	2	-	2	40+60
	IV		Value Education	1	-	-	-	-
<b>Total</b>							<b>24</b>	<b>700</b>
V	III	UCMBG20	Medical Bacteriology and Mycology	5	3	-	5	40+60
	III	UCMBH20	Food, Dairy and Industrial Microbiology	5	3	-	5	40+60
	III	UCMBI20	Molecular Biology and rDNA Technology	4	3	-	5	40+60
	III	UCMBL20	Core Practical III: Medical Microbiology	3	-	-	-	-
	III	UCMBM20	Core Practical IV: Ecology, Food and Dairy Microbiology	3	-	-	-	-
	III	UEMBA20	Elective I A: Fundamentals of cell biology	4	3	-	4	40+60
	III	UEMBB20	Elective I B: Entrepreneurial Microbiology					
	IV		Non-Major Elective I	3	3	-	2	40+60
	IV	USMBC20/ USMBD20	Skill Based Elective V	2	2	-	2	40+60
	IV		Value Education	1	-	-	-	-
<b>Total</b>							<b>23</b>	<b>600</b>
VI	III	UCMBJ20	Medical Virology and Parasitology	5	3	-	5	40+60
	III	UCMBK20	Microbial Ecology and Soil Microbiology	5	3	-	5	40+60
	III	UEMBC20	Elective IIA: Marine Microbiology	4	3	-	4	40+60
		UEMBD20	Elective II B: Microbial Nanotechnology					
	III	UEMBE20	Elective III A: Cyanobacteriology	4	3	-	4	40+60
		UEMBF20	Elective III B : Advanced Microbiology					
	III	UCMBL20	Core Practical III: Medical Microbiology	3	-	6	5	40+60
	III	UCMBM20	Core Practical IV: Ecology, Food and Dairy Microbiology	3	-	6	5	40+60
	IV		Non-Major Elective II	3	3	-	2	40+60
	IV	USMBC20/ USMBD20	Skill Based Elective VI	2	2	-	2	40+60
	IV		Value Education	1	2	-	2	40+60
<b>Total</b>							<b>34</b>	<b>900</b>

	V		Extension Activities ( 90 Hours)				1	
<b>Grand Total</b>							<b>140</b>	<b>3900</b>

### Programme Outcomes (PO)

On completion of the UG Programme, students will be able to;

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:** Emulate positive social values and exercise leadership qualities and team work.

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

### Programme Specific Outcomes (PSO)

On completion of the UG Programme in Microbiology, students will be able to;

**PSO1:** Acquire an in depth knowledge on the fundamental concepts and scope of Microbiology and its related fields.

**PSO2:** Realize the application oriented aspects of Microbiology and assimilate the technical skills in basic, medical and applied microbiology.

**PSO3:** Develop and execute oral and writing skills necessary for effective communication of discipline specific information and experimental results.

**PSO4:** Understand and explain the diversity of microorganisms and its interaction with the environment for sustainable development.

**PSO5:** Efficiently work as a team involving multiple disciplines with social and ethical values.

**PSO6:** Attain higher knowledge by developing competency in the field of Microbiology assuring and enhancing entrepreneurial skills for the betterment of the society.

<b>PSO/PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>PSO1</b>	H	M	H	M	L	H
<b>PSO2</b>	H	H	H	L	L	M
<b>PSO3</b>	H	M	H	H	M	L
<b>PSO4</b>	H	L	H	H	M	L
<b>PSO5</b>	H	L	H	L	L	M
<b>PSO6</b>	H	H	H	H	H	H

**H – HIGH (3) M – MODERATE (2) L – LOW (1)**

## SEMESTER – I

### UCMBA20 - FUNDAMENTALS OF MICROBIOLOGY

Year I	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: I	UCMBA20	Fundamentals of Microbiology	Theory	Core	6	5	100

#### Course Objective:

To provide basic knowledge on the structure of bacteria, fungi, algae, protozoa, virus along with the principles of microscopy and the control of microbial growth by physical and chemical methods.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the history, recent developments and scope of Microbiology.

**CO2:** Demonstrate microscopy with deep knowledge on the sample preparation and staining techniques.

**CO3:** Discuss important aspects of microbial evolution and diversity by employing classical techniques of microbial identification.

**CO4:** Explain the ultra-structure, arrangement and function of a bacterial cell.

**CO5:** Perform the sterilization and disinfection techniques

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	M	L	H
CO2	H	H	H	L	H	M
CO3	H	M	H	H	H	L
CO4	H	L	H	H	H	L
CO5	H	L	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	L	H
CO2	H	H	H	L	L	M
CO3	H	M	H	H	L	L
CO4	H	L	H	H	L	L
CO5	H	L	H	L	L	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

## **COURSE SYLLABUS**

### **UNIT I: History and Scope of Microbiology. (15 hours)**

- 1.1 Definition and Scope of Microbiology. (K1,K2)
- 1.2 History and recent developments- Spontaneous generation Vs Biogenesis. (K1,K2)
- 1.3 Contribution of Louis Pasteur, Robert Koch, Antony Van Leewenhoek. (K1,K2)
- 1.4 Sergei N. Winogradsky, Joseph Lister, Wilkn Beijerink. (K1,K2)
- 1.5 Alexander flemming, Selman A. Waksman, Emil Christian Hansen, Hans Christian Gram. (K1,K2)
- 1.6 Impact of Microbiology and the future. (K1,K2)

### **UNIT II: Microscopy and Staining methods. (15 hours)**

- 2.1 Microscopy and principle of working - Simple, compound, Dark Field, Phase contrast. (K1,K2, K3)
- 2.2 Fluorescent and Electron Microscope - its types (SEM and TEM). (K1,K2, K3)
- 2.3 Staining methods: Dyes and its uses – Simple staining. (K1,K2, K3)
- 2.4 Differential staining - Gram staining and Acid fast staining (Zeihl Neelson method). (K1,K2, K3)
- 2.5 Special staining techniques - Spore staining, Capsule staining (negative staining). (K1,K2, K3)
- 2.6 Flagella staining and Alberts staining for metachromatic granules. (K1,K2, K3)

### **UNIT III: Microbial evolution and diversity. (15 hours)**

- 3.1 Microbial evolution & diversity - Endosymbiotic theory. (K1,K2)
- 3.2 Binomial Nomenclature of Microbes. (K1,K2, K3)
- 3.3 Classification Five Kingdom concept (Whittaker Classification) - Eight Kingdom concept (Cavalier smith). (K1,K2)
- 3.4 Prokaryotes and eukaryotes – their differences. (K1,K2)
- 3.5 Classical techniques of Microbial identification- Morphological, Physiological and biochemical properties. (K1,K2, K3,K4)
- 3.6 General introduction to Fungi, Algae, Virus and protozoa. (K1,K2)

### **UNIT IV: Morphology and Anatomy of Bacteria. (15 hours)**

- 4.1 Morphological shape, structure and arrangement of bacteria- Anatomy of Bacteria. (K1,K2)
- 4.2 Ultrastructure and functions of cell wall (Gram positive and Gram negative cell wall). (K1,K2)
- 4.3 Cytoplasmic membranes. (K1,K2)
- 4.4 Flagella- structure and arrangement, Pili / fimbriae. (K1,K2)

4.5 Capsule - Slime layer, cytoplasmic inclusions and granules. (K1,K2)

4.6 Spore - process of sporulation. (K1,K2)

**UNIT V: Methods of Sterilization and Disinfection.**

**(15 hours)**

5.1 Overview on Sterilization– Principles and Methods of Sterilization. (K1,K2, K3)

5.2 Dry heat sterilization - Incineration and Hot air Oven- principle and uses. (K1,K2, K3)

5.3 Moist heat sterilization – Pasteurization, Tyndallization and Autoclave- principle and uses.  
(K1,K2, K3)

5.4 Filtration, Radiation- ionizing and non-ionizing and Sterilization control. (K1,K2, K3)

5.5 Disinfection - Chemical disinfectants and its uses – fumigation. (K1,K2, K3)

5.6 Phenol coefficient test. (K1,K2, K3, K4)

**TEXT BOOKS:**

1. Pelczar Jr .M.J., Chan E.C.S and Kreig, N.R (2006). Microbiology. 6<sup>th</sup> Edition, Mc Graw Hill Inc., Newyork.
2. Lansing M. Prescott, John P. Harley, Donald Klein. (2011) .Microbiology. 8<sup>th</sup> Edition, McGraw Hill Inc., New York.

**REFERENCE BOOKS:**

1. Dubey R.C and Maheswari D.K (2012). A Text of Microbiology. Revised edition, S.Chand & Company Ltd., New Delhi.
2. Geeta Sumbali and Mehrotra R.S (2009). Principles of Microbiology. 1<sup>st</sup> edition, Tata McGraw Hill P. Ltd., New Delhi.
3. Robert F. Boyd (2000). General Microbiology. 2<sup>nd</sup> Edition, Times Mirror / Moshy College publishing, Virginia.

**OER:**

E-books

1. [www.gutenberg.org](http://www.gutenberg.org)
2. [www.free-ebooks.net](http://www.free-ebooks.net)
3. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)

Video lessons

1. [www.learnerstv.com](http://www.learnerstv.com)
2. [www.webcast.berkeley.edu](http://www.webcast.berkeley.edu)
3. [www.cosmolearning.org](http://www.cosmolearning.org)

## SEMESTER – II

### UCMBB20 -MICROBIAL PHYSIOLOGY AND METABOLISM

Year I	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: II	UCMBB20	Microbial Physiology and Metabolism	Theory	Core	6	5	100

#### Course Objective:

The course is designed to familiarize students with basic concepts of microbial growth and metabolism along with an in-depth knowledge on the morphology and reproduction of fungi and algae.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Discuss on various physical and chemical growth requirements of bacteria.

**CO2:** Practically apply the knowledge in preparation of culture media for bacterial growth and identification.

**CO3:** Equip with various techniques employed to measure microbial growth and evaluate different classes of antibiotics and their mode of actions.

**CO4:** Explain the structural similarities and differences among various groups of fungi and algae along with its physiological properties.

**CO5:** Outline microbial transport systems and mechanisms of energy conservation in metabolism.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	M	L	H
CO2	H	H	M	L	M	M
CO3	H	M	L	L	L	L
CO4	H	L	M	H	M	L
CO5	H	L	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	L	L	L
CO2	H	H	M	L	L	L
CO3	H	M	M	L	L	L
CO4	H	L	M	L	L	L
CO5	H	L	M	L	L	L

H – HIGH (3), M – MODERATE (2), L – LOW (1)

## **COURSE SYLLABUS**

### **UNIT I: Nutrition requirement and types of Microorganisms. (15 hours)**

- 1.1 Nutritional requirement of Microorganisms- Macro and Micro elements (K1,K2)
- 1.2 Nutritional types of Microorganisms – phototrophs and chemotrophs. (K1,K2)
- 1.3 Nutritional types of Microorganisms lithotrophs and organotrophs. (K1,K2)
- 1.4 Nutritional types of Microorganisms autotrophs and heterotrophs. (K1,K2)
- 1.5 Uptake of nutrients into the cell -Transport of nutrients by active method. (K1,K2)
- 1.6 Uptake of nutrients into the cell -Transport of nutrients by passive method. (K1,K2)

### **UNIT II: Culture media, types and culture techniques. (15 hours)**

- 2.1 Culture Media and its types. (K1,K2,K3)
- 2.2 Preparation of culture media. (K1,K2,K3)
- 2.3 Pure culture techniques - Streak, spread, pour plate techniques. (K1,K2,K3)
- 2.4 Factors affecting growth of bacteria- pH, temperature, oxygen. (K1,K2,K3)
- 2.5 Capnophilic organisms. (K1,K2,K3)
- 2.6 Preservation of cultures- aerobic and anaerobic culture techniques- Lyophilization. (K1,K2,K3)

### **UNIT III: Microbial growth and Antimicrobial chemotherapy. (15 hours)**

- 3.1 Microbial growth (Population doubling time / generation time) – Growth curve of Bacteria. (K1,K2,K3)
- 3.2 Measurement of microbial growth (cell number, cell mass). (K1,K2,K3)
- 3.3 Batch and continuous culture- Synchronous growth. (K1,K2,K3)
- 3.4 Control of microbial growth by antimicrobial drugs & Antibiotics- An introduction. (K1,K2)
- 3.5 Drugs inhibiting cell wall, cell membrane, protein and nucleic acid synthesis. (K1,K2)
- 3.6 Antimicrobial drug resistance. (K1,K2)

### **UNIT IV: Morphology, reproduction and cultivation of fungi and algae. (15 hours)**

- 4.1 Fungi- Morphology, reproduction and cultivation of yeast (*Saccharomyces*). (K1,K2,K3)
- 4.2 Morphology, reproduction and cultivation of Molds (*Aspergillus*, *Penicillium*, *Rhizopus* and *Mucor*). (K1,K2,K3)
- 4.3 Algae- Morphology and reproduction of *Chlamydomona* and *Volvox*. (K1,K2)
- 4.4 Algae- Morphology and reproduction of *Chlorella*, *Ulothrix* and *Diatoms*. (K1,K2)
- 4.5 Classification and Salient feature of Cyanobacteria. (K1,K2)
- 4.6 Cultivation of Cyanobacteria. (K1,K2, K3)

**UNIT V: Microbial metabolism.****(15 hours)**

- 5.1 Enzymes – classification- coenzymes (functions of TPP, NAD, NADP, FMN, FAD and Coenzyme A). (K1,K2)
- 5.2 Basic concepts of Microbial Metabolism – enzymes involved. (K1,K2)
- 5.3 Mechanism of ATP Synthesis- Krebs cycle. (K1,K2)
- 5.4 Glycolysis. (K1,K2)
- 5.5 Electron transport chain – oxidative phosphorylation. (K1,K2)
- 5.6 Photophosphorylation- types (Cyclic and Non-cyclic). (K1,K2)

**TEXT BOOKS:**

1. Lansing M. Prescott, Harley J. P and Klein D.A (2005). Microbiology. 6<sup>th</sup> edition, International edition, McGraw Hill. New York.
2. Pelczar T.R, Chan M.J and Kreig N.R (2006). Microbiology.6<sup>th</sup> edition, Tata McGraw-Hill INC., New York.

**REFERENCE BOOKS:**

1. Dubey R.C and Maheswari D.K (2012). A Text of Microbiology. Revised edition, S. Chand andCompany Ltd., New Delhi.
2. Moat G, John W. Foster and Michael P. Spector (2002). Microbial physiology, 4<sup>th</sup> edition, A John Wiley sons, Inc. publication. New Delhi.
3. David white (2011).The physiology and biochemistry of prokaryotes. 4<sup>th</sup> edition, Oxford university press, UK
4. Sale A.J (1992). Fundamental principles of Bacteriology, 7<sup>th</sup> edition, McGraw Hill Publishing Co. Ltd., New York.

**OER:**

## E-books

1. [www.gutenberg.org](http://www.gutenberg.org)
2. [www.free-ebooks.net](http://www.free-ebooks.net)
3. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)

## Video lessons

1. [www.learnerstv.com](http://www.learnerstv.com)
2. [www.webcast.berkeley.edu](http://www.webcast.berkeley.edu)
3. [www.cosmolearning.org](http://www.cosmolearning.org)

## SEMESTER –II

### UCMBC20 – CORE PRACTICAL I: BASIC TECHNIQUES IN MICROBIOLOGY

Year I	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: II	UCMBC20	Basic techniques in Microbiology	Practical	Core	3	4	100

#### Course Objective:

The candidate will gain hands-on training and acquire adequate skill required to identify microorganism through staining techniques, sterilize and prepare culture media, inoculate observe and distinguish the growth patterns of microorganisms in different media.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Perform cleaning, sterilization of glasswares and prepare culture media.

**CO2:** Examine the different morphological forms of microbes.

**CO3:** Analyze and employ different staining methods for the identification of bacteria.

**CO4:** Competently cultivate bacteria in different types of media and identify their sensitivity and resistance.

**CO5:** Use Classical techniques for the identification of bacteria based on their biochemical properties.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	H
CO2	H	H	M	H	M	M
CO3	M	M	L	H	L	L
CO4	M	L	M	H	M	L
CO5	H	L	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	M
CO2	H	H	H	H	L	M
CO3	H	H	H	H	L	M
CO4	H	H	H	H	L	M
CO5	H	H	H	H	L	M

H – HIGH (3), M – MODERATE (2), L – LOW (1)

#### COURSE SYLLABUS

1. Sterilization: Principle & Methods –Dry heat, Moist heat, Filtration, fumigation and radiation.
2. Microscopy – Bright field Microscope.
3. Smear Preparation and simple staining technique.

4. Differential staining - Gram Staining and Acid fast staining.
5. Negative staining for capsule.
6. Motility Demonstration in Hay infusion broth.
7. Culture media preparation - Basal media, Enriched media, Differential media and selective media.
8. Pure culture techniques – Serial dilution, pour plate, spread plate & streak plate techniques.
9. Demonstration of Bio-chemical Characteristics - Indole, Methyl red, Voges Proskauer, Citrate, TSI test, Urease test and Sugar fermentation test.
10. Antibiotic sensitivity test – Kirby Bauer Disc Diffusion method.
11. Morphology of Fungi - LPCB wet mount preparation.
12. Examination of pond water sample – algae and protozoa.

#### **REFERENCE BOOKS:**

1. Collee J.G, Fraser A.G, Marmion B.P, Simmons A (2007). Mackie and McCartney Practical Medical Microbiology, 14<sup>th</sup> edition, Elsevier publishers, London.
2. Tille P. Bailey and Scott (2013). Diagnostic Microbiology. 13<sup>th</sup> edition, Mosby Publishers, United states.
3. James G Cappuccino and Natalie Sherman (2004). Microbiology: A laboratory manual. 6<sup>th</sup> edition, Published by Pearson Education, United States.
4. Monica Cheesbrough. (2005) District Laboratory Practice in Tropical Countries –Part I and II. 2<sup>nd</sup> edition, Cambridge University Press, New Delhi.

#### **OER:**

#### **VIRTUAL LABS/ INTERACTIVE SIMULATIONS:**

1. [www.vlab.co.in](http://www.vlab.co.in)
2. [www.aview.in/aview](http://www.aview.in/aview)
3. [www.pbs.org](http://www.pbs.org)
4. [www.micro.magnet.fsu.edu/primer/java/scienceopticsu](http://www.micro.magnet.fsu.edu/primer/java/scienceopticsu)

## SEMESTER – III

### UCMBD20 - BASIC IMMUNOLOGY AND MICROBIAL GENETICS- I

Year II	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: III	UCMBD20	Basic Immunology and Microbial Genetics -I	Theory	Core	6	5	100

#### Course Objective:

The syllabus is designed to provide basic knowledge on immunity and organs of immune system, types of antigens and antibody interactions and the role of DNA as a basic unit of gene expression.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the history of immunology and immunohaematology.

**CO2:** Discuss the overall organization of the immune system and differentiate the humoral and cell mediated immune mechanisms.

**CO3:** Explain about types of antigen, antibody and apply the principles and techniques involved in antibody production.

**CO4:** Describe the structure of DNA & RNA with their physical & chemical properties.

**CO5:** Familiarize with the process involved in the replication of DNA.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	M	L	H
CO2	H	L	M	L	M	M
CO3	H	M	L	M	M	M
CO4	H	L	M	H	M	L
CO5	H	L	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	L	M	L	L	H
CO3	H	H	M	L	L	L
CO4	H	L	M	L	L	M
CO5	H	L	H	L	L	L

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

#### UNIT I: History of immunology and Immunohaematology. (15 hours)

1.1 History of Immunology- contributions of Elie metchnikoff. (K1,K2)

1.2 Contributions of Louis Pasteur and Edward Jenner. (K1,K2)

1.3 Immunohaematology- blood grouping, Rh typing. (K1,K2)

- 1.4 Rh incompatibility- Haemolytic disease of the newborn. (K1,K2)
- 1.5 Normal Microbial flora of the human body and its function. (K1,K2)
- 1.6 Gnotobiotic animals, their interaction and uses. (K1,K2)

**UNIT II: Structure and function of immune system. (15 hours)**

- 2.1 Structure and functions of cells of the immune system- B cells, T cells. (K1,K2)
- 2.2 Functions of NK cells, phagocytic cells, Mast cells. (K1,K2)
- 2.3 Primary Lymphoid organs (Thymus and Bone marrow). (K1,K2)
- 2.4 Secondary Lymphoid organs (Lymph node and Spleen), MALT, GALT, BALM. (K1,K2)
- 2.5 Immunity – Types of Immunity – Humoral and Cell mediated immunity. (K1,K2)
- 2.6 Innate and Acquired immunity. (K1,K2)

**UNIT III: Antigen and Antibodies, types and function. (15 hours)**

- 3.1 Antigens- properties, types of antigen- haptens, adjuvants. (K1,K2)
- 3.2 Immunoglobulins- General Structure. (K1,K2)
- 3.3 Types of immunoglobulins, properties and its functions. (K1,K2)
- 3.4 Theories of antibody formation. (K1,K2)
- 3.5 Monoclonal and polyclonal antibodies. (K1,K2)
- 3.6 Production of Monoclonal antibodies and their applications. (K1,K2,K3)

**UNIT IV: Introduction to genetics and nucleic acids, its types and function. (15 hours)**

- 4.1 Genetics – Historical Introduction – Discovery of DNA Structure, Nucleic acids – DNA & RNA as Genetic Material. (K1,K2)
- 4.2 Nucleosomes, Repetitive DNA, highly repetitive DNA, Satellite and mini satellite DNA - forms of DNA. (K1,K2)
- 4.3 Types of RNA- mRNA, tRNA ,rRNA. (K1,K2)
- 4.4 Post transcriptional and translational modification. (K1,K2)
- 4.5 Genetic code. (K1,K2)
- 4.6 Central Dogma of Molecular biology. (K1,K2)

**UNIT– V: Functioning of bacterial genetic material. (15 hours)**

- 5.1 Organization & functioning of bacterial genetic material. (K1,K2)
- 5.2 Gene and Gene concept. (K1,K2)
- 5.3 Plasmids – characteristics, Structure, types and functions. (K1,K2)
- 5.4 Mechanism of DNA Replication- enzymes involved. (K1,K2)
- 5.5 Semi conservative method of replication- experimental proof. (K1,K2)
- 5.6 Types of replication- rolling circle and theta model of replication. (K1,K2)

**TEXT BOOKS:**

1. Kuby J Richard A. Goldsby, Thomas J. Kindt (2006). Immunology. 6<sup>th</sup> edition, W.H. Freeman and company, New York.
2. Richard M. Hyde (2011). Immunology. 3<sup>rd</sup> edition, Williams & Wilkins, Philadelphia.
3. Robert H Tamarin (2002). Principles of Genetics. 7<sup>th</sup> edition, Tata McGraw Hill P. Ltd., New Delhi.

**REFERENCE BOOKS:**

1. Bashir S.F (2011). Text Book of Immunology. 1<sup>st</sup> edition, PHI Learning Private limited, New Delhi.
2. Ananthanarayan R & Paniker C.K.J (2013). Text Book of Microbiology, 9th edition, Universities Press, Hyderabad
3. Tizard K (1995). Immunology. An Introduction. 1<sup>st</sup> edition, Saunders college publishing, Philadelphia.
4. Benjamin A. Pierce (2002). Genetics: A Conceptual Approach. W.H. Freeman and Company, United States.
5. Gardner Simion Snustad (2005). Principles of Genetics. 8<sup>th</sup> edition, John Wiley and Sons Inc, New York.
6. Peter Snustad D and Michael J Simmons (2003). Principles of Genetics. 3<sup>rd</sup> edition, John Wiley and Sons, Inc. publication, New Delhi.

**OER:****VIDEOS/VIDEO LESSONS / E-CONTENT FOR LEARNING:**

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

**SEMESTER – IV**  
**UCMBE20 – APPLIED IMMUNOLOGY AND MICROBIAL GENETICS- II**

Year II	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
<b>SEM : IV</b>	UCMBE20	Applied Immunology and Microbial Genetics -II	Theory	Core	5	5	100

**Course Objective:**

The syllabus is designed to familiarize students on the antigen antibody reactions *in vivo* and *ex vivo* and an in depth understanding on the central dogma of molecular biology.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Outline and apply the basic principle and mechanism of antigen and antibody reactions.

**CO2:** Discuss on the significance of autoimmune diseases, hypersensitivity reactions and interpret on different types of vaccine and vaccination schedule.

**CO3:** Explain the gene transfer mechanisms between the prokaryotes and eukaryotes.

**CO4:** Identify mutations and DNA repair mechanisms.

**CO5:** Comprehend the process of protein synthesis and the methods of gene expression.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	M	H	M	L	H
<b>CO2</b>	H	L	M	M	M	L
<b>CO3</b>	H	M	L	M	M	L
<b>CO4</b>	H	L	M	H	M	L
<b>CO5</b>	H	L	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	L	L	L
<b>CO2</b>	H	M	H	L	L	L
<b>CO3</b>	H	H	H	L	L	L
<b>CO4</b>	H	H	H	L	L	L
<b>CO5</b>	H	M	H	L	L	L

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

**COURSE SYLLABUS**

**UNIT I: Antigen –Antibody reactions.**

**(15 hours)**

- 1.1 Antigen and Antibody interaction *in vitro* – Zone phenomenon- Lattice hypothesis. (K1,K2,K3)
- 1.2 Agglutination reactions- Direct, indirect, Haemagglutination inhibition test, Coombs test. (K1,K2,K3)
- 1.3 Precipitation reactions- Ring test, slide test, tube test, Precipitation reaction in gel-immunoelectrophoresis, CIE, Single diffusion in one dimension, double diffusion in one

dimension, single diffusion in two dimension and double diffusion in two dimension, Counter Immunoelectrophoresis. (K1,K2,K3)

1.4 ELISA- direct and indirect. (K1,K2,K3)

1.5 RIA and flow cytometry. (K1,K2,K3)

1.6 Western blotting. (K1,K2,K3)

**UNIT II: Complements cascade and Antigen- antibody reactions invivo. (15 hours)**

2.1 Complements, components and pathways (classical and alternate pathways). (K1,K2)

2.2 Hypersensitivity reactions and its types ((Types I to V). (K1,K2)

2.3 Transplantation immunology. (K1,K2)

2.4 Autoimmune diseases (Rheumatoid Arthritis, Systemic Lupus Erythematosus, Myasthinia gravis, Thrombocytopaenia and Hashimoto thyroiditis). (K1,K2)

2.5 Vaccine- Definition, types and functions. (K1,K2)

2.6 Immunization Schedule. (K1,K2,K3)

**UNIT III: Gene transfer mechanisms. (15 hours)**

3.1 Gene transfer mechanism – Griffith experiment. (K1,K2)

3.2 Transformation – Definition, competent cell, transfection. (K1,K2, K3)

3.3 Mechanism of transformation and transformation frequency. (K1,K2,K3)

3.4 Transduction – Definition, generalized, abortive and specialized transduction. (K1,K2,K3)

3.5 Conjugation – Definition, U Tube experiment (K1,K2,K3)

3.6 Hfr, F<sup>+</sup>, F<sup>-</sup>, F' conjugation. (K1,K2,K3)

**UNIT IV: Mutation and DNA repair mechanisms. (15 hours)**

4.1 Mutation and its types – transition, transversion. (K1,K2)

4.2 Spontaneous (Frame shift mutation, mis sense mutation and non sense mutation). (K1,K2)

4.3 Induced mutation. (K1,K2,K3)

4.4 Detection and isolation of auxotrophic mutants - Replica plating and Ames test. (K1,K2,K3)

4.5 DNA repair mechanisms- photoreactivation, (K1,K2)

4.6 Excision repair and SOS repair. (K1,K2)

**UNIT V: Gene expression system. (15 hours)**

5.1 Protein synthesis (initiation, elongation, termination) in Prokaryotes. (K1,K2)

5.2 Protein synthesis (initiation, elongation, termination) in Eukaryotes. (K1,K2)

5.3 Operon- Definition, structure and function. (K1,K2)

5.4 Overview on the Gene expression system. (K1,K2)

5.5 Concept of Lactose operon. (K1,K2)

5.6 Tryptophan operon – Attenuation control. (K1,K2)

**TEXT BOOKS:**

1. Kuby J Richard A. Goldsby, Thomas J. Kindt (2006). Immunology. 6<sup>th</sup> edition, W.H. Freeman and company, New York.
2. Richard M.Hyde (2011).Immunology. 3<sup>rd</sup> edition, Williams & Wilkins, Philadelphia.
3. Robert H Tamarin (2002). Principles of Genetics. 7<sup>th</sup> edition, Tata McGraw Hill P. Ltd., New Delhi.

**REFERENCE BOOKS:**

1. Bashir S.F (2011). Text Book of Immunology. 1<sup>st</sup> edition, PHI Learning Private limited, New Delhi.
2. Ananthanarayan R & Paniker C.K.J (2013). Text Book of Microbiology, 9th edition, Universities Press, Hyderabad
3. Tizard K (1995). Immunology. An Introduction. 1<sup>st</sup> edition, Saunders college publishing, Philadelphia.
4. Benjamin A. Pierce (2002). Genetics: A Conceptual Approach. W.H.Freeman and Company, United States.
5. Gardner Simion Snustad (2005). Principles of Genetics. 8<sup>th</sup> edition, John Wiley and Sons Inc, New York.
6. Peter Snustad D and Michael J Simmons (2003). Principles of Genetics. 3<sup>rd</sup> edition, John Wiley and Sons, Inc. publication, New Delhi.

**OER:****VIDEOS/VIDEO LESSONS / E-CONTENT FOR LEARNING:**

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

## SEMESTER – IV

### UCMBF20 – CORE PRACTICAL II: BASIC AND APPLIED IMMUNOLOGY

Year II	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM : IV	UCMBF20	Basic and Applied Immunology	Practical	Core	3	4	100

#### Course Objective:

To impart hands on training on various agglutination and precipitation reaction and to provide an insight in identifying the cells of immune system.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Identify the ABO blood groups and its Rh types.

**CO2:** Enumerate and observe various granulocytic and agranulocytic cells of immune system.

**CO3:** Perform serological diagnosis for the detection of typhoid, syphilis, rheumatoid factor and anti streptolysin 'o'.

**CO4:** Demonstrate the direct and indirect pregnancy testing procedure.

**CO5:** Quantitate the antigens and antibodies by performing immunodiffusion techniques.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	H
CO2	H	L	M	L	L	H
CO3	H	M	L	M	M	H
CO4	H	L	M	H	M	H
CO5	H	L	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	H	L	L	L
CO2	H	L	H	M	M	L
CO3	H	H	H	M	M	L
CO4	H	M	H	L	L	L
CO5	H	H	H	L	L	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

1. Blood Grouping & Rh typing.
2. Differential counting.
3. Enumeration of WBC using Haemocytometer.
4. Enumeration of RBC using Haemocytometer.

5. Isolation of Buffy coat by wintrobes tube.
6. Widal test (Qualitative slide test and Quantitative tube test).
7. Rapid Plasma Reagin test.
8. Pregnancy test –Direct dip stick method and Indirect slide test.
9. Latex Agglutination- Anti Streptolysin ‘o’ test.
10. Latex Agglutination-Rheumatoid factor.
11. Treponema Pallidum Haemagglutination test (TPHA).
12. Precipitation reaction in Gel -Ouchterlony Double Diffusion.
13. Precipitation reaction in Gel - Radial Immuno Diffusion.

#### **REFERENCE BOOKS:**

1. Collee J.G, Fraser A.G, Marmion B.P, Simmons A (2007) Mackie and McCartney Practical Medical Microbiology, 14th edition, Elsevier publishers, London.
2. Tille P. Bailey and Scott (2013). Diagnostic Microbiology, 13<sup>th</sup> edition, Mosby Publishers, United States.
3. James G Cappuccino and Natalie Sherman (2004). Microbiology: A laboratory manual. Sixth edition, Published by Pearson Education, United States.
4. Monica Cheesbrough (2005). District Laboratory Practice in Tropical Countries - Part I and II. 2<sup>nd</sup> edition, Cambridge University Press, New Delhi.

#### **OER:**

#### **VIRTUAL LABS/ INTERACTIVE SIMULATIONS:**

1. [www.vlab.co.in](http://www.vlab.co.in)
2. [www.aview.in/aview](http://www.aview.in/aview)
3. [www.pbs.org](http://www.pbs.org)
4. [www.micro.magnet.fsu.edu/primer/java/scienceopticsu](http://www.micro.magnet.fsu.edu/primer/java/scienceopticsu)

## SEMESTER V

### UCMBG20- MEDICAL BACTERIOLOGY AND MYCOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM : V	UCMBG20	Medical Bacteriology and Mycology	Theory	Core	5	5	100

#### Course Objective:

To enable students understanding on medically important bacteria and fungi, the concepts, epidemiology and development of microbial diseases and the principles behind prevention and treatment of such diseases.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the importance of Host-Parasite relationships and demonstrate the collection of various clinical specimens and processing it.

**CO2:** Explain about the diseases caused by the bacterial pathogens, prevention and treatment.

**CO3:** Discuss the different modes of transmission of bacterial diseases and its preventive measures.

**CO4:** Compare the morphological classification of fungi, and isolation of fungi from clinical specimen.

**CO5:** Compile the common mycotic diseases, their pathogenicity and various antifungal agents used for treatment.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	H
CO2	H	L	M	L	L	H
CO3	H	M	L	M	M	H
CO4	H	M	M	H	M	H
CO5	H	M	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	L	L	L
CO4	H	H	H	M	L	M
CO5	H	H	H	L	L	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

## **COURSE SYLLABUS**

### **UNIT I: Infection, its types and processing of clinical specimens. (10 hours)**

- 1.1 Normal Microbial flora of human body. (K1,K2)
- 1.2 Host parasite relationship. (K1,K2)
- 1.3 Infection and types of infection (Primary, Secondary, Reinfection , cross infection, Nosocomial and Iatrogenic infection). (K1,K2)
- 1.4 Virulence factors of bacteria causing infection. (K1,K2)
- 1.5 Specimen collection, Transport and storage. (K1,K2,K3)
- 1.6 Specimen processing (Blood, Urine, CSF, Sputum and other body fluids). (K1,K2,K3)

### **UNIT II: Bacterial pathogens-I. (20 hours)**

- 2.1 Morphology, classification, antigenic structure, cultural characteristics, pathogenicity, laboratory diagnosis, preventive measures and treatment of Human pathogens – *Staphylococcus aureus*, *Streptococcus pyogenes*, *Streptococcus pneumoniae*. (K1,K2,K3)
- 2.2 *Neisseriae meningitidis* and *Neisseriae gonorrhoeae*, *Corynebacterium diphtheria*. (K1,K2,K3)
- 2.3 *Mycobacterium tuberculosis* and *Mycobacterium leprae*, *Bacillus anthracis*. (K1,K2,K3)
- 2.4 *Clostridium botulinum*, *Clostridium tetani* and *Clostridium perfringens*. (K1,K2,K3)
- 2.5 Family – Enterobacteriaceae- *Escherichia coli* and *Klebsiella*. (K1,K2,K3)
- 2.6 Family – Enterobacteriaceae - *Salmonella*, *Shigella* and *Proteus*. (K1,K2,K3)

### **UNIT III: Bacterial pathogens –II and Hospital waste disposal. (15 hours)**

- 3.1 Morphology, classification, antigenic structure, cultural characteristics, pathogenicity, laboratory diagnosis, preventive measures and treatment of *Vibrio cholerae* and *Vibrio parahaemolyticus*, *Pseudomonas aeruginosa*. (K1,K2,K3)
- 3.2 *Brucella abortus*, *Bordetella pertussis*, *Haemophilus influenzae*. (K1,K2,K3)
- 3.3 *Treponema pallidum*, *Chlamydiae* and *Rickettsiae*. (K1,K2,K3)
- 3.4 Zoonotic diseases. (K1,K2,K3)
- 3.5 Hospital acquired infection and their control. (K1,K2,K3)
- 3.6 Hospital waste disposal. (K1,K2,K3)

### **UNIT IV: General Mycology - yeasts of Medical importance. (15 hours)**

- 4.1 General introduction to Mycology. (K1,K2)
- 4.2 Morphology of fungi. (K1,K2,K3)
- 4.3 Classification of fungi of medical importance. (K1,K2)
- 4.4 Detection and recovery of fungi from clinical specimens. (K1,K2,K3)
- 4.5 Yeasts of medical importance – *Candida albicans*, (K1,K2,K3)
- 4.6 *Cryptococcus neoformans*. (K1,K2,K3)

**UNIT V: Common Mycotic diseases.****(15 hours)**

- 5.1 Dermatophytes and agents of superficial mycosis – *Trichophyton*, *Epidermophyton* and *Microsporum*. (K1,K2,K3)
- 5.2 Dimorphic fungi causing systemic mycoses – Histoplasmosis. (K1,K2)
- 5.3 Coccidioidomycosis. (K1,K2)
- 5.4 Blastomycosis. (K1,K2)
- 5.5 Mycotic mycetoma. (K1,K2)
- 5.6 Antifungal agents. (K1,K2,K3)

**TEXT BOOKS:**

1. Ananthanarayan R & Paniker C.K.J. (2013). Text Book of Microbiology, 9<sup>th</sup> edition, Universities Press, Hyderabad.
2. Tille P. Bailey and Scott (2013). Diagnostic Microbiology, 13<sup>th</sup> edition, Mosby Publishers, United States.
3. Jawetz, Melnick, & Adelberg's. (2013). Medical Microbiology. 26<sup>th</sup> edition. McGraw-Hill, New York.
4. Mehrotra RS and Aneja KR (2006). An Introduction to Mycology. 1<sup>st</sup> edition, New age international publishers, Chennai.

**REFERENCE BOOKS:**

1. Chakraborty P (2003). A Text book of Microbiology. 2<sup>nd</sup> edition, Published by New central Agency (P) Ltd., Kolkata.
2. Satish Gupte (2005). The Short Textbook of Medical Microbiology. 8<sup>th</sup> edition, Jaypee Brothers, Medical publishers (P) Ltd., New Delhi.
3. Rajan S (2009). Medical Microbiology. 1<sup>st</sup> edition, MJP Publishers, Chennai.
4. Rajesh Bhatia and Ratan Lalchhpujani (2004). Essentials of Medical Microbiology. 3<sup>rd</sup> edition, Jaypee Brothers, Medical Publishers (P) Ltd., New Delhi.
5. Monica Cheesbrough (2003). District Laboratory Practice in Tropical Countries. Part 1 & 2, Cambridge University Press.
6. Jagadish Chander (1996). A text book of Medical Mycology. 1<sup>st</sup> edition. Interprint, New Delhi.

**OER:****E-BOOKS:**

1. <http://www.gutenberg.org/>
2. <http://www.free-ebooks.net/>
3. <http://www.bookrix.com>
4. <http://www.e-booksdirectory.com/>
5. <http://bookboon.com/>
6. <http://www.freebooks.com/ebooks/>

## SEMESTER V

### UCMBH20 - FOOD, DAIRY AND INDUSTRIAL MICROBIOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: V	UCMBH20	Food, Dairy and Industrial microbiology	Theory	Core	5	5	100

#### Course Objective:

To provide basic knowledge on food preservation, causes of spoilage, control and preventive measures from harmful microorganisms. The course is also designed for the learners to acquire idea about fermentation technology and commercially important microbial products.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Understand the role of microorganisms in food and the factors influencing their growth

**CO2:** Apply the principles and procedures involved in preservation of food.

**CO3:** Identifying the spoilage causing microorganisms in various foods and analysing the significance of food borne and milk borne diseases in association with public health.

**CO4:** Formulate knowledge on the fermentation process with adequate information on the fermentors and identifying industrially important microorganisms.

**CO5:** Discuss on the industrial production and purification of sauerkraut, cheese, yoghurt, organic solvents, beverages, vitamins and growth factors

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	H
CO2	H	L	M	L	L	H
CO3	H	M	L	M	M	H
CO4	H	M	M	H	M	H
CO5	H	M	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	H
CO2	H	M	H	L	L	H
CO3	H	H	M	L	L	H
CO4	H	M	M	L	L	H
CO5	H	H	H	L	M	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

## **COURSE SYLLABUS**

### **UNIT I: Microorganism important in food microbiology and food preservation methods.**

**(15 hours)**

- 1.1 Food as Substrate for Microorganisms.(K1,K2)
- 1.2 Microorganisms important in food microbiology; Molds, yeasts and bacteria – General characteristics- Classification and importance. (K1,K2)
- 1.3 Principles of food preservation – Asepsis – Removal of microorganisms – anaerobic conditions. (K1,K2, K3)
- 1.4 Food preservation using high temperature – Canning. (K1,K2, K3)
- 1.5 Food preservation using low temperature. (K1,K2, K3)
- 1.6 Food preservation by Drying – Food additives. (K1,K2, K3)

### **UNIT II: Contamination and spoilage of foods.**

**(15 hours)**

- 2.1 Contamination, spoilage and preservation of cereal and cereal products. (K1,K2, K3)
- 2.2 Contamination, spoilage and preservation of vegetables and fruits. (K1,K2, K3)
- 2.3 Contamination, spoilage and preservation of meat and meat products. (K1,K2, K3)
- 2.4 Contamination, spoilage and preservation of milk and milk products. (K1,K2, K3)
- 2.5 Contamination, spoilage and preservation of Poultry, fish and other sea foods.(K1,K2,K3)
- 2.6 Spoilage of canned foods. (K1,K2,K3)

### **UNIT III: Food and milk borne diseases.**

**(15 hours)**

- 3.1 Food borne illness – General introduction to etiological agents, treatment, prevention and control measures (K1,K2,K3)
- 3.2 Food intoxication and Food infection. (K1,K2,K3)
- 3.3 Bacterial food borne diseases. (K1,K2,K3)
- 3.4 Non – bacterial food borne diseases (viral and parasitic). (K1,K2,K3)
- 3.5 Mycotoxicosis and Mycotoxins. (K1,K2,K3)
- 3.6 Milk borne diseases. (K1,K2,K3)

### **UNIT IV: Bioreactors and fermentation.**

**(15 hours)**

- 4.1 Bioreactors – Principle, types. (K1,K2,K3)
- 4.2 Design and functional Characteristics of bioreactors. (K1,K2,K3)
- 4.3 Mode of operation and control. (K1,K2,K3)
- 4.4 Primary and secondary metabolites. (K1,K2)
- 4.5 Fermentation – Types of fermentation – Batch and continuous fermentation. (K1,K2,K3)
- 4.6 Dual (or) multiple, surface and submerged fermentation. (K1,K2,K3)

**UNIT V: Fermented products and industrial production of organic solvents, beverages, vitamins and growth factors. (15 hours)**

5.1 Fermentation- fermented vegetables – sauerkraut. (K1,K2,K3)

5.2 Fermented dairy products – cheese, yoghurt. (K1,K2,K3)

5.3 Production of organic solvents: ethanol, acetone. (K1,K2,K3)

5.4 Beverages: wine, beer. (K1,K2,K3)

5.5 Organic acid: citric acid, acetic acid. (K1,K2,K3)

5.6 Production of Vitamins and growth factors: Vitamin B2 (Riboflavin), Vitamin B12, Vitamin C. (K1,K2,K3)

**TEXT BOOKS:**

1. Frazier W.C. and West Hoff D.C (2008). Food Microbiology. 4<sup>th</sup> edition, Mc Graw Hill, New York.
2. Vijaya Ramesh K (2007). Food Microbiology. 1<sup>st</sup> edition, MJP Publishers, Chennai.
3. Patel A.H (2001). Industrial Microbiology. 3<sup>rd</sup> edition, Mac Millan India Ltd, Chennai.

**REFERENCE BOOKS:**

1. Adam M.R. and Moss M.O (2004). Food Microbiology. 2<sup>nd</sup> edition, New international pvt. Ltd., publishers.UK.
2. Casida J.E (1986). Industrial Microbiology, 1<sup>st</sup> edition. Wiley Eastern publishers.UK
3. Stanbury P.F., Whitaker A and Hall S.J (1995). Principles of Fermentation technology. 1<sup>st</sup> edition, Pergamon, UK.
4. Banwart G. J (2004). Basic Food Microbiology. 2<sup>nd</sup> edition, CBS Publishers and Distributors, New Delhi.
5. James M. Jay (2003). Modern Food Microbiology. 4<sup>th</sup> edition, CBS Publishers, New Delhi.

**OER:**

**DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## SEMESTER V

### UCMBI20 - MOLECULAR BIOLOGY AND rDNA TECHNOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM : V	UCMBI20	Molecular biology and rDNA technology	Theory	Core	4	5	100

#### Course Objective:

Familiarize the students understanding on the concepts of recombinant DNA technology and strategies involved in gene manipulations.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Compare the use of various cloning vectors in gene cloning techniques and the application of genetic engineering and strain improvement using mutational rDNA technology.

**CO2:** Apply the strategies of gene cloning techniques and identify rDNA clones.

**CO3:** Compile the techniques of nucleic acid hybridization and DNA amplification.

**CO4:** Explain the procedure involved and applications of enzyme and algal biotechnology.

**CO5:** Discuss on the methods involved in the Production, of pharmaceutical products and the importance of Gene therapy.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	M	M	L
CO4	H	H	H	H	M	M
CO5	H	H	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	M	H
CO3	H	H	H	L	M	M
CO4	H	H	H	M	L	H
CO5	H	H	H	L	M	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

##### UNIT I: Vectors - cloning and expression.

(15 hours)

1.1 Historical perspectives – Plasmids – Vectors. (K1,K2,K3)

1.2 Psc101, P<sup>BR322</sup>, Ti plasmid. (K1,K2,K3)

1.3 Bacteriophage vectors-  $\lambda$  (lamda) and M 13 phage. (K1,K2,K3)

1.4 cosmid (pJB8), YAC (pYAC3). (K1,K2,K3)

- 1.5 Introduction to principles and applications of genetic recombinant technology. (K1,K2,K3)
- 1.6 Strain improvement in the production of biotechnologically useful products (mutational rDNA technology). (K1,K2,K3)

**UNIT II: Strategies of gene cloning techniques. (15 hours)**

- 2.1 Restriction endonucleases- nomenclature, its types. (K1,K2,K3)
- 2.2 Enzyme Ligase and its function. (K1,K2,K3)
- 2.3 DNA manipulative enzymes- DNA Polymerases and its types. (K1,K2,K3)
- 2.4 DNA modifying enzymes- Alkaline phosphatase, polynucleotide kinase, Terminal deoxynucleotidyl transferase. (K1,K2,K3)
- 2.5 Gene cloning techniques – Isolation and identification of rDNA clones. (K1,K2,K3)
- 2.6 Genomic and cDNA libraries. (K1,K2,K3)

**UNIT III: Nucleic acid hybridization and DNA amplification. (15 hours)**

- 3.1 Overview on Nucleic acid hybridization. (K1,K2)
- 3.2 Solution and Filter hybridization – Dot blot. (K1,K2,K3)
- 3.3 Insitu hybridization -colony and plaque hybridization. (K1,K2,K3)
- 3.4 Southern, northern, western methods of hybridization. (K1,K2,K3)
- 3.5 DNA amplification technique – Polymerase Chain Reaction. (K1,K2,K3)
- 3.6 Restriction Fragment Length Polymorphism. (K1,K2,K3)

**UNIT IV: Enzyme and algal biotechnology. (15 hours)**

- 4.1 Enzyme biotechnology – source selection. (K1,K2,K3)
- 4.2 Extraction and purification of enzymes. (K1,K2,K3)
- 4.3 Enzyme immobilization techniques (physical binding, cross linking, entrapment) - their application – products produced. (K1,K2,K3)
- 4.4 Microbial algal technology – Cultivation methods of *Spirulina*. (K1,K2,K3)
- 4.5 Exploitation of microalgae for food and feed. (K1,K2,K3)
- 4.6 Fuel (Methane, hydrogen) and Drug production from microalgae.(K1,K2,K3)

**UNIT V: Biotechnological application in the production of pharmaceuticals.(15 hours)**

- 5.1 Production of Humulin. (K1,K2)
- 5.2 Production of Interferon. (K1,K2)
- 5.3 Tissue plasminogen Activator. (K1,K2)
- 5.4 Recombinant vaccine (HBs Ag). (K1,K2)
- 5.5 Production of antibiotics- Penicillin, Streptomycin and Tetracycline. (K1,K2)
- 5.6 Gene therapy- Definition, Gene therapy methods. (K1,K2)

## **TEXT BOOKS:**

1. Brown T. A (2016). Gene cloning and DNA analysis- An introduction. 7<sup>th</sup> edition, Black wiley, United States.
2. Old R.S and Primrose S.B (2001). Principles of Gene Manipulation: An introduction to Genetic Engineering. 6<sup>th</sup> edition, Blackwell Scientific publication, London.

## **REFERENCE BOOKS:**

1. Jogdnand S.N (2005). Gene biotechnology. 2<sup>nd</sup> edition, Himalaya Publishing House, Mumbai.
2. Satyanarayana U (2005). Biotechnology. 1<sup>st</sup> edition, Books and Allied (P) Ltd., Kolkata.
3. Dubey R.C (2005). A Text of Biotechnology. Multicolour Illustrative edition, S.Chand and Company Ltd., New Delhi.
4. Bernad R Glick and Pasternak, J.J (2003). Molecular Biotechnology - Principles and Applications of Recombinant DNA.3<sup>rd</sup> edition, ASM Press, Washington, D.C.
5. Hugo W.B and Russell A.D (2002). Pharmaceutical Microbiology. 4<sup>th</sup> edition, Blackwell scientific publications / oxford, London.

## **OER:**

### **VIDEOS/VIDEO LESSONS / E-CONTENT FOR LEARNING**

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

## SEMESTER V

### UEMBA20- ELECTIVE I A: FUNDAMENTALS OF CELL BIOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM : V	UEMBA20	Elective I A: Fundamentals of Cell Biology	Theory	Core Elective	4	4	100

#### Course Objective:

To facilitate the students understanding on the basic concepts and principles of cell biology.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Compare the difference between plant cell and animal cell.

**CO2:** Analyze the basic components of prokaryotic and eukaryotic cells and the chemistry of its macromolecules and differentiate the roles of each cell organelles with its functions.

**CO3:** Compile the ultrastructure and function of nucleus and nucleolus.

**CO4:** Discuss on the different stages of cell division in prokaryotic and eukaryotic cells.

**CO5:** Outline the basic principles of osmosis, cell signalling and signal transduction.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	M	M	L
CO4	H	H	H	M	M	M
CO5	H	H	H	M	M	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	H	L	M
CO2	H	M	H	M	L	M
CO3	H	M	H	L	L	L
CO4	H	M	H	L	L	L
CO5	H	M	H	L	L	L

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

##### UNIT I: Cell organization.

**(12 hours)**

1.1 Overview of Cell organization and types of cell. (K1,K2)

1.2 Structural organization of prokaryotic cell. (K1,K2)

1.3 Structural organization of eukaryotic cell. (K1,K2)

1.4 Structure of plant cell. (K1,K2)

1.5 Structure of animal cell. (K1,K2)

1.6 Structure of Virus cell. (K1,K2)

**UNIT II: Components and functions of organelles. (12 hours)**

2.1 Structure and function of mitochondria. (K1,K2)

2.2 Structure and function of endoplasmic reticulum- rough and smooth. (K1,K2)

2.3 Structure and function of ribosomes and golgi vesicles. (K1,K2)

2.4 Lysosomes, chloroplast, peroxisomes and glyoxysomes. (K1,K2)

2.5 Extracellular matrix- collagen, microtubules, microfilaments. (K1,K2)

2.6 Centrioles, basal bodies, cilia and flagella. (K1,K2)

**UNIT III: Cytogenetics. (12 hours)**

3.1 Nucleus- Nuclear membrane, Nucleolus, Nuclear pore and annulus. (K1,K2)

3.2 Cytogenetics- an overview. (K1,K2)

3.3 Structure of chromosomes. (K1,K2)

3.4 Nucleosomes - Giant chromosomes. (K1,K2)

3.5 Polytene Chromosomes. (K1,K2)

3.6 Lamp brush chromosomes. (K1, K2)

**UNIT IV: Mitosis and Meiosis I and II. (12 hours)**

4.1 Overview of Cell cycle. (K1, K2)

4.2 Cell division- Mitosis. (K1, K2)

4.3 Meiosis I and II. (K1, K2)

4.4 Cytoplasmic matrix- compounds of matrix- inorganic compound-water. (K1, K2)

4.5 Organic compound- carbohydrates, lipids and proteins. (K1, K2)

4.6 Protein structure and synthesis. (K1, K2)

**UNIT V: Molecular organization of animal cell membrane. (12 hours)**

5.1 Cell biology- Overview on molecular organization of animal cell membrane. (K1, K2)

5.2 Membrane lipids,proteins and carbohydrates. (K1, K2)

5.3 The fluid mosaic model and artificial membranes. (K1, K2)

5.4 Mitochondrial membrane. (K1, K2)

5.5 Red cell membrane. (K1, K2)

5.6 Cell wall components and role of cell wall. (K1, K2)

**TEXT BOOKS:**

1. De Robertis E.D.P (2010). Cell and Molecular Biology.8<sup>th</sup> edition, Lippincott Williams, Philadelphia.
2. Powar.C.B (2006) .Cell biology. 1<sup>st</sup> edition ,Himalaya publishing house, New Delhi
3. Verma.P.S and Agarwal.V.K.(2005). Cell biology, Genetics, Molecular Biology, Evolution and Ecology.1<sup>st</sup> edition. S.Chand and company Ltd, Chennai.

**REFERENCE BOOKS:**

1. Gerald Karp (2013). Cell Biology. 7<sup>th</sup> edition, Wiley Blackwell publishers, United States.
2. Stephen R. Bolsover, Elizabeth A. Shephard, Hugh A. White, Jeremy S. Hyams (2011). Cell Biology: A Short course. 3<sup>rd</sup> edition, Wiley Blackwell publishers, United States.
3. John K.Young (2010).Introduction to Cell Biology.1<sup>st</sup> edition, World Scientific publishing company, Singapore.
4. George Plopper (2014). Principles of Cell Biology.2<sup>nd</sup> edition, John and Bartlett publishers, London.

**OER:**

1. [www.gutenberg.org](http://www.gutenberg.org)
2. [www.free-ebooks.net](http://www.free-ebooks.net)
3. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)

## SEMESTER V

### UEMBB20 - ELECTIVE I B: ENTREPRENEURIAL MICROBIOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: V	UEMBB20	Elective I B: Entrepreneurial Microbiology	Theory	Core Elective	4	4	100

**Course Objective:** To facilitate the students understanding on the concepts of entrepreneurship such as Planning, decision making, leadership, organizations and authority.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Explain the historical development of industrial microbiology and outline on the importance of entrepreneur development and risk assessment.

**CO2:** Analyze the microbial cells as fermented products.

**CO3:** Demonstrate the procedures involved in mushroom cultivation and its storage method.

**CO4:** Utilize various microorganisms as biofertilizers.

**CO5:** Design and use patent in the development of entrepreneurship.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	H
CO2	H	H	H	L	L	H
CO3	H	M	M	M	M	M
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	M	H
CO3	H	M	H	M	L	M
CO4	H	H	H	M	L	H
CO5	H	H	H	L	L	H

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

##### UNIT I: Entrepreneur Development.

(12 hours)

1.1 Entrepreneur development and activity. (K1,K2,K3,K4)

1.2 Institutes involved in Entrepreneurial development. (K1,K2,K3,K4)

1.3 Government contributions to Entrepreneurs. (K1,K2,K3,K4)

1.4 Risk assessment in Entrepreneurship. (K1,K2,K3,K4)

1.5 Industrial Microbiology- Definition and History. (K1,K2)

1.6 Scope of Industrial Microbiology. (K1,K2,K3)

**UNIT II: Microbial cells as fermented products. (12 hours)**

2.1 Microbial cells as fermentation products – Brewers and Baker’s yeast. (K1,K2,K3)

2.2 Food and feed yeasts. (K1,K2,K3)

2.3 Bacterial insecticides. (K1,K2,K3)

2.4 Legume inoculants - Algae. (K1,K2,K3)

2.5 Enzymes as fermentation products- bacterial and fungal amylases. (K1,K2,K3)

2.6 Enzymes as fermentation products - proteolytic enzymes. (K1,K2,K3)

**UNIT III: Mushroom cultivation. (12 hours)**

3.1 History of Mushroom cultivation in India. (K1,K2)

3.2 Common edible mushrooms cultivated in India. (K1,K2)

3.3 Preparation of compost and composting. (K1,K2,K3)

3.4 Spawn and spawning. (K1,K2,K3)

3.5 Methods used in Cultivation of *Agaricus bisporous* and *Agaricus campestris*. (K1,K2,K3)

3.6 Methods used in Cultivation *Volvariella volvaciae*. (K1,K2,K3)

**UNIT IV: Biofertilizers. (12 hours)**

4.1 Chemical fertilizers versus biofertilizers. (K1,K2)

4.2 Biofertilizer- Historical background. (K1,K2)

4.3 Organic farming. (K1,K2,K3)

4.4 Methods involved in the production of Bacterial biofertilizers. (K1,K2,K3)

4.5 Methods involved in the production of algal biofertilizers. (K1,K2,K3)

4.6 The importance of *Rhizobium* sp., *Azospirillum* sp., *Azotobacter* sp., as biofertilizers.  
(K1,K2)

**UNIT V: Patenting and Fermentation economics. (12 hours)**

5.1 Patent and secret process. (K1,K2)

5.2 History of patenting. (K1,K2)

5.3 Composition, subject matter for patenting. (K1,K2)

5.4 Characteristics of a patent, inventor, infringement, cost of patent. (K1,K2)

5.5 Patents in India and other countries. (K1,K2)

5.6 Fermentation economics. (K1,K2)

**TEXT BOOKS:**

1. Arora (2009). Entrepreneurial Development .1<sup>st</sup> edition, Himalaya Publishing House, New Delhi.
2. Arora R and Sood S.K (2010). Entrepreneurship Development. 1<sup>st</sup> edition, Kalyani Publishers, New Delhi.
3. Batra G.S and Dangal R.C (2000). Entrepreneurship and Small Scale Industries. 1<sup>st</sup> edition, Deep & Deep Publications, New Delhi

**REFERENCE BOOKS:**

1. Casida J.R (2005). Industrial Microbiology. 2<sup>nd</sup> edition, New Age International (P) Ltd., New Delhi.
2. SubbaRao NS (1997). Biofertilizer in Agriculture and Forestry, 3<sup>rd</sup> edition, Oxford & IBU Publications. New Delhi
3. Aneja K.R (2010). Experiments in Microbiology, Plant Pathology, Tissue Culture and Mushroom Production Technology, 6<sup>th</sup> edition, New age International Publication.
4. Anand Saxena (2005). Entrepreneurship Motivation, Performance, Reward. 1<sup>st</sup> edition, Deep & Deep Publication, New Delhi.
5. Anil Kumar S, Poornima S.C, Mini K and Jayashree K (2006). Entrepreneurship Development. 1<sup>st</sup> edition, New age international Publishers, New Delhi.
6. Batra G.S (2002). Development of entrepreneurship. 1<sup>st</sup> edition, Deep & Deep Publication, New Delhi.

**OER:****E- CONTENT FOR LEARNING:**

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

## SEMESTER VI

### UCMBJ20: MEDICAL VIROLOGY & PARASITOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM : VI	UCMBJ20	Medical Virology and Parasitology	Theory	Core	5	5	100

#### Course Objective:

To provide in depth knowledge on diseases caused by medically important, its epidemiology and control measures.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

CO1: Explain the properties, classification and cultivation of viruses.

CO2: Outline on the zoonotic and arthropod borne diseases.

CO3: Discuss about the oncogenic viruses and brief out on the importance of antiviral drugs and vaccines.

CO4: Describe the classification of parasites and demonstrate the laboratory diagnosis of parasitic diseases.

CO5: Compile the information on common parasites, protozoan and metazoan diseases.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	H
CO2	H	H	H	L	L	H
CO3	H	M	M	M	M	M
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	H	L	M
CO2	H	L	H	M	L	M
CO3	H	M	H	L	L	M
CO4	H	H	H	M	L	L
CO5	H	L	H	L	L	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

##### UNIT I: General properties of virus.

**(15 hours)**

1.1 General properties of virus. (K1,K2)

1.2 Detection of viruses and antigens in clinical specimens. (K1,K2,K3)

1.3 Serological diagnosis of virus infections. (K1,K2,K3)

1.4 Cultivation of viruses – egg inoculation and tissue culture. (K1,K2,K3)

1.5 Structure and properties of viroids. (K1,K2)

1.6 Prions. (K1,K2)

**UNIT II: Viral diseases - I.**

**(15 hours)**

2.1 Arthropod borne virus (Chickungunya virus, Dengue, Japanese Encephalitis, West Nile fever, Yellow fever). (K1,K2)

2.2 Rodent borne viral diseases (Lassa, Hanta and Ebola virus). (K1,K2)

2.3 Picorna viruses (Polio, Rhino Virus). (K1,K2)

2.4 Hepatitis viruses ( Type A, B and C), Rabies virus. (K1,K2)

2.5 Orthomyxo ( H1N1 Influenza) and Paramyxo viruses ( Measles, Mumps). (K1,K2)

2.6 SARS, MERS, SARS CoV2. (K1,K2)

**UNIT III: Viral diseases -II.**

**(15 hours)**

3.1 Pox viruses, Adeno viruses, Herpes Simplex virus. (K1,K2)

3.2 Reo virus, Rota virus. (K1,K2)

3.3 Human immunodeficiency virus. (K1,K2)

3.4 Oncogenic virus (Papilloma virus and Polyoma virus). (K1,K2)

3.5 Antiviral drugs and Interferon. (K1,K2)

3.6 Viral vaccines. (K1,K2)

**UNIT IV: Introduction to Medical parasitology and common protozoan diseases. (15 hours)**

4.1 Introduction to Medical Parasitology – Classification of parasites. (K1,K2)

4.2 Laboratory diagnosis of common parasitic diseases. (K1,K2)

4.3 Common protozoan diseases – Amoebiasis, Giardiasis. (K1,K2)

4.4 Trypanosomiasis. (K1,K2)

4.5 Malaria. (K1,K2)

4.6 Toxoplasmosis and Leishmaniasis. (K1,K2)

**UNIT V: Common metazoan diseases.**

**(15 hours)**

5.1 Morphology, Pathogenicity, clinical manifestation and Lab diagnosis of Ascariasis. (K1,K2, K3)

5.2 Hookworm. (K1,K2,K3)

5.3 Filariasis. (K1,K2,K3)

5.4 Hydatidosis. (K1,K2,K3)

5.5 Fasciolopsis. (K1,K2,K3)

5.6 Taenia infection.(K1,K2,K3)

**TEXT BOOKS:**

1. Jawetz, Melnick, & Adelberg (2013). Medical Microbiology. 26<sup>th</sup> edition, Mc Graw-Hill. New York.
2. Ananthanarayan R & Paniker C.K.J. (2013). Text Book of Microbiology, 9<sup>th</sup> edition, Universities Press, Hyderabad.
3. Subhash Chandra Parija (2013). Text book of Medical Parasitology. 4<sup>th</sup> edition, All India Publishers and Distributors (Medical Books Publishers), New Delhi.
4. Chatterjee K.D (2016). Parasitology, Protozoology& Helminthology. 13<sup>th</sup> edition. Joe media Publishers. Calcutta.

**REFERENCE BOOKS:**

1. Dimmok N.J and Primrose S.B (1994). Introduction to modern virology 4<sup>th</sup> edition, Blackwell scientific company publications, United States.
2. Saravanan P (2006). Virology. 1<sup>st</sup> edition, MJP Publishers, A Unit of Tamil Nadu Book House, Chennai.
3. Luria S.E, Darnell J.E, Baltimore D and Compare A (1978). General virology. 3<sup>rd</sup> edition, John Wiley and Sons, New York.
4. Jayaram Paniker C.K (2004). Text book of Medical Parasitology. 5<sup>th</sup> edition, Jaypee Brothers Publishers (P) Ltd., New Delhi.
5. Karyakarte R.P and Damle AS (2005). Medical Parasitology. Revised edition, Books and Allied (P) Ltd., Kolkata.

**OER:**

1. <http://www.gutenberg.org/>
2. <http://www.free-ebooks.net/>
3. <http://www.bookrix.com>
4. <http://www.e-booksdirectory.com/>
5. <http://bookboon.com/>
6. <http://www.freebooks.com/ebooks/>

## SEMESTER VI

### UCMBK18 - MICROBIAL ECOLOGY AND SOIL MICROBIOLOGY

Year 2020	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM : VI	UCMBK20	Microbial Ecology and Soil Microbiology	Theory	Core	5	5	100

#### Course Objective:

To facilitate students understanding on the microorganisms present in their environments and their habitat, microbial interaction, biogeochemical cycling and waste management.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Compare the role of microbial communities in the environment and discuss on the significance of Aero and Water Microbiology

**CO2:** Assess on the microbiological aspects of management of sewage and design the treatment procedures.

**CO3:** Outline on the importance of bioremediation and biodegradation of xenobiotic compounds.

**CO4:** Familiarize with microorganisms of soil and their role in biogeochemical cycle.

**CO5:** Comprehend the importance of plant- microbe interactions.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	M
CO2	H	H	H	L	L	M
CO3	H	M	M	H	M	M
CO4	H	M	H	H	M	M
CO5	H	M	H	M	M	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	H	L	M
CO2	H	L	H	M	L	M
CO3	H	M	H	L	L	M
CO4	H	H	H	M	L	L
CO5	H	L	H	L	L	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

##### UNIT I: Aero Microbiology and Water Microbiology.

(15 hours)

- 1.1 Microbes of air, Droplet, Droplet nuclei, aerosol. Assessment of air quality, solid- liquid impingement method. (K1,K2,K3,K4)
- 1.2 Brief account of air borne transmission of microbes and diseases. (K1,K2)
- 1.3 Microbiology of water – Types of water- potability of water (K1,K2)

- 1.4 Microbial assessment of water quality. (K1,K2,K3,K4)
- 1.5 Brief account on water borne diseases. (K1,K2)
- 1.6 Municipal water treatment method process. (K1,K2,K3,K4)

**UNIT II: Sewage treatment. (15 hours)**

- 2.1 Sewage– Chemical and Microbiological characteristic of sewage. (K1,K2)
- 2.2 Types of wastes - Characterization of solid and liquid waste (K1,K2)
- 2.3 Sewage treatment methods– Primary treatment. (K1,K2,K3)
- 2.4 Sewage treatment - Secondary, anaerobic – methanogenesis, aerobic – trickling filters , activated sludge, oxidation pond. (K1,K2,K3)
- 2.5 Tertiary treatment- sewage disinfection. (K1,K2,K3)
- 2.6 Utilization of solid and liquid wastes- saccharification – gasification – composting. (K1,K2,K3)

**UNIT III: Biodeterioration and remediation. (15 hours)**

- 3.1 Bioaugmentation, recalcitrants/xenobiotic compounds -Bioremediation, biodeterioration- Definition. (K1,K2)
- 3.2 Deterioration of paper. (K1,K2,K3)
- 3.3 Deterioration of leathers. (K1,K2,K3)
- 3.4 Deterioration of wood. (K1,K2,K3)
- 3.5 Deterioration of textiles /fabrics. (K1,K2,K3)
- 3.6 Metal corrosion – Biocorrosion. (K1,K2,K3)

**UNIT IV: Microbiology of soil. (15 hours)**

- 4.1 Microorganisms in soil – qualitative and quantitative microflora of different soils. (K1,K2,K3)
- 4.2 Role of microorganisms in soil fertility. Enumeration of microorganisms in soil. (K1,K2,K3)
- 4.3 Factors affecting soil microflora – moisture, pH, temperature, organic matter, agronomic practices. (K1,K2,K3)
- 4.4 Bio-Geo chemical cycles – Nitrogen cycle (K1,K2)
- 4.5 Phosphorus cycle and sulphur cycle. (K1,K2)
- 4.6 Carbon cycle and iron cycle. (K1,K2)

**UNIT V: Plant - Microbe interactions. (15 hours)**

- 5.1 Overview on Plant Microbe interactions. (K1,K2)
- 5.2 Inter relationships between plants and Microorganisms – Rhizosphere, Rhizoplane, Phyllosphere, Spherosphere – their importance in plant growth. (K1,K2)
- 5.3 Mycorrhiza – ecto and endo mycorrhiza – AM fungi – distribution and importance. (K1,K2, K3)
- 5.4 Lichens and their role. (K1,K2)

5.5 Symbiotic Nitrogen fixation - Root nodule bacteria. (K1,K2, K3)

5.6 Non- symbiotic nitrogen fixation (K1,K2,K3)

**TEXT BOOKS:**

1. Vijaya Ramesh K (2004). Environmental Microbiology. 1<sup>st</sup> edition, MJP publishers. Chennai
2. Joseph C. Daniel (1999). Environmental aspects of Microbiology. 1<sup>st</sup> edition, Bright Sun publications, Chennai.
3. Subba Rao N.S (2004). Soil Microbiology. 4<sup>th</sup> edition, Oxford and BH Publishing Co.Pvt. Ltd., New Delhi.

**REFERENCE BOOKS:**

1. Murugesan A.G and Rajakumari C (2005). Environmental Science and Biotechnology. 1<sup>st</sup> edition, MJP Publishers, Chennai.
2. Singh D.P and Dwivedi S.K (2005). Environmental Microbiology and Biotechnology. 1<sup>st</sup> edition, New Age International (P) Ltd., New Delhi.
3. Mishra RR (2004). Soil Microbiology. 1<sup>st</sup> edition, CBS Publishers and distributors, New Delhi.
4. Rangaswami G and Mahadevan A (2002). Disease of Crop Plants in India. 4<sup>th</sup> edition, PHI Learning (P) Ltd., New Delhi.
5. Atlas R.M. and Bartha R (1992). Microbial Ecology, Fundamental and Application, 3<sup>rd</sup> edition, Bengamin and Cummings. United States.

**OER:**

**E- CONTENT FOR LEARNING:**

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

## SEMESTER VI

### UEMBC20- ELECTIVE II A: MARINE MICROBIOLOGY

Year 2020	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: VI	UEMBC20	Elective II A: Marine Microbiology	Theory	Core Elective	4	4	100

#### Course Objective:

To facilitate students understanding on the ecological role of microorganisms in marine environment.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline about the different marine environment and compare the microbial communities in the aquatic environment.

**CO2:** Discuss adaptations strategies of various extremophilic microorganisms, extremozymes and their importance in biotechnology.

**CO3:** Identify the kinetics of aquatic microbial population and microbial interactions – symbiosis and antagonism.

**CO4:** Describe about the marine food borne and water borne pathogens.

**CO5:** Explain the production and biotechnological applications of novel marine microbial products.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	L	M
CO2	H	H	H	L	L	M
CO3	H	M	M	H	H	M
CO4	H	M	H	H	H	M
CO5	H	L	M	M	M	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	L
CO2	H	M	H	M	L	L
CO3	H	M	H	H	L	L
CO4	H	M	H	M	L	L
CO5	H	H	H	H	L	H

H – HIGH (3), M – MODERATE (2), L – LOW (1)

#### COURSE SYLLABUS

##### UNIT I: The marine environment.

(12 hours)

1.1 Marine environment - sea-benthic & littoral zone. (K1,K2)

1.2 Saltpan. (K1,K2)

1.3 Mangroves. (K1,K2)

- 1.4 Estuarine microbes. (K1,K2)
- 1.5 Microbial loop. (K1,K2)
- 1.6 Marine microbial community - planktons, bacteria, fungi, protozoa. (K1,K2)

**UNIT II: Extremophiles and their growth environment. (12 hours)**

- 2.1 Survival at extreme environments – starvation. (K1,K2)
- 2.2 Adaptive mechanisms in thermophilic, psychrophilic microorganisms. (K1,K2)
- 2.3 Alkalophilic microorganisms. (K1,K2)
- 2.4 Barophilic microorganisms and Osmophilic microorganisms. (K1,K2)
- 2.5 Hyperthermophiles microorganisms. (K1,K2)
- 2.6 Halophiles - importance in biotechnology. (K1,K2)

**UNIT III: Microbe- Microbe interactions. (12 hours)**

- 3.1 Microbe-microbe interactions – Lichens. (K1,K2)
- 3.2 Antagonistic interactions - amensalism, mycoparasitism. (K1,K2)
- 3.3 Animal-microbe interaction - Ectosymbiosis of Protozoa, Ruminant symbiosis. (K1,K2)
- 3.4 Plant-microbe interaction – *Rhizobium*. (K1,K2)
- 3.5 Plant-microbe interaction – *Mycorrhizae*. (K1,K2)
- 3.6 *Anabaena* - sponge. (K1,K2)

**UNIT IV: Marine pathogens. (12 hours)**

- 4.1 Marine food borne pathogens & Water borne pathogens – An overview. (K1,K2)
- 4.2 *Aeromonas*. (K1,K2)
- 4.3 *Vibrio*. (K1,K2)
- 4.4 *Salmonella*. (K1,K2)
- 4.5 *Pseudomonas*. (K1,K2)
- 4.6 *Leptospira*. (K1,K2)

**UNIT V: Marine microbial products. (12 hours)**

- 5.1 Production and applications of marine microbial products - pigments – Astaxanthin. (K1,K2)
- 5.2 Production and applications of marine microbial products -  $\beta$  carotene. (K1,K2)
- 5.3 Production and applications of marine microbial products – enzymes. (K1,K2)
- 5.4 Production and applications of marine microbial products – antibiotics. (K1,K2)
- 5.5 Production and applications of marine microbial products – polysaccharide. (K1,K2)
- 5.6 Sea food preservation methods. (K1,K2)

**TEXT BOOKS:**

1. Lansing M. Prescott, John P. Harley, Donald Klein (2011) .Microbiology. 8<sup>th</sup> edition. McGraw Hill Inc., New York.
2. Bhakuni D.S. and Rawat D.S. (2005). Bioactive marine natural products. 1<sup>st</sup> edition, Anamaya Publishers, New Delhi.
3. James W. Nybakker (2001). Marine Biology.1<sup>st</sup> edition, Benjamin Cumming Publications, United States.

**REFERENCE BOOKS:**

1. Raina M. Maier, Ian L. Pepper, Charles, P. Gerba (2006). Environmental Microbiology. 1<sup>st</sup> edition, Academic press, United States.
2. Shimshon Belkin and Rita R. Colwell (2005). Ocean and Health: Pathogens in the marine environment. 1<sup>st</sup> edition, Springer, United States.
3. Scheper T. (2005). Advances in Biochemical Engineering/Biotechnology-Marine Biotechnology I. 1<sup>st</sup> edition, Springer, United States.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## SEMESTER VI

### UEMBD20 - ELECTIVE II B: MICROBIAL NANOTECHNOLOGY

Year 2020	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: VI	UEMBD20	Elective II B: Microbial Nano Technology	Theory	Core Elective	4	4	100

#### Course Objective:

To facilitate students understanding on microbial nanotechnology and its applications.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline evolution of nanoscience and hurdles in the development of nanotechnology.

**CO2:** Understand the use spectroscopy for nanotechnology research.

**CO3:** Discuss the role of microscopy in nanotechnology research.

**CO4:** Utilize nano materials for drug development and its application in nuclear medicine.

**CO5:** Apply nanotechnology for air and water treatment and become familiar with nanoscience education in India and abroad.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	H
CO2	H	H	H	L	L	M
CO3	H	M	M	H	L	M
CO4	H	M	H	H	M	M
CO5	H	L	M	M	H	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	H
CO2	H	H	H	L	L	M
CO3	H	H	H	L	L	M
CO4	H	H	H	M	M	M
CO5	H	H	H	M	H	H

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

##### UNIT I: History and evolution of Nano Science.

(12 hours)

1.1 Definition – Evolution of Nano science. (K1,K2)

1.2 Need of Nano technology. (K1,K2)

1.3 Hurdles for Nanotechnology development. (K1,K2)

1.4 Factors affecting the manufacturing process of nano materials. (K1,K2)

1.5 Role of physicists, chemists, computer scientists, engineers in nanotechnology. (K1,K2)

1.6 Role of Medical doctors, biologists in nano technology. (K1,K2)

**UNIT II: Spectroscopy in nanotechnology research. (12 hours)**

- 2.1 Spectroscopy- An overview. (K1,K2)
- 2.2 Importance of spectroscopy in nano technology research. (K1,K2)
- 2.3 Mass spectroscopy. (K1,K2)
- 2.4 Infra-red spectroscopy. (K1,K2)
- 2.5 Raman spectroscopy. (K1,K2)
- 2.6 Ultra violet-visible spectroscopy. (K1,K2)

**UNIT III: Microscopy in nanotechnology research. (12 hours)**

- 3.1 Microscopy in nanotechnology research- An over view. (K1,K2)
- 3.2 Atomic force microscope. (K1,K2)
- 3.3 Scanning electron microscope. (K1,K2)
- 3.4 Transmission electron microscope. (K1,K2)
- 3.5 Magnetic resonance force microscopy. (K1,K2)
- 3.6 Nano probes for nucleic and hybridization detection. (K1,K2)

**UNIT IV: Nanotechnology for drug development and medical applications. (12 hours)**

- 4.1 Nanotechnology for drug development and medical applications. (K1,K2)
- 4.2 Nanotechnology for drug solubilization and drug delivery. (K1,K2)
- 4.3 Diagnosis using nanomaterials. (K1,K2)
- 4.4 Nanotherapy for cancer treatment. (K1,K2)
- 4.5 Nanotherapy for interior artery embolisms. (K1,K2)
- 4.6 Radioactive tubereene cages in Nuclear medicine. (K1,K2)

**UNIT V: Cleaning the air with nanotechnology. (12 hours)**

- 5.1 Cleaner environment with Nanotech. Cleaning the air with Nanotechnology. (K1,K2)
- 5.2 Nanotechnology for water treatment. (K1,K2)
- 5.3 Microbial nanoparticles used in cleaning air. (K1,K2)
- 5.4 Nanocarbon ball as deodorizer in fermentation process. (K1,K2)
- 5.5 Possible harm from Nanomaterials. (K1,K2)
- 5.6 Nanoscience in India – Nanoscience education abroad – ethics and society. (K1,K2)

**TEXT BOOKS:**

1. Richard Brooker and Earl Boysen (2006). Nanotechnology. 1<sup>st</sup> edition, Wiley Publishing Inc., India.
2. Bernd H.A.Rehm (2006). Microbial Bionanotechnology: Biological self-assembly systems and Biopolymer Based Nanostructures. 1<sup>st</sup> edition, Horizon Bio Science.UK.
3. Nicola Cioffi and Mahendra Rai (2012). Nano - Antimicrobials.1<sup>st</sup> edition, Springer. United States.

**REFERENCE BOOKS:**

1. Duckruix, A. and R. Giege (1992). Crystallization of Nucleic acids and Proteins. A practical approach, 1<sup>st</sup> edition, Oxford University Press, England.
2. Vadlapudi Varahalarao and Nayak B.K (2017). Microbial Nanotechnology: Mycofabrication of Nano particles and their Novel Applications.1<sup>st</sup> edition.IGI global publishers. India.
3. Nicola Cioffi and Mahendra Rai (2012). Nano - Antimicrobials.1<sup>st</sup> edition, Springer. United States
4. Anton Ficai and Alexandru Grumaezescu.(2017) .Nanostructures for Antimicrobial Therapy. 1<sup>st</sup> edition, Elsevier. Netherlands.

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2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## SEMESTER VI

### UEMBE20: ELECTIVE III A: CYANOBACTERIOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: VI	UEMBE20	Elective III A: Cyanobacteriology	Theory	Core Elective	4	4	100

#### Course Objective:

To provide an understanding on the structure, genomics, molecular regulation and applications of Cyanobacteria.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the diversity of cyanobacteria.

**CO2:** Discuss on the genomics of Cyanobacteria.

**CO3:** Explain the molecular biology of Cyanobacteria.

**CO4:** Describe the molecular regulation in Cyanobacteria.

**CO5:** Demonstrate the mass cultivation and applications of Cyanobacteria.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	H
CO2	H	H	H	L	L	M
CO3	H	M	M	H	L	M
CO4	H	M	H	H	M	M
CO5	H	H	M	M	H	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	H
CO2	H	M	H	M	L	H
CO3	H	M	H	M	L	M
CO4	H	M	H	M	L	M
CO5	H	H	H	H	H	H

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

##### UNIT-I: Introduction to cyanobacteria.

(12 hours)

- 1.1 Overview on cyanobacteriology. (K1,K2)
- 1.2 Introduction: Origins of life. (K1,K2)
- 1.3 Photosynthesis in cyanobacteria. (K1,K2)
- 1.4 Diversity of cyanobacteria. (K1,K2)
- 1.5 Fossil history of cyanobacteria. (K1,K2)
- 1.6 The Oceanic Cyanobacterial Picoplankton. (K1,K2)

##### UNIT-II: Genomics of Cyanobacteria.

(12 hours)

- 2.1 Gene transfer in cyanobacteria in nature. (K1,K2)
- 2.2 Gene transfer to cyanobacteria in lab. (K1,K2,K3)

- 2.3 Molecular ecology of Cyanobacteria. (K1,K2)
- 2.4 Environmental genomics of cyanobacteria. (K1,K2)
- 2.5 Comparative genomics of marine cyanobacteria. (K1,K2)
- 2.6 Stress response-regulatory system and regulated genes. (K1,K2)

**UNIT-III: Molecular Biology of Cyanobacteria. (12 hours)**

- 3.1 Molecular Biology of Cyanelles and Chloroplast Origins and Evolution. (K1,K2)
- 3.2 Supramolecular Membrane Organization. (K1,K2)
- 3.3 Phycobilisome and Phycobiliprotein Structures. (K1,K2)
- 3.4 The Use of Cyanobacteria in the Study of the Structure and Function of Photosystem II. (K1,K2)
- 3.5 The Cytochrome Complex. (K1,K2)
- 3.6 Photosystem I in Cyanobacteria. (K1,K2)

**UNIT-IV: Biochemistry and molecular regulation in cyanobacteria. (12 hours)**

- 4.1 The Biochemistry of cyanobacteria. (K1,K2)
- 4.2 Molecular Regulation of Carbon Dioxide Metabolism in Cyanobacteria. (K1,K2)
- 4.3 Genetic Analysis of Cyanobacteria. (K1,K2)
- 4.4 Heterocyst development. (K1,K2)
- 4.5 Heterocyst Metabolism. (K1,K2)
- 4.6 Differentiation of Hormogonia. (K1,K2)

**UNIT-V: Applications of Cyanobacteria. (12 hours)**

- 5.1 Mass cultivation of cyanobacteria under outdoor and indoor conditions. (K1,K2)
- 5.2 Cyanobacteria as a source of fine chemicals: polysaccharides and bioactive molecules. (K1,K2,K3)
- 5.3 Cyanobacteria as a source of pigments and antioxidants. (K1,K2,K3)
- 5.4 Cyanobacteria as a source of lipids and polyunsaturated fatty acids. (K1,K2,K3)
- 5.5 Cyanobacteria as biofertilizer for paddy cultivation. (K1,K2,K3)
- 5.6 Hydrogen production by cyanobacteria: Mechanism, progress and prospects. (K1,K2)

**TEXT BOOKS:**

1. Samit Ray. (2006). Cyanobacteria. 1<sup>st</sup> edition. New Age International Pvt Ltd Publishers.
2. Percy M. Gault and Harris J. Marler. (2009) .Handbook on Cyanobacteria: Biochemistry, Biotechnology and Applications (Bacteriology Research Developments), Nova Science publishers, Inc.

**REFERENCE BOOKS:**

1. Antonia Herrero and Enrique Flores. (2008). The Cyanobacteria: Molecular Biology, Genomics and Evolution, Caister academic press.
2. T. A. Sarma. (2012) Handbook of Cyanobacteria, CRC press.

3. D.A. Bryant. (1995). The Molecular Biology of Cyanobacteria (Advances in Photosynthesis and Respiration) Springer.

**OER:**

**DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## SEMESTER VI

### UEMBF20 - ELECTIVE III B - ADVANCED MICROBIOLOGY

Year 2020	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: VI	UEMBF20	Elective III B: Advanced Microbiology	Theory	Core Elective	4	4	100

#### Course Objective:

To provide the learners an overview on the advanced aspects of Microbiology

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Utilize microorganisms in the preparation of cosmetics.

**CO2:** Evaluate the biological potential in samples return from satellites and solar system.

**CO3:** Discuss the role of antimicrobial fabrics, carpets, tiles, colourants and produce bacteriostatic sanitary napkins and towels.

**CO4:** Comprehend on paper, rubber and plastic Microbiology

**CO5:** Analyze the methods for producing its antimicrobial products.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	H
CO2	H	H	M	L	L	M
CO3	H	M	L	H	M	H
CO4	H	M	L	H	M	H
CO5	H	H	M	M	H	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	H	H
CO2	H	H	H	M	L	L
CO3	H	H	H	L	M	H
CO4	H	M	H	L	M	H
CO5	H	H	H	L	H	H

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

##### UNIT-I: Cosmetic Microbiology.

(12 hours)

1.1 Definition; Preparations of Skin whitening compositions from microbes like Ascomycetes and Black yeast. (K1,K2, K3)

1.2 Preparations of Skin whitening compositions- enzymes. (K1,K2, K3)

1.3 Preparations of Skin whitening compositions- Mineral yeast ferments. (K1,K2,K3)

1.4 Microbial Production of Alpha Arbutin. (K1,K2,K3)

1.5 Microbial production of Hyaluronic acid. (K1,K2,K3)

1.6 Kojic acid and their use in Cosmetics preparations. (K1,K2)

**UNIT–II: Space Microbiology. (12 hours)**

2.1 Introduction to Space Microbiology. (K1,K2)

2.2 Monitoring of astronauts microbial flora. (K1,K2,K3)

2.3 Alterations in the load of medically important microorganisms. (K1,K2)

2.4 ESA STONE experiment. (K1,K2,K3,K4)

2.5 Evaluating the Biological Potential in Samples Returned from Planetary Satellites. (K1,K2, K3,K4)

2.6 Evaluating the Biological Potential of Small Solar System Bodies. (K1,K2,K3,K4)

**UNIT–III: Textile Microbiology. (12 hours)**

3.1 Introduction to Textile Microbiology. (K1,K2)

3.2 Antimicrobial fabrics. (K1,K2)

3.3 Antimicrobial garments. (K1,K2)

3.4 Antimicrobial carpets. (K1,K2)

3.5 Antimicrobial colorants. (K1,K2)

3.6 Bacteriostatic sanitary napkins and towels. (K1,K2,K3)

**UNIT–IV: Paper and Rubber Microbiology. (12 hours)**

4.1 Paper Microbiology- Introduction & Definition. (K1,K2)

4.2 Antimicrobial papers and its production. (K1,K2)

4.3 Antimicrobial currency. (K1,K2)

4.4 Rubber Microbiology – Introduction & Definition. (K1,K2)

4.5 Note on Antimicrobial rubbers. (K1,K2)

4.6 Antimicrobial rubber compositions. (K1,K2)

**UNIT–V: Plastic Microbiology. (12 hours)**

5.1 Definition- Bacteriostatic plastics. (K1,K2)

5.2 Antimicrobial plastic composition and production. (K1,K2)

5.3 Antiseptic plastics. Fungistatic plastics: Definition and production. (K1,K2)

5.4 Production of plastics materials from microorganisms. (K1,K2,K3)

5.5 Methods for producing anti-microbial plastic product. (K1,K2,K3,K4)

5.6 Plastic article containing a metallic bactericidal agent. Casein plastic. (K1,K2,K3)

**TEXT BOOKS:**

1. Vimaladevi M (2015) Text book of Herbal Cosmetics.1<sup>st</sup> edition, CBS Publishers and Distributors, New Delhi.
2. Alfonso F Davila (2010). Astromicrobiology.1<sup>st</sup> edition, John Wiley & Sons, Inc. New Delhi.
3. Srikanth Pilla (2011). Handbook of Bioplastics and Biocomposites Engineering and Applications.1<sup>st</sup> edition, John Wiley and Sons Inc., New Delhi.
4. Nierstrasz V and Cavaco Paulo A (2010). Advances in Textile Biotechnology. 1<sup>st</sup> edition, Elsevier, London.

**REFERENCE BOOKS:**

1. Philip A. Geis (2006) Cosmetic Microbiology: A Practical Approach. 2<sup>nd</sup> edition, CRC Press, Taylor and Francis Group, New York, London.
2. David M. Klaus (2003). Space Microbiology: Microgravity and Microorganisms. 1<sup>st</sup> edition, John Wiley & Sons, Inc. New Delhi
3. Ashish Kumar Sen (2007). Coated Textiles: Principles and Applications. 2<sup>nd</sup> edition, CRC Press, New Delhi
4. Tappi (2007). Monograph on Microbiology of Papermaking systems. Tappi publishers, New York.
5. Roberts A.D (1988). Natural Rubber Science and Technology. 1<sup>st</sup> edition, Oxford University Press. UK.
6. Chen, George Guo- Qiang (2010). Plastics from Bacteria: Natural Functions and Applications. 1<sup>st</sup> edition, Springer, United States.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## SEMESTER VI

### UCMBL20- CORE PRACTICAL III: MEDICAL MICROBIOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM : VI	UCMBL20	Medical Microbiology	Practical	Core	3	4	100

#### Course Objective:

To provide hands on training on laboratory skills in the field of Diagnostic Microbiology.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Demonstrate collection, transport and processing of clinical specimens.

**CO2:** Perform staining techniques for the identification of bacteria.

**CO3:** Isolate and identify the bacterial pathogens from various clinical specimens.

**CO4:** Prepare culture media for the cultivation of microorganisms.

**CO5:** Analyze the clinical specimens for the examination of pathogenic fungi and parasites.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	H
CO2	H	H	H	L	L	M
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	M	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	L	L	H
CO4	H	H	H	M	L	H
CO5	H	H	H	M	L	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

#### COURSE SYLLABUS

1. General requirements of collections transport of clinical specimens – Direct examinations – Staining of specimens – Methods of enriched, Selective and enrichment culture techniques used to isolate organisms from clinical materials.
2. Simple, differential and special staining of clinical materials ie., Throat Swab, vaginal Swab, pus, urine, sputum, stool etc.,
3. Quantitative urine analysis.

4. Isolation and identification of bacterial pathogens from clinical specimens their biochemical reactions- catalase, oxidase, coagulase, IMViC, TSI, urease and MMTP.
5. Antimicrobial Sensitivity testing and determination of MIC and quality control.
6. Wet mount examinations of stool for parasites (saline and iodine).
7. KOH and LPCB preparation for skin and nail scrapings, for fungi.
8. Estimation of worm burden in stool. Floatation and sedimentation techniques of stool examination.
9. Germ tube test, Assimilation, fermentation tests for yeasts.
10. Identification of pathogenic microbes including viruses in slides \ smears \ Specimens as Spotters.

#### **REFERENCE BOOKS:**

1. Collee J.G, Fraser A.G, Marmion B.P, Simmons A (2007). Mackie and McCartney Practical Medical Microbiology, 14th edition, Elsevier publishers, London.
2. Tille P. Bailey and Scott (2013). Diagnostic Microbiology, 13<sup>th</sup> edition, Mosby Publishers, United States.
3. James G Cappuccino and Natalie Sherman (2004). Microbiology: A laboratory manual. 6<sup>th</sup> edition, Published by Pearson Education, United States.
4. Monica Cheesbrough. (2005) District Laboratory Practice in Tropical Countries - Part I and II. 2<sup>nd</sup> edition, Cambridge University Press, New Delhi.

#### **OER:**

#### **VIRTUAL LABS/ INTERACTIVE SIMULATIONS:**

1. [www.vlab.co.in](http://www.vlab.co.in)
2. [www.aview.in/aview](http://www.aview.in/aview)
3. [www.pbs.org](http://www.pbs.org)
4. [www.micro.magnet.fsu.edu/primer/java/scienceopticsu](http://www.micro.magnet.fsu.edu/primer/java/scienceopticsu)

**SEMESTER VI**  
**UCMBM20 - CORE PRACTICAL IV: ECOLOGY, FOOD AND DAIRY**  
**MICROBIOLOGY**

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM : VI	UCMBM20	Ecology, food and Dairy Microbiology	Practical	Core	3	4	100

**Course Objective:**

To provide hand on experience on isolation and characterization of microbes from different food sources, agricultural and environmental samples.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Assess the microbiological quality of raw milk by MBRT and Standard Plate Count test.

**CO2:** Identify and enumerate bacteria and fungi from the spoiled foods and Rhizosphere soil.

**CO3:** Apply the technique for the isolation of yeast from food sources.

**CO4:** Analyze the potability of water by MPN test.

**CO5:** Perform the microbial test to detect soil fertility and isolate, cultivate Rhizobium from root nodule.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	L	L	H
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	H
CO5	H	H	H	H	M	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	H
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	H
CO5	H	H	H	H	M	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

**COURSE SYLLABUS**

1. Isolation of microorganisms from air by Settle plate technique.
2. Isolation and counting of faecal bacteria from water.
3. Water analysis by MPN technique
  - i. Presumptive coli form test

- ii. Confirmed coli form test
  - iii. Completed coli form test.
4. Enumeration of number of bacteria in milk by Standard plate count method.
  5. Methylene blue reductase test to assess the quality of milk.
  6. Isolation of Lactobacilli and Staphylococcus from curd.
  7. Examination of common house hold mold – LPCB wet mount.
  8. Isolation of bacteria and fungi from Spoiled food.
  9. Isolation of yeast from food sources – Grapes and Sugarcane juice.
  10. Isolation & Enumeration of bacteria and fungi from Rhizosphere soil.
  11. Microbial test for Soil fertility – Phosphate Solubilization and Nitrate reduction test.
  12. Isolation of *Rhizobium* from root nodule.

#### **REFERENCE BOOKS:**

1. Dubey R.C and Maheswari D.K (2004). Practical Microbiology 1<sup>st</sup> edition, S.Chand & Company Ltd., New Delhi.
2. Kannan N (2003). Handbook of Laboratory Culture Media, Reagents, Stains and Buffers. Panima Publishing Corporation, New Delhi.
3. James G Cappuccino and Natalie Sherman (2004). Microbiology: A laboratory manual. 6<sup>th</sup> edition, Published by Pearson Education, United States.
4. Monica Cheesbrough (2005) District Laboratory Practice in Tropical Countries - Part I and II. 2<sup>nd</sup> edition, Cambridge University Press, New Delhi.

#### **OER:**

#### **VIRTUAL LABS/ INTERACTIVE SIMULATIONS:**

1. [www.vlab.co.in](http://www.vlab.co.in)
2. [www.aview.in/aview](http://www.aview.in/aview)
3. [www.pbs.org](http://www.pbs.org)
4. [www.micro.magnet.fsu.edu/primer/java/scienceopticsu](http://www.micro.magnet.fsu.edu/primer/java/scienceopticsu)

**SKILL BASED ELECTIVE**  
**(B.SC MICROBIOLOGY- SEMESTER III & IV)**  
**USMBA20 – SKILL BASED ELECTIVE: MUSHROOM TECHNOLOGY**

Year II	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
<b>SEM: III</b>	USMBA20	Mushroom Technology	Theory	Skill Based Elective	2	2	100

**Course Objective:**

The course will provide adequate hands on experience in handling and cultivation of edible mushrooms. The subject content is designed to develop an entrepreneur.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Communicate information about scope and importance of mushrooms.

**CO2:** Formulate media used for cultivation of mushroom and select the appropriate methods for spawn production.

**CO3:** Demonstrate mushroom cultivation technology and its preservation

**CO4:** Compile in detail about edible and poisonous mushrooms.

**CO5:** Utilize the nutritional and medicinal values of mushrooms.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	M	H	M	M	H
<b>CO2</b>	H	M	H	H	M	H
<b>CO3</b>	H	H	H	H	L	H
<b>CO4</b>	H	M	M	M	L	H
<b>CO5</b>	H	M	H	M	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	M	H	M	M	H
<b>CO2</b>	H	M	H	H	M	H
<b>CO3</b>	H	H	H	H	L	H
<b>CO4</b>	H	M	M	M	L	H
<b>CO5</b>	H	M	H	M	M	H

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

**COURSE SYLLABUS**

**UNIT I: History and scope of mushroom cultivation. (6 hours)**

- 1.1 Introduction to mushroom cultivation. (K1,K2)
- 1.2 History to mushroom cultivation. (K1,K2)
- 1.3 Scope and importance of mushroom cultivation. (K1,K2)
- 1.4 Present status of mushroom industry in India. (K1,K2)
- 1.5 Mushroom research and development. (K1,K2)

1.6 National and international agencies. (K1,K2)

**UNIT II: Pure culture for spawn production. (6 hours)**

2.1 Pure Culture- Media- Preparation. (K1,K2,K3)

2.2 Maintenance of mother culture in test tube slants -Petri plates - saline bottle - poly propylene bags. (K1,K2,K3)

2.3 Spawn production- spawning. (K1,K2,K3)

2.4 Types of spawning. (K1,K2,K3)

2.5 Compost and composting. (K1,K2,K3)

2.6 Storage and transportation. (K1,K2,K3)

**UNIT III: Cultivation technology. (6 hours)**

3.1 Cultivation Technology - Infrastructure - culture rack. (K1,K2,K3)

3.2 Thatched house. (K1,K2,K3)

3.3 Substrates – vessels. (K1,K2,K3)

3.4 Inoculation methods. (K1,K2,K3)

3.5 Mushroom bed preparation. (K1,K2,K3)

3.6 Preservation technology- long term storage - short term storage. (K1,K2,K3)

**UNIT IV: Edible mushrooms cultivated in India. (6 hours)**

4.1 Types and importance of edible mushroom cultivated in India. (K1,K2)

4.2 *Agaricus bisporus*. (K1,K2,K3)

4.3 *Pleurotus* sps. (K1,K2,K3)

4.5 *Volvariella volvacea* (K1,K2,K3)

4.6 *Calocybe indica*. (K1,K2,K3)

4.7 Mushroom contamination.(K1,K2)

**UNIT V: Nutritional and Medicinal Value of mushroom. (6 hours)**

5.1 Nutritional value of mushrooms. (K1,K2)

5.2 Medicinal values of Mushroom. (K1,K2)

5.3 Preparation of low calorie foods – the mushroom recipes. (K1,K2, K3)

5.4 Marketing values of mushrooms in India. (K1,K2)

5.5 Export value of mushrooms. (K1,K2)

5.6 Poisonous Mushrooms. (K1,K2)

**TEXT BOOKS:**

1. Shu-Ting Chang, Philip G.Miles, Chang S. T (2004).Mushrooms: Cultivation, nutritional value, medicinal effect and environmental impact, 2<sup>nd</sup> edition, CRC press. United States.
2. Suman B.C and Sharma V.P (2005) Mushroom Cultivation, Processing and Uses. 1<sup>st</sup> edition, Agribios (India) Publishers, Jodhpur.

**REFERENCE BOOKS:**

1. Paul Stamets J.S and Chilton J. S. (2004.) Mushroom Cultivation: A practical guide to growing mushroom. Agarikon Press, Sathome.
2. Dubey R.C and Maheswari D.K (2012). A Text of Microbiology. Revised edition, S. Chand and Company Ltd., New Delhi.
3. Marimuthu, *et al.*, (1991). Oyster Mushroom. Department of Plant Pathology, TNAU, Coimbatore.
4. Tewari and Pankaj Kapoor S.C (1988). Mushroom Cultivation. 1<sup>st</sup> edition, Mittal Publication, Delhi.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## SKILL BASED ELECTIVE

(B.Sc Microbiology - Semester IV)

### USMBB20 – SKILL BASED ELECTIVE: BIOINSTRUMENTATION

Year II	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM : IV	USMBB20	Bioinstrumentation	Theory	Skill Based Elective	2	2	100

#### Course Objective:

To provide an in depth knowledge on handling various laboratory instruments with a keen idea about its principle of working.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the working principles of various laboratory equipment.

**CO2:** Demonstrate various types of centrifugation.

**CO3:** Discuss on the different techniques of gel electrophoresis and comprehend the methods of blotting

**CO4:** Compile the techniques of chromatography.

**CO5:** Explain principle and usage of various spectrophotometres.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	L	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	L	L	M
CO4	H	H	H	L	L	M
CO5	H	H	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	L	L	M
CO4	H	H	H	L	L	M
CO5	H	H	H	L	L	M

H – HIGH (3), M – MODERATE (2), L – LOW (1)

#### COURSE SYLLABUS

##### UNIT I: Basic science equipments and its uses.

(6 hours)

1.1 Buffers, molar and normal solutions. (K1,K2)

1.2 pH meter, pH electrodes - calomel and glass electrodes. (K1, K2)

1.3 Hot Air oven, Autoclave. (K1, K2, K3)

1.4 Incubator. (K1, K2, K3)

1.5 Water bath shaker. (K1, K2, K3)

1.6 Laminar air flow- its application and uses. (K1, K2, K3)

**UNIT II: Centrifuge and its application.**

**(6 hours)**

1.1 Centrifugation- Definition- Principle. (K1, K2, K3)

1.2 Types of centrifuges - low speed and high speed. (K1, K2, K3)

1.3 Ultra centrifuge. (K1, K2, K3)

1.4 Differential centrifugation. (K1, K2, K3)

1.5 Density gradient centrifugation. (K1, K2, K3)

1.6 Applications of centrifuge. (K1, K2, K3)

**UNIT III: Electrophoresis.**

**(6 hours)**

3.1 Electrophoresis - SDS – PAGE. (K1, K2, K3)

3.2 Agarose gel electrophoresis. (K1, K2, K3)

3.3 Southern blotting. (K1, K2, K3)

3.4 Northern blotting. (K1, K2, K3)

3.5 Western blotting. (K1, K2, K3)

3.6 DOT blotting. (K1, K2, K3)

**UNIT IV: Chromatographic techniques.**

**(6 hours)**

4.1 Chromatography – paper. (K1, K2, K3)

4.2 Thin layer chromatography. (K1, K2, K3)

4.3 Column chromatography. (K1, K2, K3)

4.4 Ion exchange chromatography. (K1, K2, K3)

4.5 Gas chromatography. (K1, K2, K3)

4.6 HPLC- its application and uses. (K1, K2, K3)

**UNIT V: Spectrophotometry.**

**(6 hours)**

5.1 Colorimetry, (K1, K2, K3)

5.2 Spectrometry – Principle of work. (K1, K2, K3)

5.3 Types- UV and visible spectrophotometer. (K1, K2, K3)

5.4 Flame photometry. (K1, K2, K3)

5.5 FACS. (K1, K2, K3)

5.6 Biosensors – its application and uses. (K1, K2, K3)

**TEXT BOOKS:**

1. Bajpai P.K (2010). Biological Instrumentation and Methodology. Revised edition, S.Chand & Co.Ltd., New Delhi.
2. John G Webster (2004). Bioinstrumentation. Student edition. John Wiley and Sons, Ltd., New Delhi.

**REFERENCE BOOKS:**

1. Palanivelu P (2004). Analytical Biochemistry and Separation techniques. 3<sup>rd</sup> edition, MKU Coop, Press Ltd., Palkalai Nagar, Madurai.
2. Gurumani N (2006). Research Methodology for Biological Sciences. 1<sup>st</sup> edition, MJP Publishers, A Unit of Tamil Nadu Book House, Chennai.
3. Subramanian M.A (2005). Biophysics - Principles and Techniques. 1<sup>st</sup> edition, MJP Publishers, A Unit of Tamil Nadu Book House, Chennai.
4. Ravishankar S (2001). A Text Book of Pharmaceutical Analysis. 3<sup>rd</sup> edition. Rx Publications, Tirunelveli.

**OER:****WEB RESOURCES:**

## E-books

1. [www.gutenberg.org](http://www.gutenberg.org)
2. [www.free-ebooks.net](http://www.free-ebooks.net)
3. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)

## Video lessons

1. [www.learnerstv.com](http://www.learnerstv.com)
2. [www.webcast.berkeley.edu](http://www.webcast.berkeley.edu)
3. [www.cosmolearning.org](http://www.cosmolearning.org)

**SKILL BASED ELECTIVE**  
**(B.Sc Microbiology- Semester V & VI )**

**USMBC20 – SKILL BASED ELECTIVE: DIAGNOSTIC MICROBIOLOGY**

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
<b>SEM: V &amp; VI</b>	USMBC20	Diagnostic Microbiology	Theory	Skill Based Elective	2	2	100

**Course Objective:**

To provide the learners an overview on clinical Microbiology, laboratory organization and various diagnostic approaches from traditional to molecular methods.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

- CO1:** Explain general safety regulations and guidelines of microbiology laboratory.  
**CO2:** Apply procedures in the collection and transport of clinical specimens.  
**CO3:** Examine and identify the pathogenic microorganisms from clinical specimens.  
**CO4:** Perform serological and molecular methods for the diagnosis of diseases.  
**CO5:** Determine the sensitivity and resistance pattern of bacterial pathogens to various antibiotics.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	L	H	H
<b>CO2</b>	H	H	H	L	M	M
<b>CO3</b>	H	H	H	L	M	M
<b>CO4</b>	H	H	H	L	M	M
<b>CO5</b>	H	H	H	L	M	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	L	H	H
<b>CO2</b>	H	H	H	L	M	M
<b>CO3</b>	H	H	H	L	M	M
<b>CO4</b>	H	H	H	L	M	M
<b>CO5</b>	H	H	H	L	M	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

## **COURSE SYLLABUS**

### **UNIT I: Philosophy of Diagnostic Microbiology. (5 hours)**

- 1.1 Purpose and philosophy of Diagnostic Microbiology. (K1,K2)
- 1.2 Organization of clinical microbiology laboratory. (K1,K2)
- 1.3 Responsibility of clinical microbiology laboratory. (K1,K2)
- 1.4 Laboratory safety: General safety considerations – biohazards. (K1,K2)
- 1.5 Practices specific to Microbiology. (K1,K2)
- 1.6 Classification of biological agents on the basis of hazards. (K1,K2)

### **UNIT II: Collection of clinical specimens. (5 hours)**

- 2.1 Collection of bacterial, viral, fungal and protozoan diseases associated clinical specimens- An overview.(K2,K3,K4)
- 2.2 Oral cavity and throat swab. .(K2,K3,K4)
- 2.3 Skin Scrapping. .(K2,K3,K4)
- 2.4 Blood. .(K2,K3,K4)
- 2.5 CSF.(K2,K3,K4)
- 2.6 Urine and faeces. (K2,K3,K4)

### **UNIT III: Examination and processing of clinical samples. (5 hours)**

- 3.1 Examination of clinical sample by staining - Gram stain. (K2,K3,K4)
- 3.2 Ziehl – Neelson staining for tuberculosis. (K2,K3,K4)
- 3.3 Giemsa stained thin blood film for malaria. (K2,K3,K4)
- 3.4 LPCB for fungal identification (K2,K3,K4)
- 3.5 Culture based techniques- processing of various clinical specimens. (K2,K3,K4)
- 3.6 Culture for the growth of fungi. (K2,K3,K4)

### **UNIT IV: Serological and Molecular diagnosis. (9 hours)**

- 4.1 Serological Methods – Agglutination based methods: WIDAL. (K2,K3,K4)
- 4.2 Automated methods: ELISA. (K2,K3,K4)
- 4.3 Immunodiffusion. (K2,K3,K4)
- 4.4 Immunoelectrophoresis. (K2,K3,K4)
- 4.5 Western blotting. (K2,K3,K4)
- 4.6 Nucleic acid based methods - PCR. (K2,K3,K4)

### **UNIT V: Antimicrobial sensitivity. (6 hours)**

- 5.1 Importance and determination of resistance/sensitivity of bacterial pathogens using disc diffusion method. (K2,K3,K4)
- 5.2 Determination of minimal inhibitory concentration (MIC) of an antibiotic by serial double dilution method and E test – importance of MIC determination. (K2,K3,K4)
- 5.3 Antimycotic susceptibility testing –reporting and resulting. (K2,K3,K4)
- 5.4 Computerization. (K1,K2,K3)
- 5.5 Quality assurance. (K1,K2,K3)
- 5.6 Safe disposal of specimens and biohazards. (K1,K2,K3)

**TEXT BOOKS:**

1. Tille P. (2013). Bailey's and Scott's Diagnostic Microbiology, 13<sup>th</sup> edition, Mosby publishers, United States.
2. Collee J.G, Fraser, A.G, Marmion B.P and Simmons A (2007). Mackie and McCartney Practical Medical Microbiology, 14<sup>th</sup> edition, Elsevier publishers. London.

**REFERENCE BOOKS:**

1. Ananthanarayan R and Paniker C.K.J (2009). Textbook of Microbiology, 8<sup>th</sup> edition, Universities Press Private Ltd. Hyderabad.
2. Brooks G.F, Carroll K.C, Butel J .S, Morse S.A and Mietzner T. A (2013). Jawetz, Melnick and Adelberg's Medical Microbiology. 26<sup>th</sup> edition. McGraw Hill Publication.
3. Betty A Forbes, Daniel F Sahn and Alice S Weissfeld (2007). Bailey and Scott's Diagnostic Microbiology, 12<sup>th</sup> edition, Mosby publishers, United States.
4. Monica Cheesbrough (2003). District Laboratory Practice in Tropical Countries - Part I and II. 2<sup>nd</sup> edition, Cambridge University Press, New Delhi.

**OER:****E-BOOKS:**

1. <http://www.gutenberg.org/>
2. <http://www.free-ebooks.net/>
3. <http://www.bookrix.com>
4. <http://www.e-booksdirectory.com/>
5. <http://bookboon.com/>
6. <http://www.freebooks.com/ebooks/>

**USMBD20 – SKILL BASED ELECTIVE: NUTRACEUTICALS AND FUNCTIONAL FOODS**

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
<b>SEM:</b> V & VI	USMBD20	Nutraceuticals and functional foods	Theory	Skill Based Elective	2	2	100

**Course Objective:** To familiarize students on the basic nutraceutical constituents of different foods and its role in health benefits.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Explain the historical perspective, classification, scope and future prospects of nutraceuticals.

**CO2:** Discuss the nutraceuticals constituents present in various food products and the role of probiotics and prebiotics as nutraceuticals.

**CO3:** Analyze food as remedies for the common disorders.

**CO4:** Outline genetically modified plants which are commercially available and their applications.

**CO5:** Communicate the pharmaceutical applications of genetically engineered plants.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	L	L	H
<b>CO2</b>	H	H	H	H	L	H
<b>CO3</b>	H	H	H	L	M	M
<b>CO4</b>	H	M	H	M	M	M
<b>CO5</b>	H	M	H	M	M	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	L	L	H
<b>CO2</b>	H	H	H	H	L	H
<b>CO3</b>	H	H	H	L	M	M
<b>CO4</b>	H	M	H	M	M	M
<b>CO5</b>	H	M	H	M	M	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

## **COURSE SYLLABUS**

### **UNIT I: Basics of nutraceuticals. (6 hours)**

- 1.1 Introduction to nutraceuticals – The link between nutrition and medicine. (K1,K2)
- 1.2 Historical perspective. (K1,K2)
- 1.3 Sources of nutraceuticals. (K1,K2)
- 1.4 Classification of nutraceuticals. (K1,K2)
- 1.5 Scope. (K1,K2)
- 1.6 Future prospects of Nutraceuticals. (K1,K2)

### **UNIT II: Colonic functional foods. (6 hours)**

- 2.1 Colonic functional foods – Probiotics. (K1,K2)
- 2.2 Prebiotics. (K1,K2)
- 2.3 Synbiotics – Health aspects of functional colonic foods. (K1,K2)
- 2.4 Milk ingredients as functional foods. (K1,K2)
- 2.5 Brief idea about some Nutraceutical rich supplements e.g. Caffeine. (K1,K2).
- 2.6 Green tea. (K1, K2)

### **UNIT III: Food as remedies. (6 hours)**

- 3.1 Food as Remedies- An overview. (K1,K2)
- 3.2 Nutraceutical remedies for common disorders like Arthritis. (K1,K2)
- 3.3 Bronchitis and circulatory problems. (K1,K2)
- 3.4 Hypoglycemia and nephrological disorders. (K1,K2)
- 3.5 Liver disorders and Osteoporosis. (K1,K2)
- 3.6 Psoriasis and Ulcers. (K1,K2)

### **UNIT IV: Genetically modified foods as nutraceuticals. (6 hours)**

- 4.1 Wild crop and genetically modified crops- Definition and uses. (K1,K2)
- 4.2 Nutraceuticals from genetically modified foods: *Bacillus thuringiensis* corn. (K1,K2)
- 4.3 Indian Bt egg plant. (K1,K2)
- 4.4 Purple tomato - tearless onion. (K1,K2)
- 4.5 Rainbow cauliflower. (K1,K2)
- 4.6 Calgene- FLAVR SAVR tomato. (K1,K2)

### **UNIT V: Plant pharmaceuticals as nutraceuticals**

- 5.1 Nutraceuticals from plant pharmaceuticals. (K1,K2)
- 5.2 Beta-carotene in rice (Golden rice). (K1,K2)
- 5.3 Transgenic “heart-healthy” Canola oil. (K1,K2)
- 5.4 Edible vaccine. (K1,K2)
- 5.5 Hepatitis B vaccine in maize. (K1,K2)

## 5.6 Cholera vaccine in potatoes. (K1,K2)

### **TEXT BOOKS:**

1. Robert E.C. Wildman (2016). Handbook of Nutraceuticals and Functional Foods. 2<sup>nd</sup> edition, CRC Press, Taylor and Francis Group. New York, London.
2. Kramer, Hoppe and Packer (2001). Nutraceuticals in Health and Disease Prevention. 1<sup>st</sup> edition, Marcel Dekker. Inc., New York.
3. Functional Foods Concept to product. Edited by Gibson R and Christine M Williams. Woodhead Publishing Limited.

### **REFERENCE BOOKS:**

1. Sukhcharn Singh, Riar C.S and Saxena D.C (2015). Functional foods and Nutraceuticals. 1<sup>st</sup> edition, New India Publishing Agency, New Delhi.
2. Rotimi E.Aluko (2012). Functional foods and Nutraceuticals. 1<sup>st</sup> edition, Springer, New York.
3. Lillian E.Forman (2009). Genetically Modified foods. 1<sup>st</sup> edition, ABDO Publishing Company, Edina, United States.
4. Functional foods, nutraceuticals and natural products. Concepts and Applications. Edited by Dhiraj A. Vattam, Vatsala Maitin.

### **OER:**

### **DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## USMBE20 – SKILL BASED ELECTIVE: COSMETOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: V & VI	USMBE20	Cosmetology	Theory	Skill Based Elective	2	2	100

### Course Objective:

To provide adequate knowledge on cosmeceuticals, personal care and hygiene products and familiarize with the skills in formulation science required to scientifically design and develop products.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Give information about significance of cosmetics and adulteration of natural products.

**CO2:** Formulate face packs, hair oils for different types of skin and hair.

**CO3:** Analyze the structure, function and types of skin.

**CO4:** Outline the biology of hair, hair growth cycle and scalp hygiene and utilize the natural herbs for skin, hair and oral care preparations.

**CO5:** Communicate the cosmeceutical applications of micro and macroalgae.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	L	L	H
CO2	H	M	H	L	L	H
CO3	H	M	H	L	L	H
CO4	H	M	H	L	L	H
CO5	H	M	H	L	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	L	L	H
CO2	H	M	H	L	L	H
CO3	H	M	H	L	L	H
CO4	H	M	H	L	L	H
CO5	H	M	H	L	L	H

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

### COURSE SYLLABUS

#### UNIT I: Cosmetics and its significance.

(6 hours)

1.1 Cosmetics – Definition and purpose. (K1,K2)

1.2 Classification of cosmetics. (K1,K2)

1.3 Significance and its importance. (K1,K2)

- 1.4 Stability of product forms and quality control. (K1,K2)
- 1.5 Adulteration of Natural products: Qualitative method of detection. (K1,K2)
- 1.6 Quantitative methods of detection of adulteration. (K1,K2)

**UNIT II: Role of cosmetics in facial skin care. (6 hours)**

- 2.1 Structure and function of skin. (K1,K2)
- 2.2 Types of Skin. (K1,K2)
- 2.3 Differences between baby's skin and adult skin. (K1,K2)
- 2.4 Formulations of face packs for dry, oily and normal skins. (K1,K2, K3)
- 2.5 Herbal remedy for skin disorders- pimple, acne, boils, black heads, white heads, and open pores. (K1,K2, K3)
- 2.6 Skin care in different seasons. (K1,K2, K3)

**UNIT III: Hair Care. (6 hours)**

- 3.1 Structure and function of hair. (K1,K2)
- 3.2 Types of hair and Hair growth cycles. (K1,K2)
- 3.3 Defects in hair shaft. (K1,K2)
- 3.4 Processes involved in hair growth and color formation in hair. (K1,K2)
- 3.5 Role of scalp hygiene. (K1,K2)
- 3.6 Formulations of hair oils and hair tonics- remedy for dandruff, premature greying and hair loss. (K1,K2,K3)

**Unit IV: Role of Herbs in Cosmetics / Herbal cosmetics. (6 hours)**

- 4.1 Hair care preparation: Henna, Amla (K1,K2,K3)
- 4.2 Hibiscus, Bhringaraj. (K1,K2,K3)
- 4.3 Skin Care preparation: Aloe vera. (K1,K2,K3)
- 4.4 Turmeric, Sandal wood. (K1,K2,K3)
- 4.5 Oral care preparation: Babool. (K1,K2,K3)
- 4.6 Neem, Clove. (K1,K2,K3)

**UNIT V: Algae in Cosmetics. (6 hours)**

- 5.1 Microalgae and macroalgae- An introduction. (K1,K2)
- 5.2 Chlorophyceae (green algae). (K1,K2)
- 5.3 Phaeophyceae (brown algae). (K1,K2)
- 5.4 Rhodophyceae (red algae). (K1,K2)
- 5.5 Applications of algae in cosmetics: sunscreen, moisturizer, anti-aging,whitening and hair care. (K1,K2,K3)
- 5.6 Cosmetic products using algal metabolites. (K1,K2)

**TEXT BOOKS:**

1. Pandey. H (2009),“ Herbal beauty products with formulations and processes”. Himalaya publishers.
2. Simon.Y.Mills(2000) , “ The essential book of herbal medicine”. 2<sup>nd</sup> edition . Elsevier.
3. Eliot Cowan (1996). “Plant spirit medicine: The healing power of plants”. CRC press. United states.

**REFERENCE BOOKS:**

1. Sagrin C.B.( 2011). Cosmetic Science and technology. 1<sup>st</sup> edition. Wiley & Sons. United states.
2. Marc Paye, Andre. O. Barel.(2000). Handbook of Cosmetic Science and technology . CRC press, Unites states.
3. Surabhi Joshi, Roshani Kumari and Vivek N. Upasani. (2003). Applications of Algae in Cosmetics: An Overview. S. Chand and Company Ltd., New Delhi.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

**ALLIED MICROBIOLOGY**  
**( B.Sc Biochemistry- Semester III)**  
**UAMBA20 – ALLIED III: MICROBIOLOGY –I**

Year 2020	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
<b>SEM: III</b>	UAMBA20	Allied III: Microbiology-I	Theory	Allied	4	4	100

**Course Objective:**

To make the students know about the third major component of the biotic system and provide a detailed insight on the study of microbes.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Discuss history, recent developments and microscopy.

**CO2:** Utilize techniques of sterilization, pure culture and staining.

**CO3:** Outline classification and anatomy of bacteria.

**CO4:** Compare structural characteristics of algae, fungi and protozoa.

**CO5:** Demonstrate measurement of microbial growth and explain classification of antibiotics with its mode of action.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	M	H	L	L	M
<b>CO2</b>	H	H	H	L	L	M
<b>CO3</b>	H	L	H	H	L	M
<b>CO4</b>	H	L	M	H	M	M
<b>CO5</b>	H	M	M	M	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	M	H	L	L	M
<b>CO2</b>	H	H	H	L	L	M
<b>CO3</b>	H	L	H	H	L	M
<b>CO4</b>	H	L	M	H	M	M
<b>CO5</b>	H	M	M	M	L	H

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

## **COURSE SYLLABUS**

### **UNIT I: History of Microbiology and Microscopy. (12 hours)**

- 1.1 Definition and scope of Microbiology-History and recent Developments, Spontaneous generation and Biogenesis. (K1,K2)
- 1.2 Contribution of Louis Pasteur, Antony Van Leuwenhoek, Joseph Lister, Robert Koch. (K1,K2)
- 1.3 Edward Jenner, Emil Christian Hansen, Hans Christian Gram, Alexander Fleming. (K1,K2)
- 1.4 Microscopy – Bright field Microscopy, Dark field Microscopy. (K1,K2, K3)
- 1.5 Phase contrast Microscope and Fluorescence Microscope. (K1,K2)
- 1.6 Electron Microscopy – TEM & SEM. (K1,K2)

### **UNIT II: Basic techniques in Microbiology. (12 hours)**

- 2.1 Sterilization of glass wares. (K1, K2, K3)
- 2.2 Culture media and its types. (K1, K2, K3)
- 2.3 Preparation of basal media. (K1, K2, K3)
- 2.4 Pure culture techniques – spread plate, pour plate and streak plate techniques.(K1,K2, K3)
- 2.5 Serial dilution and Standard plate count methods. (K1,K2, K3)
- 2.6 Staining techniques – simple and differential (Grams staining and Acid fast staining). (K1,K2, K3)

### **UNIT III: Binomial nomenclature and Anatomy of bacteria. (12 hours)**

- 3.1 Brief outline on bacterial classification- Binomial Nomenclature of Microbes. (K1,K2)
- 3.2 Morphology of bacteria - size, shape and arrangement of bacteria. (K1,K2)
- 3.3 Anatomy of Bacteria – Cell wall (Gram positive and Gram negative). (K1,K2)
- 3.4 Cytoplasmic membrane. (K1,K2)
- 3.5 Flagella –structure and arrangement, capsule, pili .(K1,K2)
- 3.6 Spore and sporulation. (K1,K2)

### **UNIT IV: Structural characteristics of algae, fungi and protozoa. (12 hours)**

- 4.1 Structural characteristics of Microalgae- An overview. (K1,K2)
- 4.2 *Oscillatoria, Volvox, Chlorella*. (K1,K2,K3)
- 4.3 Structural characteristics of fungi – An overview. (K1,K2)
- 4.4 Yeast- *Saccharomyces* and its reproduction. (K1,K2)
- 4.5 Molds - *Aspergillus, Penicillium, Rhizopus, Mucor*. (K1,K2, K3)
- 4.6 Protozoa (*Entamoeba* and *Plasmodium*). (K1,K2, K3)

### **UNIT V: Growth of Microorganism and their control. (12 hours)**

- 5.1 Measurement of microbial growth (turbidity, biomass, cell count). (K1,K2, K3)
- 5.2 Growth curve. (K1,K2, K3)

- 5.3 Preservation of culture (Lyophilization, Liquid N<sub>2</sub>). (K1,K2)
- 5.4 Antibiotics – Definition, classification and mode of action. (K1,K2)
- 5.5 Antibiotics inhibiting cell wall and cell membrane synthesis. (K1,K2)
- 5.6 Antibiotics inhibiting nucleic acid and protein synthesis. (K1,K2)

**TEXT BOOKS:**

1. Pelczar T.R, Chan M.J and Kreig N.R (2006). Microbiology.6<sup>th</sup> edition, Tata McGraw-Hill INC., New York.
2. Ananthanarayanan R and Jayaram Paniker, C.K. (2009).Text book of Microbiology.8<sup>th</sup> edition. Orient Longman, Hyderabad

**REFERENCE BOOKS:**

1. Lansing M. Prescott, John P. Harley., Donald A. Klein (2011) .Microbiology.8<sup>th</sup> edition. McGraw Hill Inc., New York.
2. Michael T. Madigan., John M. Martinko (2006) Brock Biology of Microorganisms. 11<sup>th</sup> edition, Pearson Prentice Hall publishers, United States.

**OER:**

E-books

1. [www.gutenberg.org](http://www.gutenberg.org)
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3. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)

Video lessons

1. [www.learnerstv.com](http://www.learnerstv.com)
2. [www.webcast.berkeley.edu](http://www.webcast.berkeley.edu)
3. [www.cosmolearning.org](http://www.cosmolearning.org)

**ALLIED MICROBIOLOGY**  
**( B.Sc Biochemistry- Semester IV)**  
**UAMBB20- ALLIED IV: MICROBIOLOGY – II**

Year 2020	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
<b>SEM: IV</b>	UAMBB20	Allied IV: Microbiology-II	Theory	Allied	4	4	100

**Course Objective:** To make the students know about the third major component of the biotic system and provide a detailed insight on the significance microbes in different environments.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Discuss the role of microorganisms in soil and biogeochemical cycles.

**CO2:** Disseminate knowledge on the potability of water, purification of municipal water supplies and sewage treatment process

**CO3:** Communicate sources of airborne pathogens and the diseases caused.

**CO4:** Explain Food borne diseases and outline on the contamination, spoilage and preservation of food.

**CO5:** Compile on different types of fermentation and fermented microbial product.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	M	H	H	L	M
<b>CO2</b>	H	H	H	M	L	M
<b>CO3</b>	H	H	H	L	L	M
<b>CO4</b>	H	H	H	L	L	M
<b>CO5</b>	H	H	H	L	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	M	H	H	L	M
<b>CO2</b>	H	H	H	M	L	M
<b>CO3</b>	H	H	H	L	L	M
<b>CO4</b>	H	H	H	L	L	M
<b>CO5</b>	H	H	H	L	L	H

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

## **COURSE SYLLABUS**

### **UNIT I: Microbiology of soil and Biogeochemical cycle. (12 hours)**

- 1.1 Microbiology of soil - Microbes in soil. (K1,K2)
- 1.2 Rhizosphere, rhizoplane and phylloplane. (K1,K2)
- 1.3 Nitrogen fixation (symbiotic and non-symbiotic) - nitrifying and denitrifying bacteria. (K1,K2)
- 1.4 Biogeochemical cycle – Carbon cycle, Nitrogen cycle. (K1,K2)
- 1.5 Sulphur cycle and phosphorus cycle. (K1,K2)
- 1.6 Phosphate solubilizers and sulphur bacteria -Bacterial Biofertilizers. (K1,K2)

### **UNIT II: Microbiology of water. (12 hours)**

- 2.1 Microbiology of water – types of water – potable water. (K1,K2)
- 2.2 Municipal water purification. (K1,K2)
- 2.3 Sewage treatment process – An overview. (K1,K2)
- 2.4 Primary, Secondary and tertiary treatment process. (K1,K2)
- 2.5 Sewage disinfection and disposal. (K1,K2)
- 2.6 Water borne diseases. (K1,K2)

### **UNIT III: Aero Microbiology. (12 hours)**

- 3.1 Microbiology of air- An overview. (K1,K2)
- 3.2 Indoor and outdoor microflora. (K1,K2)
- 3.3 Distribution and source of airborne organisms – Droplet, Droplet nuclei and Infectious dust. (K1,K2)
- 3.4 Assessment of air quality. (K1,K2, K3)
- 3.5 Air sanitation. (K1,K2, K3)
- 3.6 Airborne diseases. (K1,K2)

### **UNIT IV: Food Microbiology (12 hours)**

- 4.1 Food Microbiology – An introduction. (K1,K2)
- 4.2 Food preservation techniques- asepsis, high temperature and low temperature. (K1,K2,K3)
- 4.3 Food preservation techniques – drying, radiation and food additives. (K1,K2, K3)
- 4.4 Microbial spoilage of food - vegetables and fruits, cereal and cereal products. (K1,K2)
- 4.5 Microbial spoilage of food – meat and meat products, milk and milk products. (K1,K2)
- 4.6 Food borne diseases. (K1,K2)

### **UNIT V: Fermentation and Industrial production. (12 hours)**

- 5.1 Fermentation- types of fermentation. (K1,K2)
- 5.2 Fermentor- structure and types. (K1,K2)
- 5.3 Industrial production – Antibiotic (Penicillin). (K1,K2)

5.4 Industrial production - alcohol (Ethanol). (K1,K2)

5.5 Industrial production - organic acid (acetic acid). (K1,K2)

5.6 Industrial production - Vitamin (B12). (K1,K2)

**TEXT BOOKS:**

1. Frazier W.C. and West Hoff D.C (2008). Food Microbiology. 4<sup>th</sup> edition. Mc Graw Hill, New York.
2. Joseph C. Daniel (1999). Environmental aspects of Microbiology. 1<sup>st</sup> edition, Bright Sun publications, Chennai.
3. Subba Rao NS (2004). Soil Microbiology. 4<sup>th</sup> edition, Oxford and BH Publishing Co.Pvt. Ltd., New Delhi.

**REFERENCE BOOKS:**

1. Vijaya Ramesh K (2004). Environmental Microbiology. 1<sup>st</sup> edition, MJP publishers. Chennai
2. Casida, J.E (1986), Industrial Microbiology. 1<sup>st</sup> edition. Wiley Eastern publishers. UK
3. Patel A.H (2001). Industrial Microbiology. 3<sup>rd</sup> edition. Mac Millan India ltd, Chennai.

**OER:**

E-books

1. [www.gutenberg.org](http://www.gutenberg.org)
2. [www.free-ebooks.net](http://www.free-ebooks.net)
3. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)

Video lessons

1. [www.learnerstv.com](http://www.learnerstv.com)
2. [www.webcast.berkeley.edu](http://www.webcast.berkeley.edu)
3. [www.cosmolearning.org](http://www.cosmolearning.org)

**ALLIED PRACTICAL**  
**UAMBC20 - ALLIED PRACTICAL: MICROBIOLOGY**

Year 2020	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
<b>SEM:</b> IV	UAMBC20	Allied Practical: Microbiology	Practical	Allied	2	2	100

**Course Objective:**

To provide hands on training in basic and applied Microbiological techniques.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Perform cleaning & sterilization of glasswares.

**CO2:** Analyze the concept of simple and differential staining method and Prepare basal media for the cultivation of bacteria.

**CO3:** Assess and enumerate microorganisms present in different environment.

**CO4:** Examine the quality of milk sample.

**CO5:** Demonstrate the morphology of algae and fungi.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	L	H	L	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	H	L	M
CO4	H	M	H	L	L	M
CO5	H	L	H	H	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	H	L	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	H	L	M
CO4	H	M	H	L	L	M
CO5	H	L	H	H	L	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

## **COURSE SYLLABUS**

1. Cleaning of glasswares.
2. Sterilization of Glassware and culture media.
3. Microscopy- Bright field compound Microscope.
4. Preparation of bacterial smear and simple staining.
5. Grams staining Technique.
6. Hanging drop method for testing motility of bacteria.
7. Preparation of culture media – Nutrient agar, Nutrient broth, Agar slant.
8. Enumeration of microorganism in air by open plate count method.
9. Enumeration of bacteria from soil and water samples by standard plant count method.
10. Assessment of quality of milk by MBRT test.
11. Morphology of Fungi- Lacto phenol cotton blue wet mount preparation.
12. Observation of pond water for the presence of microorganism.

## **REFERENCE BOOKS:**

1. Dubey RC and Maheswari DK (2004). Practical Microbiology 1<sup>st</sup> edition, S.Chand & Company Ltd., New Delhi.
2. Kannan N (2003). Handbook of Laboratory Culture Media, Reagents, Stains and Buffers. Panima Publishing Corporation, New Delhi.
3. Rajan S and Selvi Christy (2011). Experimental procedures in life sciences. Anjana Book House publishers and distributors, Chennai
4. James G Cappuccino and Natalie Sherman (2004). Microbiology: A laboratory manual. 6<sup>th</sup> edition, Published by Pearson Education.

## **OER:**

## **VIRTUAL LABS/ INTERACTIVE SIMULATIONS:**

1. [www.vlab.co.in](http://www.vlab.co.in)
2. [www.aview.in/aview](http://www.aview.in/aview)
3. [www.pbs.org](http://www.pbs.org)
4. [www.micro.magnet.fsu.edu/primer/java/scienceopticsu](http://www.micro.magnet.fsu.edu/primer/java/scienceopticsu)

## NON-MAJOR ELECTIVE

(For B.Sc /B.C.A/B.Com/B.B.A- Semester V and Semester VI)

### UGMBA20 – NON MAJOR ELECTIVE: FOOD MICROBIOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: V & VI	UGMBA20	Food Microbiology	Theory	Non Major Elective	3	2	100

#### Course Objective:

To provide in depth knowledge on the significance microorganisms associated with food.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the scope of food microbiology

**CO2:** Acquire knowledge on the role of microorganisms in food.

**CO3:** Prepare fermented dairy products and formulate the traditional Indian fermented products.

**CO4:** Communicate the significance of food borne diseases in association with public health.

**CO5:** Explain about the genetically modified plants which are commercially available and their applications.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	L	H	L	L	H
CO2	H	M	H	M	L	M
CO3	H	H	H	L	M	H
CO4	H	L	H	L	L	M
CO5	H	L	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	H	L	L	H
CO2	H	M	H	M	L	M
CO3	H	H	H	L	M	H
CO4	H	L	H	L	L	M
CO5	H	L	H	L	L	M

H – HIGH (3), M – MODERATE (2), L – LOW (1)

## **COURSE SYLLABUS**

### **UNIT I: Food Microbiology and its scope. (9 hours)**

- 1.1 Food Microbiology- Definition, Scope of Food Microbiology. (K1,K2)
- 1.2 Importance of microbes in food Microbiology - Bacteria. (K1,K2)
- 1.3 Importance of microbes in food Microbiology – Yeast. (K1,K2)
- 1.4 Importance of microbes in food Microbiology – Mold. (K1,K2)
- 1.5 Probiotics- its health benefits. (K1,K2)
- 1.6 Single cell proteins - its health benefits. (K1,K2)

### **UNIT II: Fermented dairy products. (9 hours)**

- 2.1 Fermented dairy products: Yogurt and Dahi. (K1,K2)
- 2.2 Acidophilus milk. (K1,K2)
- 2.3 Koumiss. (K1,K2)
- 2.4 Kefir. (K1,K2)
- 2.5 Cheese- their production. (K1,K2)
- 2.6 Therapeutic values of Fermented milk. (K1,K2)

### **UNIT III: Traditional Indian fermented foods. (9 hours)**

- 3.1 Traditional Indian fermented foods - Idli / dosa. (K1,K2,K3)
- 3.2 Papad, bread. (K1,K2)
- 3.3 Soy sauce. (K1,K2)
- 3.4 Sauerkraut, pickle. (K1,K2, K3)
- 3.5 Edible mushroom – their health benefits. (K1,K2)
- 3.6 Mushroom recipies – indian and western. (K1,K2, K3)

### **UNIT IV: Food borne illness. (9 hours)**

- 4.1 Food-borne illness- An introduction. (K1,K2)
- 4.2 Food intoxication (Staphylococcus and Clostridium). (K1,K2)
- 4.3 Food infection- Bacterial. (K1,K2)
- 4.4 Food infection – Viral. (K1,K2)
- 4.5 Food infection - Parasitic. (K1,K2)
- 4.6 Prevention and control measures. (K1,K2, K3)

### **UNIT V: Genetically modified foods. (9 hours)**

- 5.1 Genetically modified foods: Indian BT egg plant. (K1,K2)
- 5.2 Golden Rice. (K1,K2)
- 5.3 Purple tomato - tearless onion. (K1,K2)
- 5.4 Rainbow cauliflower. (K1,K2)
- 5.5 Methionine enriched oil. (K1,K2)
- 5.6 Calgene FLAVR SAVR tomato. (K1,K2)

**TEXT BOOKS:**

1. Frazier W.C. and West Hoff D.C (2008). Food Microbiology. 4<sup>th</sup> edition. Mc Graw Hill, New York.
2. Ronnie Cummins and Ben Lilliston (2009). Genetically Engineered Food. 2<sup>nd</sup> edition, Hachette publishers, UK.

**REFERENCE BOOKS:**

1. Adam. M.R and Moss M.O (2004). Food Microbiology. 2<sup>nd</sup> edition. New international pvt. Ltd., publishers.
2. Vijaya Ramesh K (2007). Food Microbiology. 1<sup>st</sup> edition, MJP Publishers, Chennai.
3. Robinson R.K,( 1990). Dairy Microbiology.1<sup>st</sup> edition, Elseveir Applied science, London.
4. James M Jay (2003). Modern Food Microbiology. 4<sup>th</sup> edition, CBS Publishers, New Delhi.
5. Shu-Ting Chang, Philip G.Miles and Chang S. T (2004).Mushrooms: Cultivation, nutritional value, medicinal effect and environmental impact, 2<sup>nd</sup> edition, CRC press. United States.
6. Knut J. Heller (2006).Genetically Engineered Food: Methods and Detection.1<sup>st</sup> edition, John Wiley & Sons, United States.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## NON-MAJOR ELECTIVE

(For B.Sc /B.C.A/B.Com/B.B.A- Semester V and Semester VI)

### UGMBB20 – NON MAJOR ELECTIVE: WASTE WATER MICROBIOLOGY

Year III	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: V & VI	UGMBB20	Waste water Microbiology	Theory	Non Major Elective	3	2	100

#### Course Objective:

To provide in depth knowledge on the significance of waste water and on waste water and its treatment cum recycling methods.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Use the available technologies for physical, chemical and biological treatment of municipal water.

**CO2:** Demonstrate the microbiological analysis of potable water and brief out water borne diseases.

**CO3:** Outline bioremediation of pesticides, heavy metals and oil spills.

**CO4:** Explain the sewage treatment process.

**CO5:** Utilization of solid and liquid waste.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	L	H	L	L	H
CO2	H	M	H	M	L	M
CO3	H	H	H	L	M	H
CO4	H	L	H	L	L	M
CO5	H	L	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	M
CO2	H	M	H	L	M	M
CO3	H	M	H	L	H	H
CO4	H	H	H	L	M	H
CO5	H	M	H	L	M	M

**H – HIGH (3), M – MODERATE (2), L – LOW (1)**

## **COURSE SYLLABUS**

### **UNIT I: Microbiology of water and treatment of municipal water supplies. ( 9 hours)**

- 1.1 Microbiology of water. (K1,K2)
- 1.2 Types of water. (K1,K2)
- 1.3 Potability of water. (K1,K2)
- 1.4 Sources of drinking water. (K1,K2)
- 1.5 Treatment method of municipal water supplies – Sedimentation and filtration. (K1,K2)
- 1.6 Disinfection of water- chlorination. (K1,K2)

### **UNIT II: Detection of potability of water and water borne diseases. ( 9 hours)**

- 2.1 Indicators of faecal contamination. (K1, K2)
- 2.2 Methods to detect potability of water samples: Standard qualitative procedure: Most Probable Number test. (K1,K2, K3)
- 2.3 Membrane filtration technique. (K1,K2, K3)
- 2.4 Water-borne diseases- An overview. (K1,K2)
- 2.5 Bacterial, viral and Protozoal water borne diseases- their etiological agents and clinical symptoms. (K1,K2)
- 2.6 Prevention and control measures. (K1,K2, K3)

### **UNIT III: Water pollution. ( 9 hours)**

- 3.1 Water Pollution – Definition, sources of water pollution. (K1, K2)
- 3.2 Pollution of water bodies by heavy metals. (K1, K2)
- 3.3 Removal of heavy metals by biosorption. (K1, K2)
- 3.4 Removal of pesticides. (K1, K2)
- 3.5 Marine oil spill pollution. (K1, K2)
- 3.6 Removal of oil spills by using microorganisms. (K1, K2)

### **UNIT IV: Sewage treatment process. ( 9 hours)**

- 4.1 Characteristics of sewage and objectives in sewage treatment. (K1, K2)
- 4.2 Biological treatment of sewage: preliminary treatment. (K1, K2)
- 4.3 Secondary treatment - activated sludge process. (K1, K2)
- 4.3 Trickling filters. (K1, K2)
- 4.4 Anaerobic sludge digestion. (K1, K2)
- 4.5 Household waste water treatment. (K1, K2, K3)

**UNIT V: Utilization of solid and liquid waste. ( 9 hours)**

- 5.1 Utilization of solid and liquid waste: Industrial re-use of effluents. (K1, K2)
- 5.2 Municipal reuse of effluent. (K1, K2)
- 5.3 Agricultural reuse of effluent (crop irrigation). (K1, K2)
- 5.4 SCP production. (K1, K2)
- 5.5 Composting (fertilizer). (K1, K2)
- 5.6 Aquaculture. (K1, K2)

**TEXT BOOKS:**

1. Vijaya Ramesh K (2004). Environmental Microbiology. 1<sup>st</sup> edition, MJP publishers. Chennai.
2. Atlas R.M. and Bartha R (1992). Microbial Ecology, Fundamental and Application, 3<sup>rd</sup> Edition, Benjamin and Cummings. United States.

**REFERENCE BOOKS:**

1. Joseph C. Daniel (1999). Environmental aspects of Microbiology. 1<sup>st</sup> edition, Bright Sun publications, Chennai.
2. Murugesan A.G and Rajakumari C (2005). Environmental Science and Biotechnology. 1<sup>st</sup> edition, MJP Publishers, Chennai.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>
5. <http://www.pdfdrive.com>

# Department of Physics (UG)

## SYLLABUS AND REGULATIONS

Under

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**AUXILIUM COLLEGE (Autonomous)**  
*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*  
**Gandhi Nagar, Vellore-632 006**

**Department of Physics (UG)**  
**OUTCOME BASED EDUCATION - 2020**  
**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighbouring districts.

**B) NAME OF THE PROGRAMME: B.Sc. Physics**

**Vision:**

To prepare the students for quality physics education and equip them with skills for higher studies.

**C) ELIGIBILITY CRITERIA OF THE PROGRAMME**

Students who have completed their higher Secondary with Physics and Maths are eligible.

### D) List of Courses

Sem	Part	Paper Code	Title of the Paper	Hour s/ Week	Exam		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper – I	6	3	-	3	40+60
	II	UENGA20	English Paper – I	6	3	-	3	40+60
	III	UCPHA20	Properties of Matter and Acoustics	6	3	-	5	40+60
	III	UCPHC20	Practical – I	3	-	-	-	-
	III	UAMAA20	Allied - I: Mathematics – I	6	3	-	5	40+60
	III	-	Skill-Based Elective – I	2	3	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
<b>Total</b>							<b>18</b>	<b>500</b>
II	I	ULTAB20	Tamil Paper – II	6	3	-	3	40+60
	II	UENGB20	English Paper – II	6	3	-	3	40+60
	III	UCPHB20	Thermal Physics and Statistical Mechanics	6	3	-	5	40+60
	III	UCPHC20	Practical – I	3	-	3	4	40+60
	III	UAMAB20	Allied - II: Mathematics – II	6	3	-	5	40+60
	IV	-	Skill-Based Elective –II	2	3	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
<b>Total</b>							<b>22</b>	<b>600</b>
III	I	ULTAC20	Tamil Paper – III	6	3	-	3	40+60
	II	UENGC20	English Paper – III	6	3	-	3	40+60
	III	UCPHD20	Mathematical Methods and Classical Mechanics	6	3	-	5	40+60
	III	UCPHF20	Practical – II	3	-	-	-	-
	III	UACHA320	Allied - III: Chemistry – I	4	3	-	4	40+60
	III	UACHC420	Allied Practical: Chemistry	2	-	-	-	-
	III	USPHB320	Skill-Based Elective : Electrical Appliances - I	2	3	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
<b>Total</b>							<b>17</b>	<b>500</b>
IV	I	ULTAD15	Tamil Paper – IV	6	3	-	3	40+60
	II	UENGD20	English Paper – IV	6	3	-	3	40+60
	III	UCPHE20	Optics	5	3	-	5	40+60
	III	UCPHF20	Practical – II	3	-	3	4	40+60
	III	UACHB420	Allied - IV: Chemistry – II	4	3	-	4	40+60
	III	UACHC420	Allied Practical: Chemistry	2	-	3	2	40+60
	IV	USPHC420	Skill-Based Elective- Electrical Appliances - II	2	3	-	2	40+60
	IV	UNEVS17	Environmental Studies	2	3	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
	<b>Total</b>							<b>25</b>

Sem	Part	Paper Code	Title of the Paper	Hours/ Week	Exam		Credits	Marks	
					Th	Pr			
V	III	UCPHG20	Electricity and Magnetism	5	3	-	5	40+60	
	III	UCPHH20	Atomic Physics and Spectroscopy	5	3	-	5	40+60	
	III	UCPHI20	Basic Electronics	4	3	-	4	40+60	
	III	UCPHL20	Practical - III: General Practical	3	-	-	-	-	
	III	UCPHM20	Practical - IV: Applied Electronics	2	-	-	-	-	
	III	UEPHA20	Elective - I A: Digital Electronics and communication	5	3	-	5	40+60	
	III	UEPHB20	Elective - I B: Astro and Plasma Physics						
	IV	-	Non Major Elective – I	3	3	-	2	40+60	
	IV	USPHD520	Skill-Based Elective - Physics for competitive Examinations	2	3	-	2	40+60	
	IV	UVEDA15	Value Education	1	-	-	-	-	
<b>Total</b>							<b>23</b>	<b>600</b>	
VI	III	UCPHJ20	Nuclear Physics	5	3	-	5	40+60	
	III	UCPHK20	Relativity and Quantum Mechanics	5	3	-	5	40+60	
	III	UCPHL20	Practical - III: General Practical	3	3	-	4	40+60	
	III	UCPHM20	Practical - IV: Applied Electronics	2	-	3	4	40+60	
	III	UEPHC20	Elective - II A: Solid State Physics and Material Science	5	3	-	5	40+60	
	III	UEPHD20	Elective - II B: Materials Science						
	III	UEPHE20	Elective - III A: Microprocessor 8085	5	3	-	5	40+60	
	III	UEPHF20	Elective - III B: Communication Physics						
	IV	-	Non Major Elective – II	3	3	-	2	40+60	
	IV	USPHE620	Skill-Based Elective – Mobile communication	2	2	-	2	40+60	
	IV	UVEDA15	Value Education	1	2	-	2	40+60	
	Total							<b>34</b>	<b>900</b>
	IV		Extension Activity (90 Hours)				1	-	
<b>Total</b>							<b>140</b>	<b>3900</b>	

### **E) Programme Objectives (PO)**

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:** Emulate positive social values and exercise leadership qualities and team work.

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

### **F) Programme Specific Outcomes (PSO)**

**PSO1:** Students are expected to acquire knowledge in physics, including the major premises of Properties of matter and sound, Thermal Physics, Classical and quantum mechanics, electricity and Magnetism, electronics, optics, Relativity and modern physics.

**PSO2:** Students are also expected to develop skills in Physics for competitive Examinations.

**PSO3:** Analyze physical problems and develop correct solutions using natural laws.

**PSO4:** Students will develop the proficiency in the skill of data using a variety of laboratory instruments.

**PSO5:** Students will realize and develop an understanding of the impact of physics and science on society.

**PSO6:** Prepare the student to successfully compete for employment and to offer a wide range of applications.

PSO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	H	M	H	M	H	H
PSO2	H	M	H	H	M	H
PSO3	H	L	H	H	M	M
PSO4	H	M	H	M	H	L
PSO5	L	M	M	H	L	H
PSO6	H	H	L	L	H	L

(STRONGLY CORRELATED - H, MODERATELY CORRELATED - M, WEAKLY CORRELATED -L)

**SEMESTER – I**  
**UCPHA20 – Properties of Matter and Acoustics**

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> UCPHA20	<b>Title of the Course:</b> Properties of Matter and Acoustics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Objectives**

1. To give introduction to different properties of matter namely elasticity, mass, viscosity and surface tension.
2. To make the students to understand the concept of bending, uniform bending and non-uniform bending of the beam.
3. To understand the concept of ultrasonics and its applications.

**Course Outcomes (CO)**

1. The properties of solids especially knowledge of elasticity help the students to identify the materials suitable for the construction of buildings, houses etc.
2. Learn the basics of properties of matter, how Young's modulus and rigidity modulus are defines and how they are evaluated for different shapes of practical relevance.
3. Properties of fluids especially knowledge of viscosity and surface tension help the students in their daily life and agriculture
4. Study the behaviour of the progressive wave
5. Learn the fundamentals of harmonic oscillator model, including free, damped and forced oscillators.

CO	PO					
	1	2	3	4	5	6
CO1	L	M	M	H	H	L
CO2	M	L	L	L	M	H
CO3	H	L	H	H	M	L
CO4	M	L	H	M	M	L
CO5	M	M	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	L	H
CO2	M	H	H	M	H	L
CO3	L	M	H	M	L	H
CO4	M	M	M	H	H	M
CO5	H	H	M	L	M	H

**(Low - L, Medium – M, High - H)**

## Course Syllabus

### Unit I: Elasticity

(12 hours)

- 1.1 Stress-Strain - Types- Hooke's law - Basic ideas of elastic moduli - Young's modulus-Rigidity Modulus- Bulk Modulus (K1, K2)
- 1.2 Behaviour of a wire under progressive tension - Work done in stretching and Twisting a wire (K3)
- 1.3 Twisting couple on a cylinder (K3)
- 1.4 Determination of Rigidity modulus and moment of inertia using torsional pendulum (with and without mass) (K3, K4)
- 1.5 Determination of  $q$ ,  $n$ ,  $\sigma$  by Searle's method (K3, K4)
- 1.6 Compound pendulum, moment of inertia - determination of radius of gyration using graph method. (K3, K4)

### Unit II: Bending of Beams

(12 hours)

- 2.1 Bending of beams - Expression for bending moment (K1, K3)
- 2.2 Cantilever- Determination of Young's Modulus by cantilever oscillations (K2, K4)
- 2.3 Non-uniform bending- Determination of Young's Modulus by Koenig's method (K2, K3, K4)
- 2.4 Uniform bending- Expression for Elevation (K2, K3, K4)
- 2.5 Experiment to determine young's modulus using pin and microscope (K3, K4)
- 2.6 Expression of Poisson's ratio- Relationship between the three moduli of elasticity (K3, K4)

### Unit III: Surface Tension

(15 hours)

- 3.1 Definition and dimension of surface tension, Excess of pressure, Problems and its relation between curvatures (K1, K2, K3, K4)
- 3.2 Jaeger's method and variation of surface tension with temperature - Drop weight method (K1, K2, K3, K4)
- 3.3 **Viscosity:** Viscosity definition, stream line flow, turbulent flow- Reynold's number, Searle's Viscometer, Meyer's formula for the rate of flow of a gas through a capillary tube. (K1, K2, K3, K4).
- 3.4 Poissuille's formula, Comparison of Viscosity using Oswald's Viscometer Stoke's formula, determination of co-efficient of viscosity (K3, K4)
- 3.5 **Osmosis:** Osmosis and osmotic pressure, Laws of osmotic pressure - Determination of osmotic pressure by Berkeley and Hartley method (K3, K4)
- 3.6 Osmosis and vapor pressure of a solution, Osmosis and boiling point of a solution (K3, K4)

#### **Unit IV: Waves and Oscillations**

**(15 hours)**

- 4.1 Progressive wave – properties and characteristics of progressive wave (K1,K2)
- 4.2 Simple harmonic motion – Expression for free oscillations (K3)
- 4.3 Expression for Damped and Forced oscillations (K3, K4)
- 4.4 Expression for velocity of sound in a string - Determination of frequency of the vibrator in transverse and longitudinal mode using Melde's string (K2, K3, K4)
- 4.5 Determination of Specific gravity of solid and liquid by Melde's string (K3, K4)
- 4.6 Reverberation Time - Sabine's Formula (Derivation only) - Absorption coefficient Acoustic aspects of halls and auditorium (K2, K3)

#### **Unit 5: Ultrasonics**

**(15 hours)**

- 5.1 Introduction - characteristic properties of ultrasonic waves (K1,K2)
- 5.2 Stationary waves and resonance (Half wave length and quarter wave length resonance) Attenuation and Sources of ultra sound (K2,K3)
- 5.3 Piezoelectric method and Magnetostriction Method (K3,K4)
- 5.4 Low frequency/high intensity applications (Welding, Echo Sounder, sensor for temperature and pressure) (K3,K4)
- 5.5 High frequency/ low intensity applications (NDT, Holography) (K3,K4)
- 5.6 Different types of scans and its clinical Applications (Obstetrics, Examination of heart) SONAR (K3,K4)

#### **Books for Study:**

1. Murugesan. R.S. - Properties of Matter, 1<sup>st</sup> Edition- Chand & Co.Pvt Ltd., NewDelhi, Reprint 2005.
2. D. S. Mathur - Elements of Properties of Matter, 1<sup>st</sup> Edition - Shyamala CharitableTrust, New Delhi, 2005.
3. Brijilal & Subramaniam N. - Properties of Matter, 1<sup>st</sup> Edition - Vikas PublicationHouse, New Delhi, 2001.
4. Brijilal & Subramaniam N – Textbook of Sound, 1<sup>st</sup> Edition - Vikas PublicationHouse, New Delhi, 2005.
5. M. N. Srinivasan - Textbook of Sound – Himalayan Publication, 1991.
6. Brijilal & Subramaniam N - Waves and Oscillations - Vikas Publication House, New Delhi,1994.

#### **Reference Books:**

1. K. Halliday, R. Resnick and K.S. Krane and J. Walker - Fundamentals of Physics, 6<sup>th</sup> Edition - Wiley, N.Y., 2001.
2. R. P .Feymann, R.B., Leighton and M. Sands - The Feynmann Lectures on Physics, Vol 1,2 and 3-Narosa, New Delhi,1998,Vol.1,1<sup>st</sup> Edition, 1998, Vol 2. 2<sup>nd</sup> Edition, 1998, Vol.3.3<sup>rd</sup> Edition, 2001.

3. Arora C.L - Mechanics and Properties of Matter, 1<sup>st</sup> Edition - Chand & Co. Pvt. Ltd., New Delhi, 1999.

**SEMESTER – II**  
**UCPHB20 – THERMAL PHYSICS AND STATISTICAL MECHANICS**

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> UCPHB20	<b>Title of the Course:</b> Thermal Physics and Statistical Mechanics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Objectives**

1. To introduce the law of thermodynamics and their applications.
2. To acquire knowledge about classical and quantum theory of radiation.
3. To understand the basic of statistical mechanics.

**Course Outcomes (CO)**

The learners will be able to

1. Become familiar with various thermodynamic process and work done in each of these processes.
2. Have a clear understanding about Reversible and irreversible process
3. Learn the working of a Carnot engine, and knowledge of calculating change in entropy for various processes.
4. Realize the importance of Thermo dynamical functions and applications of Maxwell's relations.
5. Learn the relation between the entropy and probability.

CO	PO					
	1	2	3	4	5	6
CO1	L	H	H	H	M	L
CO2	M	L	L	M	M	H
CO3	H	H	H	M	M	H
CO4	M	H	H	H	L	M
CO5	H	M	H	M	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	H	M	H
CO2	H	H	M	H	M	L
CO3	M	M	L	M	H	M
CO4	L	M	H	M	H	L
CO5	H	L	M	H	M	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I: Thermal Conduction and Radiation**

**(16 hours)**

- 1.1 Coefficient of Thermal Conductivity - Thermal Diffusivity (K1, K2)
- 1.2 Rectilinear Flow of Heat along a Bar - Forbe's method - Lee's Disc Method (K3,K4)
- 1.3 Relation between Thermal and Electrical Conductivities - Wiedemann - Franz Law and Stefan's Law (K1,K2)
- 1.4 Derivation of Newton's Law of Cooling from Stefan's Law and Laboratory determination of Stefan's Constant (K3, K4)
- 1.5 Planck's Quantum Theory of Radiation-Deduction of Wien's Law and Raleigh-Jeans Law from Planck's Law (K1,K3,K4)
- 1.6 Solar Constants - Temperature of the Sun - Solar Spectrum (K2)

### **Unit II: Thermodynamics – I**

**(14 hours)**

- 2.1 Introduction – Thermodynamic system- Zeroth Law of Thermodynamics Quasistatic process (K1, K2)
- 2.2 Statement of First Law of Thermodynamics - Statement of Second Law (K1, K2)
- 2.3 Heat Engines and Ideal Heat Engine - Concept of Entropy-Entropy of an Ideal Gas Reversible and Irreversible Process and their entropy (K2,K3)
- 2.4 Carnot Theorem and Proof of Carnot Theorem (K2, K3,K4)
- 2.5 Construction and working of Internal Combustion Engine - Petrol and Diesel Engines(K3, K4)
- 2.6 First Latent Heat Equation – Clausis-Clapeyron equation and Second Latent Heat Equation (K4)

### **Unit III: Thermodynamics – II**

**(15 hours)**

- 3.1 Thermodynamic Scale of Temperature or Work Scale of Temperature and its Relation to Perfect Gas Scale (K4)
- 3.2 Entropy Temperature Diagram (K3)
- 3.3 Maxwell's Thermodynamic Equations and its Applications (K4)
- 3.4 Thermodynamic Potentials - Free Energy – Enthalpy - Internal energy – Helmholtz free energy – Significance of thermodynamic potentials (K1,K2)
- 3.5 Gibbs function - Gibb's Helmholtz Equation - Third Law of Thermodynamics (K1,K3)
- 3.6 Phase transition expression for the first order and second order transition (K3, K4)

### **Unit IV: Low Temperature Physics**

**(15 hours)**

- 4.1 Introduction – Production of low temperature – Joule Thomson effect-Joule Kelvin Effect (Temperature of inversion) (K3)
- 4.2 Kammerling Onne's Method - Liquefaction of Hydrogen- Liquefaction of Helium(K3)

- 4.3 Helium I and II - Lambda Point, Viscosity- thermal conductivity- Rolling films (K3,K4)
- 4.4 Production of low temperature - adiabatic demagnetization
- 4.5 Practical applications of Low Temperature (K3)
- 4.6 Refrigerators - Air Conditioning Machines (K3, K4)

#### **Unit V: Statistical Mechanics**

**(15hours)**

- 5.1 Definition of Phase-Space - Micro and Macro States (K1, K2)
- 5.2 Different types of Ensembles - Definition and relation between entropy and Probability (K1)
- 5.3 Expression for Maxwell Boltzmann Statistics (K4)
- 5.4 Maxwell's law of Distribution energy (K3)
- 5.5 Expression for Fermi Dirac Statistics (K3, K4)
- 5.6 Derivation for Bose Einstein Statistics - Comparison of Three Statistics (K3,K4)

#### **Books for Study:**

1. Brijilal and Subrahmanyam S. - Heat and Thermodynamics – Chand & Co., New Delhi, Reprint 1998.
2. D.S. Mathur - Heat and Thermodynamics - Sultan Chand & Sons, New Delhi, V Edition, 2005
3. Arora. C.L. – A Textbook of Heat and Thermodynamics - Chand & Co., New Delhi, Reprint 1998.
4. Dr. D. Jayaraman and Dr.K.Ilangovan – Thermal Physics and Statistical Mechanics- S. Viswanathan publishers 2016.

#### **Books for Reference:**

1. A.B.Gupta and H.Roy – Thermal Physics – Books and Allied Pvt. Ltd., Reprint 2005
2. D.Halliday, R.Resnick and J.Walker – Fundamental of Physics, 6<sup>th</sup> Edition - Wiley N.Y., 2001
3. Roy - Thermal and Statistical Physics – S Chand & Co.,2001
4. R.Murugesan – Thermal Physics – S.Chand& Co. Publication, Reprint 2004

**SEMESTER – III**  
**UCPHD20 – Mathematical Methods and Classical Mechanics**

<b>Year:</b> II	<b>Course Code:</b> UCPHD20	<b>Title of the Course:</b> Mathematical Methods and Classical Mechanics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Objectives**

1. To introduce the students the basic methods of applied mathematics to solve the physical problems that arises in conventional physics such as electricity and magnetism, classical and quantum mechanics and spectroscopy.
2. To make the students acquire the mathematical skills in solving the basic numerical problems.
3. To demonstrate knowledge and understanding of following fundamental concepts in dynamics of system of particle, motion of rigid body.
4. To represent the equations of motion for complicated mechanical systems using the Lagrangian and Hamiltonian formulations of classical mechanics.

**Course Outcomes (CO)**

The learners will be able to

1. Learn about gradients, divergence and curl in orthogonal curvilinear and their typical applications in physics
2. Learn about special type of matrices that are relevant in physics and get introduced to special functions like gamma function, beta function, delta function, dirac delta function, Bessel functions and their recurrence relations
3. Analyse statistical data using measures of central tendency, dispersion. Learn the methods of skewness like Karl-Pearson coefficient, Bowleys coefficient
4. Learn about the mechanics of moving particles and the constraints. The measure of position of moving particle and the parameters required to describe the state of system. Lagrange's equation deals with position, momentum and total energy of system in motion
5. Learn about Hamiltonian functions and differences between Lagrangian and Hamiltonian. It deals with various physical applications

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	M	H	H
CO2	M	L	H	M	H	L
CO3	L	M	L	M	M	H
CO4	M	H	H	H	L	L
CO5	L	M	M	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	M	M	H
CO2	H	M	M	H	H	L
CO3	M	H	H	L	M	H
CO4	H	M	H	M	L	H
CO5	M	H	H	M	H	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Vector algebra and Matrices

(14 hours)

- 1.1 Gradient of a scalar field – Physical Interpretation - Line, surface and volume integrals (K1, K2)
- 1.2 Divergence and curl of vector function and its physical significance (K3, K4)
- 1.3 Gauss divergence theorem - Application of vector to hydrodynamics- heat flow in solids- gravitation and electromagnetic field(K4)
- 1.4 Introduction to matrices - Review of algebraic operations of matrices - Properties of matrix multiplication (K3)
- 1.5 Eigen value - Eigen vectors(K4)
- 1.6 Characteristics equation of matrix – Cayley Hamilton’s theorem - Diagonalization of matrices(K4)

### Unit II: Special function

(14 hours)

- 2.1 Beta function - Symmetry property of beta function– Evaluation of beta function (K1, K2, K3)
- 2.2 Gamma function - Evaluation of gamma function (K1, K2, K3)
- 2.3 Legendre’s differential equation and Legendre’s functions (K4)
- 2.4 Generating functions of Legendre’s polynomial (K2)
- 2.5 Orthogonal properties of Legendre’s polynomials - Recurrence formulae (K4)
- 2.6 Recurrence formulae - Bessel’s differential equation(K4)

### Unit III: Statistics

(14 hours)

- 3.1 Introduction to statistics - Measures of central tendency (K1, K2)
- 3.2 Measure of arithmetic mean, median, mode (K1, K3)
- 3.3 Measure of dispersion, Range, Quartile deviation, mean deviation and standard deviation (K2, K3, K4)
- 3.4 Measure of skewness - Karl Pearson’s coefficient of skewness (K4)
- 3.5 Bowley’s coefficient of skewness (K4)
- 3.6 Distribution models - binomial, Poisson and normal distribution (K4)

**Unit IV: Classical Mechanics I****(14 hours)**

- 4.1 Mechanics for a system of particles - constraints – Holonomic and non-Holonomic constraints(K1)
- 4.2 Degrees of freedom - Generalized coordinates (K2)
- 4.3 Principle of virtual work(K1, K2)
- 4.4 D'Alembert principle - Lagrange's equation from D'Alembert principle- Lagrange's equation for system containing dissipative forces (K3, K4)
- 4.5 Applications of Lagrange's equation –Spherical pendulum - simple pendulum, - compound pendulum (K4)
- 4.6 Central force - Equation of motion and first integrals (K4)

**Unit V: Classical Mechanics II****(14 hours)**

- 5.1 Phase –Space (K1)
- 5.2 Hamiltonian function – Hamilton's equation – Physical significance of Hamiltonian function (K2, K3)
- 5.3 Applications of Hamiltonian equations – Simple pendulum, compound Pendulum (K4)
- 5.4 Poisson's bracket - Properties of Poisson's bracket (K3,K4)
- 5.5 Relation between Lagrange and Poisson bracket (K4)
- 5.6 Application of Lagrangian and Hamiltonian for a charged particle (K4)

**Books for Study:**

1. Sathya Prakash - Mathematical Physics – S.Chand & Sons, Reprint 2006.
2. P.N. Arora, Sumeet Arora – Comprehensive Statistical Methods – S. Chand Publication, 2012.
3. Guptha Kumar - Classical Mechanics – Pragathi Prakashan, 2008.
4. J Medhi - Statistical Methods: An Introductory Text - New age International Publications, 2013.
5. N G Das – Statistical Methods- McGraw-Hill Companies, 2018.

**Reference Books:**

1. B.D.Gupta – Mathematical Physics, 3<sup>rd</sup> Edition – Vikas Publishing House Pvt. Ltd., 2007.
2. B.S.Rajput – Mathematical Physics – Pragati Prakashan Publication, 2005.
3. H.K.Dass – Mathematical Physics - S.Chand and Co. Ltd., 2007.
4. Herbert Goldstein – Classical mechanics – Narosa Publications, 2001.
5. H.K.Dass -Statistical mechanics - S.Chand and Co. Ltd., 2014.

**SEMESTER – IV**  
**UCPHE20 – Optics**

<b>Year:</b> II	<b>Course Code:</b> UCPHE20	<b>Title of the Course:</b> OPTICS	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> IV							

**Course Objectives**

1. Students understand the dual nature of light through the different branches of optics like Geometrical optics and Physical optics.
2. To teach them the aberration in lenses in optical instruments.
3. To teach the basic concepts and working of interference, diffraction and polarization.
4. To explain the students about important application of interference, diffraction and polarization.

**Course Outcomes (CO)**

1. To make the students understand different types of lenses and the aberrations in it
2. Learn about dispersion by thin prism and dispersion without deviation; deviation without dispersion of prism
3. Study about interference and various interferometers used for the applications like wavelength and resolution determination and refractive index of gases
4. Learn about the concept of diffraction. Its types Fresnel's and Fraunhofer diffraction experiments and applications
5. Study about polarization, its experiments Laurent's half shade polarimetry and applications

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	L	H	H
CO2	M	M	H	M	H	L
CO3	L	M	M	M	H	H
CO4	M	H	H	H	M	L
CO5	L	M	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	L	H	H
CO2	M	H	H	M	L	H
CO3	H	L	H	H	M	L
CO4	M	H	H	L	M	H
CO5	H	M	L	M	H	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I: Geometrical Optics (14 hours)**

- 1.1 Lens and its types (K1)
- 1.2 Optic center of the lens - Principal foci and Principal points - Thick lens formula(K1,K2)
- 1.3 Power of thick lens - Defects in lenses - various defects and its minimizing method (K2, K3)
- 1.4 Method of minimizing spherical aberration - contact method and out of contact method – Chromatic aberration in lenses (K3)
- 1.5 Conditions for achromatic aberration of two thin lenses in contact and out of contact(K3 , K4)
- 1.6 Basic ideas of eyepiece - Ramsden's and Huygen's eyepiece and comparison(K4)

### **Unit II: Dispersion (14 hours)**

- 2.1 Dispersion - Prism - Explanation of VIBGYOR- application (K1)
- 2.2 Dispersion produced by a thin prism - angular dispersion (K1, K2)
- 2.3 Dispersive power of a prism - resolving power of a prism (K2, K3)
- 2.4 Combination of prisms to produce - dispersion without deviation and deviation without dispersion (K3)
- 2.5 Achromatic prism - Direct vision spectroscope-constant deviation spectrometer (K3,K4)
- 2.6 Determination of refractive index of the material of small angled prism (K4)

### **Unit III: Interference (14 hours)**

- 3.1 Interference - condition for interference - theory of interference in reflected system (K1, K2)
- 3.2 Interference in thin films- Thin films - air wedge - Determination of diameter of a thin wire by air wedge method - test for optical flatness (K2, K3)
- 3.3 Newton's rings- Determination of refractive index of a liquid (K4)
- 3.4 Michelson's interferometer - theory - application - determination of wavelength and resolution of spectral lines (K4)
- 3.5 Refractive index of gases - Jamin's and Rayleigh's interferometer - Fabry - Perot interferometer (K3, K4)
- 3.6 Holography – Principle - construction and reconstruction –application(K1, K3, K4)

#### **Unit IV: Diffraction**

**(14 hours)**

- 4.1 **Diffraction:** Fresnel's Diffraction (K1)
- 4.2 Fresnel's ideas of wave fronts - Fresnel's explanation of rectilinear propagation of light - half period zones (K1, K2, K3)
- 4.3 Comparison of half period one and convex lens - Diffraction at a circular aperture, straight edge (K2, K3)
- 4.4 **Fraunhofer diffraction:** Fraunhofer diffraction at single slits and double slits - theory of plane diffraction grating - determination of wavelength using grating (K3, K4)
- 4.5 Dispersive power of a grating - absent spectra - overlapping spectra - resolving power of a grating (K2, K3)
- 4.6 Difference between prism and grating - difference between Fresnel and Fraunhofer diffraction(K3, K4)

#### **Unit V: Polarization**

**(14 hours)**

- 5.1 Polarisation - Double refraction by Huygens explanation of double refraction in uniaxial crystals (K1, K2)
- 5.2 Nicol prism as a polarizer and analyser (K3, K4)
- 5.3 Quarter and half wave plates - production and detection of a plane- circularly and elliptically polarized light (K4)
- 5.4 Optical activity - Fresnel's explanation - experimental verification(K3)
- 5.5 Specific rotatory power - determination of specific rotatory power by Laurent's half shade polarimeter (K3)
- 5.6 Kerr effect and Faraday Effect -LCDs (K3, K4)

#### **Books for Study:**

1. Subramanyam, Brijlal – A Text of Optics – S.Chand & Co. Ltd., 2006.
2. Murugesan R – Optics and Spectroscopy - S.Chand & Co. Ltd., 2005.

#### **Reference Books:**

1. Khanna D.R, Gulati H.R. - Optics - S.Chand and Co. Ltd., Reprint 2002.
2. Raj M.G. - Fundamentals of Optics – Anmol Publications Ltd., New Delhi, 1996.
3. C.L.Arora – Optics, 1<sup>st</sup> Edition - S.Chand and Co. Ltd., New Delhi, 1999.
4. Eugene Hecht - Optics, 4<sup>th</sup> Reprint – Pearson Education Publication, 2004.

**SEMESTER – V**  
**UCPHG20 – Electricity and Magnetism**

<b>Year:</b> III	<b>Course Code:</b> UCPHG20	<b>Title of the Course:</b> Electricity and Magnetism	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> V							

**Course Objectives**

1. To make the students understand the principles and theory of electrostatics, current electricity, thermo electricity, electromagnetism and alternating current.
2. To familiarize the students with different kinds of magnetism such as para, dia, Ferro and anti-ferro magnetism and the various theories of magnetism.

**Course Outcomes (CO)**

The learners will be able to

1. Solve mathematical problems involving electric and magnetic forces, fields, and various electro-magnetic devices and electric circuits.
2. Develop explicit problem-solving strategies that emphasize qualitative analysis steps to describe and clarify the problem.
3. Import knowledge of Transient current, Alternate current
4. To present a clear & consistent picture of the Ballistic galvanometer, Figure of merit, Capacitances, Emf of cells
5. Gain confidence in their ability to apply mathematical methods to understand electromagnetic problems to real-life situations

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	L	H	H
CO2	L	M	H	M	M	L
CO3	L	M	M	M	H	H
CO4	M	H	L	H	M	L
CO5	L	M	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	H	M	L
CO2	M	H	M	H	L	M
CO3	M	L	M	H	M	H
CO4	L	M	H	H	M	L
CO5	M	H	H	L	H	H

**(Low - L, Medium – M, High - H)**

## Course Syllabus

### Unit I: Electrostatics

(16 hours)

- 1.1 Coulomb's law – Permittivity of free space – Relative permittivity (K1,K2)
- 1.2 Gauss Law – statement – proof of Gauss' law – differential form of Gausslaw (K1,K2,K3)
- 1.3 Applications of Gauss Law – Electric field due to a uniformly charged sphere (K3,K4)
- 1.4 Electric Potential – electric potential as line integral of electric field – Relation between electric potential and electric field (K1,K2,K3)
- 1.5 Potential due to a uniformly charged conducting sphere (K1,K2,K3)
- 1.6 Electric dipole – dipole moment – Electric Potential and Electric field due to a dipole Poisson's and Laplace's equations. (K1,K2,K3,K4)

### Unit II: Capacitors & Thermoelectricity

(15 hours)

- 2.1 Capacitance – Definition - Principle – Energy of a charged capacitor (K1,K2)
- 2.2 Loss of energy on sharing of charges – Force of attraction between the plates of a charged capacitor (K3,K4)
- 2.3 Electrometers - construction and working of Quadrant electrometer - Theory of quadrant electrometer – Heterostatic and Idiostatic uses (K1,K2,K3,K4)
- 2.4 Thermoelectricity – Seebeck effect - Peltier Effect – Thomson effect - Expression for Peltier and Thomson co- efficiencies (K1,K2,K3,K4)
- 2.5 Thermodynamics of thermocouple - Thermo-electric diagrams and its uses (K1,K2,K3,K4)
- 2.6 Potentiometer – principle - Emf of thermocouple using Potentiometer. (K1,K2,K3,K4)

### Unit III: DC and AC circuits

(15 hours)

- 3.1 Transient current (DC) – Growth and decay of current in a circuit containing inductance and resistance (LR) – time constant (K2,K3,K4)
- 3.2 Growth and decay of charge in a circuit containing capacitance and resistance (CR) – time constant - Determination of high resistance by leakage (K3,K4)
- 3.3 Growth and decay of charge in LCR circuit – Conditions for oscillations (K3,K4)
- 3.4 Alternating current – Peak, average and RMS values of AC voltage (K1,K2,K3,K4)
- 3.5 AC circuit containing Resistance, inductance and Capacitance (series resonant circuit) resonant frequency (K2,K3,K4)
- 3.6 Power in AC circuit. (K1,K2)

### Unit IV: Electromagnetism

(14 hours)

- 4.1 Biot and Savart's law (Vector treatment) (K3)
- 4.2 Magnetic induction due to a circular coil carrying current – Force on a current carrying conductor placed in a uniform magnetic field (K3,K4)
- 4.3 Moving coil Ballistic Galvanometer – Construction and theory – Damping correction

- Conditions for dead beat – conditions for ballistic (K1,K2,K3,K4)
- 4.4 Current and voltage sensitivities of moving coil galvanometer - Experimental method for figure of merit (K1,K2,K3,K4)
- 4.5 Absolute capacity of a capacitor – Comparison of capacitances - Comparison of EMFs of cells (K1,K2,K3,K4)
- 4.6 Self-inductance and Mutual inductance - self inductance of a long solenoid – mutual inductance of co-axial solenoids – Eddy current and its uses. (K1,K2,K3,K4)

### **Unit V: Magnetism**

**(15 hours)**

- 5.1 Magnetic Induction (B) – Magnetization (M) – Magnetic susceptibility - Permeability (K1,K2)
- 5.2 Relation between B, H and M (K3)
- 5.3 Hysteresis – Hysteresis curve - Experiment to draw M-H curve (hysteresis – horizontal model) (K3,K4)
- 5.4 Importance of hysteresis curves – choice of magnetic materials - Ferrites- Properties of dia, para and ferro magnetic materials (K1,K2,K3,K4)
- 5.5 Langevin's theory of dia and para magnetism (K4)
- 5.6 Weiss theory of ferro magnetism. (K3,K4)

### **Books for Study:**

1. R.Murugesan – Electricity and Magnetism – S.Chand & Co. Ltd., New Delhi, 2009.
2. D.N. Vasudeva – Electricity and Magnetism – S.Chand & Co. Ltd., New Delhi, 2009.

### **Books for Reference:**

1. David J.Criffitts – Introduction to Electro Dynamics – Prentice Hall of India Pvt. Ltd., New Delhi 2002.
2. Duggal B.D. and Chabra C.L – Fundamentals of Electricity and Magnetism Shoban Lal Nagin. Chand & Co. Jallundui, Delhi, 1997.
3. Halliday D., R.Resnich and J.Walker – Fundamentals of Physics, 6<sup>th</sup> Edition – WileyNew York, 2001.
4. Tayal D.C. - Electricity and Magnetism – Himalayan Publishing House, Bangalore, 1999.
5. Tewari K.K. – Electricity and Magnetism – S.Chand& Co. Ltd., New Delhi, 2001.

**SEMESTER – V**  
**UCPHH20 – Atomic Physics and Spectroscopy**

<b>Year:</b> III	<b>Course Code:</b> UCPHH20	<b>Title of the Course:</b> Atomic Physics And Spectroscopy	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Objectives**

1. To provide the students with basic ideas of properties of atoms and ions when subjected to Electric and magnetic fields.
2. To make the students to acquire the knowledge about the salient features of vector atom model and to explain the fine structure of spectral lines.
3. To provide a brief understanding of the principles of Spectroscopy.

**Course Outcomes (CO)**

The learners will be able to

1. Understand the observed dependence of atomic spectral lines on externally applied electric and magnetic fields.
2. Analyse the types of photo electric cells.
3. Realize the theories explaining the structure of atoms and the origin of the observed spectra.
4. Identify the atomic effect such as Zeeman Effect and its types
5. List the different types of atomic spectra

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	M	H	H
CO2	M	M	H	M	M	L
CO3	H	M	M	M	H	H
CO4	M	H	L	H	M	L
CO5	H	M	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	L	H
CO2	M	H	H	L	H	M
CO3	H	M	H	H	L	M
CO4	H	M	M	M	L	H
CO5	M	H	H	M	H	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Positive Ray Analysis (14 hours)

- 1.1 Overview of Positive Ray Analysis and its properties (K1,K2)
- 1.2 Determine the value of  $e/m$  using Thomson's parabola method (K3,K4)
- 1.3 Aston's mass spectrograph(K4)
- 1.4 Dempster's mass spectrograph(K3)
- 1.5 Critical potentials (ionization and excitation potential) (K1,K2)
- 1.6 Experimental determination of critical potentials-Frank and Hertz experiment-Davis and Goucher's experiment. (K1,K2,K3,K4)

### Unit II: Photo Electric Effect (14 hours)

- 2.1 Photo electric emission and laws (K1,K2)
- 2.2 Determination of  $e/m$  using Lenard's experiment(K3,K4)
- 2.3 Richardson and Compton experiment(K3,K4)
- 2.4 Einstein's photoelectric equation – Experimental Verification of Einstein's photoelectric equation by Millikan's experiment (K3,K4)
- 2.5 Photoelectric cells-photo-emissive cell - photo-voltaic cell - photoconductive cell- (K3,K4)
- 2.6 Applications of photo electric cell – Photo multiplier tube (K2,K3)

### Unit III: Vector Atom Model (15 hours)

- 3.1 Vector Atom Model-Spatial Quantization – Electron spin (K1,K2,K3)
- 3.2 Quantum numbers of electrons (K1,K2,K3)
- 3.3 Coupling scheme -L-S and j-j Couplings (K2,K3)
- 3.4 Pauli's Exclusion Principle and Electronic configuration of elements and periodic classification (K4)
- 3.5 Magnetic dipole moment of electron due to orbital and spin motion- Bohr magneton (K2,K4)
- 3.6 Stern and Gerlach experiment - Spin Orbit Coupling (K2,K4)

### Unit IV: Fine Structure of Spectral Lines (16 hours)

- 4.1 Overview of Spectral terms and notations, Selection rules, Intensity rule and interval rule ((K1,K2,K3)
- 4.2 Fine structure of Sodium D lines (K3)
- 4.3 Spectrum of Helium (K3)
- 4.4 Zeeman effect (experimental arrangement for the normal Zeeman effect (K2,K3)
- 4.5 Larmor's theorem(K2,K3)
- 4.6 Debye's explanation of normal Zeeman effect-Anomalous Zeeman effect- Theoretical explanation-Lande's  $g$  factor and explanation of splitting of D1 and D2 lines of sodium – Coalescence of spectral lines. (K1,K2,K3,K4)

**Unit V: Spectroscopy (K1 to K4)****(16 hours)**

- 5.1 Electromagnetic spectrum - Laws of Absorption Spectrum (K1,K2,K3)
- 5.2 UV rays -Sources of UV –detection –IR rays- Sources – Detection (K1,K2,K3)
- 5.3 Double Beam Spectrophotometer (K3)
- 5.4 Scattering of light - Rayleigh’s scattering(K2)
- 5.5 Raman effect-Experimental study of Raman effect-Quantum theory of Raman effect (K2,K3,K4)
- 5.6 Comparison of Raman and IR Spectra (K2)

**Books for Study:**

1. N.Brijial & N.Subrahmanyam-Atomic and nuclear physics-S. Chand & Co. Publication, New Delhi, 2005.
2. R.Murugesan Kiruthiga sivaprasanth-Modern Physics-S.Chand-First edition 2007.
3. S.N.Ghoshal-Atomic Physics-S.Chand&Co.Publication New Delhi,2006.
4. B.K.Sharma-Spectroscopy-GOEL publishing House-20th Edition,2007.
5. O.D.Tyagi and M.Yadav-A Text book of Spectroscopy-Anmol Publications,1996.

**Books for Reference:**

1. Atomic and molecular physics - C.L.Arora- S.Chand & Co.Publication, New Delhi.
2. Atomic and molecular physics-Raj Kumar-Campus Books International First edition 2003.
3. Text book of Atomic Physics-D.K.Jha-Discovery Publishing house, New Delhi,2004.
4. Gurdeep Chatwal and Sham Anand-Spectroscopy-Himalaya Publishing House, 2009.

**SEMESTER – V**  
**UCPHH20 – Basic Electronics**

<b>Year:</b> III	<b>Course Code:</b> UCPHI20	<b>Title of the Course:</b> BASIC ELECTRONICS	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> V							

**Course Objectives**

1. To give knowledge of some basic electronic components and circuits.
2. To acquire the knowledge about the characteristics and working principles of semiconductor diodes, transistors, FET, UJT and SCR.
3. Analysis the working of semiconductor circuits such as rectifiers, Amplifiers, oscillators, and multivibrators.

**Course Outcomes (CO)**

1. Learn the basic role of semiconductor and its working principle.
2. Identify and explain the various current components in a transistor.

3. Have a clear understanding about different types of oscillators and its working functions.
4. Analysis the I-V characteristic of semiconductor diodes, transistors, FET, UJT and SCR.
5. Realize the importance of special device and its applications.

CO	PO					
	1	2	3	4	5	6
CO1	L	M	M	L	H	H
CO2	M	H	H	H	L	L
CO3	H	L	M	H	H	M
CO4	M	H	M	H	H	L
CO5	L	M	H	M	H	L

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	L	H	H
CO2	H	H	M	M	L	M
CO3	H	M	M	H	L	H
CO4	H	H	L	M	H	M
CO5	H	M	M	H	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Semiconductor Devices and Rectifiers

(14 hours)

- 1.1 Semiconductors -P-type and N-type- PN junction diode (K1,K2,K3)
- 1.2 V-I characteristics -PN junction diode (K4)
- 1.3 Zener diode -Zener diode as a voltage regulator (K1, K2,K4)
- 1.4 Half wave and full wave rectifiers -theory of full wave rectifier- Bridge rectifiers-expression for efficiency and ripple factor for half wave and full wave rectifiers (K1, K2, K3, K4)
- 1.5 Filters-Types of filter circuits -Action of filter circuits - $\pi$  section filter (K1,K2,K3, K4)
- 1.6 Diode voltage doubler- Diode voltage multiplier -Clipping and Clamping (K1,K2,K3, K4)

### Unit II: Transistors and Amplifiers

(14 hours)

- 2.1 Junction transistors- CB, CE modes configuration (K1, K3)
- 2.2 Relationship between  $\alpha$ ,  $\beta$  of a transistor (K4)
- 2.3 Transistor amplifier- Methods of transistor biasing -voltage divider Method (K1,K2,K3, K4)
- 2.4 Two-port representation of a transistor -h-parameters -AC equivalent circuit of a transistor amplifier (common emitter only), expressions for current gain, voltage gain, input, impedance, output admittance and power gain (K1, K2,K3,K4)

- 2.5 RC coupled amplifier -Frequency response curve (K3,K4).
- 2.6 Power amplifiers- Classification of amplifiers-class A power amplifier- Push -pull amplifiers, class B power amplifier-Emitter follower (K3,K4).

### **Unit III : Oscillators**

**(14 hours)**

- 3.1 Feedback in amplifier-Positive and negative Feedback-Advantages of negative feedback (K2, K3)
- 3.2 Oscillators -Oscillations in tank circuit (K1, K2)
- 3.3 Barkhausen Criterion (K3, K4)
- 3.4 Hartley and Colpitts oscillators(K3, K4)
- 3.5 Phase shift and Wien Bridge oscillators (K3,K4)
- 3.6 Expressions for the frequency of oscillation and conditions for oscillations in hparameters(K4)

### **Unit IV: Special devices**

**(14 hours)**

- 4.1 Field effect transistor –JFET– construction and working – Output characteristics (K1, K3, K4)
- 4.2 Difference between FET and bipolar transistor(K2)
- 4.3 Parameters of JFET (K3)
- 4.4 Description and working of MOSFET- Depletion and Enhancement type MOSFETS (K3, K4)
- 4.5 Construction, working and V-I-characteristics UJT (K3, K4)
- 4.6 Construction, working and V-I characteristics of Silicon controlled rectifier (K3,K4).

### **Unit V: OP-AMP and Multivibrators**

**(12 hours)**

- 5.1 Differential amplifier - differential gain (K3,K4)
- 5.2 Common mode rejection ratio (CMRR) (K3,K4).
- 5.3 Operational amplifiers- characteristics of an ideal OP-AMP (K3,K4)
- 5.4 Expression for voltage gain, inverting and non-inverting amplifier (K3,K4)
- 5.5 Voltage follower, Summer, Differentiator, Integrator (K2,K3,K4)
- 5.6 Multivibrators, astable, monostable and Bistable multivibrator using transistors and op-amp (K3,K4)

### **Books for Study:**

1. Mehta V.K. – Principles of Electronics, 6<sup>th</sup> Edition – S.Chand& Co. Ltd., 2003.
2. Badge M.K. Singh S.P. – Elements of Electronics - S.Chand& Co. Ltd., 2002.
3. Subramanyam .A - Applied Electronics – The National Publishing Company, 2006.

### **Books for Reference:**

1. Theraja B.L. Basic Electronics – S.Chand and Co. Pvt. Ltd., 2000.
2. Chattopadhyaya – Foundation of Electronics – New Age International Pvt. Ltd., Publishers, New Delhi, 1999.

3. Gupta and Kumar – Hand Books of Electronics, 24<sup>th</sup> Revised Edition – Pragathi Prakasham, 1998.
4. Theodre F.Bogart – Electric Circuit, 2<sup>nd</sup> Edition – Glenco Pvt.Ltd., 1996.
5. Puri & Chand – Handbook of Electronics – Anmol Publication, Reprint, 1996.
6. Albert Paul Nalvino – Principles of Electronics, 6<sup>th</sup> Edition - Tata McGraw Hill Publications Co., 1999.
7. Sedha R.S. – Applied Electronics - S.Chand and Co. Pvt. Ltd., 2019.

### SEMESTER – V

#### UEPHA20 – Elective IA: Digital Electronics and Communication

<b>Year:</b> III	<b>Course Code:</b> UEPHA20	<b>Title of the Course:</b> Elective IA: Digital Electronics and Communication	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> V							

#### Course Objectives

1. To analyze logic processes and implement logical operations using logic circuits.
2. To understand the design and operation of arithmetic circuits, logic families, flip flop and counters.
3. To analyze different parameters of analog communication techniques.
4. To introduce students the concept and theory of signals and systems needed in electronics and telecommunication fields

#### Course Outcomes (CO)

The learners will be able to

1. Learn the fundamental operation of logic circuit.
2. Express the basic design and operation of arithmetic circuits.
3. Convert different type of codes and number systems which are used in digital communication system.
4. To introduce students to the basic idea of signal, modulation and demodulation techniques of analog communication.
5. To understand the concept, working principle, block diagram and key applications of AM and FM transmitting & receiving system.

CO	PO					
	1	2	3	4	5	6
CO1	M	H	M	H	L	M
CO2	M	L	H	M	M	L
CO3	L	M	H	M	M	H
CO4	L	M	H	M	L	L
CO5	H	M	H	M	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	H	M	L
CO2	H	M	H	M	M	H
CO3	M	L	M	H	M	M
CO4	H	M	H	H	L	M
CO5	H	M	H	L	H	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Boolean algebra and Logic gates

(12 hours)

- 1.1 Decimal and binary systems -Decimal to binary and binary to decimal conversion (K1,K2)
- 1.2 Boolean operations, logic expressions, rules and laws of Boolean algebra (K4)
- 1.3 DeMorgan's theorems -Simplification of Boolean expressions using Boolean algebra Techniques (K1, K2,K4)
- 1.4 Fundamental products-Sum of products - Karnaugh map- pair, quads and octet (K3)
- 1.5 AND gate - OR gate - NOT gate - NAND gate - NOR gate (K2, K4)
- 1.6 EX – OR and EX – NOR gates – NAND and NOR as universal gates (K2, K4)

### Unit II: Arithmetic Circuits and Logic Families

(12 hours)

- 2.1 Introduction of Arithmetic circuits (K1)
- 2.2 Adders- Half Adder - Full Adder (K2,K3)
- 2.3 Subtractor - Half Subtractor (K2,K3)
- 2.4 Parallel binary adders- BCD adder (K3,K4)
- 2.5 Multiplexers and De-Multiplexers with suitable example (K3, K4)
- 2.6 Digital logic family- RTL NOR gate-DTL NAND gate- TTL NAND gate - Characteristics of TTL family(K3, K4)

### Unit III: Flip Flop and Counters, D/A Conversion & A/D Conversion

(13 hours)

- 3.1 RS flip flop -clock pulses- clocked RS flip flop- Preset and clear, JK flip flop- Race around condition- JK Master slave flip flop- D flip flop- T flip flop(K2,K3)
- 3.2 Asynchronous counter-3 bit binary counter - Mod 7 counter (K2, K3)
- 3.3 Operation of synchronous counters- mod8 parallel counter (K3, K4)
- 3.4 Combination counter-Decade counter (K3, K4)
- 3.5 Binary weight- Resistance divider method – Binary ladder method (K3,K4).
- 3.6 Simultaneous equation (K4)

### Unit IV: Modulation and Demodulation

(12 hours)

- 4.1 Modulation- Amplitude modulation- Mathematical analysis of AM wave (K1,K3,K4)
- 4.2 Modulation index (modulation factor) - Power in AM wave (K1, K2)
- 4.3 Frequency modulation - expression for frequency modulated wave(K1, K3)

- 4.4 Demodulation -Ratio Detector (K1, K2, K4)  
 4.5 Block diagram of AM transmitting system- AM receiver: Principle of Superhetrodyne receiver (K3,K4)  
 4.6 Block diagram of FM transmitting & receiving system (K3, K4)

**Unit V: Propagation of Radio Waves and Radar (13 hours)**

- 5.1 Antenna- Dipole and Folded type Antennas-array of antennas (K1,K2)  
 5.2 Propagation of Radio waves -Propagation of ground waves- Space wave propagation- Skywave propagation (K3,K4).  
 5.3 Skip distance and maximum usable frequency and Fading (K1,K2)  
 5.4 The ionosphere- Effect of ionosphere on propagation of radio waves - Eccles Larmor theory (K3,K4)  
 5.5 Principle, working and applications of Radar (K1,K2,K3,K4)  
 5.6 Range equation for radar and Duplexer (K3, K4)

**Book for Study:**

1. Malvino and Leech – Digital Principles and Applications, 5<sup>th</sup> Edition – Tata McGraw Hill, 2002.
2. A.Subramanyam - Applied Electronics –National Publishing Company, 2006.
3. R.Murugesan Kiruthiga Sivaprasath - Modern Physics – S.Chand, 2007.

**Books for Reference:**

1. Mano Morris – Digital Logic and Computer Designs, 23<sup>rd</sup> Edition – Prentice Hall Publication, 2000.
2. R.S. Sedha – A Textbook of Electronics – S.Chand Publication, 2001.
3. Gupta & Kumar - Handbook of Electronics – PragatiPrakasan Publication, 2002..
4. T.L.Floyd – Digital Fundamentals, 3<sup>rd</sup> Edition – Universal Book Stall, New Delhi, 2002.
5. V.K.Puri – Digital Electronics, 5<sup>th</sup> Reprint – Tata McGraw Hill Publication, 2003.

**SEMESTER – V  
 UEPHB20 – Elective – IB: Astro and Plasma Physics**

<b>Year:</b> III	<b>Course Code:</b> UCPHB20	<b>Title of the Course:</b> Elective – IB: Astro and Plasma Physics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> V							

**Course Objectives**

1. To understand various astrophysical phenomena by applying the knowledge obtained in Plasma Physics

2. To study and help to understand a solid grounding in fundamental plasma physics.
3. To acquire the knowledge about variety of structures we can see in the universe from stars and planetary systems, to galaxies and clusters of galaxies.

### Course Outcomes (CO)

The learners will be able to

1. Learn the basic theories about the sun and solar system.
2. Learn the most fascinating and important astrophysical phenomena.
3. Have a clear understanding about visible matter in the universe
4. Study the various phases of the interstellar medium inside galaxies
5. Study in detail about Cosmic Rays, Galaxy and Instrumentation

CO	PO					
	1	2	3	4	5	6
CO1	L	H	M	M	H	H
CO2	L	H	M	H	L	M
CO3	M	L	H	M	H	H
CO4	H	L	M	L	H	M
CO5	L	H	M	H	H	L

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	M	H	L
CO2	M	H	M	H	H	M
CO3	H	M	H	M	L	H
CO4	M	L	L	L	M	H
CO5	H	M	L	H	L	M

(Low- L, Medium - M, High - H)

### Course Syllabus

#### Unit I: Theories about solar system and the sun

(12 hours)

- 1.1 Theories on solar system like Geo-centric theory and Helio-centric theory (K1,K2,K3)
- 1.2 Kepler's laws of gravitation and Newton's law of gravitation- Basic ideas of the solar system (K1,K2).
- 1.3 The Sun and temperature distribution near the photosphere (K3,K4).
- 1.4 Chromosphere boundary and solar granulation (K3,K4).
- 1.5 Study the basic concepts chromospheres, Spicules, plages and filaments, solar

corona and Solar flares (K2,K3)

1.6 Radio emission from the sun, solar wind and syroheliometer (K1,K2,K3,K4).

## **Unit II: Stars**

**(12 Hours)**

2.1 Colour Index of stars, stellar evolution and birth of a star (K1, K2,K3)

2.2 Maturity, ageing of stars and death of a star (K1,K3,K4)

2.3 Types of stars such as binary, multiple, variable, erupting and exploding stars (K1, K2,K3, K4)

2.4 Nebulae, Novae and Super Novae (K1, K2,K3,K4).

2.5 White dwarfs and electrons in white dwarfs(K3,K4).

2.6 Study of neutron stars, pulsars, quasars and black holes (K1,K3,K4).

## **Unit III: Cosmic Rays, The Galaxy and Instrumentation**

**(12 hours)**

3.1 Cosmic rays and discovery of cosmic rays (K2, K3).

3.2 Latitude effect, azimuth effect, altitude effect and longitude effect (K3,K4).

3.3 Primary cosmic rays and secondary rays (K1,K2)

3.4 Cosmic ray showers and vanallen belts (K3, K4).

3.5 The Galaxy, hubble's law and general structure of galaxy(K1,K2,K3,K4).

3.6 Astronomical Instruments: Reflecting and refracting telescopes, radio telescopes and hubble space telescope (HST) (K1, K3,K4).

## **Unit IV: Basic concepts of Plasma**

**(12 hours)**

4.1 Introduction to plasma and composition and characteristics of plasma (K1,K3)

4.2 Collisions, elastic collisions, Inelastic collisions and space plasma (K2,K3)

4.3 Interstellar space plasma and earth's atmospheric plasma (K3)

4.4 Atmosphere of other planets (K3, K4)

4.5 Nuclear reactions in steller plasma (K3,K4)

4.6 Proton-Proton cycle (K3, K4)

## **Unit V: Characteristics and Applications of Plasma**

**(12 hours)**

5.1 Properties of plasma in a magnetic field (K3,K4)

5.2 Force on plasma in a magnetic field (K3)

5.3 Current in magnetized plasma (K3)

5.4 Collisions in fully ionized magneto-plasmas and pinch effect. (K3,K4)

5.5 Applications of plasma (K4)

5.6 Controlled thermonuclear reactions, Heating and confinement of plasma Stellarator and tokamak (K3, K4)

**Books for Study:**

1. K.S.Krishnaswamy – Astro Physics: A Modern Perspective – New Age International Pvt. Ltd., New Delhi, 2002.
2. G.K.Sasidharan – The Great Universe – S.Chand& Company Ltd., New Delhi, 2008.
3. R.Murugeshan Kiruthiga Sivaprasath – Modern Physics–S.Chand &Co.Publication, 2007.

**Books for Reference:**

1. BaidyananthBasu – An Introduction to Astro Physics – Prentice Hall of India, 2004.
2. V.B.Bhatia – Textbook of Astronomy and Astro Physics with Elements of Cosmology – Narosa Publishing House, New Delhi, 1998.
3. R.R.Danial – Concepts of Space Science – University Press, Reprint 2002.
4. K.CosmicKapoor – Space Book – Lotus Press, 2005.
5. Goswami – Elements of Plasma Physics – New Central Book Agency, Reprint 2000.

**SEMESTER – VI**  
**UCPHJ20 – NUCLEAR PHYSICS**

<b>Year:</b> III	<b>Course Code:</b> UCPHJ20	<b>Title of the Course:</b> NUCLEAR PHYSICS	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> VI							

**Course Objectives**

1. To understand the basic properties of nucleus.
2. To expose to the students the processes of Radioactivity, nuclear fission, nuclear fusion and their applications in various fields.
3. To introduce a brief account of the elementary particles and cosmic rays.

**Course Outcomes (CO)**

The learners will be able to

1. Demonstrate a knowledge of fundamental aspects of the structure of the nucleus, radioactive decay, nuclear reactions and the interaction of radiation and matter.
2. Discuss nuclear and radiation physics connection with other physics disciplines – solid state, elementary particle physics, radiochemistry.
3. Describe experimental techniques used (or developed) for nuclear physics purposes semiconductor detectors and discuss their influence on development of new technologies.
4. Students learn about nuclear models, nuclear reactions, and radioactivity. Students might also examine nuclear imaging, dosimetry, and isotopic dating in a course focusing on nuclear science's applications.
5. Explore an application of nuclear and radiation physics and communicate their understanding to a group of their peers in a short presentation.

CO	PO					
	1	2	3	4	5	6
CO1	L	H	M	M	H	H
CO2	L	H	M	H	L	M
CO3	M	L	H	M	H	H
CO4	H	L	M	L	H	M
CO5	L	H	M	H	H	L

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	H	H	L
CO2	M	L	M	H	H	M
CO3	H	M	H	M	L	H
CO4	M	L	H	L	M	H
CO5	H	M	H	H	L	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Properties of Nuclei and Nuclear Structure (15 hours)

- 1.1. Introduction and overview – Classification of nuclei (K1, K2)
- 1.2. General properties of Nucleus and Binding energy – Mass defect - Packing fraction – Nuclear Stability (K1,K2,K3)
- 1.3. Nuclear forces – Meson theory of Nuclear forces (K3,K4)
- 1.4. Nuclear models – Liquid drop model – Weizacker's semi empirical mass formula (K3,K4)
- 1.5. Shell model – Evidences for magic numbers (K2,K3)
- 1.6. Collective Model (K3)

### Unit II: Radioactivity (15 hours)

- 2.1 Fundamental laws of radio activity – Laws of radioactive disintegration – Mean life – Half life (K1,K2,K3)
- 2.2 Measurement of decay constants – Law of successive disintegration – Age of the earth (K3,K4)
- 2.3 Biological effects of nuclear radiations (K2,K3)
- 2.4 Discovery of natural radioactivity – Gamow's Theory of alpha decay - Alpha ray spectra (K2,K3,K4)
- 2.5 Beta decay – Beta decay spectra – Origin of the line and continuous spectrum (K3,K4)
- 2.6 Neutrino theory of beta decay – Gamma ray spectra – Origin of gamma rays – Nuclear isomerism (K3,K4)

### Unit III : Particle Detectors and Particle Accelerators (15 hours)

- 3.1 **Particle Detectors:** Geiger Muller Counter (K4)
- 3.2 Wilson Cloud Chamber (K3)
- 3.3 Bubble Chamber (K3)
- 3.4 Scintillation counter -ionization chamber (K2,K3)
- 3.5 **Particle Accelerators:** Linear Accelerator – Betatron (K2,K3,K4)
- 3.6 Synchrocyclotron – Protonsynchrotron (K3,K4)

**Unit IV: Artificial Transmutation of Elements****(15 hours)**

- 4.1 Artificial transmutation of elements (K1,K2)
- 4.2 Nuclear reactions - Q value for a nuclear reaction (K3,K4)
- 4.3 Types of nuclear reactions – Conservation laws of nuclear reaction – Threshold energy of an endoergic reaction (K2,K3,K4)
- 4.4 Discovery of neutron – Detection and properties of neutron (K3)
- 4.5 Thermal neutrons - Induced radioactivity (K3)
- 4.6 Applications of radio isotopes in medicine, agriculture, industry – Carbon dating (K3,K4)

**Unit V: Nuclear Fission and Fusion****(15 hours)**

- 5.1 Discovery – Nuclear fission – Calculation of energy in amu - Energy released in fission - Bohr wheeler's theory of nuclear fission (K2,K3,K4)
- 5.2 Chain reaction – atom bomb – nuclear reactors (K2)
- 5.3 Power reactor – Breeder reactor (K3,K4)
- 5.4 Nuclear fusion – source of stellar energy - thermo nuclear reaction (K3,K4)
- 5.5 Carbon – nitrogen cycle, proton – proton cycle – Hydrogen bomb (K2,K3)
- 5.6 Elementary particles – Baryons – Hyperons – leptons – mesons – the quark model. (K1,K2,K3,K4)

**Books for Study:**

1. R.Murugesan Kiruthiga Sivaprasath - Modern Physics – S.Chand, 2007.
2. M L Pandya & R P S Yadav - Elements of Nuclear physics – Ramnath Meerut Publication, 7<sup>th</sup> reprint, 2006.
3. D.C.Tayal- Nuclear Physics – Himalaya Publishing House, 2006.
4. B.N. Srivatsav - Basic Nuclear Physics, 17<sup>th</sup> Edition – Pragathi Prakasham, 2001.

**Reference Books**

1. J.B .Rajam - Nuclear Physics – S.Chand and Co. Pvt. Ltd., Reprint 2000.
2. S.B.Patel – Introduction to Nuclear Physics – New Age International Publication, Reprint 2003.
3. Beiser - Concept of Modern Physics - McGraw Hill Publications Co. Ltd., 2005.
4. C.L.Arora -B.Sc physics: Nuclear Physics – S. Chand & Co.Pvt. Ltd., 1999.
5. G.Chatwal - Nuclear Physics, Vol. I and II – Dominant Publication, 2007.

**SEMESTER – VI**  
**UCPHK20 – Relativity and Quantum Mechanics**

<b>Year:</b> III	<b>Course Code:</b> UCPHK20	<b>Title of the Course:</b> Relativity and Quantum Mechanics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> VI							

**Course Objectives**

1. Understand the concept of constant relative motion of different bodies in different frames of references
2. To introduce students to the concept of special relativity and its applications to Physical Sciences
3. To make the students understand the inadequacy of classical mechanics and the birth of quantum mechanics.
4. To study role of uncertainty in quantum physics.
5. To impart the knowledge about the postulates and the basic principles of quantum mechanics and operator formulation.
6. Students learn the concept of wave function and Schrodinger equation and their applications using spherically symmetric potentials.

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concept of constant relative motion of different bodies in different frames of references
2. To introduce students to the concept of special relativity and its applications to Physical Sciences
3. To make the students understand the inadequacy of classical mechanics and the birth of quantum mechanics.
4. To study role of uncertainty in quantum physics.
5. To impart the knowledge about the postulates and the basic principles of quantum mechanics and operator formulation.

CO	PO					
	1	2	3	4	5	6
<b>CO1</b>	M	H	M	H	M	M
<b>CO2</b>	M	H	H	M	M	L
<b>CO3</b>	L	M	H	M	M	H
<b>CO4</b>	L	M	H	M	L	L
<b>CO5</b>	H	M	H	M	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	L	H	M
CO2	L	H	M	L	H	M
CO3	H	H	M	L	H	M
CO4	M	L	H	M	H	M
CO5	H	H	M	L	H	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Relativity

(15 hours)

- 1.1 Postulates of special theory of relativity-Galilean transformation equation- Michelson-Morley Experiment (K1,K2,K3,K4)
- 1.2 Lorentz transformation equations(K3,K4)
- 1.3 Length contraction and Time dilation (K1,K2,K3)
- 1.4 Relativity of simultaneity and Addition of velocities (K1,K2,K3)
- 1.5 Variation of mass with velocity and Mass energy relation (K1,K2,K3,K4)
- 1.6 Minkowski's four dimensional space and Elementary ideas of general theory of relativity and its significance - Red Shift.(K3,K4)

### Unit II: Wave Nature of Matter

(15 hours)

- 2.1 De Broglie wavelength - Phase velocity and group velocity of de Broglie waves – relationship between phase velocity and group velocity (K3,K4)
- 2.2 Experimental study of matter waves – Davisson and Germer's experiment – G. P. Thomson's experiment (K1,K2,K3,K4)
- 2.3 Wavelength of motion of particles like electron – Electron microscope (K1,K2,K3,K4)
- 2.4 Heisenberg's uncertainty principle – $\gamma$ - ray microscope (K2,K3)
- 2.5 Application – Diffraction of electron beam by single slit and Non- existence of electrons inside the nucleus (K1,K2,K3,K4)
- 2.6 Explanation of Bohr radius - Minimum energy of Simple Harmonic Oscillator. (K3,K4)

### Unit III: Schrodinger Equation

(15 hours)

- 3.1 Failures of Classical mechanics - Wave function - Physical interpretation of wave function - Postulates of quantum mechanics (K1,K3,K4)
- 3.2 Operators for physical quantities (K2,K3,K4)
- 3.3 Eigen value equation - Eigen values and Eigen functions (K2,K3)
- 3.4 Schrodinger's equation -Time dependent and time independent equation (K1,K3,K4)
- 3.5 Expectation values – Expectation values of observables (K2,K3)
- 3.6 Ehrenfest's theorem (K4)

**Unit IV: One dimensional Problem****(15 hours)**

- 4.1 Free particle solution of Schrodinger's equation (K3,K4)
- 4.2 Bound state problems: Particle in a box (K3,K4)
- 4.3 Wave equation and solution for the particle - Eigen values of energy (K2,K3,K4)
- 4.4 Normalization of the wave functions (K1, K3)
- 4.5 Simple harmonic oscillator– Square well potential of finite depth (K3,K4)
- 4.6 Rectangular potential barrier - Tunneling effect. (K4)

**Unit V: Spherically Symmetric Potential Problems:****(15 Hours)**

- 5.1 Schrodinger equation in Spherical polar coordinates (K1,K3)
- 5.2 Reduction of two body problems in to one body problem (K3)
- 5.3 Hydrogen atom – Wave equations for the hydrogen atom - Separation of variables- Azimuthal, polar and Radial wave equations (K1,K2,K3,K4)
- 5.3 Solution for Azimuthal and polar wave equation (K1,K2,K3,K4)
- 5.5 Rigid Rotator- Moment of inertia of a rigid rotator (K1,K3,K4)
- 5.6 Wave equation for rigid rotator and its energy levels- wave functions for the rigid rotator. (K3,K4)

**Books for Study:**

1. R.Murugesan – Modern Physics – S.Chand Publication – Reprint 2007 (Units I, III, V – Rigid Rotator)
2. Arthur Beiser – Concepts of Modern Physics – McGraw Hill Publication, 2003.
3. S.P.Singh, M.K.Badge& Kamal Singh – Quantum Mechanics – S.Chand & Co. Ltd., Reprint 2001(Unit – IV )
4. G.Aruldass – Introduction to quantum mechanics – Prentice Hall of India, Reprint 2005 (Unit – IV)
5. D.Devanathan, - Introduction to Quantum Mechanics – Narosa Publications, 2019.
6. Kamal Singh, S.P.Singh – Elements of Quantum Mechanics – S.Chand publications – Edition 2005 (Unit V)

**Books for Reference:**

1. Gupta Kumar Sharma – quantum Mechanics - Jai Prakash Nath Publications, 2017.
2. B.K.Agarwal – quantum Mechanics – Lokbharathi Publications, 2003
3. Sathyaprakash - Mathematical physics – S.Chand & Sons, Reprint 2006.
4. Sathyaprakash – Advanced quantum mechanics - S.Chand & Sons, Reprint 2006.

## SEMESTER – VI

### UEPHC20 – Elective – II A: Solid State Physics and Material Science

<b>Year:</b> III	<b>Course Code:</b> UEPHC20	<b>Title of the Course:</b> Elective - II A: Solid State Physics and Material Science	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To have background about solid materials and crystal structure.
2. To understand the fundamentals of polarization mechanisms in dielectric materials.
3. To characterize the properties of solids and dynamic lattice vibrations arrangements of atoms
4. To study electrons in solids and key features distinguishing metals, insulators and semiconductors and defects in crystals.
5. To learn superconductivity and magnetism.

#### Course Outcomes (CO)

The learners will be able to

1. Building blocks of crystals, Bravais lattices, crystal structure, reciprocal lattice
2. To learn lattice dynamics, phonons, density of states, specific heat, thermal conductivity
3. To study electron theory, free model theory, band theory of metals, semiconductors and electrical conductivity
4. Learn the basic properties of superconductors in the frame of BCS theory
5. To study the dielectric property of various materials

CO	PO					
	1	2	3	4	5	6
CO1	L	H	H	M	H	M
CO2	M	H	H	M	H	M
CO3	H	M	L	M	H	H
CO4	H	H	M	H	H	M
CO5	M	M	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	L	H	M
CO2	L	H	M	L	H	M
CO3	H	H	M	L	H	M
CO4	M	L	H	M	H	M
CO5	H	H	M	L	H	M

(Low- L, Medium - M, High – H)

## **Course Syllabus**

### **Unit I: Crystal Structure**

**(14 hours)**

- 1.1 Crystal lattice – Primitive and unit cell – seven classes of crystals – Bravais lattice – Miller indices (K1, K2)
- 1.2 Structure of crystals - simple cubic - face centered cubic structure - body centered cubic structure - hexagonal close packed structure(K4, K5)
- 1.3 Reciprocal lattices - properties of reciprocal lattice(K3, K4)
- 1.4 Bragg's law - Determination of crystal structure (K4, K5)
- 1.5 The Laue method of X – ray diffraction (K4, K5)
- 1.6 Powder crystal method (Debye- Scherrer method) (K4, K5)

### **Unit II: Band Theory of Solids and Defects**

**(14 hours)**

- 2.1 Energy band in solids (K1)
- 2.3 Electron in a periodic potential (K3, K4)
- 2.3 Brillouin zones (K1, K2)
- 2.4 Brillouin zones construction(K3, K4)
- 2.4 Crystal imperfections (K3)
- 2.5 Point defects - line defects - surface defects(K4)
- 2.6 Effects of crystal imperfections(K3)

### **Unit III: Dielectric properties**

**(14 hours)**

- 3.1 Dielectrics - Dielectric polarizability - Dielectric constant (K1, K2)
- 3.2 Different types of electric polarization (Ionic, electronic and orientational polarization) (K3, K4)
- 3.3 Frequency and temperature effects on polarization (K3, K4)
- 3.4 Dielectric loss - Local field or internal field - Clausius – Mosotti Relation -determination of dielectric constant (K2, K3, K4)
- 3.5 Dielectric breakdown (K2)
- 3.6 Properties of different types of insulating materials (K3, K4)

### **Unit IV: Bonding in Crystals and Lattice Vibrations**

**(14 hours)**

- 4.1 Types of bond in crystals- Ionic, covalent, metallic, Vanderwaal's and Hydrogen bonding (K1, K2, K3)
- 4.2 Phonons of mono atomic one dimensional lattice (K3, K4)
- 4.3 Specific heat of solids – Atomic heat - Dulong and Petit's (K3, K4)
- 4.4 Einstein's theory of specific heat (K4)
- 4.5 Debye's theory of specific heat (K4)
- 4.6 Cohesive energy of ionic crystals (K2, K3)

## **Unit V: Superconductivity**

**(14 hours)**

- 5.1 Introduction - Properties of superconductors(K1, K2)
- 5.2 Type I and Type II superconductors (K2, K3)
- 5.3 BCS theory of super conductors - Cooper pair - Electron – Lattice – electron interaction(K3, K4)
- 5.4 Meissner effect - Ac Josephson effect of superconductors(K4)
- 5.5 Dc Josephson effect of superconductors(K4)
- 5.6 High temperature superconductors - Application of superconductors (K3)

### **Books for Study:**

1. R.Murugesan, Kiruthiga Sivaprasath - Modern Physics, First Edition - Ltd, NewDelhi, 2007.
2. Gupta Kumar – Solid State Physics, 9<sup>th</sup> Edition - K.Nath & Co. Education, 2006.
3. S.O.Pillai - Solid State Physics, 6<sup>th</sup> Edition - S.Chand& Co., 2005.
4. D Velmurugan – Elements of Crystallography – M J P Publishers, 2008.

### **Books for Reference:**

1. H.C.Guptha - Solid State Physics - Vikas Publishing House, 2013.
2. S.L.Kakani - Solid State Physics: Theory, Application and Problems – 2005.
3. P.K.Palaniswamy - Solid State Physics - SciTech Publication, 2003.
4. J.P.Srinivastva - Elements of Solid State Physics - Prentice Hall of India, 2004.
5. Wahab - Solid State Physics: Structure and Properties of Materials, 2<sup>nd</sup> Edition – Narosa Publishing Huse, 2008.
6. V Rajendran, A Marikani - Material Science – Tata McGraw Hill Publishing Company, 2005.

**SEMESTER – VI**  
**UEPHD20 – Elective – II B: Materials Science**

<b>Year:</b> III	<b>Course Code:</b> UEPHD20	<b>Title of the Course:</b> Elective - II B: Materials Science	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> VI							

**Course Objectives**

1. To brief the theory of the electrical, thermal, mechanical and magnetic properties of materials.
2. To understand the different types of materials and their characterization with respect to their applications
3. To understand the various properties of materials and its measure
4. To expose the students the different NDT available in industry

**Course Learning Outcomes (CO)**

The learners will be able to

1. To learn about the materials properties and corrosion-oxidation of material
2. Study about the thermal properties of material and its effect
3. Learn about the testing of material quality
4. To study the synthesis of nanoparticles and characterization of nanoparticles
5. To make the students to understand the future application of nano materials

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	L	H	H
CO2	M	M	H	M	H	L
CO3	L	M	M	M	H	H
CO4	M	H	H	H	M	L
CO5	L	M	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	L	H	L
CO2	L	H	M	L	H	M
CO3	H	L	M	L	M	L
CO4	M	L	H	M	H	M
CO5	H	H	M	L	M	M

(Low- L, Medium - M, High - H)

**Unit I: Material Classification – Corrosion and Oxidation** (14 hours)

- 1.1 Materials - Material classification - Properties of Engineering material - Mechanical properties (K1, K2)
- 1.2 Effect of heat treatment - Effect of atmospheric exposure (K2)
- 1.3 Creep - Creep resisting materials (K2, K3)
- 1.4 Factors influencing corrosion - Types of corrosion (K2, K3)
- 1.5 Basic mechanisms of corrosion - Corrosion testing (K4)
- 1.6 Oxidation - Corrosion control (K3, K4)

**Unit II: Properties of Materials** (14 hours)

- 2.1 Heat capacity - Specific heat - Thermal expansion - Melting Point (K1, K2)
- 2.2 Thermal conductivity - Thermal shock resistance – Thermal stability –Magnetic properties (K2)
- 2.3 Permeability –Superconductivity – Coercive force – Hysteresis (K2, K3)
- 2.4 Electrical property – Resistivity - Conductivity - Temperature coefficient of resistance(K2, K3)
- 2.5 Dielectric strength -Thermoelectricity - Optical properties (K3, K4)
- 2.6 Refractive index – Absorptive – Reflectivity (K3)

**Unit III: Non – destructive Testing** (14 hours)

- 3.1 NDT – Advantages of NDT - Defects in materials (K1, K2, K3)
- 3.2 Selection of the NDT method - Visual inspection (K3, K4)
- 3.3 Basic principle - Liquid penetration testing - Physical principle (K3)
- 3.4 Magnetic Particle Testing (MPT) - Principle of MPT – Sensitivity – Limitation (K3, K4)
- 3.5 Eddy Current Testing (ECT) – Principle - Instrument for ECT (K3, K4)
- 3.6 Eddy Current Testing (ECT) - Application –Limitations (K3, K4)

**Unit IV: Nano Technology** (14 hours)

- 4.1 Introduction to Nano technology – Position control – Self assembly (K1, K2, K3)
- 4.2 Positional devices – stiffness – Top- down method – Bottom-up method (K3, K4)
- 4.3 Enabling Technologies – Characteristics of Self assembly – Zeolitic materials (K2, K3, K4)
- 4.4 Application of Nano Technology – Scanning electron microscope (SEM) (K3, K4)
- 4.5 Transmission electron microscope (TEM) (K3, K4)
- 4.6 The Scanning tunneling microscope (K3, K4)

**Unit V: Nano Particles** (14 hours)

- 5.1 Fabrication of nano particles – Grinding with Iron balls – Gas condensation (K3, K4)
- 5.2 Laser ablation – Thermal and ultrasonic decomposition (K3, K4)
- 5.3 Atom optics - Sol Gels – precipitation of quantum dots (K3, K4)
- 5.4 Characterization of nanoparticles (K3)
- 5.5 Optical measurement – Electrical measurement (K3, K4)
- 5.6 Application of nanoparticles (K3)

### Books for Study:

1. O.P. Khanna – Material Science and Metallurgy – Dhanpat Raj Publication – Reprint 1998.
2. W.R.Fahrner (Ed) – Nanotechnology and Nano electronics – Springer Private Limited, 2006.
3. Richard Booker and Earl Boysen – Nano Technology – Wiley Publication, 2005.

### Books for Reference:

1. K.G. Aswani – Material Science, 2<sup>nd</sup> Edition – S.Chand & Company, Ltd., 2001.
2. M.Arumugam – Physics II – Anuradha Agencies, Reprint 2005.
3. K.Goser, P.Glosekotter, J.Dienststuhl – Nanoelectronics and Nano Systems – Springer Publication, 2008.

## SEMESTER – VI

### UEPHE20 – Elective III A: MICROPROCESSOR 8085

<b>Year:</b> III	<b>Course Code:</b> UEPHE20	<b>Title of the Course:</b> Elective III A: Microprocessor 8085	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> VI							

### Course Objectives

1. To provide a basic knowledge about computer language in binary system
2. To understand the fundamental concepts of conversion of binary into decimal and hexa decimal systems
3. To have a knowledge about basics logic gates and Flip flops
4. To familiarize with the concepts of Registers and multiplexers
5. To give a knowledge about the basics of ROM and RAM
6. To understand the concept of microprocessor bus structure and architecture of 8085.

### Course Outcomes (CO)

The learners will be able to

- 1 Develop an ability to convert from binary into decimal and hexa decimal system
- 2 Provide a clear internal behavior of a basic logic gates
- 3 Explain the principles of registers and the block diagram of multiplexers
- 4 Provide a comprehensive understanding about the usage of ROM and RAM and make the students to differentiate the working process of ROM and RAM.
- 5 Enable the learners to get an in-depth knowledge in microprocessor and how to execute an instruction using processor.

CO	1	2	3	4	5	6
CO1	M	H	H	L	H	H
CO2	M	M	H	M	H	L
CO3	L	M	M	M	H	H
CO4	M	H	H	H	M	L
CO5	L	M	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	L	M	H	L
CO2	H	M	L	L	M	H
CO3	M	H	L	M	H	M
CO4	H	M	M	H	L	H
CO5	H	L	M	M	H	L

(Low- L, Medium - M, High - H)

## Course Syllabus

### Unit I: Digital Fundamentals and Architecture of 8085 (14 hours)

- 1.1 Binary and Hexa decimal system – Representation of negative numbers (K1,K3)
- 1.2 Binary coded decimal and basic logic gates – High impedance state (K2,K3)
- 1.3 D flip flop and D latches – Registers– Multiplexers and Demultiplexers (K2,K3,K4)
- 1.4 ROM and RAM – Microprocessor as CPU –Input and output unit (K2,K3,K4)
- 1.5 System and Bus structure – Execution of an instruction (K2,K3,K4)
- 1.6 Block diagram of Architecture of 8085 – Internal Register – Flag -ALU.(K3,K4)

### Unit II: Instruction Sets of 8085 (14 hours)

- 2.1 Machine language and assembly language (K3,K4)
- 2.2 Programmer's model of 8085 (K4)
- 2.3 Data transfer instructions I – Arithmetic, logic and special instructions (K2,K3,K4)
- 2.4 Assembly language to Hex code – Data transfer instruction II (K2,K3,K4)
- 2.5 Branch instructions – Stack and stack related instructions (K3,K4)
- 2.6 I/O and Machine control instructions - 8085 Addressing modes (K2,K4)

### Unit III: 8085 Instruction Timings (14 hours)

- 3.1 Introduction on 8085 instruction timings (K2,K3,K4)
- 3.2 Memory read cycle (K3,K4)
- 3.3 Memory Write cycle (K3,K4)
- 3.4 Wait states – Halt state (K2)
- 3.5 Timing diagrams for some instructions (MOV, MVI, LXI, STA, DCX)
- 3.6 Delay calculations. (K3,K4)

**Unit IV: Memory and I/O Interface****(14 hours)**

- 4.1 Memory interface basics (K1,K2)
- 4.2 Demultiplexing address/data bus (K1,K3)
- 4.3 Generating control signals – ROM / EPROM interface (2K X 8 EPROM, 4K X 8 ROM) (K1, K3)
- 4.4 RAM interface (2K X 8 RAM interface, 2K X 8 RAM interface using Decoders) (K1, K4)
- 4.5 IN instruction and its timing diagram – Out instruction and its timing diagram (K2,K3)
- 4.6 Memory mapped I/O –difference between Memory Mapped I/O and I/O Mapped I/O (K3,K4)

**Unit V: Interrupts****(14 hours)**

- 5.1 Introduction – INTR and INTA – RST 5.5, RST 6.5, RST 7.5 AND TRAP (K1,K3,K4)
- 5.2 Triggering levels – Priority levels (K2,K3,K4)
- 5.3 Programmable Peripheral Interface 8255(K4)
- 5.4 Simple programs- code conversion- 8 bit addition, subtraction (K3,K4)
- 5.5 Multiplication and division (K3,K4)
- 5.6 Arranging number in ascending and descending orders. (K3,K4)

**Book for Study:**

1. V.Vijayendran – Fundamentals of Microprocessor 8085 – Edition 2006

**Books for Reference:**

1. Ramesh Gaonkar – Microprocessor Architecture, Programming and Applications with 8085 – Penram International Publishing Private Limited.
2. Malvino – An Introduction to Microprocessor – Tata McGraw Hill Publication, 3<sup>rd</sup> Edition.
3. B. Ram – Fundamentals of Microprocessor and Microcomputer – Dhanpat Raj Publisher.
4. Ajit Pal – Microprocessor Principle and Applications – Tata McGraw Hill Publication.

## SEMESTER – VI

### UEPHF20 – Elective III B: Communication Physics

<b>Year:</b> III	<b>Course Code:</b> UEPHF20	<b>Title of the Course:</b> ELECTIVE III B: Communication Physics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To learn about the radio communication system and propagation of waves
2. To study about the microwave communications and generation of microwaves
3. Students understand the satellite communication system
4. To provide a basic idea of fiber optic communication
5. To help of the students understand the light sources of fiberoptics
6. To learn about the transmission lines and facsimile transmission

#### Course Outcomes (CO)

The learners will be able to

1. Students understand the direct waves and ground waves
2. Students understand the working of television and RADAR
3. Analyse the types of Kepler's law
4. Students understand the principles of fiber optics
5. Realize the LED, diodes, detectors

CO	PO					
	1	2	3	4	5	6
CO1	L	M	L	L	L	H
CO2	M	H	L	H	L	L
CO3	M	M	L	H	L	L
CO4	L	M	M	L	L	L
CO5	M	L	M	L	L	M

CO	PSO					
	1	2	3	4	5	6
CO1	L	H	H	L	H	M
CO2	H	M	H	H	M	L
CO3	L	H	L	L	M	H
CO4	H	M	L	H	H	M
CO5	M	H	L	M	L	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Radio Communication System (14 hours)**

- 1.1 Propagation (K1,K2)
- 1.2 Direct waves and ground waves (K3)
- 1.3 Modulation amplitude modulation Generation of SSB Signal (K2,K3)
- 1.4 Detectors and its types (K3,K4)
- 1.5 Receivers, simple receiver (K3,K4)
- 1.6 Super heterodyne receiver (K4)

### **Unit: II Microwave Communication (14 hours)**

- 2.1 Generation of microwaves, klystron oscillator, reflex oscillator (K2)
- 2.2 Television picture tube ,iconoscope, image orthicon, scanning synchronization (K2,K3)
- 2.3 TV transmission, TV reception (K1,K2)
- 2.4 Fundamentals of colouring TV and RADAR (K2,K3)
- 2.5 RADAR equations, TYPES and PPI displace (K2,K3)
- 2.6 Automatic tracking RADAR ,applications of RADAR (K1,K2,K3)

### **Unit III: Satellite Communication (14 hours)**

- 3.1 Kepler's laws ,station keeping (K1,K2)
- 3.2 Satellite attitude, power system (K1,K2,K3)
- 3.3 Transmission path loss (K4)
- 3.4 Satellite earth station (K3,K4)
- 3.5 Satellite station (K2)
- 3.6 Introduction to Indian satellite (K3)

### **Unit IV: Fiber Optics Communication (14 hours)**

- 4.1 Principles of light transmission in a fiber (K2,K3,)
- 4.2 Propagation with in a fiber, effect of index profile on propagation (K1,K4)
- 4.3 Modes of propagation, listing of losses in fiber (K1,K2,K3)
- 4.4 Light sources of fiber optics (K2,K3,)
- 4.5 LED ,laser diodes, detectors (K2,K3,)
- 4.6 Photo diode, avalanche photo diode (K2,K3,)

### **Unit V: Transmission Line Facsimile Transmission (14 hours)**

- 5.1 Transmission lines, herts experiment (K1,K2)
- 5.2 Fundamentals of aerial (K2)
- 5.3 Radiation field, radiation resistance power radiated for a dipole antenna(K1,K2,K3)
- 5.4 Facsimile transmitter, cylindrical scanning (K2,K3)
- 5.5 Facsimile receiver, photographic reception (K2,K3)
- 5.6 Direct recording reception (K4)

### Book for Study:

1. A.Subramanyam - Applied Electronics –National Publishing Company, 2006.
2. R.Murugesan Kiruthiga Sivaprasath - Modern Physics – S.Chand, 2007.

### Books for Reference

1. Gupta and Kumar- Hand book of electronics, 24<sup>th</sup> revised edition- pragathi pragasham,1998
2. Puri & Chand - hand book of electronics - Anmol publications, Reprint 1996.
3. Albert Paul Nalvino – Principles of electronics, 6<sup>th</sup>Edition,Tata McGraw Hill publications co., 1999.
4. Sedha.R.S., Applied electronics -S.Chand and Co. Pvt.Ltd., 2009.
5. Dennis Reddy and John Coleman- Electronic communication – Tata McGraw Hill publications Co.,2000.

### SEMESTER – I / III UAPHA20 – Allied I: Physics I

<b>Year: I/II</b>	<b>Course Code:</b> UAPHA20	<b>Title of the Course:</b> ALLIED I: PHYSICS I	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem: I / III</b>							

### Course Objectives

1. To impart knowledge about Physics to the students of Mathematics and Chemistry
2. To apply the concepts of Physics to their core subject.

### Course Outcomes (CO)

The learners will be able to

1. Gains the knowledge of the properties of materials and its applications.
2. Understands the properties of liquids.
3. Able to understand the concepts of heat, superconductors and its application
4. Perceives the clear knowledge of the characteristic behaviour of sound with its applications.
5. Understand the properties of light

CO	PO					
	1	2	3	4	5	6
CO1	L	M	L	L	L	H
CO2	M	H	L	H	L	L
CO3	M	M	L	H	L	L
CO4	L	M	M	L	L	L
CO5	M	L	M	L	L	M

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	L	H	L	L
CO2	H	M	M	M	M	M
CO3	M	L	L	L	M	H
CO4	L	M	H	M	H	M
CO5	H	H	M	H	H	M

(Low- L, Medium - M, High - H)

### Unit I: Elasticity

(14 hours)

- 1.1 Stress – Strain - Hooke's law – Definitions of Young's Modulus, rigidity and bulk modulus modulus–Definition of Poisson's ratio (K1, K2)
- 1.2 Energy stored in a stretched wire - problems (K2)
- 1.3 Bending of beams –Neutral axis - Expression for internal bending moment - Cantilever –Depression at the loaded end of a cantilever (K3, K4)
- 1.4 Experimental determination of Young modulus by non-uniform bending using pin and microscope– I form girders –Problems (K4)
- 1.5 Torsional couple – Potential energy stored in a twisted wire – Expression for couple per unit twist(K3, K4)
- 1.6 Torsional Pendulum - Experimental determination of rigidity modulus by Torsional oscillation (without masses) - Experimental determination of rigidity modulus by static torsion method. (K3, K4).

### Unit II: Properties of liquids

(14 hours)

- 2.1 **Viscosity:** Stream line and turbulent flow– critical velocity - Viscous force – Coefficient of viscosity of a liquid (K2)
- 2.2 Poiseuille's formula –Determination of coefficient of viscosity of liquid by Poiseuille's method - Problems (K2, K3)
- 2.3 Comparison of coefficient viscosities of two liquids using graduated burette - Ostwald's viscometer method. (K3)
- 2.4 Terminal velocity – Stokes law- Experimental determination of coefficient of viscosity of highly viscous liquid. (K2, K4)
- 2.5 **Surface Tension:** Definition – Excess of Pressure inside curved surface (curvilinear co-ordinates) – Spherical and cylindrical drops and bubbles - Problems (K3)
- 2.6 Determination of surface tension by the method of drops - Interfacial tension between two immiscible liquids – Determination of interfacial tension by the method of drops (K3, K4)

### Unit III : Heat

(14 hours)

- 3.1 Specific Heat of Capacity – Definition – Determination of specific heat of capacity of a liquid by method of mixtures – Half time radiation correction (K1, K2, K3, K4)

- 3.2 Specific heat capacity by Callender and Barne's method –Merits and demerits (K3,K4)
- 3.3 Newton's law of cooling –Statement - Determination of specific heat of a liquid using Newton's law of cooling. (K2,K3,K4)
- 3.4 Joule Kelvin effect –Definition - Temperature of inversion –Porous plug experiment – Results – Theory of Joule Kelvin effect (K2,K3,K4)
- 3.5 Liquefaction of air by Linde's Process - Liquefaction of Helium –Properties of Helium I and II - Lambda point. (K2,K3,K4)
- 3.6 Superconductors – Definition of type I and II Superconductors – Meissner effect - Applications – Magnetic levitation. (K1,K2,K3)

#### **Unit IV: Sound**

**(14 hours)**

- 4.1 Properties of sound – Longitudinal and transverse waves - Expression for Velocity of transverse vibrations along a stretched string - frequency of transverse vibrations along a stretched string (K1,K2,K4)
- 4.2 Laws of transverse vibrations of strings -Determination of A.C. frequency using Sonometer- Problems (K2,K3)
- 4.3 Ultrasonics–Piezo-electric effect – Inverse piezo-electric effect - Production of ultrasonic waves by Piezo electric oscillator (K2,K3,K4)
- 4.4 Definition of Magnetostriction- Production of ultrasonic waves by Magnetostriction oscillator (K2,K3,K4)
- 4.5 Applications of Ultrasonics– Scientific, industrial and medical applications. (K2,K3)
- 4.6 Acoustics of buildings – Definition of Reverberation – Reverberation time - Sabine's formula (Without derivation) – Absorption coefficient– Factors affecting the acoustics of buildings (K2,K4)

#### **Unit V: Optics**

**(14 hours)**

- 5.1 **Physical Optics:** Interference – Definition – Conditions for interference – interference in thin films (reflected light) (K1, K2, k4)
- 5.2 Newton's ring - Determination of radius of curvature of lens by forming Newton's rings(K2,K3,K4)
- 5.3 Air wedge – Expression for fringe width – Experiment to measure the diameter of a thin wire by air wedge method – Test for optical flatness. (K2,K3,K4)
- 5.4 Diffraction–Definition – Plane transmission Grating –construction - Theory of plane transmission grating– Experimental determination of wavelength using transmission grating – Problems (K1,K2,K4)
- 5.5 **Polarization:** Definition of polarization –Polarization by reflection (Brewster's law)– Double refraction - Optical activity – specific rotatory power (K1,K2,K4)
- 5.6 Function of a half shade – Determination Specific rotatory power of sugar solution using Laurent's half shade polarimeter– Uses of polarised light. (K3,K4)

#### **Books for Study:**

1. R.Murgeshan– Allied Physics –S.Chand & Co. Ltd., New Delhi, First Edition 2008.
2. Dr.Dhanalakshmi and Dr.R.Sabesan – Allied Physics – Popular Book Dept, 2005.

3. N.Brijilal and N.Subramaniam– Heat and Thermodynamics –S.Chand and Co. Ltd., New Delhi, 2008.
4. R.Murgeshan – Electricity and Magnetism – S.Chand & Co. Ltd, New Delhi, 2008.
5. R.Murgeshan and KiruthigaSivaprasath - Modern Physics –S.Chand& Co. Ltd., New Delhi, 2007.
6. V.K.Mehta– Principles of Electronics –S.Chand& Co. Ltd., Mew Delhi, 2008.

### Books for Reference:

1. D.S. Mathur– Elements of Properties of matter–Shyamalt Charitable Trust, New Delhi, 2007.
2. N.Brijilal and N.Subramaniam– Waves and oscillations –Vikas Publishing house Pvt. Ltd., 1992.
3. N.Brijilal and N.Subramaniam– A text book of Optics –S.Chand and Co. Ltd., New Delhi, 2004.
4. V.Rajendran and A.Marikani– Material Science - Tata McGraw Hill Publishing company Ltd., 2004.
5. P.Mani– A text book of Engineering Physics –Dhanam Publications, Chennai, 2013.

### SEMESTER – II / IV

#### UAPHB20 – Allied II: Physics II

Year: II	Course Code: UAPHB220	Title of the Course: ALLIED II: PHYSICS II	Course Type: Theory	Course Category: Allied	H/W 4	Credits 4	Marks 100
Sem: IV	/420						

### Course Objectives

1. To emphasize the significance of Physics to the students of Mathematics and Chemistry
2. To impart the knowledge of the various branches of Physics.

### Course Outcomes (CO)

1. Gain the knowledge about electricity and properties of magnetic materials.
2. Understand the importance of Wave mechanics.
3. Able to understand the concepts of nuclear reactions and the types of accelerators and detectors.
4. Perceive the fundamental knowledge about crystallography and the advancement in the field of communication
5. Learn about rectifiers, filters and opto-electronic devices with its applications

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	L	M	H
CO2	M	H	H	H	H	L
CO3	M	M	L	H	H	M
CO4	L	M	M	L	H	L
CO5	M	L	M	L	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	M	M	L
CO2	M	M	L	L	H	L
CO3	L	L	M	M	L	H
CO4	M	M	L	M	H	L
CO5	H	M	M	M	H	L

(Low- L, Medium - M, High - H)

### Unit I: Electricity and Magnetism

(12 hours)

- 1.1 Transient current (DC) – Growth and decay of current in a (LR circuit) circuit containing inductance and resistance –Decay of current in a (LR circuit) circuit containing inductance and resistance (K1, K2,K3)
- 1.2 Growth of a charge of a capacitor through resistor (RC-circuit) - Decay of charge of a capacitor through resistor (RC-circuit) – time constant (K3, K4)
- 1.3 Measurement of high resistance by Leakage method - problems (K3)
- 1.4 Magnetic Induction (B) – Magnetization (M) – Magnetic Susceptibility - Permeability – Relation between B, H and M (K1, K2, K3)
- 1.5 Properties of dia, para and ferro magnetic materials - Hysteresis loop – Definitions of Retentivity – Coercivity (K1, K2, K3)
- 1.6 Energy loss due to hysteresis– the importance of hysteresis curves –choice of magnetic materials (K2, K3, K4)

### Unit II: Wave Mechanics

(12 hours)

- 2.1 Wave mechanics – Dual nature of matter – De Broglie wave length– problems - Definition of phase velocity and group velocity – Relationship between them. (K1,K2,K3)
- 2.2 Experimental study of matter waves – Davisson and Germer’s experiment (K3, K4)
- 2.3 Heisenberg’s uncertainty principle – Applications – Determination of position of an electron with  $\gamma$  ray microscope (K1, K2, K3)
- 2.4 - Diffraction of electron beam through a slit - Proof for non-existence of electrons inside the nucleus. (K2, K3)
- 2.5 Wave function – Properties of wave function – Basic Postulates of wave mechanics (K1, K2)
- 2.6 Derivation of time dependent Schrödinger’s equation – Time independent

Schrödinger's Equation (K3, K4)

### **Unit III : Nuclear Physics**

**(12 hours)**

- 3.1 Artificial transmutation – Rutherford's experiment – Types of nuclear reactions (K1,K2,K3)
- 3.2 Energy balance in nuclear reactions and the Q-value – Q value equation for a nuclear reaction– Threshold energy of an endoergic reaction (K2,K3)
- 3.3 Neutron– Properties of neutron - Neutron Charge – Decay of neutron – Neutron diffraction- spin and Magnetic moment of neutron (K1, K2,K3)
- 3.4 Classification of Neutrons - Neutron detection – Boron Detectors (slow neutrons)- Proton recoil detectors (fast neutrons) (K3, K4)
- 3.5 Particle Accelerators – Linear Accelerator - Betatron (K3, K4)
- 3.6 Particle detectors – Wilson cloud chamber (K3, K4)

### **Unit IV: Crystallography, Fibre Optics and Optics**

**(14 hours)**

- 4.1 Crystal – Definition of unit cell – Miller Indices – Seven types of crystal systems (K1, K2,K3)
- 4.2 Definition of Bravais lattice - Definition of reciprocal lattice and its properties –Derivation of Bragg's law (K1, K2,K3)
- 4.3 Fibre Optics - Introduction – Optical fibre – Construction - Principle - Acceptanceangle and condition for propagation through optical fibre (K1, K3)
- 4.4 Classification of optical fibres– Single mode and multimode fibres– Step index and graded index fibres (K3).
- 4.5 Step index single mode fibre – Step index multimode fibre– Graded index multimode fibre – Fibre optic communication system with block diagram. (K3)
- 4.6 Laser – Principle – Types of laser - Semi conductor Laser –Nd-YAG Laser – Applications of laser. (K3, K4)

### **Unit V: Electronics**

**(14 hours)**

- 5.1 Rectifiers – Half and full wave rectifiers - Full-Wave Bridge Rectifier construction – working and Mathematical Analysis (K1, K2,K3)
- 5.2 Filters - Types of Filter circuits – Capacitor filter – Choke input filter -  $\pi$  section filter (K2, K3)
- 5.3 Zener Diode – Characteristics of Zener Diode –Zener diode as voltage regulator (K2, K3)
- 5.4 Opto-Electronic Devices : Photo Diode – Principle – Characteristics of Photo Diode – Applications – Alarm Circuit – Counter circuit (K3, K4)
- 5.5 Light Emitting Diode (LED) – Principle – Characteristics of LED – Applications –Power indicator – Seven Segment Display (K3, K4)
- 5.6 Solar Cell – Construction - Working - Characteristics – Uses (K4)

#### **Books for Study:**

1. R.Murgeshan– Allied Physics –S.Chand & Co. Ltd., New Delhi, First Edition, 2008.
2. Dr.Dhanalakshmi and Dr.R.Sabesan – Allied Physics – Popular Book Dept, 2005.

3. N.Brijilal and N.Subramaniam– Heat and Thermodynamics –S.Chand and Co. Ltd., New Delhi, 2008.
4. R.Murgeshan– Electricity and Magnetism –S.Chand & Co. Ltd, New Delhi, 2008.
5. R.Murgeshan and Kiruthiga Sivaprasath - Modern Physics –S.Chand& Co. Ltd., New Delhi, 2007.
6. V.K.Mehta– Principles of Electronics –S.Chand& Co. Ltd., New Delhi, 2008.

**Books for Reference:**

1. D.S. Mathur– Elements of Properties of matter–Shyamalt Charitable Trust, New Delhi, 2007.
2. M.Narayamurthi and others – A text book of Sound – The National Publishing company, Chennai, 1986.
3. N.Brijilal and N.Subramaniam– Waves and oscillations –Vikas Publishing house Pvt. Ltd.,1992.
4. N.Brijilal and N.Subramaniam– A text book of Optics –S.Chand and Co. Ltd., New Delhi, 2004.
5. V.Rajendran and A.Marikani– Material Science - Tata McGraw Hill Publishing company Ltd., 2004.
6. S.O.Pillai– Solid State Physics – New Age International (P) Ltd. Publishers, New Delhi, 2006.
7. P.Mani– A text book of Engineering Physics –Dhanam Publications, Chennai – 42, 4<sup>th</sup> edition, 2018.

## SEMESTER II

### UCPHC20 - PRACTICAL – I

(Any 16 experiments)

1. Compound Pendulum – Determination of  $g$  and  $k$ .
2.  $q$  by Non-Uniform Bending – Pin and Microscope.
3.  $q$  by Non-Uniform Bending – Optic Lever.
4. Torsional Pendulum – Rigidity modulus of a wire (without masses).
5.  $n$  by Static Torsion (Mirror and telescope method).
6. Surface tension and interfacial surface tension by drop weight method.
7. Focal Length and Refractive Index of Convex Lens (UV and Conjugate foci method for 'f' and direct reflection method for R).
8. Focal Length and Refractive Index of short focal Concave Lens (Combination method, in contact and out of contact methods for 'f' and direct reflection method for R).
9. Spectrometer -  $\mu$  of solid prism.
10. Specific heat capacity of a liquid – Method of Mixtures (Barton's correction).
11. Sonometer – Determination of AC Frequency of the given steel wire.
12. Sonometer – Determination of AC Frequency of the given Brass wire.
13. Potentiometer – Calibration of low range voltmeter.
14. Field along the axis of a coil –  $B_H$  using deflection magnetometer.
15. Torsional Pendulum –  $M$ ,  $n$  and  $I$  (with mass).
16. Lee's Disc – Thermal conductivity of bad conductors and emissivity.
17. Spectrometer -  $\mu$  of hollow prism.

**SEMESTER IV**  
**UCPHF20 - PRACTICAL – II**  
(Any 16 experiments)

1. Bifilar Pendulum .
2. Young's modulus of the beam-Uniform bending – Pin and Microscope.
3. Young's modulus of the beam-Uniform bending – Optical lever.
4. Young's modulus by cantilever – Mirror and Telescope method.
5. Surface Tension – Capillary rise method – Radius by Mercury Pellet method.
6. Sonometer – Specific gravity of Solids and Liquids.
7. Melde's String – Frequency of Vibrator.
8. Melde's String-Specific gravity of Solids and Liquids.
9. Air wedge- Determination of thickness of a thin wire.
10. Specific heat capacity of a liquid –Newton's law of cooling
11. Spectrometer – i-d curve .
12. Spectrometer - grating – normal incidence – standardization – wavelength of mercury lines.
13. Spectrometer – grating – Minimum deviation – wavelengths of mercury lines.
14. Potentiometer – Calibration of ammeter.
15. Potentiometer – Unknown Resistance and Specific resistance.
16. P.O Box- Measurement of temperature and co-efficient of Resistance.
17. Figure of Merit - Aperiodic Galvanometer.
18. Determination of M and  $B_H$  using deflection and vibration magnetometers – Tan A and Tan B position.

**SEMESTER VI**  
**UCPHL20- PRACTICAL III**  
(Any 16 experiments)

1. Young's modulus by Non uniform bending – Koenig's Method
2. Spectrometer – i-i' Curve.
3. Spectrometer – Dispersive power of a prism.
4. Spectrometer – Narrow angled prism.
5. Spectrometer –grating –normal incidence – dispersive power.
6. Spectrometer – prism – Cauchy's constant
7. Newton's rings – Determination of R and  $\mu$ .
8. Newton's rings - Refractive index of water.
9. Conversion of Galvanometer into Voltmeter and its calibration
10. Conversion of Galvanometer into Ammeter and its calibration.
11. Potentiometer – Calibration of high range Voltmeter.
12. Potentiometer – emf of thermocouple.
13. Deflection of Magnetometer - Tan C position.
14. Determination of  $B_H$  using Deflection-bar magnet - Null deflection method.
15. Vibration Magnetometer – Determination of  $B_H$  - Field along the axis of coil apparatus.
16. Mirror Galvanometer - emf of a thermocouple-Direct deflection method.
17. Quantity Sensitiveness of B.G.
18. Absolute capacity of a condenser – B.G.-Damping correction.
19. Comparison of Capacitances – B.G.
20. Comparison of EMF'S – B.G
21. Internal resistance of the cell – B.G.

**SEMESTER VI**  
**UCPHM20 – PRACTICAL IV: APPLIED ELECTRONICS**

**(Any 16 experiments)**

1. Construction of full wave rectifier-solid state (using 2 diodes).
2. Voltage stabilization using Zener diode and IC 7805.
3. Construction of dual power supply using 7812 and 7912.
4. Single stage amplifier using transistor- Frequency response, voltage gain and variation with load.
5. Construction of Hartley Oscillator (using transistor) –Frequency determination using CRO.
6. Construction of Colpitt's Oscillator (using transistor) –Frequency determination using CRO.
7. OR, AND gates using diodes, NOT using transistors.
8. NAND and NOR gates – Universal building block.
9. Verification of Demorgan's theorem.
10. OP – AMP - Inverting amplifier.
11. OP – AMP - Summer and subtractor.
12. FET – Characteristics.
13. Flip-flop - RS, JK, D using NAND gate.
14. Half adder, Full adder using logic gates.
15. Modulus Counters using 7490.
16. Simplification of Boolean equation using K-map using NAND gates only
17. Astable Multivibrator using IC 555.
18. Single stage amplifier using FET - Frequency response, voltage gain and variation with load.
19. Addition and subtraction using 8085.
20. Multiplication and division using 8085.
21. Code conversion binary to HEX.

**SEMESTER II**  
**UAPHC20: ALLIED PRACTICAL: PHYSICS**

(Any 15 experiments)

1. Young's modulus – Non- Uniform ending – Pin and microscope
2. Rigidity modulus by Torsional oscillations.
3. Rigidity modulus by static torsion method.
4. Surface tension of a liquid and interfacial tension between liquids by drop weight method (Densities being given)
5. Comparison of co-efficient of viscosity using burette method – (Radius using microscope).
6. Specific heat capacity of a liquid – Method of mixtures – Half time correction.
7. Sonometer – Determination of AC frequency using steel wire.
8. Focal length of a lens by distant object method, U-V method and Conjugate foci method.
9. Figure of merit of a galvanometer (Table galvanometer or mirror galvanometer)
10. Potentiometer – Calibration of low range voltmeter.
11. Potentiometer – Calibration of low range ammeter.
12. Determination of horizontal component of earth's magnetic induction using deflection magnetometer.
13. Air wedge – Determination of thickness of wire.
14. Newton's rings – Determination of radius of curvature.
15. Spectrometer – grating – Wavelength of mercury lines.
16. Zener diode – Characteristics study.
17. Construction of OR, AND, NOT gates using diodes and transistors and verification of truth table.

## SEMESTER –I/II

### USPHAn20 - SKILL BASED ELECTIVE:EVERYDAY PHYSICS

Year/ Semester 2020	Course Code	Title of The Course	Course Type	Course Category	H/ W	Credits	Marks
SEM: I/II	USPHAn20	Everyday Physics	Theory	SBE	2	-	60

#### Course Objectives

1. To make students aware of the concepts of Physics involved in day-to-day life.
2. To impart knowledge on basics of Electricity.
3. To learn safety precautions in handling electrical appliances.
4. To study the principles domestic electric appliances.

#### Course Outcomes (CO):

1. Appraise the importance of Physics in daily life.
2. Apply the knowledge to identify the components used in direct current machines
3. Describe the difference between alternating current and direct current.
4. Explain Electrical safety measurements
5. Examine the working of basic household appliances

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	H	H	L
CO2	M	H	L	L	M	H
CO3	H	L	H	H	M	L
CO4	M	L	H	M	M	L
CO5	M	M	H	M	L	H

(Low - L, Medium – M, High - H)

### Unit I: Laws of motion

- 1.1 Velocity – Acceleration – Force (K1,K2)
- 1.2 Momentum - Law of Conservation Momentum (K1,K2)
- 1.3 Newton’s Law’s of Motion (K3,K4)
- 1.4 Construction and Working of Aero planes (K3,K4)
- 1.5 Jet Planes – Rockets (K2,K3)
- 1.6 Relative Velocity - Apparent change in the velocity when trains move in the same and Opposite Directions. (K2,K3)

### Unit II: Circular motion

- 2.1 Circular Motion - Centripetal Force and its Applications (K3,K4)
- 2.2 Centrifugal Force (K1.K2)
- 2.3 Motion of a Cyclist along a Circular Path and Reason for Bending (K3,K4)
- 2.4 Centrifuge and its Applications (K3,K4)
- 2.5 Escape velocity – Orbital velocity – Parking orbits (K2,K3)

### Unit III: Semi-conductors

- 3.1 Energy – Law of Conservation Energy (K2,K3)
- 3.2 Basic concepts of atom- atomic number – mass number - isotopes - Nuclear Fission (K3,K4)
- 3.3 Chain reaction - Nuclear fusion (K2,K3)
- 3.4 Reactions Taking Place in Sun And Stars – Carbon nitrogen cycle – Proton – Proton cycle (K3,K4)
- 3.5 Semi conductors – doping – P-type n-type – semi conductor diode (K2,K3)
- 3.6 Light Emitting Diode (LED) and its Application - Seven segment display.(K3,K4)

#### **Unit IV: Electricity**

- 4.1 Current – Voltage – Ohm's law (K1,K2)
- 4.2 Photo Electric Effect (K2)
- 4.3 Principle, Construction and Working of Solar Cell (K3,K4)
- 4.4 Description and working of Emergency Lamp (K3,K4)
- 4.5 Sodium Vapour Lamp - Mercury Vapour Lamp. (K3,K4)

#### **Unit V: House Wiring Accessories**

- 5.1 House Wiring Accessories - Switches –Types of Switches (K1,K3,K4)
- 5.2 Lamp Holders – Types of Lamp Holders (K3,K4)
- 5.3 Ceiling Roses - Socket Outlets (K2)
- 5.4 Plugs – Wires and Cables (K1,K2)
- 5.5 Types of Wiring System (Tree And Distribution System) (K3,K4)
- 5.6 Supply of Electricity to Homes – Fuse – Earthing (K3,K4)

#### **Books for Study and Reference:**

1. M Arul Thalpathi - Basic and Applied Electronics – Com teck Publishers, 2005.
2. Dr. Prem Kumar – Basic Electrical and Electronics Engineering – Anuradha Publications, 2016.
3. Brijilal & Subramaniam.N. - Properties of Matter, 1<sup>st</sup> Edition - Vikas Publication House, New Delhi, 2001.
4. R.Murugesan – Modern Physics – S.Chand Publication – Reprint 2007.

### SEMESTER – III

#### USPHB320 - SKILL-BASED ELECTIVE: ELECTRICAL APPLIANCES - I

Year/ Semester	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
2020- 2021							
<b>SEM: III</b>	USPHB320	Skill-Based Elective: Electrical Appliances - I	Theory	-	2	-	60

#### Course Objectives

1. To give introduction to different electrical appliances.
2. To make the students of other discipline to understand the day-to-day applications of Physics.
3. To make the students apply the concepts of Physics and its application in electrical appliances.

#### Course Outcomes (CO)

1. Learn the effect of electric current and Safety precautions to be taken when working with electricity.
2. To Study the colour code for insulation wires
3. Study about supply of electricity to homes.
4. Study about different types of lamps and the behaviour of Lamps in series and lamps in parallel connection.
5. Study the construction and working of domestic appliances.

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	H	H	L
CO2	M	M	H	H	M	H
CO3	H	M	L	H	M	L
CO4	M	H	H	M	M	M
CO5	M	L	H	M	H	L

(Low - L, Medium – M, High - H)

## **Unit I: Electric Current**

- 1.1 Effects of electric current (K1,K2)
- 1.2 Safety precautions to be taken when working with electricity (K1,K2)
- 1.3 Causes of fire on electrical appliances (K1,K2)
- 1.4 Precautions and remedial measures (K1,K2)
- 1.5 Fuse (K1,K2)
- 1.6 Earthing (K2,K3)

## **Unit II: AC and DC**

- 2.1 AC and DC (K1,K2,K3)
- 2.2 Single phase and three phase connections (K3,K4)
- 2.3 RMS and peak values (K2,K3)
- 2.4 Star and delta connection, overloading (K3,K4)
- 2.5 Earthing and short circuiting (K2,K3)
- 2.6 Colour code for insulation wires (K1,K2)

## **Unit III: Electrical Accessories**

- 3.1 House Wiring Accessories (K1,K2)
- 3.2 Switches, Types of Switches and circuit breaker (K1,K2,K3)
- 3.3 Lamp Holders, Types of Lamp Holders (K1,K2,K3)
- 3.4 Ceiling Roses, Socket Outlets, Plugs (K2,K3)
- 3.5 Wires and Cables (K1,K2)
- 3.6 Types of Wiring System (Tree And Distribution System)- Supply of Electricity to Homes (K3,K4)

## **Unit IV: Lamps**

- 4.1 Light effect (K1)
- 4.2 Working of electric bulb (K1,K2)
- 4.3 Carbon Arc lamps (K1,K2)
- 4.3 Sodium Vapour lamp (K1,K2,K4)
- 4.4 Mercury Vapour lamp (K1,K2,K4)
- 4.5 Grouping of lamps: Lamps in series and lamps in parallel (K1,K3)

## **Unit V: Domestic appliances**

- 5.1 Construction and working of domestic appliances (K1)
- 5.2 Electric iron box (K2,K3,K4)
- 5.3 Immersion heater (K2,K3)
- 5.4 Electric stove (K2,K3,K4)
- 5.5 Washing machine (K2,K3)
- 5.6 Air conditioner (K2,K3)

**Books for Study and Reference:**

1. Dr.P.Mani – A Textbook of Engineering Physics – Dhanam Publications, Chennai, 2011.
2. M.L.Anwani – Basic Electrical Engineering – DhanpatRai and Co., NaiSarak, Delhi, 2009.

## SEMESTER – IV

### USPHC420 - SKILL-BASED ELECTIVE: ELECTRICAL APPLIANCES - II

Year/ Semester 2020-2021	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
<b>SEM: IV</b>	USPHC420	Skill-Based Elective: Electrical Appliances - II	Theory	-	2	-	60

#### Course Objectives

1. To give introduction to different electrical appliances.
2. To make the students of other discipline to understand the day-to-day applications of Physics.
3. To make the students apply the concepts of Physics and its application in electrical appliances.

#### Course Outcomes (CO)

1. Learn the importance of passive components and charges.
2. To Study the behaviour of resistance and capacitance
3. Study the applications of electric and magnetic fields.
4. Study the behaviour electrical appliances like inverter, UPS and lamps.
5. Study the construction, working and applications of domestic appliances.

CO	PO					
	1	2	3	4	5	6
CO1	M	M	L	H	H	H
CO2	M	M	H	H	M	L
CO3	H	M	L	H	M	H
CO4	M	H	H	M	M	M
CO5	H	L	H	M	L	H

(Low - L, Medium – M, High - H)

## **Unit I: Passive Components and Charges**

- 1.1 Resistance (K1,K2)
- 1.2 Resistors in series and in parallel (K3,K4)
- 1.3 Capacitance (K1,K2)
- 1.4 Capacitors in series and in parallel (K3,K4)
- 1.5 Electrical Charge (K1,K2)
- 1.6 Current – Electrical Potential (K1,K2,K3)

## **Unit II: Electric Circuit**

- 2.1 Ohm's law (K1,K2)
- 2.2 Galvanometer, Ammeter (K1,K2)
- 2.3 Voltmeter and Multimeter (K1,K2)
- 2.4 Analog and Digital (K2)
- 2.5 Electrical Energy - Power – Watt – kWh (K3,K4)
- 2.6 Consumption and electrical power (K2)

## **Unit III: Electricity and Magnetism**

- 3.1 Electromagnetic Induction (K1,K2)
- 3.2 Self induction and Mutual induction (K3,K4)
- 3.3 Electromagnets (K1,K2)
- 3.4 Chokes (K1,K2)
- 3.5 Transformers (K3,K4)
- 3.6 Applications - Electric bell (K3,K4)

## **Unit IV: Electrical Appliance**

- 4.1 Inverter – UPS (K1,K2)
- 4.2 Generator and Motor (K1,K2,K3,K4)
- 4.3 Different types of windings (K1,K2)
- 4.4 Fluorescent lamps (K3,K4)
- 4.5 Street Lighting – Flood lighting (K1,K2,K3)
- 4.6 Electrical Fans (K1,K2)

## **Unit V :Domestic Appliances**

- 5.1 Wet Grinder – Mixer (K1,K2)
- 5.2 Stabilizer – Refrigerator (K1,K2,K3,K4)
- 5.3 Electromagnetic waves (K1,K2)
- 5.4 Applications – Microwave oven (K2,K3)
- 5.5 Television (K1,K2,K3)
- 5.6 Wi-Fi- Modem – LCD (K1,K2,K3)

**Books for study:**

1. Theraja B.L. Basic Electronics – S.Chand and Co. Pvt. Ltd., 2000.
2. A K Theraja- A text book in Electrical Technology- S chand& Co, 2014
3. Sedha R.S. – Text book of Applied Electronics -S.Chand and Co. Pvt. Ltd., 2000.

**SEMESTER VI**  
**USPHD520 – SKILL BASED ELECTIVE: PHYSICS FOR COMPETITIVE EXAMINATIONS**

<b>Year</b>	<b>Course Code</b>	<b>Title Of The Course</b>	<b>Course Type</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
2020							
<b>SEM: VI</b>	USPHD520	Skill Based Elective: Physics For Competitive Examinations	Theory	Elective	2	-	60

**Learning Objectives**

1. To make the students familiar with problems in Physics.
2. To prepare the students for various Entrance examinations.
3. To know the various applications of physics.
4. To summarize important topics in physics.

**Course Outcomes (CO)**

The learners will be able to

1. To know the basic laws in Physics and its applications
2. To learn the principle of optics and study the light experiments like Newton's ring and Air wedge.
3. To study and evaluate the problems in Electricity and magnetism.
4. To give an extended knowledge in atomic physics and nuclear physics to solve the problems.
5. To know the application of semiconductor materials in various electronic circuits.

CO	PO					
	1	2	3	4	5	6
CO1	M	L	M	H	M	H
CO2	L	M	L	H	M	H
CO3	H	M	H	L	M	H
CO4	M	H	H	M	H	M
CO5	M	M	L	M	H	H

(Low - L, Medium – M, High - H)

### Unit I: Mechanics and Waves

- 1.1 Newton's laws of motion and its application Conservative forces and frictional forces  
-Centrifugal and Coriolis forces (K1,K2,K3,K4)
- 1.2 Kepler's laws – Escape velocity and artificial satellite - Gravitational Law and field.  
(K1,K2)
- 1.3 Motion under a central force - Moments of Inertia and products of Inertia - Principal moments and axes (K2,K3)
- 1.4 Rigid body motion, fixed axis rotations - Bernoulli's theorem – Elasticity (K3,K4)
- 1.5 Waves and Simple Harmonic motion – Lissajous figures- Damped and Undamped oscillators (K1,K2,K3,K4)
- 1.6 Wave equation -Resonance – Doppler effect in sound- Ultrasonics and applications.  
(K1,K3,K4)

### Unit II: Light

- 2.1 Thick lens formulae - power of a lens - Fermat's Principle – Rayleigh criterion.(K1,K2)
- 2.2 Resolving power of a prism and grating - Conditions for constructive and destructive interferences. (K3,K4)
- 2.3 Newton's rings - Calculation of radius of curvature – Air wedge – Calculation of bandwidth. (K2,K3)
- 2.4 Fresnel and Fraunhofer diffraction (K3,K4)

2.5 Linear, circular and elliptic polarization - double refraction and optical rotation  
(K1,K2,K3)

2.6 Specific rotatory power of an optically active substance (K3,K4)

### **Unit III: Electricity and Magnetism**

3.1 Electric Charge - Coulomb law – Gauss law – Electric potential (K3,K4)

3.2 Capacitors – Energy stored in a capacitor–Dielectric and polarization  
(K2,K3)

3.3 Ampere’s law - BiotSavart law – Faraday’s laws of electromagnetic induction  
(K1,K2)

3.4 Self-inductance – Mutual inductance – Alternating currents. (K3,K4)

3.5 Growth and decay of current and charge in LR circuit – RC circuit – LCR circuit.  
(K3,K4)

3.6 Magnetic permeability and susceptibility, Dia, para and ferromagnetism,  
Measurement of susceptibility, Hysteresis loop. (K1,K2)

### **Unit IV: Atomic and Nuclear Physics**

4.1 Atomic physics: X-ray spectrum – Compton Effect (K1,K2)

4.2 Compton wavelength Photoelectric effect (K2,K3,K4)

4.3 Calculation of DeBroglie wavelength of electrons (K2,K3,K4)

4.4 Wave velocity and group velocity for DeBroglie waves (K3,K4)

4.5 Uncertainty principle - Pauli Exclusion Principle (K3,K4)

4.6 Mass defect - Binding energy – Radioactive disintegration law – half life – Q value  
of nuclear reactions – Nuclear fission and fusion (K1,K2,K3,K4)

### **Unit V: Electronics**

5.1 Semiconductors - Rectifiers (K2)

5.2 Zener diode as voltage regulator (K2,K3,K4)

5.3 Transistor as an Amplifiers – Relation between  $\alpha$  and  $\beta$  (K3,K4)

5.4 Feedback amplifier – Oscillators (K1,K2)

5.5 Amplitude and frequency modulation (K2,K3)

5.6 OR, AND, NOR and NAND gates – OP amps (K3,K4)

### **Books for Study:**

1. D S Mathur – Mechanics – S. Chand Publication, 2001.
2. Brijlal Subramaniam - Properties of Matter (Unit I) – Eurasia Publication House Pvt. Ltd., 2001
3. Nelkan and Parker – Advanced Level Physics – Heinemann Longmann Education International Publication, 1995. (Unit II)
4. C.L Arora - Simplified Course in B.Sc Physics – S.Chand, 1999. (Unit III)

5. S.L.Kakani – Objective Physics – S.Chand and co. Ltd., New Delhi, 2001. (Unit IV)
6. R.S.Sedha – Basic Electronics – S.Chand Publications, New Delhi, 2006 (Unit V)
7. Dr.N.K.Nayyar - Unique Quintessence of physics – Unique Publishers, 2010.

**Books for Reference:**

1. Dr.Surekha Singh – UGC CSIR/NET/JRF/SLET – UpkarPrakashan Publishers.
2. Karen Cummings, Priscilla Laws, Edward Redish, Patrick Cooney - Understanding Physics, 6<sup>th</sup> Edition – Wiley Student Education, 2005.
3. The Pearson Guide to Objective Physics – S.Chand Publishing House, 2007.
4. Sathya Prakash Arya – Objective Physics – MTG Books Publishers, 2007.
5. S.L.Kakani - Objective Physics, 10<sup>th</sup> Edition - S.Chand Publishing House, 2007.
6. K.C.Jain, C.LArora – Numerical Problems in Physics - S.Chand Publishing House, 2005

## SEMESTER VI

### USPHE620 – SKILL BASED ELECTIVE: MOBILE COMMUNICATION

Year 2020	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
SEM: VI	USPHE620	Mobile Communication	Theory	SBE	2	-	60

#### Course Objectives

1. To make the students acquire knowledge about mobile phones.
2. To have the basic understanding of working of cell phones.
3. To know the various applications radio propagation.
4. To understand the multiple access techniques in communication.

#### Course Outcomes (CO)

The learners will be able to

1. To know the basics generations of mobile communication
2. To learn the cellular concept and techniques
3. To study the mobile radio propagation and concepts of diffraction, scattering and interference.
4. To attain knowledge in cell coverage for signal and traffic.
5. To understand the concepts of multiple access techniques.

CO	PO					
	1	2	3	4	5	6
CO1	M	M	L	M	H	H
CO2	M	L	H	M	M	H
CO3	L	M	L	H	M	H
CO4	M	H	M	H	L	L
CO5	L	M	M	M	L	H

(Low - L, Medium – M, High - H)

## **Unit I: Introduction to Cellular Mobile Communication**

- 1.1 Zero generation - push to talk (K1,K2)
- 1.2 First generation – Advanced mobile phone system (K2,K3)
- 1.3 Second generation – Advantages and disadvantages (K3,K4)
- 1.4 Third generation (K1,K2,K3)
- 1.5 Fourth generation (K3,K4)

## **Unit II: Cellular Concept**

- 2.1 Frequency Reuse concept (K1,K2)
- 2.2 Channel Assignment (K1,K2)
- 2.3 Handoff technique (K2,K3)
- 2.4 Trunking and Grade of service (K3,K4)
- 2.5 Cell splitting – Cell sectoring (K2,K3)

## **Unit III: Mobile Radio Propagation**

- 3.1 Free Space propagation model (K1,K2)
- 3.2 Fraunhofer region (K1,K2)
- 3.3 Properties of Radio waves (K3,K4)
- 3.4 Concept of Reflection (K1)
- 3.5 Concept of Diffraction (K3,K4)
- 3.6 Scattering – Interference (K3,K4)

## **Unit IV: Cell coverage for Signal and Traffic**

- 4.1 Introduction - Cell coverage for Signal and Traffic (K3,K4)
- 4.2 Propagation in near in distance (K2,K3)
- 4.3 Curves for near in propagation (K2,K4)
- 4.4 Long distance propagation (K3)
- 4.5 Mobile to Mobile Propagation (K3,K4)
- 4.6 Doppler shift. (K3,K4)

## **Unit V: Multiple Access Techniques**

- 5.1 Introduction-Multiple Access Techniques (K1,K2)
- 5.2 FDMA (K3,K4)
- 5.3 TDMA (K4)
- 5.3 CDMA-Synchronous CDMA (K1,K2,K3,K4)
- 5.4 Soft handover – Hard handover (K1,K2)
- 5.5 Roaming – SDMA (K3,K4)

**Books for Study:**

- 1 G.K.Behera – Lopamudra: Mobile Communication – Sci-tech Publication Pvt.Ltd.,2009. (Unit I & V)
- 2 V.Jeyasri Arokiamary – Mobile Communication - Technical Publications, Pune, 2008. (Unit II & III.)
- 3 G.Radha Krishna – Cellular and Mobile Communications – BS Publications, 2010. (Unit IV)

**Books for Reference:**

1. T.G. Palanivelu, R.Nakkeeran - Wireless and Mobile Communication - PHI Learning Pvt Ltd., 2009.

## SEMESTER V & VI

### UGPHAn20 - NON MAJOR ELECTIVE: FUNDAMENTALS OF PHYSICS

Year 2020	Course Code	Title of the course	Course type	Course Category	H/w	Credits	Marks
<b>SEM: V &amp; VI</b>	UGPHA 520/620	NME: Fundamentals of Physics	Theory	Core	3	-	100

#### COURSE OBJECTIVES

1. To make the students understand the Kinetics & Kinematics
2. To impart Knowledge of Heat and Temperature
3. To provide a deep understanding of the sound and light
4. To present a clear & consistent picture of the Nuclear reactor, Atom bomb, production of X rays and explain the astronomy

#### COURSE OUTCOMES (CO)

1. To learn the Students understand the Newton's law's & applications
2. To highlight the importance of transmission of heat
3. To familiarize the ultrasonic and Laser
4. To help of the students understand the concepts of Nuclear fission and Nuclear fusion
5. To derive the equation for Newton's law of gravitation and satellite motion

CO	PO					
	1	2	3	4	5	6
CO1	H	L	M	H	M	L
CO2	M	M	H	L	M	H
CO3	H	L	H	H	L	H
CO4	L	H	H	M	M	M
CO5	M	M	L	M	M	L

(Low - L, Medium - M, High - H)

## **Unit I - Kinematics**

- 1.1 Position and displacement – velocity – speed (K1,K2)
- 1.2 Newton's law of motion – applications of Newton's third law (K1,K2)
- 1.3 Fundamental forces in nature (K1, K4)
- 1.4 Apparent weight of a man in lift (K3,K4)
- 1.5 Work – power – energy (K1,K2)
- 1.6 Applications of centripetal and centrifugal forces (K3,K4)

## **Unit II – Heat**

- 2.1 Heat – measures of heat(temperature) (K1,K2)
- 2.2 Specific heat – heat of fusion (K1,K2)
- 2.3 Heat of vaporization (K1)
- 2.4 Transmission of heat – conduction – Convection - radiation (K1, K4)
- 2.5 Peltier effect (K3,K4)
- 2.6 Super conductors - applications of super conductors (K1,K2)

## **Unit III: Sound and Light**

- 3.1 Sound - properties of sound - Ultrasonics - Different types of scans – medical applications of ultrasonics (K3,K4)
- 3.2 Clinical applications of different types of scans (obstetrics - early pregnancy kidney and liver) (K3,K4)
- 3.3 Acoustics of buildings – reverberation (K2,K3)
- 3.4 Acoustics aspects of hall and auditorium (K1,K2)
- 3.5 Light - properties of light - different types of lenses (K1,K2)
- 3.6 Human eye – defects of vision – laser – its medical applications (K1,K2)

## **Unit IV: Atomic and nuclear Physics**

- 4.1 Atom - nucleus - atomic number - mass number (K1,K2)
- 4.2 Nuclear fission - chain reaction – uncontrolled chain reaction (K1,K2,)
- 4.3 Application - atom bomb (K3,K4)
- 4.4 Controlled chain reaction - application - nuclear reactor (K3,K4)
- 4.5 Nuclear fusion – hydrogen bomb (K3,K4)
- 4.6 X – rays - production of X – rays properties of X - rays - medical applications of X – rays. (K1,K2,K3)

## **Unit V: Astronomy**

- 5.1 Gravitation - Newton's law of gravitation (K1)
- 5.2 Satellite motion - escape velocity – weightlessness in a satellite (K1, K4)
- 5.3 Geocentric theory – heliocentric theory (K1,K2)
- 5.4 Kepler's law - solar system - individual planets (K1,K2,)
- 5.5 Comets - asteroids - and other constituents of solar system - (K3,K4)
- 5.6 Formation of stars (K1,K2)

**Books for Reference:**

1. Brijial and N.Subramaniam - A Textbook of Optics - S.Chand & Co. Ltd., New Delhi, 2004.
2. Brijial and N.Subramaniam - Heat and Thermodynamics - S.Chand & Co. Ltd., New Delhi, 1998.
3. R.Murugesan - Properties of Matter - S.Chand & Co. Ltd., New Delhi, 2005.
4. Brijial and N.Subramaniam - A Textbook of Sound - N.Vikias Publishing House, New Delhi, 2006.
5. G.K.Sadidharan - The Great Universe - S.Chand & Co. Ltd., 2003.
6. K.S.Krishnaswamy - Astrophysics: A Modern Prespective - New Age International Pvt. Ltd., New Delhi, 2002.

# **Department of Communication Media (UG)**

## **SYLLABUS AND REGULATIONS**

Under

**OUTCOME-BASED**

**EDUCATION2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

# **B.Sc. Visual Communication**

## **OUTCOME BASED EDUCATION - 2020 (Effective for the Batch of Students Admitted from 2020-2021)**

### **A) INSTITUTION LEVEL**

#### **Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

#### **Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighbouring districts.

### **B) NAME OF THE PROGRAMME: B.Sc. Visual Communication**

#### **Vision:**

To enhance the logical reasoning, analytical thinking and problem-solving skills of the students and prepare them to be lifelong learners who will be socially responsible to navigate the complexities of a rapidly changing society.

### **C) ELIGIBILITY CRITERIA OF THE PROGRAMME**

A candidate who has qualified in Higher Secondary Examination conducted by the Government of Tamil Nadu or an examination accepted as equivalent thereto is eligible for seeking admission to the B.Sc. Visual Communication Course.

**Course Duration:** The duration of the course is three academic years consisting of 6 semesters.

**Structure of the Course B.Sc. Visual Communication:**

Sem	Part	Subject Code	Title of Subject	Instruc-tional Hours/ Week	Exam Hours		Cre dits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper – I	6	3	-	3	40+60
	II	UENGA20	English Paper – I	6	3	-	3	40+60
	III	UCVCA20	Introduction to Visual Communication	5	3	-	4	40+60
	III	UCVCB20	Practical I – Drawing and Design	4	-	3	4	40+60
	III	UAHCA20	Allied – I: Human Communication	6	3	-	5	40+60
	IV		Skill-Based Elective - I	2	2	-	2	40+60
	IV		Value Education	1	-	-	-	-
			<b>Total</b>				<b>21</b>	<b>600</b>
II	I	ULTAB20	Tamil Paper – II	6	3	-	3	40+60
	II	UENGB20	English Paper – II	6	3	-	3	40+60
	III	UCVCC20	Basic Photography	5	3	-	4	40+60
	III	UCVCD20	Practical II – Professional Photography	4	-	3	4	40+60
	III	UABAA20	Allied– II: Basics in Advertising	6	3	-	5	40+60
	IV		Skill-Based Elective - II	2	2	-	2	40+60
	IV		Value Education	1	2	-	2	40+60
			<b>Total</b>				<b>23</b>	<b>700</b>

Sem	Part	Subject Code	Title of Subject	Instruc-tional Hours/ Week	Exam Hours		Cre dits	Marks
					Th	Pr		
III	I	ULTAC20	Tamil Paper – III	6	3	-	3	40+60
	II	UENGC20	English Paper – III	6	3	-	3	40+60
	III	UCVCE20	Television Production	5	3	-	4	40+60
	III	UCVCF20	Practical III - Computer Graphics	5	-	3	4	40+60
	III	UASWA20	Allied -Script writing	6	3	-	5	40+60
	IV	USCMA320	Skill-Based Elective - Art of story board	2	2	-	2	40+60
			<b>Total</b>				<b>21</b>	<b>600</b>
IV	I	ULTAD20	Tamil Paper – IV	6	3	-	3	40+60
	II	UENGD20	English Paper – IV	6	3	-	3	40+60
	III	UCVCG20	Media, Culture and Society	6	3	-	3	40+60
	III	UCVCH20	Practical IV- Post Production Editing	4	-	3	3	40+60
	III	UAJLA20	Allied-IV: Journalism	6	3	-	5	40+60
	IV	UNEVS20	Environmental Studies	2	2	-	2	40+60
	IV	USCMB420	Skill-Based Elective - Introduction to Art Direction	2	2	-	2	40+60
			<b>Total</b>				<b>22</b>	<b>700</b>
V	III	UCVCI20	Media Research	5	3	-	4	40+60
	III	UCVCJ20	Film Appreciation	5	3	-	4	40+60
	III	UCVCK20	Digital Public Relations	5	3	-	3	40+60
	III	UCVCL20	Practical V –2D Animation	6	-	3	4	40+60
	III	UCVCM20	Practical VI - Internship	-	-	3	3	40+60
	III	UCVCN20	Project -1 Documentary Production	3	-	3	5	40+60
	IV	USCMC520	Skill-Based Elective - E-Content - Production	2	2	-	2	40+60
	IV	UGCMA520	Non-Major Elective – I	3	2	-	2	40+60
			<b>Total</b>				<b>27</b>	<b>800</b>

Sem	Part	Subject Code	Title of Subject	Instructional Hours/ Week	Exam Hours		Credits	Marks
VI	III	UCVCO20	Media Laws & Ethics	5	3	-	4	40+60
	III	UCVCP20	Introduction to ICT and New Media	5	3	-	4	40+60
	III	UCVCQ20	Practical VII: Web Designing	5	-	3	5	40+60
		UEVCA20	Elective II A: E-Content Development	5	3	-	3	40+60
		UEVCB20	Elective II B: Media Management					
	III	UCVCR20	Project – 2 - Short Film Production	4	-	3	5	40+60
	IV	USCMD620	Skill-Based Elective Digital Publishing	2	2	-	2	40+60
	IV	UGCMA620	Non-Major Elective - II	3	2	-	2	40+60
		-	Value Education	1	-	-	-	-
<b>Total</b>							<b>25</b>	<b>700</b>
	V	Extension Activities					1	
<b>Grand Total</b>							<b>140</b>	<b>4100</b>

### **SKILLED PAPERS**

**I Years – I Sem. - Basic Drawing (other Departments)**

**II Sem. Basic Drawing (other Departments)**

**II years – III Sem. - Art of story board (for Vis Com students)**

**IV Sem.–Introduction to Art Direction (for Vis Com students)**

**III years – V Sem. – E-content Production (for Vis Com students)**

**VI Sem. – Digital Publishing (for Vis.Com Students)**

**NON-MAJOR ELECTIVE (offered to other Departments)**

**III years – V and VI Semester– Advertisement**

**Alternative paper -Democracy and Media**

## PROGRAMME, B.Sc. VISUAL COMMUNICATION (2020-2021)

### PROGRAMME OUTCOMES (PO)

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:** Emulate positive social values and exercise leadership qualities and team work.

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

### PROGRAM SPECIFIC OUTCOME (PSO)

1. To Acquire Fundamental knowledge of Visual communication and the related study area.
2. To become competent enough to undertake the professional job as per the demands and requirements of the media and Entertainment Industry.
3. To become a socially responsible citizen with a global vision.
4. To get equipped with ICT competencies including Digital literacy.
5. To become ethically committed media professionals and entrepreneur by adhering to human values, Indian, and the Global culture.
6. To make women professionals in media and attain professional portfolios to become entrepreneurs to increase employability.

PSO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	3	3	3	2	3	3
PSO2	3	3	3	2	3	3
PSO3	3	3	3	3	3	3
PSO4	3	3	3	2	3	3
PSO5	3	3	3	3	3	3
PSO6	3	3	3	3	3	3

(STRONGLY CORRELATED - 3, MODERATELY CORRELATED - 2, WEAKLY CORRELATED -1)

**SEMESTER - I**  
**UCVCA20 - INTRODUCTION TO VISUAL COMMUNICATION**

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> UCVCA20	<b>Title of the Course:</b> Introduction to Visual Communication	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objective:**

- To give an overview about the field of Visual communication and Visual language and to enable them to understand the various fields of work in this area

**Course Outcomes (CO)**

The Learners will be able to

CO1: Indicating the Basic Concepts of Communication.

CO2: Analyzing the concepts of Visual cues and Visual Theories.

CO3: Acquiring an in-depth knowledge in Visual Analysis and Visual Stereotypes

CO4: Identifying the Essential aspects of Visual Language.

CO5: Exploring the insights of Visuals in Media.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	M	H	H	M
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

### **Unit I: Basics of Visual Communication**

**(18 hours)**

- 1.1. Definition: communication. (K1, K2)
- 1.2. Need for and Importance of Communication. (K1, K2)
- 1.3. Introduction to Visual Communication: Sensing, Selecting and Perceiving (K1,K2,K3, K4)
- 1.4. Visual Cues: Color, Form, Depth. (K1, K2, K3, K4)
- 1.5. Eight Depth Factors. (K1, K2, K3, K4)
- 1.6. Movements. (K3, k4)

### **Unit II: Visual Theories and Persuasion**

**(18 hours)**

- 2.1. Sensory Theories of Visual Communication: Gestalt. (K3, k4)
- 2.2. Sensory Theories of Visual Communication: Constructivism. (K1, K2, K3, K4)
- 2.3. Perceptual Theories of Visual Communication: Semiotics –Charles sanders Peirce, (K1, K2, K3, K4)
- 2.4. Cognitive Theory, (K1, K2, K3, K4)
- 2.5. Visual Persuasion in Advertising, (K1, K2, K3, K4)
- 2.6. Visual Recurring. (K3, k4)

### **Unit III: Visual Stereotypes and Analysis**

**(18 hours)**

- 3.1. Visual Stereotypes: Reinforcing Stereotypes with Images.(K1, K2, K3, K4)
- 3.2. Visual Analysis: Composition.(K1, K2, K3, K4)
- 3.3. Semiotic Signs and Codes (K3, K4)
- 3.4. Cognitive Elements(K1, K2, K3, K4)
- 3.5. Purpose of the Work, (K3, K4)
- 3.6. Image Aesthetics (K3, K4)

### **Unit IV: Visual Language**

**(18 hours)**

- 4.1. Principles of Visual & other Sensory Perceptions. (K1, K2, K3, K4)
- 4.2. Color Psychology & theory (some aspects) (K1, K2, K3, K4)
- 4.3. Color symbolism, Visual Thinking (K3, K4)
- 4.4. Principles of Design (K1, K2, K3, K4)
- 4.5. Elements of Design(K1, K2, K3, K4)
- 4.6.Process of developing creative ideas, Visual Culture(K3, K4)

### **Unit V: Visuals in Media**

**(18 hours)**

- 5.1. Definition: Media. (K1, K2)
- 5.2. Types of Media – Traditional Media & folk Media (K1, K2, K3, K4)
- 5.3. Print Media, Electronic Media and New Media.(K1, K2, K3, K4)
- 5.4. Visual language.(K3, K4)
- 5.5.Visual pleasure. (K3, K4)
- 5.6. Concept of gaze. (K3, K4)

**Books for Study and Reference:**

1. Seeing is Believing: An introduction to visual communication, 4<sup>th</sup> edition, – Arthur Asa Berger, McGraw Publication, 2012
2. Paul Martin Lester – Visual Communication: Images with Messages, 5<sup>th</sup> Edition - Wadsworth Cengage Learning, 2011.
3. KevalJ.Kumar - Mass Communication in India – 4<sup>th</sup> Edition Jaico Publications, 2011.
4. Joseph R. Dominick – The Dynamics of Mass Communication: Media in the Digital Age, 10<sup>th</sup> Edition - Tata McGraw Hill, 2010.
5. Stanley J. Baran – Introduction to Mass Communication: Media Literacy and Culture, 5<sup>th</sup> Edition - Tata McGraw Hill, 2010.
6. Uma Joshi, Rameshwari Pandya, AnuradhaMathu – Folk Media and Harmony, Swastik Publications, 2010.
7. Jonathan Baldwin, Lucienne Roberts – Visual Communication - AVA Publishing SA, 2006.
8. John Morgan, Peter Welton,1992 - See what I Mean?: An Introduction to Visual Communication

## SEMESTER I

### UCVEB20 - PRACTICAL - I - DRAWING AND DESIGN

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> UCVEB20	<b>Title of the Course:</b> Drawing and Design	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objective:

- To develop basic drawing and modeling skills in students and to enable them to expand their visual expression skills.

#### Course Outcomes(CO)

The Learners will be able to

CO1: Classifying the Basic Drawing Skills

CO2: Acquiring Knowledge about Geometrical Shapes, Alphabets and Numbers and create Still life.

CO3: Applying the Perspective Techniques in outdoor sketching using appropriate Lights and Shades

CO4: Practicing Colors Using Watercolor and Poster colors

CO5: Implementing the Techniques to create Animals Birds and Human Forms

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Course Syllabus:****Exercises: Each exercise: 6 hours**

1. Basic geometrical shapes
2. Alphabets, Numbers and 3D Lettering
3. Still life
4. Overlaying (Geometrical Shapes, Irregular shapes)
5. Patterns and structure
6. Perspectives
7. Light and shades
8. Birds and Animal
9. Human form
10. Outdoor sketching
11. Human portrait with Light.
12. Water color Landscape.

Cognitive level: (K1, K2, K3, K4, K5)

The drawing record should contain exercise completed by each student on every practical class. All exercises must be in pencil, charcoal and different medium – water color, poster color.

The Internal Evaluation (40 Marks) is based on the exercises.

The Semester Examination (60 marks) is based on the practical examination (45 marks), Record (10 marks) and Viva Voce (5 marks)

## SEMESTER - I

### UAHCA20 - ALLIED - I HUMAN COMMUNICATION

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	UAHCA20	Human communication	Theory	Allied	6	5	100

#### Objective:

- To enable students, understand the basic concepts of Human communication and the evolution of communication skills.

#### Course Outcomes(CO)

The Learners will be able to

CO1: Restating the Basic Concepts of Communication.

CO2: Acquiring Knowledge about the Barriers of Communication.

CO3: Describing the Various types of Verbal and Non Verbal Communication.

CO3: Acquiring in depth knowledge in Inter personal and Intra Personal communication.

CO4: Applying the Communication Skills in Public Speaking.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	M	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction to Communication and Language (18 hours)**

- 1.1. Human Communication what and why. (K1, K2)
- 1.2. Define Communication (K1, K2, K3)
- 1.3. Functions of Communication. (K1, K2)
- 1.4. Types - Western Models of communication: Aristotle Model of Communication, Lasswell Model, Shannon and Weaver Model of Communication. Eastern Models of Communication: Sadharanikaran Model. (K1, K2, K3)
- 1.5. Language: Power and nature of language. (K1, K2, K3)
- 1.6. Gender and culture of language. (K2, K3, K4)

### **Unit II: Verbal and Non-Verbal Communication (18 hours)**

- 2.1. Introduction to verbal communication (K1, K2, K3)
- 2.2. Functions of verbal and non-verbal communication. (K1, K2, K3)
- 2.3. Functions of non-verbal communication (K1, K2, K3)
- 2.4. Types of verbal communication (K1, K2, K3)
- 2.5. Types of non-verbal communication - Chronemics, Proxemics, Oculistics, Olfactics, Haptics, Kinesics, Chromatics, Silence (K1, K2, K3)
- 2.6. Characteristics of nonverbal communication (K1, K2, K3)

### **Unit III: Interpersonal and Intra Personal Communication (18 hours)**

- 3.1. Characteristics of Intrapersonal Communication. (K1, K2, K3)
- 3.2. Characteristics of Interpersonal Communication (K1, K2, K3)
- 3.3. Relational development and maintenance (K1, K2, K3)
- 3.4. Models of self-disclosure. (K1, K2, K3)
- 3.5. Group Communication and its characteristics, Types and Goals. (K1, K2, K3, K4)
- 3.6. Patterns of interaction - problem solving in groups. (K1, K2, K3, K4)

### **Unit IV: Listening and Speaking (18 hours)**

- 4.1. Listening - Misconceptions about listening. (K1, K2, K3)
- 4.2. Challenges of effective listening. (K1, K2, K3)
- 4.3. Types of informative speaking. (K1, K2, K3)
- 4.4. Informative VS persuasive speaking. (K1, K2, K3)
- 4.5. Techniques of informative speaking. (K1, K2, K3)
- 4.6. Building credibility as a speaker. (K1, K2, K3)

### **Unit V: Public Communication (18 hours)**

- 5.1. Public communication. (K1, K2, K3)
- 5.2. Effective public communication. (K1, K2, K3)
- 5.3. Purpose of Public communication (K1, K2, K3)
- 5.4. Speech structure. (K1, K2, K3)
- 5.5. Analyzing and Public speaking. (K1, K2, K3)
- 5.6. Rhetoric, persuasion and propaganda. (K1, K2, K3)

## **Books for Study and Reference**

1. David Holmes - Communication Theory: Media Technology and Society - Sage Publication, 2005
2. BerkoD.Wolvin, R. Wolvin - Communicating, 9<sup>th</sup> Edition - Houghton Mifflin Company, 2004
3. Armand Mattelart, MichaleMatterlart-Karl Erik Rosengren - Communication: An Introduction-Sage Publication, 2002
4. KevalJ.Kumar - Mass Communication in India – 4<sup>th</sup> Edition Jaico Publications, 2011.
5. Joseph A. DeVito-Human Communication: The Basic Course-2013 .

**SEMESTER - II**  
**UCVCC20 - BASIC PHOTOGRAPHY**

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> UCVCC20	<b>Title of the Course:</b> Photography	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objective:**

- To inculcate in students an in-depth knowledge on the theoretical aspects of photography including concepts and techniques used in photography

**Course Outcomes (CO)**

The Learners will be able to

CO1: Explaining the key elements of photography and its evolution.

CO2: Analyzing the compositional techniques and exposure controls.

CO3: Acquiring an in-depth knowledge about the characteristics of light, color and various lighting setup.

CO4: Categorizing about types of camera, lens and digital image processing.

CO5: Apply and practice the photography techniques in a practical way.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

Course Syllabus:

**Unit I: Introduction (15 hours)**

- 1.1. History of Photography. (K1, K2, K3)
- 1.2. Analog Photography. (K1, K2, K3)
- 1.3. Digital Photography. (K1, K2, K3)
- 1.4. Parts and function of a Digital Camera Works – The Sensor – Angle of View – Shutter Speed
- 1.5. Aperture – Focal Length – Depth of Field. (K1, K2, K3, K4)
- 1.6. Camera Features. (K1, K2, K3) , Camera Modes. (K1, K2, K3)

**Unit II: Camera Composition (15 hours)**

- 2.1. Composition – Rules – Subject – Focal Point – Centre of Interest – Rule of Thirds. (K1, K2, K3)
- 2.2. Perspective and choosing the Viewpoint. (K1, K2, K3)
- 2.3. Viewfinder and View Screen. (K1, K2, K3)
- 2.4. Exposure Controls. (K1, K2, K3)
- 2.5. Texture – Pattern – Shapes and Forms – Emphasis – Filters. (K1, K2, K3)
- 2.6. Basic Shots – High and Low Angle. (K1, K2, K3)

**Unit III: Color and Lighting (15 hours)**

- 3.1. Characteristics of Light and color. (K1, K2, K3)
- 3.2. Quality of light, guidelines for lighting (K1, K2, K3)
- 3.3. Color Temperature, Lighting Control and lighting equipment – Diffused Light – Bounced Light – Reflection Light – Refraction Light (K1, K2, K3)
- 3.4. Natural Light – Artificial Light – Flash Light – Portraiture Light (K1, K2, K3)
- 3.5. Three Point Lighting (K1, K2, K3)
- 3.6. Four Point Lighting (K1, K2, K3)

**Unit IV: Digital Imaging (15 hours)**

- 4.1. Lens and special lens Types. (K1, K2, K3)
- 4.2. Camera Types – Zoom Types. (K1, K2, K3)
- 4.3. Image Resolution – Types of Resolution. (K1, K2, K3)
- 4.4. Image File Format – Raster and Vector Formats, Properties of common image file format. (K1, K2, K3, K4)
- 4.5. Image Adjustment Tools. (K1, K2, K3)
- 4.6. Editing Digital image – Manipulating an Image. (K1, K2, K3)

**Unit V: Photography techniques (15 hours)**

- 5.1. Darkroom Techniques (K1, K2, K3)
- 5.2. Film Processing. (K1, K2, K3)
- 5.3. Developing and Printing. (K1, K2, K3)
- 5.4. Printer Resolution and its types. (K1, K2, K3)
- 5.5. Types of Photography: Nature – Architecture – Landscape – Wildlife – Sports – Fashion. (K1, K2, K3, K4)
- 5.6. Photo Journalism. (K1, K2, K3)

### **Books for Study and Reference:**

1. Michael Langford, Efthimia Bilissi – Langford's Advanced Photography: The Guide for aspiring Photography, 7<sup>th</sup> edition, Focal Press, 2008.
2. Michael Langford, Philip Andrews – Langford's Starting Photography: The Guide to great Images with Digital or film, 5<sup>th</sup> Edition, Focal Press, 2007.
3. Arnaud Frich – Panoramic Photography: From Composition and Exposure to Final Exhibition, Focal Press, 2007.
4. Rick Sammon – Complete Guide to Digital Photography, W.W. Norton, 2004
5. Fred S. Parrish – Photojournalism: An Introduction, Wardsworth Thomson Learning, 2002.
6. Ralph E. Jacobson, Sidney F. Ray, Geoffrey G. Attridge, Norman R. Axford – The Manual of Photography: Photographic and Digital Imaging, 9<sup>th</sup> Edition, Focal Press, 2000.

## SEMESTER - II

### UCVCD20 - PRACTICAL – III – PROFESSIONAL PHOTOGRAPHY

<b>Year: I</b> <b>Sem: III</b>	<b>Course Code:</b> UCVCD20	<b>Title of the Course:</b> Professional Photography	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objective:

- To enable students to try first-hand, the basic techniques of photography and to develop the skills for a good photographer

#### Course Outcomes (CO)

The Learners will be able to

CO1: Discussing the various parts and functions of the camera.

CO2: Acquiring knowledge in lighting and exposure techniques

CO3: Applying composition skills.

CO4: Utilizing the various filters and lenses.

CO5: Creating various genres of photography.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	H	H	M	H
CO3	H	H	M	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

## **Course Syllabus:**

Photography record / Album should include all the necessary details (colour, shutter speed, lens type etc..)

Final practical examination will test students' knowledge on photography (either viva or written exam or practical work on fundamentals of photography) the following exercises should be covered.

### **EXERCISES: 1 – 3 (20 hours), 3 – 6 (20 hours), 6 – 9 (20 hours)**

(Include the basic Elements and principles in photographic Composition)

1. Basic shots (Long, Mid, Close-up, low angle, high angle)
2. Portraiture
3. Reflection, play of light, shadow
4. Motion and freezing movement
5. Landscape (scenic, people, birds / animals, monuments)
6. Silhouette
7. Indoor Photography with three point lighting
8. Industrial, Sports/action
9. Advertising photography
10. Picture story assignment

Cognitive level: K1,K2,K3,K4,K5

The Internal Examination (40 Marks) is based on the exercises and Album preparation.

The Semester Examination (60 Marks) is based on the Practical Examination (45 Marks) and the Record (10 Marks) and Viva Voce (5 Marks)

## SEMESTER – II

### UABAA20 - ALLIED – II: BASICS IN ADVERTISING

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> UABAA20	<b>Title of the Course:</b> Basics in Advertising	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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#### Objective:

- To provide a basic understanding about the field of Advertising and to develop skills in creating media advertisement.

#### Course Outcomes (CO)

The Learners will be able to

CO1: Discussing the basic concepts of advertising and its history.

CO2: Acquiring basic knowledge about advertising media.

CO3: Analyzing the process of layout designing for an advertisement.

CO4: Evaluate the impact of advertisement on society.

CO5: Creating an advertisement for print, radio and television.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction to Advertising (18 hours)**

- 1.1 Advertising – definition. (K1, K2)
- 1.2 History of advertising, Ads in India. (K2, K3)
- 1.3 Benefits of advertising. (K2, K4)
- 1.4 Role of advertising. (K2, K3)
- 1.5 Types of ads, Market segmentation. (K2, K3)
- 1.6 Functions of advertising.(K2, K4)

### **Unit II: Advertising Concepts (18 hours)**

- 2.1. Advertising agency (K1, K2)
- 2.2. Structure of Ad agency. (K2, K3)
- 2.3. Marketing Mix, Product Life Cycle, USP, Brand Image.(K2, K3)
- 2.4. Types of Advertising Media. (K2, K3,)
- 2.5. Media Planning.(K2, K3, K4)
- 2.6. Advertising codes of ASCI. (K2, K3, K4)

### **Unit III: The Process of Designing an Ad (18 hours)**

- 3.1. Process of Visualization. (K2, K3)
- 3.2. Copywriting and its techniques.(K2, K3)
- 3.3. Photography, Illustration. (K2, K3, K4)
- 3.4. Image Manipulation.(K2, K3)
- 3.5. Types of headline. (K2, K3)
- 3.6. Layout design – Grid, thumb nail, roughs and compressive layout, final output. (K1,K2, K3,K4)

### **Unit IV: Advertising and Society (18 hours)**

- 4.1. Social, psychological and economic effects of advertising on Society.(K1, K2, K3)
- 4.2. Current issues. (K2, K3)
- 4.3. Commercialism in advertising. (K2, K3)
- 4.4. Advertising and children, Advertising and women. (K1, K2, K3)
- 4.5. Ethics in Advertising. (K1, K2, K3)
- 4.6. Role of Advertising in Social Media.(K1, K2, K3, K4)

### **Unit V: Practical (18 hours)**

Practical assignments in advertising, Preparation of print, Preparation of Radio Ad, Preparing ads for specific target Group. (K1, K2, K3, K4)

### **Books for Study and Reference:**

1. S.N. Murthy, U Bhojana - Advertising an IMC Perspective - Excel Books, 2007
2. S. A. Chunawalla - Advertising, Sales and Promotion Management - Himalaya Publishing House, 2006
3. Frank Jefkins, Daniel Yadin – Advertising, 4<sup>th</sup> Edition - Pearson Education, 2006.
4. J.V. Vilanilam, A.K.Varghese - Advertising Basics: A Resource Guide for Beginners - Response Books, 2004

5. Sandage, Fryburger, Rotzoll - Advertising Theory and Practice, 11<sup>th</sup> Edition - AITBS Publishers, 2004
6. R.C.Bhatia - Marketing Communication and Advertising - Galgotia Publishers, 2003
7. John Philip Jones - International Advertising: Realities and Myths - Sage Publications, 2000
8. John Philip Jones - How Advertising Works - Sage Publications, 1998
9. Mahendra Mohan - Advertising Management: Concepts and Cases - Tata McGraw Hill, 1989
10. Robert Cluley - Essentials of Advertising, Kogan Page Publishers, February, 2017
11. Courtland L.Bovee - Advertising Excellence, Mc Graw Hill, 1995

**SKILLED BASED ELECTIVE**  
**BASIC DRAWING (I Years students of other Department)**

<b>Year: I</b> <b>Sem: II</b>	<b>Course code:</b> <b>USCMA120/ USCMA220</b>	<b>Title of the Course:</b> <b>Basic drawing</b>	<b>Course Type:</b> <b>Practical</b>	<b>Course Category:</b> <b>Skill Based Elective</b>	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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**Objective:**

- To develop basic drawing and modeling skills in students and to enable them to expand their visual expression skills.

**Course Outcomes (CO)**

The Learners will be able to

CO1: Classifying the Basic Drawing Skills.

CO2: Acquiring Knowledge about Geometrical Shapes, alphabets and Numbers to create Still life.

CO3: Identifying the concept of angles of Lighting and Shading.

CO4: Applying the Perspective Techniques in outdoor sketching using appropriate Lights and Shades.

CO5: Practicing the Design and patterns in the form of Zen tangle Art.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Course Syllabus:**

**Unit I: Basic Drawing**

**(2 hours)**

Basic structure of objects, drawing straight lines, the foundation of perspective, angles of lights and eye view. (K1, K2, K3)

**Unit II: Light and Shades**

**(2 hours)**

Lights and dimension –still life –lines and curves of different thickness-creative patterns –effects of lights –and differences-landscape. (K1, K2, K3, K4)

**Unit III: Perspective**

**(2 hours)**

Principles of Design-Balance-Emphasis, Proportion, Variety and Unity (K1, K2, K3, K4)

**Unit IV: Exercises:**

**(6 hours)**

1. Alphabets and numbers
2. Overlaying (Geometrical Shapes, Irregular shapes)
3. Patterns and structure in day-to-day life
4. Perspectives

Cognitive level: K1, K2, K3, K4, K5

The drawing record should contain exercise completed by each student on every practical class. All exercises must be in pencil and different medium – water color, poster color.

The Internal Evaluation (40 Marks) is based on the exercises.

The Semester Examination (60 marks) is based on the practical examination (45 marks), Record (10 marks) and Viva Voce (5 marks)

**SEMESTER III**  
**UCVCE20 - TELEVISION PRODUCTION**

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> UCVCE20	<b>Title of the Course:</b> Television Production	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Objective:**

- To introduce to the students, the field of television media and to train them to produce any type of television programmes

**Course Outcomes (CO)**

The Learners will be able to

CO1: Describing the phases and development of television production.

CO2: Acquire an in-depth knowledge about preproduction stages of television production.

CO3: Explaining the camera operation techniques and implementation.

CO4: Analyze the lighting techniques and production management.

CO5: Acquire a profound knowledge in post-production techniques.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	M	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

### **Unit I: Introduction to Television medium (15 hours)**

- 1.1. Introduction to Television production (K1, K2)
- 1.2. Origin of television in the World – The Coming of Indian Television (K1, K2, K3)
- 1.3. Phases and development of television (K1, K2, K3)
- 1.4. Generating ideas (K1, K2, K3)
- 1.5. Clustering and Brain storming (K2, K3)
- 1.6. The Production team members and their Responsibility (K2, K3, K4)

### **Unit II: Pre Production Activities (15 hours)**

- 2.1. Creative Script writing (K1, K2)
- 2.2. Screen play Writing (K1, K2, K3)
- 2.3. Talent, Casting, Makeup: Performer Techniques - Acting Techniques (K1, K2, K3)
- 2.4. Audition – Casting - Make up (K2, K3)
- 2.5. Indoor set - outdoors set (K2, K3)
- 2.6. Budget preparation. (K2, K3)

### **Unit III: Production Elements (15 hours)**

- 3.1. Basic Camera function and elements (K1, K2)
- 3.2. Parts of the Camera – Camera operations – techniques (K1, K2, K3)
- 3.3. Types of Cameras (K3, K4)
- 3.4. Framing a shot (K2, K3)
- 3.5. Angle and Movements (K2, K3, K4)
- 3.6. Single Camera set up and multiple camera set up. (K2, K3, K4)

### **Unit IV: Production (15 hours)**

- 4.1. Lighting - Lighting Instruments (K1, K2)
- 4.2. Lighting Techniques (K3, K4)
- 4.3. Production Standard NTSC, PAL, SECAM etc., (K2, K3, K4)
- 4.4. Various kinds of Mike and their Usage – Sound Pickup Pattern (K2, K3, K4)
- 4.5. The role of the Director - Art Direction (K2, K3, K4)
- 4.6. Scenery Properties and set Dressing - Floor Management - Production Management. (K2, K3, K4)

### **Unit V: Post Production (15 hours)**

- 5.1. Editing Functions (K2, K3, K4)
- 5.2. Aesthetic Principles of Continuity editing, complexity editing (K2, K3, K4)
- 5.3. Voice over (or) Narration (K3, K4)
- 5.4. Music – Dubbing (K2, K3, K4)
- 5.5. Video Editing: Linear Editing - Nonlinear Editing (K1, K2, K3, K4)
- 5.6. Types of Editing Modes (Assemble, Insert, Online Modes) (K1, K2, K3, K4)

**Exercises:** Presentation of Talk shows, Cultural Programs, News Desk etc,

### **Books for Study and Reference:**

1. KevalJ.Kumar - Mass Communication in India – 4<sup>th</sup> Edition Jaico Publications, 2011.
2. Lan Hutchby – Media Talk Conversation Analysis and the Study of Broadcasting - Tata McGraw Hill, 2010.
3. Matt Briggs - Television Audiences and Everyday Life, Tata McGraw Hill, 2010.
4. David Miles, Robert Runstein - Modern Recording Techniques, 6<sup>th</sup> Edition – Focal Press, 2005.
5. Carl, Philip, Firtiz, Louis - Modern Radio Production, 6<sup>th</sup> Edition – Thomson Wardsworth, 2004.
6. Zettl Herbert – Television Production Handbook -Wardsworth Thompson Learning, 2000.
7. Zettl Herbert – Video Basics 3 – Wardsworth, 2001

## SEMESTER – III

### UCVCF20 - PRACTICAL III -COMPUTER GRAPHICS

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> UCVCF20	<b>Title of the Course:</b> Computer Graphics	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objective:

- To equip the students to design basic layout designs in print media using Adobe Photoshop software.

#### Course Outcomes (CO)

The Learners will be able to

CO1: Explaining the Tools and Techniques of Adobe Photoshop.

CO2: Applying the knowledge of the tool in designing logos, visiting cards and letter head.

CO3: Creating print advertisements like brochures, pamphlet, banners and magazine with the usage of proper techniques.

CO4: Applying the techniques effectively to create personalizes greeting cards and Cd covers

CO5: Compiling and implementing all the techniques learnt, to create image manipulation.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

## **Course Syllabus:**

### **Exercises in Photoshop- Exercise: 1 - 4 (30 hours), Exercise: 5 – 8 (30 hours)**

1. Logo design and Letterhead
2. Visiting Cards
3. Brochures / pamphlet
4. Magazine Cover page
5. Package Designing / CD covers
6. Greeting Card
7. Banner
8. Image manipulation

Cognitive level: K1,K2, K3,K4,K5

The Internal Evaluation (40 marks) is based on the exercises.

The Semester Examination (60 marks) is based on the Practical Examination (45 marks), Record (10 marks) and Viva Voce (5 marks)

## SEMESTER - III

### UASWA20 - ALLIED III: SCRIPT WRITING

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> UASWA20	<b>Title of the Course:</b> Script Writing	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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#### Objective:

- To make students understand the guidelines and techniques of script writing and to give them practice in writing scripts for various media

#### Course Outcomes (CO)

The Learners will be able to

CO1: Describing the basic concepts of script preparation and its models.

CO2: Analyze the dramatic structure and forms of script writing.

CO3: Learning the various forms of writing for visual mediums.

CO4: Draw the basic writing elements of radio production.

CO5: Apply and evaluate the writing skills.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High – H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High – H)

## **Course Syllabus:**

### **Unit I: Introduction to script & script preparation (18 hours)**

- 1.1. Definition of scripts (K1, K2)
- 1.2. Script formats, Basics of script writing (K2, K3, K4)
- 1.3. The four models of writing (K1, K2, K3)
- 1.4. Script preparation–selecting and contracting with writers (K2, K3, K4)
- 1.5. Adapting the seven methods (K2, K3, K4)
- 1.6. Script review (K3, K4)

### **Unit II: Script development (18 hours)**

- 2.1. The stages of script development (K1, K2)
- 2.2. Three act structures for film and television (K2, K3)
- 2.3. Writing a script with and without dialogue (K2, K3, K4)
- 2.4. Dramatic structures and forms (K2, K3, K4)
- 2.5. Role of the script writer (K3, K4)
- 2.6. Screenplay- Story board – Shot, Scene and Sequence. (K3, K4)

### **Unit III: Television & Radio Formats (18hours)**

- 3.1. Television formats and genres (K1, K2, K3)
- 3.2. Script formats for corporate videos (K1, K2, K3)
- 3.3. Writing for interactive communication (writing for websites) (K2, K3, K4)
- 3.4. The golden Rule of writing for Radio (K2, K3, K4)
- 3.5. Radio formats (K2, K3, K4)
- 3.6. Genres( K3, K4)

### **Unit IV: Radio Programming (18 hours)**

- 4.1. Radio jingle (K1, K2, K3)
- 4.2. Drama for radio (K1, K2, K3)
- 4.3. Commercial advertisement for radio (K1, K2, K3)
- 4.4. PSA (Radio) (K1, K2, K3)
- 4.5. Creating word pictures (K3, K4)
- 4.6. Write a script for an entertainment show (radio).(K1, K2, K3,K4)

### **Unit V: Writing for Television (18 hours)**

- 5.1. Script Writing Software (K1, K2, K3)
- 5.2. Studio Binder, Script for PSA (K1, K2, K3)
- 5.3. Advertisement (K2, K3)
- 5.4. Short story(K3, K4)
- 5.5. Drama and Documentary (K3, K4)
- 5.6. News writing (K3, K4)

### **Books for Study and Reference:**

1. Keval J. Kumar - Mass Communication in India – 4<sup>th</sup> Revised Edition – Jaico Publication, 2011.
2. Richard Whitaker – Janet E. Ramsey - Ronald D. Smith – Media Writing: Print, Broadcast and PR, 3<sup>rd</sup> Edition – Routledge, 2009.
3. Angel Wadia - Film, Television and Radio Production, Elements, Dimensions and Trends - Kanishka Publishers, 2008.
4. Anthony Friedmann – Writing for Visual Media, Second Edition, Sage Publication, 2006
5. Esta DE Fossard John Riber – Writing and Producing for TV and Film, Vol. 2 – Sage Publications, 2005.
6. Pat Cooper Ken Dancy Gel – Writing the Short Film, Third Edition – Focal Press, 2005.
7. Sharda Kaushik – Script to Screen: An Introduction to TV Journalism – Macmillan India Ltd., 2003.

## SEMESTER – III

### USCMC320 - SKILLED BASED ELECTIVE – III: ART OF STORY BOARD

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> USCMC320	<b>Title of the Course:</b> Art of Story Board	<b>Course Type:</b> Theory	<b>Course Category:</b> Skilled Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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#### Objective:

- This subject will explore the basic concepts of Storyboarding and allow students to create and review storyboards of their own.

#### Course Outcomes (CO)

At the end of the course, learners will be able to:

CO1: Discussing the planning processes of visual storytelling.

CO2: Sketching the art of story boarding process

CO3: Experimenting the field view shorts and angle

CO4: Explore the basic storyboard techniques.

CO5: Creating the storyboard with the learned technique.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	M	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

## **Course Syllabus:**

### **Unit: I - The Storyboards Beginnings (6 hours)**

Introduction to storyboarding - Preproduction process - Basic of Storyboards - screenplay and picturing - shots and storyboard panels - types of camera shots and angles. (K1, K2,K3)

### **Unit: II - Basic of Storyboard (6 hours)**

Types of Story board - Thumbnail story boards - the planning processes of visual storytelling – continuity - pacing - transitions and sequence - cinematic storyboard. (K1, K2,K3)

### **Unit: III - Shot Angles (6 hours)**

Cuts - Posing - Staging and camera move - tilt - pan - COse-up - Extreme COse up - Establishing Shot - Long Shot background, Medium Shot, low angle, high angle - different perspectives. (K2,K3,K4)

### **Unit: IV- Storyboard Technique (6 hours)**

Techniques of storyboard - Types of lay outs - concept and story developing- Script – Foreground - Middle Ground and Background - Developing Drawing Skills, Building the Storyboard. (K1,K2,K3,K4)

### **Unit: V – Practical (6 hours)**

Practical assignment on basic shots – advertisement –Comics – front page for a book – cartoon – Fantasy – poem.(K2,K3,K4)

### **Reference Books:**

1. Wendy Tumminello - “Exploring Storyboarding (Design Exploration Series)”, Delmar Cengage Learning, 1st Edition, 2004
2. John Hart, - “The Art of the Storyboard A Filmmaker’s Introduction”, Focal Press; 2 edition 2013
3. Giuseppe Cristiano -“ Storyboard Artist: A Guide to Freelancing in Film, TV, and Advertising” Michael Wiese Productions, 2012

**SEMESTER IV**  
**UCVCG20 - MEDIA, CULTURE AND SOCIETY**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: IV</b>	UCVCG20	Media culture and society	Theory	Core	6	4	100

**Objective:**

- To enable the students to understand the theories of media and the impact of media on society and culture

**Course Outcomes (CO)**

The Learners will be able to

CO1: Report and Restate the elements of society and its theories.

CO2: Illustrate the characteristics of culture and its models.

CO3: Analyze the various models of media and Categories the ecological perspective of media audience

CO4: Analyze the various models of media.

CO5: Evaluate the social issues of media.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

## Course Syllabus:

### Unit I: Concepts of society

(18 hours)

- 1.1. The definition of society (K1, K2)
- 1.2. Essential elements of society (K1, K2)
- 1.3. Understanding Mass Media (K1, K2, K3)
- 1.4. Theories of society: the mass society theory, functionalism, uses and Gratification theory, social construction theory (K2, K3, K4)
- 1.5. Communication technology determinism (K3, K4)
- 1.6. The information society. (K3, K4)

### Unit II: Concept of culture

(18 hours)

- 2.1. The definition of culture, characteristics of culture, (K1, K2)
- 2.2 Components of culture, functions of culture. (K1, K2, K3)
- 2.3. Media and popular culture,(K1, K2, K3)
- 2.4. Mass media culture and development (K1, K2, K3)
- 2.5. Development communication, modernization, (K1, K2, K3)
- 2.6. Models of development, dependency/structuralism model.(K1, K2, K3, K4 )

### Unit III: Media Audience

(18 hours)

- 3.1. Reception, (K1, K2)
- 3.2. Audience positioning, (K1, K2,K3)
- 3.3. Subjectivity, Pleasure (K1, K2)
- 3.4. Audience dynamics (K3, K4)
- 3.5. Impact of Media on Society (K1, K2,K3)
- 3.6. Ecological perspectives.(K3, K4)

### Unit IV: Media Analysis:

(18 hours)

- 4.1. Media Text, (K1, K2)
- 4.2. Media Ideology, (K1, K2, K3)
- 4.3. Media and Realism (class, Gender, Race, Age, Minorities, children),(K1, K2, K3, K4)
- 4.4. Approaches to Media Analysis (K1, K2, K3)
- 4.5. Marxist theory, semiotics, (K1, K2, K3)
- 4.6. Psychoanalytic.(K1, K2 K3, K4)

### Unit V: Alternate Media

(18 hours)

- 5.1. Alternative approaches to developments, (K1, K2, K3)
- 5.2. Revival of modernization models, (K1, K2, K3)
- 5.3. Peculiarity of Indian Society, Media in Indian society, (K1, K2, K3, K4)
- 5.4. Internet initiatives for rural development,(K1, K2, K3, K4)
- 5.5. Communication for development (K1, K2, K3)
- 5.6. Sensationalism, 4G, VR, gaming, mobile addiction.(K1, K2, K3, K4)

### **Books for Study and Reference:**

1. Mukul Sahay – A Textbook of Communication Media and Society – Wisdom Press, Delhi, 2013.
2. Keval J.Kumar - Mass Communication in India, 4<sup>rd</sup> Edition - Jaico Publication, 2011.
3. Graeme Burton - Media and Society Critical Perspectives, 2<sup>nd</sup> Edition - Tata McGraw Hill, 2010
4. Paul Hodkinson,Media,Culture and Society:An Introduction,SAGE Publication Ltd,2010.
5. Michael O'Shaughnessy,JaneStadler,Media and Society an Introduction,Oxford University press,2005
6. Amos Owen Thomas - Media, Culture and Politics Across India, Sage Publication, 2005
7. McQuail Denis – Mass Communication Theory, 4<sup>th</sup> and 5<sup>th</sup> Edition - Sage Publication, 2000.
8. Silverstone rogers – Why study Media? –sage Publications- 1999
9. Berger, Asa Authur,- Media Analysis Techniques- Sage Publications -1998.

## SEMESTER -IV

### UCVCH20- - PRACTICAL – IV: POST PRODUCTION EDITING

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> UCVCH20	<b>Title of the Course:</b> Post Production Editing	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objective:

- To teach students the art of editing videos through Adobe Premier CC software and to complete basic exercises in editing.

#### Course Outcomes (CO)

The Learners will be able to

CO1: Explaining the various tools and workspace of adobe premiere pro.

CO2: Using various effects and techniques.

CO3: Applying the titling and adding sound effects

CO4: Creative synchronization of song and scene remix

CO5: Create a short film or documentary using editing techniques.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Course Syllabus:**

**Exercises: 1 - 3 (30 hours), Exercises 3 – 6**

**(30 hours)**

Students must make a 5 minutes edited version of the following:

1. Song remix and scene remix with masking, blur, color and reverse effects
2. Subtitles for part of a feature film other than English
3. Prepare a movie Trailer and add Titling and End credits
4. Teaser for any programme.
5. Shoot and Edit a short film or documentary (Max 1 minute)
6. Prepare a video presentation with a voice over.

Cognitive level: K1,K2,K3,K4

The Internal evaluation for 40 Marks is based on the exercises.

The Semester Examination (60 Marks) is based on the practical examination (45 marks), Record (10 marks) and Viva Voce (5 marks)

**SEMESTER IV**  
**UAJLA20 - ALLIED – IV - JOURNALISM**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: IV</b>	UAJLA20	Journalism	Theory	Allied	6	5	100

**Objective:**

- To introduce the field of Visual Nature of journalism in various media and to develop journalistic skills in students

**Course Outcomes (CO)**

The Learners will be able to

CO1: Explaining the basic concepts of journalism.

CO2: Analyzing the newspaper organization and its ethical codes.

CO3: Evaluating the role of journalist in the stream of electronic media.

CO4: Classifying the duties and responsibilities of Television journalist.

CO5: Acquiring the Knowledge and process of online journalism.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction to Journalism (18 hours)**

- 1.1. Evolution of Journalism (K1, K2)
- 1.2. News, Types of news, News values (K1, K2, K3)
- 1.3. Structure of news story (K1, K2, K3)
- 1.4. Journalism ethics (K2, K3)
- 1.5. Functions of news (K3, K4)
- 1.6. Journalism in action (finding, choosing, sourcing, gathering, writing, editing and taking news further) (K1, K2, K3, K4)

### **Unit II: Print Journalism (18 hours)**

- 2.1. History of newspaper, Press council (K1, K2, K3)
- 2.2. Code of ethics of Indian journalist (K1, K2, K3)
- 2.3. News agencies (K1, K2,)
- 2.4. Newspaper organizations (ABC – RNI – INS - India Press council (K2, K3, K4)
- 2.5. Style of writing, journalist as investigator, journalist as entertainer (K3, K4)
- 2.6. Difference between newspaper and news magazine, Types of news magazine (K2, K3, K4)

### **Unit III: Electronic Journalism-Radio Journalism (18 hours)**

- 3.1. News flow in broadcast media (K1, K2, K3)
- 3.2. Basics of Radio News, Sources and contacts (K1, K2, K3)
- 3.3. Wire services, Components of News (K1, K2, K3)
- 3.4. Radio news room setup, Radio News Reporting, (K2, K3, K4)
- 3.5. News writing and presentation, Elements of editing, integrating audio bytes (K2, K3, K4)
- 3.6. Radio talks and discussions, radio interviews. Writing for packages- local, regional, national (Voice over, Sound on Tape) (K2, K3, K4)

### **Unit IV: Television Journalism (18 hours)**

- 4.1. TV News room work process (K1, K2, K3)
- 4.2. Basics of TV News, Structuring TV News (K1, K2, K3)
- 4.3. News gathering and writing (K1, K2, K3)
- 4.4. Integrating sound bites, visualization of News, voice-overs (K1, K2, K3)
- 4.5. TV interviews, Process of Live inputs, News Debates News analysis (K1, K2, K3, K4)
- 4.6. Gate keeping, News anchoring (K1, K2, K3)

### **Unit V: Online Journalism (18 hours)**

- 5.1. Newspapers and News reporting in the digital age (K1, K2, K3)
- 5.2. News flow in online media (K1, K2, K3)
- 5.3. Media differences in news coverage (K1, K2, K3)
- 5.4. Organization of online newspapers, Internet news producing strategies (K1, K2, K3, K4)
- 5.5. Future of internet news (K1, K2, K3)
- 5.6. Citizen journalism. (K1, K2, K3)

**Assignments:**

Students can produce their own production of tabloids, newspapers. Journals, magazine.

**Books for Study and Reference:**

1. Lynette Sheridan burns-Understanding Journalism 2<sup>ND</sup> edition-Sage publications-2013
2. KevalJ.Kumar - Mass Communication in India - Jaico Publications, 2011.
3. Rajesh Pandey-Visual Journalism-adhyayan publishers and distributors-edition 2009
4. Ajay Dash-Journalistic Writing-Sonali publications-2008
5. Paul Chantter, Peter Stewart – Basic Radio Journalism – Focal Press, 2007.
6. Brad Schultz – Broadcast News Producing - Sage Publication, 2007.
7. B.K. Desh Pandey - Photojournalism – Sonali Publications, 2007.
8. Dr.G.C.Banik – PR and Media Relation - Jaico Publications, 2005.
9. B.N. Ahuja - Theory and Practice of Journalism - Surjeet Publication, Delhi, 2004

**SEMESTER – IV**  
**USCMD420- SKILLED BASED ELECTIVE – IV: INTRODUCTION TO ART**  
**DIRECTION**

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> USCMD420	<b>Title of the Course:</b> Introduction to Art Direction	<b>Course Type:</b> Theory	<b>Course Category:</b> Skilled Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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**Objective of the Course**

1. This course examines the visual history and development of art direction and production design.
2. This course focuses on the Indian and Hollywood Art Department, their responsibilities and relationships both intra-departmentally and with the other crafts and departments.
3. This course focuses on introduction to set design and basics of set construction, design visualization.
4. Students will see how design elements enhance story theme, character, plot, tone, location, period, lighting techniques, cinematography, editing, and visual effects.
5. Students will learn budgeting, stage management and scheduling.
6. Students will design a mini set model.

**Course Outcomes (CO)**

The Learners will be able to

CO1: Explaining the basic concepts of art direction.

CO2: Analyzing the various works of the prominent art directors.

CO3: Acquiring in-depth knowledge about the creation of set models.

CO4: Compiling the technical aspects of set direction.

CO5: Acquiring the stage management skills.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

### **Unit I: Introduction to art Direction**

History and Development of Art Direction – Role of Art director – Responsibilities – Colour Basics – Colour – colour psychology –Basics of design - Exploring Form, Space, Mass, Volume – Thematic elements (K1, K2,K3,K4)

### **Unit II: Roles of an Art Director**

Prominent Indian Art Directors’ work in movies – Hollywood Art Directors – Works in movies – Qualities of an Art Director - Scenic Building Blocks – Types of flats and materials – blueprint of the construction of set – Perspectives – constructional methods – slab building (K1,K2,K3,K4 )

### **Unit III: Properties**

Model Creation types of set models in a TV program – Set decoration – Types of properties used in Set Decoration. Historical Techniques: Painted glass, mattes, foreground miniatures, forced perspective.(K1, K2,K3,K4)

### **Unit IV: Set Design**

Location Scouting, Interiors and Exteriors. How to photograph the location for Set designing. Taking measurements. Other details of importance – Camera angles and movements - Design for performance through areas such as lighting, set design and costume, design visualization.(K1, K2, K3,K4)

### **Unit V: Budget**

Types of layout – Concept and idea for story creation - symbols used – foreground –middle ground and background - Budgeting for set design – Stage Management – Role and Responsibilities – Scheduling for programmes.(K1, K2,K3,K4)

### **Reference Books –**

1. Michael Rizzo -“The Art Direction Handbook for Film” Second Edition
2. Nicholas Proferes - “Film Directing Fundamentals”, Focal Press, 3<sup>rd</sup> Edition, 2008.
3. Fionnuala Halligan - “Filmcraft: Production Design”, Focal Press 2012.
4. Colin Winslow - “The Handbook of Model Making for Set Designers Paperback”, Crowood Press, 2008.
5. Tony Davis –“Stage Design”,Rotovision, September,2001.

**SEMESTER V**  
**UCVCI20 - MEDIA RESEARCH**

<b>Year:</b> <b>III</b>  <b>Sem: V</b>	<b>Course Code:</b> UCVCI20	<b>Title of the Course:</b> Media Research	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objective:**

- To orient students on the need for media research and the techniques and process of research studies

**Course Outcomes (CO)**

The Learners will be able to

CO1: Restating the Types and Characteristic of Research.

CO2: Analyzing the Research Process.

CO3: Acquiring an in depth Knowledge in Sampling Techniques.

CO4: Discussing the Qualitative and Quantitative Research Methods.

CO5: Acquiring Knowledge in Data Analysis and Presentation.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction (15 hours)**

- 1.1. Research: Definition of research-Characteristics of Research (K1,K2,K3)
- 1.2. Research Process- Research Problem –Research Design (K1,K2,K3)
- 1.3. Types of Research –Anthropological Research, Historical Research (K1,K2,K3,K4)
- 1.4. Experimental Research (K1, K2, K3)
- 1.5. Content Analysis and other types- Hypothesis (K1, K2,K3)
- 1.6. Types of Hypothesis. (K1, K2,K3)

### **Unit II: Research Process (15 hours)**

- 2.1. Objective of the Research – Review of literature.(K1,K2,K3)
- 2.2. Research Design - Data collection.(K1,K2,K3,K4)
- 2.3. Survey methodology -Techniques and Analysis.(K1,K2,K3,K4)
- 2.4. Questionnaire, Audience Survey.(K1, K2,K3)
- 2.5. NRS-IRS,TAM-TRP, Election Related survey.(K1,K2,K3,K4)
- 2.6. Opinion poll, Exit poll.(K2, K3,K4)

### **Unit III: Research tools (15 hours)**

- 3.1. Sampling Definition.(K1, K2, K3)
- 3.2. Sampling Terminology.(K2, K3)
- 3.3. Principles of Sampling.(K1, K2, K3)
- 3.4. Aims in Selecting a Sample.(K1, K2, K3)
- 3.5. Types of Sampling: Probability Sampling.(K1, K2, K3, K4)
- 3.6. Non-Probability Sampling.(K1, K2, K3, K4)

### **Unit IV: Media Research methods (15 hours)**

- 4.1 Quantitative Research: Descriptive Research.(K1, K2, K3)
- 4.2 Co-Relation Research. - Participant observation.(K1, K2, K3, K4)
- 4.3. Interviews and Depth interview – focus group.(K2, K3)
- 4.4. Qualitative Research methods: Qualitative content Studies - case study- cross cultural Research-Action Research.(K1, K2, K3)
- 4.5. Ethno Methodological Research- Triangulation Method.(K1, K2, K3, K4)
- 4.6. Marketing Media Research.(K1, K2, K3)

### **Unit V: Data Analysis (15 hours)**

- 5.1. Data Analysis - Interpretation of Results.(K1, K2, K3)
- 5.2. Statistical analysis – Mean and standard deviation. (K1, K2, K3)
- 5.3. Chi square Test-T-test. (K1, K2, K3)
- 5.4. Computer Assisted handling and Analysis (SPSS). (K1, K2, K3)
- 5.5. Data Presentation – Charts and graphs. (K1, K2, K3, K4)
- 5.6. Preparing research report. (K1, K2, K3)

### **Practical Exposure:**

Pilot Study Research (Should be done by the students on their desired topic.)

**Books for Study and Reference:**

1. Wimmer, D Roger and Dominick R Joseph, Mass Media Research: An Introduction, Wadsworth publishing Company, California, 2013
2. Kenneth S. Borden, Bruce B. Abbott - Research Designs and Methods, 6<sup>th</sup> Edition -Tata McGraw Hill, 2005.
3. R. Panneerselvam - Research Methodology - Prentice Hall, 2004.
4. Arthur Asa Berger - Media and Communication Research Methods: An Introduction to Quantitative and Qualitative Approaches - Sage Publication, 2000
5. Klaus Krippendorff - Content Analysis: An Introduction to its Methodology, 2<sup>nd</sup> Edition - Sage Publication, 2000.
6. Ranjit Kumar – Research Methodology: A Step by Step Guide for Beginners - Sage Publication, 1996.

**SEMESTER V**  
**UCVCJ20 – FILM APPRECIATION**

<b>Year:</b> <b>III</b>	<b>Course Code:</b> UCVCJ20	<b>Title of the Course:</b> Film Appreciation	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> V							

**Objective:**

- To introduce films as a form of visual communication and develop technical knowledge and critical outlook towards film making

**Course Outcomes (CO)**

The Learners will be able to

CO1: Identifying the concepts of Film as a Mass medium and its Production Stages.

CO2: Acquire an In-depth knowledge in Film Language.

CO3: Analyze about origin of Indian Cinema.

CO4: Exploring the Film making Techniques in World Cinema

CO5: Distinguish the Film genres.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Course Syllabus:**

**Unit I: Film as a Medium (15 hours)**

1.1. Film History: Early Cinema with special reference to Tamil Nadu and India. (K1, K2, K3)

1.2. Cinema as a mass medium. (K1, K2, K3)

1.3. Persistence of vision, Phi phenomenon. (K1, K2,)

1.4. Film Production Process: Pre Production. (K2, K3, K4)

- 1.5. Production. (K2, K3)
- 1.6. Post Production. (K3,K4)

**Unit II: Film Concepts (15 hours)**

- 2.1. Film Concepts:Screenplay.(K1, K2, K3)
- 2.2. Mise-en-scene, Mise-en-shot.(K1, K2, K3)
- 2.3. Cinematography,Cinematic codes.(K3 K4)
- 2.4. Film Concepts and Film Grammar-Lighting.(K1, K2, K3)
- 2.5. Make-up, Performance, Sets.(K1, K2, K3)
- 2.6. Editing, Sound, Music and dubbing, Direction.(K1, K2, K3,K4)

**Unit III: Indian Classics (15 hours)**

- 3.1.Origin of Classical Narrative Cinema.(K1, K2, K3,K4)
- 3.2. Soundless film - Development of classical Indian Cinema.(K3 K4)
- 3.3. Film Movement- popular Indian classic.(K3 K4)
- 3.4. Films:PatherPanchali, ApurSansar.(K3 K4)
- 3.5. 36 ChowrangeeLane.(K3 K4)
- 3.6. Mughal-e-Azam, Pyasaa (discussion of film elements).(K3 K4)

**Unit IV: World Classics (15 hours)**

- 4.1. History of Global film-Development of Hollywood Cinema.(K1, K2, K3,K4)
- 4.2. World movies – Lumier Brothers and cinematograph.(K1, K2, K3,K4)
- 4.3. Static to Multi-shot, Beginning of Narrative (Trip to Moon, Birth of a Nation).(K3 K4)
- 4.4. Editing – multiple exposure (The Four Troublesome heads).(K3 K4)
- 4.5. Montage (Battleship Potemkin), cross-cutting (The Great train Robbery) and techni-colour (The Wizard of Oz).(K3 K4)
- 4.6.Essays on The Good, bad and the ugly, Rebecca, Schindler’s list, Avatar(discussion of film elements).(K1,K2,K3 K4)

**Unit V: Genres (15 hours)**

- 5.1.Film genres –Documentary and Fiction (K1,K2,K3 K4)
- 5.2. Historic, drama, horror.(K3 K4)
- 5.3.Science fiction, comedy.(K3 K4)
- 5.4.Romantic, action and animation(K3 K4)
- 5.5. Essays on classics: Citizen Kane, The Tramp, Psycho.(K3 K4)
- 5.6. Rashomon, Bicycle thieves (Discussion of film elements).(K1,K2,K3 K4)

**Movies to be watched:** Citizen Kane, The Tramp, Psycho, Rashomon, Bicycle thieves, Pather Panchali, Apur Sansar, 36 Chowrangee Lane, Mughal-e-Azam, Pyasaa, The Good, Bad and the Ugly, Schindler’s list, Avatar, Rebecca

**Books for Study and Reference:**

1. Bywater and Thomas – Film Criticism, 1<sup>st</sup> Edition – Pearson Education, 2009
2. Bhawana Somaaya - Fragmented Frames, 1<sup>st</sup> Edition – Pustak Mahal, 2008
3. Bastian Cleve - Film Production Management, 3<sup>rd</sup> Edition - Focal Press, 2006
4. Susan Hayward - Key Concepts in Cinema Studies - Routledge, 2004
5. Michael Rabiger -Directing Film Techniques and Aesthetics,3<sup>rd</sup> Edition-Local Press, 2003
6. Paul Martin Lester - Visual Communication, 3<sup>rd</sup> Edition - Thomson Wadsworth, 2003
7. Thomas A. Ohanian, Michael E. Philips - Digital Film Making, 2<sup>nd</sup> Edition - Focal Press, 2000
8. Yves Thorval - The Cinema of India (1896-2000) - Macmillan Press, 2000

**SEMESTER V**  
**UCVCK20 - DIGITAL PUBLIC RELATIONS**

<b>Year:</b> <b>III</b> <b>Sem: V</b>	<b>Course Code:</b> UCVCK20	<b>Title of the Course:</b> Digital Public Relations	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 3	<b>Marks</b> 100
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**Objective:**

- To initiate students to the field of Public Relations by giving them a background, trends and techniques in PR
- the course will teach principles of digital communications management and their application to develop strategy,

**Course Outcomes (CO)**

The Learners will be able to

CO1: Summarize the Concepts and Scope of Public Relations in different sectors.

CO2: Evaluating the Process of PR and acquiring the profound knowledge in Public relation writing.

CO3: Analyzing the corporate, social and ethical Responsibilities of PR.

CO4: Examine the different roles of Digital PR

CO5: Preparing and presenting a PR campaign on social issues

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

### **Unit I: Public Relations: Introduction (15 hours)**

- 1.1. Evolution and Definition of Public relations (K1, K2, K3)
- 1.2. History of PR in India Activities of PR.(K1, K2, K3)
- 1.3. Scope of PR,Roles of a PRO, PR in Government.(K1, K2, K3, K4)
- 1.4. PR in service sector.(K1, K2, K3)
- 1.5. Internal and External Publics.(K1, K2, K3)
- 1.6. SWOT analysis of PR.(K1, K2, K3, K4)

### **Unit II: PR process Writing (15 hours)**

- 2.1. The PR process, PR, In-house vs external agency (K1, K2, K3)
- 2.2. PR in crises, Role of a PR Writer, (K1, K2, K3)
- 2.3.Ethical and legal responsibilities of a PR Writer(K1, K2, K3)
- 2.4. Research for the PR Writer,(K2, K3)
- 2.5.Copy writing for the web (K1, K2, K3)
- 2.6.Social media & mobiles, Benefits of PR.(K1, K2, K3)

### **Unit III: Corporate Social Responsibilities (15 hours)**

- 3.1.Public Utilities and PR.(K1, K2, K3)
- 3.2.Social responsibilities of PR.(K1, K2, K3)
- 3.3.Corporate social responsibilities.(K1, K2, K3,K4 )
- 3.4.Benefits of CSR, Types of CSR.(K2, K3)
- 3.5. Advantages& disadvantages of CSR.(K2, K3)
- 3.6. PR and emerging Global Markets. (K1, K2, K3, K4 )

### **Unit IV: Digital Public Relation (15 hours)**

- 4.1.Definition of DPR, Why Digital PR is important. (K1,K2, K3)
- 4.2. Traditional PR VS Digital PR.(K2, K3)
- 4.3. Types of Digital PR Strategy. (K2, K3)
- 4.4. Types of Digital PR- (SEO and Digital Marketing) Overview of digital marketing,
- 4.5 SEO, Social Media Marketing,.(K2, K3)
- 4.6.Mastering Google (AdWords advertising, analytics & applications), Benefits of Digital PR.(K1, K2, K3, K4 )

### **Unit V: Public Relations Ethics (15 hours)**

- 5.1. Concepts of Ethics.(K1,K2,K3)
- 5.2. Public Relations society of India (PRSI).(K1,K2,K3)
- 5.3. The International Public Relations Association (IPRA).(K1,K2,K3)
- 5.4. Public Relations society of America (PRSA).(K1, K2,K3)
- 5.5. Council of Public Relations Firms.(K2,K3)
- 5.6. Charter on Media Transparency. (K1,K2,K3,K4)

**Exercise: Campaign Project:**

The students are divided into groups according to the strength of the class and they will choose Any one topic of their choice and the campaign is done in the nearby villages or government or Panchayat or private schools or prison giving awareness on the topics apt for that region or On any Current issue of the year.

(Project should be submitted as a video format or as power point presentation with Appendix)

**Books for study and Reference:**

1. Keith Butterick- Introducing PR (theory and practice)-Sage publications-2012.
2. K.M. Shrinivastava - Public Relations in the Digital Era – Pilgrim’s Publishing, Varanasi, 2007.
3. Dr.G.C.Banik, Public Relation and Media Relations – Jaico Publishing House, 2005.
4. Scott M.Cutlip, Allen H.Centre, Glen M.Broom, Effective Public Relations – Pearson Education, 2003.
5. Dova Newsom, Bob Carrell - Public Relations Writing, Form and Style – Thomas Learning, 2001.

**Websites reference:**

<http://www.marketingteacher.com/digital-public-relations-dpr/>

<http://www.omtac.com/h/n/OMTAC/digitalmarketingresi//292#A>

<https://www.ricemedia.co.uk/blog/digital-pr-important-everything-need-know/>

<http://www.csrinpractice.com/what-is-csr/>

<https://www.exposureninja.com/wp-content/uploads/2020/04/what-is-digital-pr-campaign-strategy-checklist.pdf>

## SEMESTER - V

### UCVCL20 - PRACTICAL V - 2D ANIMATION

<b>Year:</b> <b>III</b> <b>Sem: V</b>	<b>Course Code:</b> UCVCL20	<b>Title of the Course:</b> 2D Animation	<b>Course Type:</b> Practical V	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objective:

- To enable students to learn the art of 2-D animation using Adobe Animate CC software

#### Course Outcomes (CO)

The Learners will be able to

CO1: Locating the Various tools and workspace of Adobe Animate software

CO2: Acquiring the knowledge in basic Animation Techniques.

CO3: Apply and usage of Button in Animated Greeting Cards.

CO4: Prepare an Online Web Advertisement.

CO5: Applying the Concept of Transition in Slideshows.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Exercises: Each exercise carry**

(18 hours)

1. Key frame animation
2. Interactive card using buttons
3. Animated cartoon (story /Rhymes)
4. Online or Web Advertisements (horizontal and vertical)
5. Slide show using Transition

Cognitive Level: K1,K2,K3,K4.

The Internal Examination (40 Marks) is based on the Regular performance of exercises.

The Semester Examination (60 Marks) is based on the Practical Examination (45 Marks), Record (10 Marks) and Viva Voce (5 Marks)

**SEMESTER –V**  
**UCVCM20 -- PRACTICAL VI: INTERNSHIP**

<b>Year:</b> <b>III</b> <b>Sem: V</b>	<b>Course Code:</b> UCVCM20	<b>Title of the Course:</b> Internship	<b>Course Type:</b> Practical VI	<b>Course Category:</b> Core	<b>H/W</b> 2	<b>Credits</b> 4	<b>Marks</b> 100
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**Objective:**

- To train students in the field of television production with first-hand experience working in a television news organization for a month as an internee. One month training in media will expose the students to actual working conditions of daily on online news media or electronic media (TV and Radio studio). This internship is intended to enable students acquire field experience and journalistic skills of reporting, writing and editing for medium of their choice. Students will be required to maintain a journal recording their daily events in detail and submit a report on their activities at the end of the training.

**Course Outcomes (CO)**

The Learners will be able to

CO1: Outline the concepts of News production in Television Medium.

CO2: Acquiring an in-depth knowledge in the Respective Media Industry.

CO3: Compiling the Types of Work done in News Production.

CO4: Evaluating the Experience gained in News Production.

CO5: Substantiate the Report with proper documents.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Course Syllabus:**  
**Order of details expected in the Internship Report**

College Certificate  
Certificate from Media Industry  
Acknowledgements  
Table of Contents  
List of Figures  
Synopsis

1. Introduction
  - 1.1 About the Media in general
  - 1.2 About the Media Industry
  - 1.3 About the Team
  - 1.4 Areas of Field Experience
  - 1.5 Outstanding Individual Works
2. (Divide the successive Chapters based on Issue/Type of Work/Chronological Events, giving a detailed account of the work done, substantiating it with scripts, photographs, clippings of the telecast, etc.)
3. (Second Last Chapter) About the experiences and lessons learnt from them, categorized according to content.
4. Conclusion

Appendix A (Photographs: Workplace, Team)

Appendix B (Photographs: Reported Issues, Press Meets, etc)

Appendix C (Press Release, Hand-Outs, Notices, News Script samples, etc)

Cognitive Level: K1, K2, K3, K4.

The Internal Evaluation for 40 marks is based on the journal, proof of work (photographs, clippings, script, press release/handouts, etc collected during the internship), and the preparation of the final report.

The Semester examination (60 Marks) is based on the evaluation of the Internship Report (50 marks) and Viva-Voce (10 marks).

## SEMESTER V

### UCVCN20 - PROJECT: DOCUMENTARY PRODUCTION

<b>Year:</b> <b>III</b>	<b>Course Code:</b> UCVCN20	<b>Title of the Course:</b> Documentary Production	<b>Course Type:</b> Project	<b>Course Category:</b> Core Elective	<b>H/W</b> 3	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> V							

#### Objective:

- To train students in short-film making or documentary making by putting into practice the techniques learned in television production and script writing through team work.

Students will specialize in Television production and prepare a group project on any chosen theme. The editing of the project should be done with the editing software that is taught to the students during the course. The master copy of the production in a DVD format must be submitted along with the script and the storyboard.

#### Course Outcomes (CO)

##### The Learners will be able to

- CO1: Analyzing the Concepts of Documentary production.  
 CO2: Implementing the Pre-Production process of Documentary.  
 CO3: Executing the Production process of Documentary.  
 CO4: Compile the Post Production Activities according to the Script.  
 CO5: Presenting the Documentation with Master Copy.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Exercise:** Documentary - 5 to 7 minutes

1. Proposal Format to be given (5 hours)
2. Script Approval (10 hours)
3. Story Board (15 hours)
4. Documentation (15 hours)

Cognitive Level: K1, K2, K3, K4.

The Internal Evaluation (40 marks) is based on the production process and the model viva.

The Semester Evaluation (60 marks) is based on the Viva-voce and the quality of the production presented for the Examination.

## SEMESTER V

### USCMD520 – SKILL BASED ELECTIVE: E- CONTENT PRODUCTION

<b>Year: III Sem: V</b>	<b>Course Code: USCMD520</b>	<b>Title of the Course: E- Content Production</b>	<b>Course Type: Practical</b>	<b>Course Category: Skilled Based Elective</b>	<b>H/W 2</b>	<b>Credits 2</b>	<b>Marks 100</b>
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#### Objective:

To enable students know about the production process and techniques of e-content development, implementing effective e-content material for education field.

All students will specialize in e- content development and prepare an individual project with the help of required software and multimedia accessories. The final copy of the production must be submitted along with the script.

#### Course Outcomes (CO)

The Learners will be able to:

CO1: Describing the Planning Process of E-content development

CO2: Acquiring the In-depth knowledge about the E-content design

CO3: Selecting the Appropriate Methods to Implement the E-content design

CO4: Applying and testing the E-content course material

CO5: Executing and publishing the E-contents for formal education.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

## **Course Syllabus:**

**Exercises Each Exercise carry: (10 hours )**

1. Students can choose any Program of their choice and Prepare E-Content for a course.
2. Production (video presentation, PowerPoint presentation etc)
3. Web Publishing (Overall presentation for uploading in the website)

Cognitive Level: K1, K2, K3, K4.

The Internal Evaluation (40 Marks) is based on the process of development of the campaign.

The Semester Evaluation (60 Marks) is based on the (45 Marks) practical examination on conduct of the campaign and submission of the report (10 marks) and Viva voce (5 Marks)

**SEMESTER VI**  
**UCVCO20 - MEDIA LAWS AND ETHICS**

<b>Year:</b> <b>III</b> <b>Sem: VI</b>	<b>Course Code:</b> UCVCO20	<b>Title of the Course:</b> Media laws and Ethics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objective:**

- To familiarize students with the framework of laws that apply to the field of electronic as well as print media

**Course Outcomes (CO)**

The Learners will be able to

CO1: Explaining the Concept of Media Laws and Rights

CO2: Reviewing Various Media Acts and its uses.

CO3: Acquire an in depth Knowledge in Media Laws.

CO4: Analyzing the Cyber Laws and Regulations.

CO5: Examine the Media Regulatory Authority Bodies.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

### **Unit I: Media and Freedom (15 hours)**

- 1.1. Concept of media freedom, (K1, K2, K3)
- 1.2. Evolution of Article 19 (a), Rights and Restrictions, (K1, K2, K3)
- 1.3. Theories of the press, (K1, K2, K3)
- 1.4. Rights and Obligations of the media, (K1, K2, K3)
- 1.5. Components of Media Ethics, (K1, K2, K3)
- 1.6. IPC sections 124A, 108, 501, 144. (K1, K2, K3, K4)

### **Unit II: Media Persons and the law (15 hours)**

- 2.1. Defamation, Official Secrets Act, (K1, K2, K3)
- 2.2 Intellectual Property Rights, Issues of Privacy, (K1, K2, K3, K4)
- 2.3 Copyright Act, Obscenity, (K1, K2, K3)
- 2.4 Source Confidentiality, (K1, K2, K3)
- 2.5 Parliamentary Privileges Act, (K1, K2, K3)
- 2.6 Right to Information Act (K1, K2, K3, K4)

### **Unit III: Laws on Media Institutions (15 hours)**

- 3.1 Cable regulation Act, (K1, K2, K3)
- 3.2 Indian cinematography Act 1952, (K1, K2, K3)
- 3.3 Film censorship, (K1, K2, K3)
- 3.4 Contempt of Court, (K1, K2, K3)
- 3.5 Press and Registration of Books Act, (K1, K2, K3)
- 3.6 Regulation related to broadcast media (Indian Broadcasting code) (K1, K2, K3, K4)

### **Unit IV: Cyber Laws (15 hours)**

- 4.1. Laws regulating Foreign Direct Investment in media (K2, K3, K4)
- 4.2. IT Act, Cyber laws in India. (K2, K3, K4)
- 4.3. Cyber security concerns. (K2, K3, K4)
- 4.4. Preventive measures. (K3, K4, K5)
- 4.5. Penalties. (K2, K3, K4)
- 4.6. Network service providers' protection. (K2, K3, K4)

### **Unit V: Regulating Authorities (15 hours)**

- 5.1. Ministry of Information and Broadcasting. (K1, K2, K3)
- 5.2. Directorate of Advertising & Visual Publicity. (K2, K3,)
- 5.3. Directorate of Field Publicity. (K2, K3, K4)
- 5.4. Press Council. (K2, K3, 4k)
- 5.5. Central Board of Film Certification. (K3, K4,)
- 5.6. Advertising Standards Council of India, Telecom Authority. (K3, K4,)

**Books for Study and Reference:**

1. Paranjay Guha Thakurta - Media Ethics, 2<sup>nd</sup> Edition - Oxford, 2012.
2. Devesh Kishore, Ganga Sagar Singh - Media Law, Har-Anand Publication, 2012.
3. Brij Kishore Sharma - Introduction to the Constitution of India, 6<sup>th</sup> Edition – PHI -Learning, 2011.
4. Gillian Doyle - Media Ownership - Sage Publications, 2002.
5. Dr. Durga Das Basu - Introduction to the Constitution of India, 19<sup>th</sup> Edition - Wadhwa Publications, Nagpur, 2001.
6. Cees J Hamelink - The Ethics of Cyber Space - Sage Publications, 2000.
7. Philip Patterson Lee Wilkins – Media ethics issues and cases, 6<sup>th</sup> Edition, Tata Mc Grawhill-2010
8. Durga Doss Basu, (2000) Press Laws, Central Law Book Agency, Delhi.

## SEMESTER VI

### UCVCP20 - INTRODUCTION TO ICT AND NEW MEDIA

<b>Year: III</b>	<b>Course Code:</b> UCVCP20	<b>Title of the Course:</b> Introduction to ICT and New Media	<b>Course Type:</b> Theory	<b>Course Category:</b> Core Elective	<b>H/W</b>  5	<b>Credits</b>  3	<b>Marks</b>  100
<b>Sem: VI</b>							

#### Objective:

- To give students a brief idea of the evolution of the Communication and Information Technology, its effects on Economics and working in the New Media

#### Course Outcomes (CO)

The Learners will be able to

CO1: Identifying the Concept of Internet and its Features.

CO2: Acquiring the Knowledge in Usage of ICT in Print Media.

CO3: Applying the Techniques of ICT in Electronic Media.

CO4: Implementing the ICT tools and techniques in New Media.

CO5: Analyzing the Connectivity issues in New Media.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Unit I: Introduction to ICT** (15 Hours)

- 1.1. Evolution of ICT (4 stages). (K1, K2, K3)
- 1.2. From ARPANET to internet. (K2, K3, K4)
- 1.3. New Media as a Mass Medium. (K3, K4, K5)
- 1.4. Structure and features of Internet. (K1, K2, K3)
- 1.5. ISP, TCP/IP. (K2, K3, K4)
- 1.6. E-mail, WWW. (K2, K3, K4)

**Unit II: ICT for Print media** (15 Hours)

- 2.1. New source of news – blogs, citizen journalism. (K2, K3, K4)
- 2.2. Hyper-local news, the converged or single man journalist. (K2, K3, K4)
- 2.3. Change in News flow (K2, K3, K4)
- 2.4. Online-only Newspapers, e-Newspapers. (K2, K3, K4)
- 2.5. Replica editions. (K3, K4)
- 2.6. Limitations of online newspapers. (K2, K3, K4)

**Unit III: ICT for Electronic media** (15 Hours)

- 3.1. Scroll News (K1, K2, K3)
- 3.2. Image and video digitization. (K2, K3, K4)
- 3.3. Digitization of radio and television news (K2, K3, K4)
- 3.4. On-the-spot broadcast (K3, K4)
- 3.5. User-generated content. (K1, K2, K3, K4)
- 3.6. Privacy, Copyright issues. (K3, K4)

**Unit IV: ICT for New media** (15 Hours)

- 4.1. Traditional vs Web journalism. (K2, K3, K4)
- 4.2. Interactivity, Archiving (K1, K2, K3)
- 4.3. News feeds (K2, K3, K4)
- 4.4. Syndicated Content. (K3, K4)
- 4.5. Future: Evernet. (K3, K4)
- 4.6. Internet of things (K2, K3, K4)

**Unit V: Browsers & Servers** (15 Hours)

- 5.1. ISP and browsers. (K2, K3)
- 5.2. Server, Proxy server. (K2, K3)
- 5.3. Security Socket Layer. (K2, K3)
- 5.4. Firewalls Open Source, 4G. (K2, K3, K4)
- 5.5. Uplink and Downlink. (K2, K3, K4)
- 5.6. Last mile connectivity(K3, K4)

**Books for Study and Reference**

1. Harley Hahn, The Internet, Tata Mc-Graw-Hill Publishing, 2<sup>nd</sup>. ed., 2005
2. Joseph R. Dominick, The Dynamics of Mass Communication, Tata McGraw-Hill Publishing House, 10<sup>th</sup> ed. 2010
3. Seema Hasam, Mass Communication Principles and Concepts, CBS Publishers, 2010

**SEMESTER VI**  
**UCVCQ20 – PRACTICAL VII -WEB DESIGNING**

<b>Year: III</b> <b>Sem: VI</b>	<b>Course Code: UCVCQ20</b>	<b>Title of the Course: Web Designing</b>	<b>Course Type: Practical VII</b>	<b>Course Category: Core Elective</b>	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objective:**

- To teach students the art of designing basic websites using Adobe Dreamweaver software

**Course Outcomes (CO)**

The Learners will be able to

CO1: Acquiring the Basic Knowledge about Adobe Dreamweaver.

CO2: Locating the Various Tags used for Creating web pages.

CO3: Designing the Navigation Structure for Web Pages.

CO4: Creating the Webpage and Making Links.

CO5: Adding Various Effects to Web Pages

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

Developing a static web site with embedded multimedia elements using Dreamweaver, supported by Flash for graphics and animation, Swish for Flash authoring and Adobe Photoshop for image editing.

Introduction to Web design - Elements of Hypertext – markup language – heading section, body section, other HTML tags, advanced tags, frame tags – up linking the sites.

### **Kindly Note: Each exercise carries: 15 hours**

1. No objects / elements downloaded from the Internet should be used. The static images should be created by the student using appropriate software's.
2. A minimum of Five exercises should be carried out on each theme outlined above
3. At least FIVE complete web sites for different categories of products or organizations must be created for the record.
4. All exercises should be accompanied by "paper-page" and "paper-design" in record form along with the original file containing the exercises.
5. The above mentioned are the minimum requirement for external examination.

### **Order of details expected in the Record**

1. Bonafide Certificate
2. Table of Contents
3. Introduction
4. Software Specification
5. Web Content
6. Web Structure
7. Web Page Samples
8. Bibliography

(Cognitive Level : k1, k2, k3, k4)

The Internal Evaluation (40 Marks) is based on the process of development of the web page.

The Semester Evaluation (60 Marks) is based on the (45 Marks) practical examination on development of a small website with a minimum of 5 web pages, Record (10 marks) and Viva voce (5 Marks)

**SEMESTER – V**  
**UEVCA20 - ELECTIVE II A: E\_CONTENT DEVELOPMENT**

<b>Year:</b> <b>III</b> <b>Sem: V</b>	<b>Course Code:</b> UEVCA20	<b>Title of the Course:</b> E- Content Development	<b>Course Type:</b> Theory	<b>Course Category:</b> Skilled Based Elective	<b>H/W</b> 5	<b>Credits</b> 3	<b>Marks</b> 100
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**Objective:**

To enable students, know about the production process and techniques of e-content development, implementing effective e-content material for education field.

**Course Outcomes (CO)**

At the end of the course, learners will be able to:

CO1: Explain the basic concepts of E-content

CO2: Analyzing the types and models of E-content

CO3: Acquiring the knowledge and presentation on E-content.

CO4: Evaluating the E-learning platforms and technologies

CO5: Executing and publishing the E-contents for formal education

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

### **Unit I: E - Content Production (15 hours)**

- 1.1. Introduction –Evolution of E-learning Standards (K1, K2, K3)
- 1.2. Characteristics of e-content development. (K1, K2, K3)
- 1.3. Phases of e –content development: Analysis Phase (K2, K3)
- 1.4. The design phase-the development phase-testing phase (K1, K2, K3)
- 1.5. Implementation phase (K2, K3)
- 1.6. The evaluation phase. (k1, k2, k3)

### **Unit II: Types and Models of E-content (15 hours)**

- 2.1. Models of E-content development, SCORM Model (k1, k2, k3)
- 2.2. e-Publishing processes –e-Author, e-Editing, e-Publishing. (k2, k3, k4)
- 2.3. LMS-Learning Object Design. (k1, k2, k3)
- 2.4. Types of e-content-OER\_RLOS-E-Books. (k2, k3, k4)
- 2.5. Web content-video Streamer-Blogging. (k2, k3, k4)
- 2.6. Instructor`s role in the development of e-content. (k1, k2, k3, k4)

### **Unit III: Guidelines and presentations of E-content (15 hours)**

- 3.1. Guideline for E-content development. (k1, k2, k3)
- 3.2. UGC-E-content scheme-UGCINFONET-CEC. (k2, k3)
- 3.3. Content Management Systems – Templates, standard characteristics and, delivery, effectiveness of content. (k1, k2, k3)
- 3.4. Media: Animations, illustrations, slideshows, interactivities, Video, photographs and audio clips. Animation. (k1, k2, k3)
- 3.5. Self-running, non-interactive 2D animations. (k2, k3, k4)
- 3.6. Audio narrative of the onscreen-text. - Audio toggle on/Off-Video Streaming, Assessment and feedback options. (k1, k2, k3, k4)

### **Unit IV: E-Learning –Technology (15 hours)**

- 4.1. e-Learning and e-learners. (k1, k2, k3)
- 4.2. e-courses, e-learning ability. (k1, k2, k3)
- 4.3. Open educational resources – Learning authoring. (k2, k3, k4)
- 4.4. e-learning technologies-: Computer and Internet Enabled Learning. (k3, k4)
- 4.5. IP Learning – Mobile learning – Videoconferencing – VSAT. (k2, k3, k4)
- 4.6. Online learning – Web conferencing – Standalone e-learning – Assisted e-learning – e-Cooperative learning – Blended learning – Info Learning. (k1, k2, k3, k4)

### **Unit V: Future trends of E-content (15 hours)**

- 5.1. Present trends and future. (k2, k3, k4)
- 5.2. e-Content for different types of industries. (k2, k3, k4)
- 5.3. Education, marketing, training, agriculture, etc., (k1, k2, k3, k4)
- 5.4. Economics of e-content business. (k1, k2, k3, k4)
- 5.5. Budget and market Trends.(k3, k4)
- 5.6. Pedagogical issues in E-content development. (k1, k2, k3, k4)

**References:**

1. Robin Manston and Frank Rennie e-Learning: The Key Concepts, Routledge, London & New York, 2006.
2. Jeong-Baeson and Shirley O'Neil. Enhancing Learning & Technology: Pedagogy, Technology and Language, Academic & Professional Publishers & Consultancy Services, Queensland, Australia, 2007.
3. K.L. Kumar. Educational Technology, New Age International Pvt. Ltd.,

All students will specialize in e- content development and prepare an individual project with the help of required software and multimedia accessories. The final copy of the production must be submitted along with the script.

**Exercises - Each Exercise carry: 10 hours**

1. Content preparation
2. Production (video presentation, PowerPoint presentation etc)
3. Web Publishing (Overall presentation for uploading in the website)

The Internal Evaluation (40 Marks) is based on the process of development of the campaign.

The Semester Evaluation (60 Marks) is based on the (45 Marks) practical examination on conduct of the campaign and submission of the report (10 marks) and Viva voce (5 Marks)

**SEMESTER VI**  
**UEVCB20 - ELECTIVE II B: MEDIA MANAGEMENT**

<b>Year: III Sem: VI</b>	<b>Course Code: UEVCB20</b>	<b>Title of the Course: Media Management</b>	<b>Course Type: Theory</b>	<b>Course Category: Core</b>	<b>H/W 5</b>	<b>Credits 4</b>	<b>Marks 100</b>
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**Objective:**

To offer an understanding of the working of media organizations and the function and ethics of media professionals

**Course Outcomes (CO)**

The Learners will be able to

CO1: Discussing the Concepts of Management Principles.

CO2: Acquiring the knowledge in Structure of News Media Companies.

CO3: Utilizing the Internet in the Electronic Media Management

CO4: Applying the Ethical Codes effectively in the Media Management.

CO5: Evaluating the Ownership Patterns of Electronic Media Management.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

**Unit I: Managing Media** (15 hours)

- 1.1. Managing Media. (K1, K2, K3)
- 1.2. Concept of Management Principal Levels of Management. (K1, K2, K3)
- 1.3. Agenda setting - Management skills. (K1, K2, K3)
- 1.4. Management functions. (K1, K2)
- 1.5. Management roles – Strategic alliances. (K1, K2, K3)
- 1.6. Implications for management - Radio, TV and Cable. (K1, K2, K3, K4)

**Unit II: Operations and Structure of News Media companies** (15 hours)

- 2.1. Structure of Media companies. (K1, K2, K3)
- 2.2. Consolidation and Convergence. (K1, K2, K3)
- 2.3. Kinds of Media ownership. (K2, K3, K4)
- 2.4. Combining forces and news roles. (K2, K3)
- 2.5. Financial Management. (K1, K2, K3, K4)
- 2.6. Meeting financial goals – Budgeting - Cross media ownerships. (K2, K3, K4)

**Unit III: Electronic Media Management** (15 hours)

- 3.1. The internet and Electronic media management. (K1, K2, K3)
- 3.2. Online Management - utilization of the Internet. (K2, K3, K4)
- 3.3. The web department. (K2, K3, K4)
- 3.4. Web formations and management. (K2, K3, K4)
- 3.5. Revenue streams: advertising - e-Commerce. (K2, K3, K4)
- 3.6. ERP- Local Portal, live streaming, e-zines, web TV. (K1, K2, K3, K4)

**Unit IV: Ethics of Management** (15 hours)

- 4.1. Ethical codes and Ethical Norms of Media management. (K2, K3, K4)
- 4.2. Fairness doctrine. (K3, K4).
- 4.3. Controversies over programming. (K3, K4)
- 4.4. Ethics in news and public affairs. (K2, K3, K4)
- 4.5. Modern approaches to Management media conglomeration affecting media agenda. (K2, K3, K4).
- 4.6. Predatory marketing. (K3, K4).

**Unit V: Patterns of Media Organization and Ownership** (15 hours)

- 5.1. Case studies on Ownership of radio and television station. (k2, k3, k4)
- 5.2. Obtaining a Broadcast license. (k2, k3, k4)
- 5.3. Ownership limits. (k3, k4)
- 5.4. Station organization. (K3, k4)
- 5.5. Ownership patterns in cable television. (k3, k4)
- 5.6. Cable TV structure. (k3, k4)

**Books for Study and Reference:**

1. Dennis F.Herrick - Media Management in the Age of Giants - Surjeet Publications, 2005.
2. James Rdmond, Robert Trager - Media Organization Management – Biztantra, 2004.
3. Simon Cottle - Media Organization and Production - Sage Publications, 2003.
4. Alan B.Alberran - Management of Electronic Media - Thomson Publishers, 2002.
5. John E. Craft, Frederic A.Leigh, Donald G.Godfroy - Electronic Media – Wadsworth, 2001.

## SEMESTER VI

### UCVCR20 - SHORT FILM PRODUCTION

<b>Year: III</b> <b>Sem: VI</b>	<b>Course Code:</b> UCVCR20	<b>Title of the Course:</b> Short Film Production	<b>Course Type:</b> Project - 2	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 5	<b>Marks</b> 100
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#### Objective:

- To train students in short-film making or documentary making by putting into practice the techniques learned in television production and script writing

Students will specialize in Television/Radio Production and prepare an individual project on Documentary / short film on any chosen theme. The master copy of the production must be submitted along with the script.

#### Course Outcomes (CO)

The Learners will be able to

CO1: Identifying the Concepts of Short film production.

CO2: Implementing the Pre-Production process of Short film.

CO3: Executing the Production process of short film.

CO4: Compile the Post Production Activities according to the Script.

CO5: Presenting the Documentation with Master Copy.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Course Syllabus:****Exercises:**

1. Produce a short film with a good concept not exceeding 10 minutes with suitable visual transitions and sound effects.

(Cognitive Level: K1, K2, K3, K4)

The Internal Evaluation (40 marks) is based on the production process and the model viva.

The Semester Evaluation (60 Marks) is based on the Viva-Voce and the quality of the production.

**SEMESTER VI**  
**USCMD620 - SKILLED BASED ELECTIVE- VI: DIGITAL PUBLISHING**

<b>Year:</b> <b>III</b>  <b>Sem: VI</b>	<b>Course Code:</b> USCMD620	<b>Title of the Course:</b> Digital Publishing	<b>Course Type:</b> Theory	<b>Course Category:</b> Skilled Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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**Outcomes Objective:**

- To learn the basic principles of printing and methodologies used for printing and print finishing.

**Course Outcomes (CO)**

The Learners will be able to

CO1: Select the Various Type Faces.

CO2: Acquiring the Knowledge in the process of Printing.

CO3: Analyzing the Substrates used for Printing.

CO4: Acquiring the Knowledge in final Printing Process.

CO5: Implementing the Creative ideas in Printing Process.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

### **Unit I:Typeface (6 hours)**

Type and Font, Font family, spacing and design. (K1, K2, K3, K4)

### **Unit II: Printing principles (6 hours)**

Letterpress, Lithography, Gravure, Silk-screen printing, Hot metal printing.(K1, K2, K3, K4)

### **Unit III: Paper and ink (6 hours)**

Substrates - Paper Types, Unusual Substrates, Ink. (K1, K2, K3, K4)

### **Unit IV: Print Finish (6 hours)**

Varnish, Folding, Emboss and Demboss, Binding - Wiro, spiral, comb, Canadian, case binding, Perfect binding.(K1, K2, K3, K4)

### **Unit V: Application (6 hours)**

Eclecticism, Integrating type and image, Environment. (K1, K2, K3, K4)

## **Books for Study and Reference**

1. Gravin Ambrose and Paul harris-The fundamentals of typography-AVA Publishing,2006.
2. Ambros, Harris – Print and Finish, AVA publishing, 2006
3. John Feather- History of British publishing- Routledge, 2005
4. Helmut Kipphan- Handbook of Print media, 1<sup>st</sup> edition- Springer,2004.
5. J.Michael Adams and penny Ann Dolin- Printing Technology,5<sup>th</sup> edition- Thomson Delmar Learning,2001.
6. David Bann-The Print Production Handbook-A MacDonald Book,1985.

**SEMESTER V & VI - NON MAJOR ELECTIVE - 1**  
**UGCMA620 -DEMOCRACY and MEDIA (III Years students of other Department)**

<b>Year:</b> <b>III</b>	<b>Course Code:</b> <b>UGCMA520/</b>	<b>Title of the Course:</b> Democracy and Media	<b>Course Type:</b> Theory	<b>Course Category:</b> Non- Major Elective	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 100
<b>Sem:</b> <b>V/VI</b>	<b>UGCMA620</b>						

**Objective**

- To equip students with tools for critical consumption of Media.
- To analyze the structural deficiencies preventing the media from performing its democratic function.

To understand media as an ideological state apparatus to manufacture consent.

**Course Outcomes (CO)**

At the end of the course, learners will be able to:

CO1: Restate the concepts of democratic media and its rights.

CO2: Analyzing the capitalized Media and its Business.

CO3: Examine the policy of the Democratic Media

CO4: Discover the emergency of digital news platforms

CO5: To find the relationship between the social media alternative media & democracy.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	M	M	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

### **Unit I: Theory, Concepts, and Definitions (10 hours)**

Definition of Democracy and Democratic theory, Media as the fourth estate, Democratic responsibilities of media, Fundamental rights and media's role in protecting them, Media as the voice of the voiceless, Media as the watching dog of the democracy. (K1,K2,K3,K4)

### **Unit II: Democracy, capitalism & Media (10 hours)**

Contemporary structure of media within capitalism; Advertising funding & its implications on media's democratic functions. Big business and government. Media as big business. Use of SLAAP on media houses and self-censorship, Media concentration, Conglomeration, Commercialization& its effects on Democracy. (K1,K2,K3,K4)

### **Unit III: Democratic Media (10 hours)**

Media Reform and democratic media, Media policy and democratic reform, Alternative to commercial media models: case studies of BBC, NPR and Aljazeera. Critical analysis of DD and Raja Sabha TV as possible democratic Media. (K1,K2,K3,K4)

### **Unit IV: Digital News Platform (10 hours)**

Emergency of Digital News Platform and their role in democratic communication. (The wire, Quint, News Laundry, The News Minute, Scroll), Representation of cast and minorities in media. (K1,K2,K3,K4)

### **Unit V: Social Media, Alternative Media & Democracy (10 hours)**

Social Media as the new public sphere, social media and democratic elections in the current era (case studies of 2016 US election & 2019 Indian election), Alternative Media spaces: Exploring community Radio, Dalit camera, Video Volunteers and Alt News, Critical examination of alternative models of media. (K1,K2,K3,K4)

## **Books for Study and Reference:**

1. Curran, J. Media and democracy. Routledge, 2011
2. Chattarji, S., &Ninan, S. (Eds.). (2013). The Hoot reader: media practice in twenty-first century India. New Delhi: Oxford.
3. Ghosh, S., &Thakurta, P.G. (2016). Sue the Messenger: How Legal Harassment by Corporates is Shackling Reportage and Understanding Democracy in India. ParanjyGuhaThakurta.
4. Hardy, J. (2014). Critical political economy of the media: An introduction. Routledge.
5. Herman, E. S., & Chomsky, N. (2010). Manufacturing consent: The political economy of the mass media. Random House.
6. McChesney, R. W. (2016). Rich media, poor democracy: Communication politics in dubious times. New Press.
7. Thomas, P. N. (2010). Political Economy of the Communications in India: The Good, The Bad and the Ugly (1<sup>st</sup> ed.). New Delhi, India: Sage Publication.

**SEMESTER V & VI - NON MAJOR ELECTIVE – 1I**

**UGCMB620 –ADVERTISING (III Years students of other Department)**

<b>Year: III</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: V/VI</b>	UGCMB520/ UGCMB620	Advertising	Theory	Non- Major Elective	3	2	100

**Objective:**

To provide a basic understanding about the field of Advertising and to develop skills in creating media advertisement

**Course Outcomes (CO)**

The Learners will be able to

CO1: Describing the basic concepts of advertising and its history.

CO2: Acquiring basic knowledge about advertising Concepts.

CO3: Analyzing the process of layout designing for an advertisement.

CO4: Evaluate the impact of advertisement on society.

CO5: Implementing the advertisement concept for print, radio and television.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	H	H	M	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**(Low - L, Medium – M, High - H)**

## **Course Syllabus:**

### **Unit I: Introduction to Advertising (9 hours)**

Advertising – definition, History of advertising, Types of Advertising – Benefits of Advertising, Benefits of advertising, Role of advertising, Market segmentation (K1, K2,K3,K4)

### **Unit II: Advertising Concepts (9 hours)**

Advertising Pyramid, Marketing Mix, Product Life Cycle, USP, Brand Image, Media Planning (K1, K2,K3,K4)

### **Unit III: The Process of Designing an Ad (9 hours)**

Process of Visualization, Copywriting, Photography, Illustration, Image Manipulation, Layout design – Grid, Mondrian thumb nail, roughs and compressive layout, final output(K1, K2,K3,K4)

### **Unit IV: Advertising and Society (9 hours)**

Social, psycho and economic effects of advertising on Society, Current issues, Commercialism in advertising, Advertising and children, Advertising and women, Ethics in Advertising(K1, K2,K3,K4)

### **Unit V: Practical (9 hours)**

Practical assignments in advertising, Preparation of print and Radio ad, Preparing ads for specific target Group.(K1, K2,K3,K4)

## **Books for Study and Reference:**

1. S.N. Murthy, U Bhojana - Advertising An IMC Perspective - Excel Books, 2007
2. S. A. Chunawalla - Advertising, Sales and Promotion Management - Himalaya Publishing House, 2006
3. Frank Jefkins, Daniel Yadin – Advertising, 4<sup>th</sup> Edition - Pearson Education, 2006.
4. J.V. Vilanilam, A.K.Varghese - Advertising Basics: A Resource Guide for Beginners - Response Books, 2004
5. Sandage, Fryburger, Rotzoll - Advertising Theory and Practice, 11<sup>th</sup> Edition - AITBS Publishers, 2004
6. R.C.Bhatia - Marketing Communication and Advertising - Galgotia Publishers, 2003
7. John Philip Jones - International Advertising: Realities and Myths - Sage Publications, 2000.

**B.SC. VISUAL COMMUNICATION**  
**PATTERN OF THEORY QUESTION PAPER**  
(With effect from 2020– 2021)

**(i) Continuous Assessment ( 2 Hours, 50 Marks)**

**SECTION A -7 x 2 = 14 Marks**

Answer **ALL** Questions

1. CLO3      K1
2. CLO3      K2
3. CLO3      K1
4. CLO3      K2
5. CLO4      K1
6. CLO4      K2
7. CLO4      K3

**SECTIONB -3 x 7 = 21 Marks**

Answer any **THREE** out of five Questions

8. CLO3      K2
9. CLO3      K3
10. CLO3     K4
11. CLO4     K3
12. CLO4     K4

**SECTION C - 1 x 15 = 15 Marks**

Answer any **ONE** out of two Questions

13. CLO3     K3
14. CLO4     K4

**(ii) Semester Examination (3 Hours, 100 Marks)**

**SECTION A - 10 x 2 = 20 Marks**

Answer **ALL** Questions

(Two Questions from each unit)

- 1 Unit I      CO1    K1
- 2 Unit I      CO1    K2
- 3 Unit II     CO2    K1
- 4 Unit II     CO2    K2
- 5 Unit III    CO3    K1
- 6 Unit III    CO3    K2
- 7 Unit IV    CO4    K1
- 8 Unit IV    CO4    K2
- 9 Unit V     CO5    K1
- 10 Unit V    CO5    K2

**SECTION B** - 5 x 7= 35 Marks

Answer **ALL** Questions (Either or type)

(Two Question from each unit)

- 11. A) Unit I CO1 K2
- 11. B) Unit I CO1 K2
- 12. A) Unit II CO2 K3
- 12. B) Unit II CO2 K3
- 13. A) Unit III CO3 K4
- 13. B) Unit III CO3 K4
- 14. A) Unit IV CO4 K3
- 14. B) Unit IV CO4 K3
- 15. A) Unit V CO5 K4
- 15. B) Unit V CO5 K4

**SECTION C** - 3 x 15 = 45 Marks

Answer **THREE** out of Five Questions

(At least one question from each unit)

- 16. Unit I CO1 K2
- 17. Unit II CO2 K3
- 18. Unit III CO3 K4
- 19. Unit IV CO4 K2
- 20. Unit V CO5 K3

# **Department of Zoology (UG)**

## **SYLLABUS AND REGULATIONS**

**Under**

### **OUTCOME-BASED EDUCATION 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



### **AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**AUXILIUM COLLEGE (Autonomous), Gandhi Nagar, Vellore-632006.**(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> cycle)**OUTCOME BASED EDUCATION****B.Sc. ZOOLOGY**

(Effective for those admitted from the Academic Year 2020 – 2021)

**Structure of the Course and Scheme of Examinations:**

Sem	Part	Paper Code	Title of Subject	Hours	Exam		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper- I	6	3	-	3	40+60
	II	UENGA20	English Paper- I	6	3	-	3	40+60
	III	UCZOA20	Invertebrata	6	3	-	6	40+60
	III	UCZOC20	Core Practical-I	3	-	-	-	-
	III	UACHA20	Allied I: Chemistry-I	4	3	-	4	40+60
	III	UACHC20	Allied Practical: Chemistry	2	-	-	-	-
	IV	-	Skill – Based Elective-I	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
			<b>Total</b>	<b>30</b>			<b>18</b>	<b>500</b>
II	I	ULTAB20	Tamil Paper -II	6	3	-	3	40+60
	II	UENGB20	English Paper -II	6	3	-	3	40+60
	III	UCZOB20	Chordata	6	3	-	6	40+60
	III	UCZOC20	Core Practical-I	3	-	3	4	40+60
	III	UACHB20	Allied II: Chemistry-II	4	3	-	4	40+60
	III	UACHC20	Allied Practical: Chemistry	2	-	3	2	40+60
	IV	-	Skill – Based Elective-II-	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
			<b>Total</b>	<b>30</b>			<b>24</b>	<b>700</b>
III	I	ULTAC20	Tamil Paper -III	5	3	-	3	40+60
	II	UENGC20	English Paper -III	6	3	-	3	40+60
	III	UCZOD20	Cellbiology& Bioinstrumentation	7	3	-	6	40+60
	II	UCZOF20	Core Practical-II	3	-	-	-	-
	III	UAPBA20	Allied III: Plant Biology-I	4	3	-	4	40+60
	III	UAPBC20	Allied Practical: Plant Biology	2	-	-	-	-
	IV	USZOC320	Skill – Based Elective-III- Sericulture	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
			<b>Total</b>	<b>30</b>			<b>18</b>	<b>500</b>

IV	I	ULTAD20	Tamil Paper -IV	6	3	-	3	40+60
	II	UENGD20	English Paper -IV	5	3	-	3	40+60
	III	UCZOE20	Genetics and Evolution	5	3	-	4	40+60
	II	UCZOF20	Core Practical-II	3	-	3	4	40+60
	III	UAPBB20	Allied III: Plant Biology-II	4	3	-	4	40+60
	III	UAPBC20	Allied Practical:Plant Biology	2	-	3	2	40+60
	IV	UNEVS20	Environmental Studies	2	2	-	2	40+60
	IV	USZOD420	Skill – Based Elective-IV- Poultry Keeping	2	2		2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
				<b>Total</b>	<b>30</b>			<b>24</b>
V	III	UCZOG20	Developmental Biology	5	3	-	5	40+60
	III	UCZOH20	Physiology	4	3	-	4	40+60
	III	UCZOI20	Bio-statistics	4	3	-	4	40+60
	III	UCZOL20	Core Practical -III	3	-	-	-	-
	III	UCZOM20	Core Practical -IV	3	-	-	-	-
	III	UEZOA20	Elective IA: Economic Zoology	5	3	-	5	40+60
		UEZOB20	Elective IB: Vermiculture					
	IV	-	Non-Major Elective-I	3	3	-	2	40+60
	IV	USZOE520	Skill – Based Elective-V: Ornamental Fish Keeping	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	-	-	-	-
			<b>Total</b>	<b>30</b>			<b>22</b>	<b>600</b>
VI	III	UCZOJ20	Biotechnology	4	3	-	4	40+60
	III	UCZOK20	Environmental Biology	4	3	-	3	40+60
	III	UCZOL20	Core Practical -III	3	-	3	5	40+60
	III	UCZOM20	Core Practical -IV	3	-	3	5	40+60
	III	UEZOC20	Elective IIA: Microbiology	5	3	-	5	40+60
	III	UEZOD20	Elective IIB: Bioinstrumentation					
	III	UEZOE20	Elective IIIA: Immunology	5	3	-	5	40+60
	III	UEZOF20	Elective IIIB: Parasitology					
	IV	-	Non-Major Elective-II	3	3	-	2	40+60
	IV	USZOF620	Skill – Based Elective-VI: Animal Behaviour	2	2	-	2	40+60
IV	UVEDA20	Value Education	1	2	-	2	40+60	
			<b>Total</b>	<b>30</b>			<b>33</b>	<b>900</b>
	V		Extension Activities (90Hours)				1	
			<b>Total</b>	<b>120</b>			<b>140</b>	<b>4000</b>

**PROGRAMME OBJECTIVES:****On completion of the UG Programme, students will be able to:****PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.**PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.**PO5:** Emulate positive social values and exercise leadership qualities and team work.**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.**PROGRAMME SPECIFIC OBJECTIVES:****As Zoology graduates, students will:****PSO1:** Demonstrate comprehensive knowledge on the complexity of life process, their molecular, cellular and physiological process, their genetics, evolution, behaviour and their interrelationship with the environment.**PSO2:** Undertake further studies in Zoology or Multidisciplinary areas.**PSO3:** Develop skills that are relevant to wage employment, self-employment and entrepreneurship.**PSO4:** Technically sound in applying the Information technology and will be Lifelong learners in updating to the current advancements in their respective fields.**PSO5:** Exercise leadership qualities and moral values through ethical ways with the concern for the society.**PSO6:** Utilize the opportunities to conceptualize, nurture and accomplish the dream to be entrepreneur/leaders.

PSO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>PSO1</b>	H	H	M	H	M	H
<b>PSO2</b>	H	H	H	H	M	H
<b>PSO3</b>	H	M	H	M	H	H
<b>PSO4</b>	M	H	H	H	H	H
<b>PSO5</b>	M	H	H	L	H	M
<b>PSO6</b>	M	M	H	L	H	H

**H-HIGH (3): M-MODERATE (2): L-LOW-(1)**

## SEMESTER I

### UCZOA20 – INVERTEBRATA

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	UCZOA20	Invertebrata	Theory	Core	6	6	100

#### Objectives:

- To understand the systematic and functional morphology of various groups of Invertebrates.
- To study their economic importance, affinities and adaptations.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Discuss general classification, binomial nomenclature and Phylum Protozoa.

**CO2:** Explain the classification up to class level, type study and salient features of Phylum Porifera and Coelenterata.

**CO3:** Elaborate the classification up to class level, type study and salient features of Phylum Platyhelminthes and Aschelminthes.

**CO4:** Discuss the classification up to class level, type study and salient features of Phylum Annelida and Arthropoda.

**CO5:** Explain the classification up to class level, type study and salient features of Phylum Mollusca and Echinodermata.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

CO /PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	H
CO4	H	H	M	H	M	H
CO5	H	H	M	H	M	H

#### Unit I:

**(18 Hours)**

- 1.1: General character and outline classification of Invertebrata up to class level with examples - Structure, function and life cycle of all the type studies. (K1, K2).
- 1.2: Binomial nomenclature. (K1,K2, K3)
- 1.3: Phylum – Protozoa – General characters and classification. (K1, K2, K3)
- 1.4: Type study: *Plasmodium vivax*. (K1,K2, K3)
- 1.5: General essay: Nutrition in Protozoa. (K1, K2, K3)
- 1.6: General essay: Locomotion in Protozoa. (K1, K2, K3)

**Unit II:** (18 Hours)

- 2.1: Phylum – Porifera - General characters and classification. (K1, K2, K3)
- 2.2: Type study: Sycon. (K1, K2, K3)
- 2.3: General essay: Canal system in Sponges. (K1, K2, K3)
- 2.4: Phylum – Coelenterata - General characters and classification. (K1, K2, K3)
- 2.5: Type study: Obelia. (K1, K2, K3)
- 2.6: General essay: Corals and Coral Reef, Polymorphism. (K1, K2, K3)

**Unit III:** (18 Hours)

- 3.1: Phylum – Platyhelminthes- General characters and classification. (K1, K2, K3)
- 3.2: Type study: Tapeworm. (K1, K2, K3)
- 3.3: General essay: Helminth parasites in humans-*Wuchereria bancrofti*. (K1, K2, K3)
- 3.4: General essay: Parasitic adaptations in Helminthes. (K1, K2, K3)
- 3.5: Phylum: Aschelminthes - General characters and classification. (K1, K2, K3)
- 3.6: Type study: Ascaris. (K1, K2, K3)

**Unit IV:** (18 Hours)

- 4.1: Phylum: Annelida - General characters and classification. (K1, K2, K3)
- 4.2: Type study: Nereis. (K1, K2, K3)
- 4.3: General essay: Adaptive radiation in Polychaetes. (K1, K2, K3)
- 4.4: Phylum: Arthropoda- General characters and classification. (K1, K2, K3)
- 4.5: Type study: Prawn. (K1, K2, K3)
- 4.6: General essay: Social life in Insects, Peripatus and its affinities. (K1, K2, K3)

**Unit V:** (18 Hours)

- 5.1; Phylum: Mollusca- General characters and classification. (K1, K2, K3)
- 5.2: Type study: Freshwater Mussel. (K1, K2, K3)
- 5.3: General essay: Respiration in Mollusca. (K1, K2, K3)
- 5.4: Phylum: Echinodermata- General characters and classification.
- 5.5: Type study: Sea star. (K1, K2, K3)
- 5.6: General essay: Larval forms in Echinodermata and their significance. (K1, K2, K3)

**Books for study and Reference:**

**Text Books:**

1. Ekambaranatha Ayyar M, and T.N. Ananathakrishnan- Manual of Zoology Vol. I [Invertebrata], Parts I and II – S. Viswanathan (Printers and publishers) Pvt. Ltd; Madras, 1992.
2. Jordan, E.L and P.S Verma – Invertebrate Zoology, Revised Edition – S. Chand and Co. Ltd, New Delhi, 2013.

**Reference Books:**

3. Kotpal, R.L. – Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata- Rastogi Publications, Meerut, 1992.
4. Parker and Haswell, - Textbook of Zoology Vol.I (Invertebrata) – B.S. Publishers and distributors, New Delhi, 1964.
5. Barrington, E.J.W. - Invertebrate Structure and Functions- English Language Book Society, 1969.
6. Hyman L.H. - The Invertebrata, Vol I to VI. – McGraw- Hill Book Co., New York, 1951.

**E-Resources:**

<https://www.civilserviceindia.com>

[www.iaszoology.com](http://www.iaszoology.com)

<http://www.insects.org>

<http://www.earthlife.net/begin>.

<http://faunaofindia.nic.in>

**SEMESTER II**  
**UCZOB20– CHORDATA**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	UCZOB20	Chordata	Theory	Core	6	6	100

**Objectives:**

- To understand the systematic and functional morphology of various groups of Chordates.
- To study their affinities and adaptations to different modes of life.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Explain taxonomic status of vertebrates and its origin and Evolution.

**CO2:** Describe anatomy and functions of systems in vertebrates.

**CO3:** Discuss adaptive radiations in vertebrates.

**CO4:** Explain the salient features of chordates.

**CO5:** Explain the structural, functional and phylogenetic significance of chordates.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	M	M	M	M
CO4	H	H	M	M	M	M
CO5	H	H	M	H	M	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	M
CO4	H	H	M	H	M	M
CO5	H	H	M	H	M	M

**Unit I:**

**(18 Hours)**

1.1: General character and outline classification of Chordates up to class level. (K1, K2).

1.2: Protochordata: General characters and classification. (K1, K2).

1.3: Type study: Amphioxus. (K1, K2, K3)

1.4: Affinities of cephalochordates. (K1, K2, K3)

1.5: Retrogressive Metamorphosis in Ascidia. (K1, K2, K3)

1.6: General essay: Origin of Chordates. (K1, K2, K3)

**Unit II: Pisces****(18 Hours)**

- 2.1: Affinities of Cyclostomata. (K1, K2, K3)
- 2.2: Type study: Shark. (K1, K2, K3)
- 2.3: General essay: Migration in Fishes. (K1, K2, K3)
- 2.4: Accessory respiratory organs. (K1, K2, K3)
- 2.5: Parental care in Fishes. (K1, K2, K3)
- 2.6: Electric organs. (K1, K2, K3)

**Unit 3: Amphibia****(18 Hours)**

- 3.1: Type study: Frog. (K1, K2, K3)
- 3.2: General essay: Parental care in Amphibians. (K1, K2, K3)
- 3.3: Adaptive radiations in Amphibians. (K1, K2, K3)
- 3.4: **Reptilia** - Type study: Calotes. (K1, K2, K3)
- 3.5: General essay: Poison apparatus and biting mechanism in snakes. (K1, K2, K3)
- 3.6: Identification of poisonous and non-poisonous snakes. (K1, K2, K3, K4)

**Unit 4: Aves****(18 Hours)**

- 4.1: Type study: Pigeon. (K1, K2, K3)
- 4.2: General essay: Flight adaptations in birds. (K1, K2, K3)
- 4.3: Migration in birds. (K1, K2, K3)
- 4.4: Flightless birds. (K1, K2, K3)
- 4.5: Beaks in birds. (K1, K2, K3)
- 4.6: Feet in birds. (K1, K2, K3)

**Unit 5: Mammals****(18 Hours)**

- 5.1: Type study: Rabbit. (K1, K2, K3)
- 5.2: General essay: Dentition in mammals. (K1, K2, K3)
- 5.3: Adaptive radiations in Mammals. (K1, K2, K3)
- 5.4: Characteristics of Prototheria with examples. (K1, K2, K3)
- 5.5: Characteristics of Eutheria with examples. (K1, K2, K3)
- 5.6: Characteristics of Metatheria with examples. (K1, K2, K3)

**Books for study and Reference:****Text Books:**

1. Jordan, E.L and P.S Verma – Chordate Zoology and Elements of Animal Physiology, 10<sup>th</sup> Edition – S. Chand and Co. Ltd, Ram Nagar, New Delhi, 1995.
2. Ekambaranatha Ayyar M, and T.N. Ananathakrishnan- Manual of Zoology Vol. II [Chordata] – S. Viswanathan (Printers and publishers) Pvt. Ltd; Madras, 1992.

**Reference Books:**

3. Parker and Haswell, - Textbook of Zoology Vol.II (Chordata) – A.Z.T.B.S. Publishers and distributors, New Delhi, 1964.
4. Newman H.H.- The phylum Chordata- Satish Book Enterprise, Agra, 1981.
5. Modern Text Book of Zoology- Vertebrates-Revised Fourth Edition 2015-16 Rastogi Publications.
6. Kotpal R.L. – Modern Text book of Zoology, Vertebrates, 4<sup>th</sup> edition. Rastogi Publication., Meerut, 2015-16.

**E-Resources:**

<https://www.civilserviceindia.com>

[www.iaszoology.com](http://www.iaszoology.com)

<http://www.earthlife.net/begin>.

<http://faunaofindia.nic.in>

<https://www.birds.com>

## SEMESTER I & II

### UCZOC20 – CORE PRACTICAL – I: INVERTEBRATA AND CHORDATA

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I & II	UCZOC20	Core Practical-I	Practical	Core	3	4	100

#### Objectives:

- To obtain practical skills in dissection and display of the systems.
- To learn about adaptation, biological significance of animals.
- To understand the evolutionary significance and skeletal structures of animals.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Acquire knowledge about the digestive, circulatory and nervous system of arthropods and vertebrates.

**CO2:** Prepare mounting of the mouth parts of insects.

**CO3:** Analyze the biological significance of invertebrates and vertebrates.

**CO4:** Distinguish structure and function of invertebrates and vertebrates.

**CO5:** Justify the importance of evolutionary significance of animals, osteology and dentition in mammals.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

#### INVERTEBRATA

1. Dissections:
  - a) Major: Cockroach – Digestive and Nervous system.
  - b) Prawn: Digestive and Nervous system.
2. Minor: Mouth parts - Mosquito, House fly.  
 Prawn - Cephalic Appendages.  
 Thoracic Appendages.  
 Abdominal Appendages.
3. Study of museum specimen/ slides relevant to the types studied in theory:

- a) Biological significance
- b) Descriptive notes
- c) Structure and function
- d) Evolutionary significance

**SPOTTERS LIST: INVERTEBRATA**

1. ENTAMOEBA
2. VOLVOX
3. PLASMODIUM
4. TRYPANOSOMA
5. VORTICELLA
6. SYCON
7. SPONGE GEMMULE
8. EUPLECTELLA
9. HYALONEMA
10. OBELIA COLONY
11. OBELIA MEDUSA
12. ADAMSIA
13. ZOANTHUS
14. PHYSALIA
15. VELLELA
16. TAENIA SOLIUM
17. SCOLEX OF TAENIA SOLIUM
18. BLADDERWORM
19. ASCARIS MALE AND FEMALE
20. SCHISTOSOMA
21. WUCHERERIA
22. NEREIS ENTIRE
23. NEREIS PARAPODIUM
24. CHAETOPTERUS
25. ARENICOLA
26. TROCHOPHORE LARVA
27. PRAWN ENTIRE
28. PRAWN – DIGESTIVE SYSTEM
29. PRAWN – NERVOUS SYSTEM
30. PRAWN- APPENDAGES
31. NAUPLIUS LARVA
32. ZOEAL LARVA
33. MEGALOPA LARVA
34. PERIPATUS
35. LIMULUS
36. COCKROACH- DIGESTIVE SYSTEM
37. COCKROACH- NERVOUS SYSTEM
38. HOUSEFLY MOUTH PARTS
39. MOSQUITO MOUTH PARTS
40. UNIO ENTIRE
41. GLOCHIDIUM LARVA
42. RADULA OF PILA
43. CHITON
44. MYTILUS

45. OCTOPUS
46. SEA STAR ENTIRE
47. PEDICELLARIA OF SEA STAR
48. BIPINNARIA LARVA
49. HOLOTHURIA
50. SEA LILY

**CHORDATA:**

1. Dissections:
  - a) Major: Frog (Model) - Digestive, Arterial and Venous system.
  - b) Minor: Shark -Placoid scales.
  
2. Study of museum specimen/ slides relevant to the types studied in theory:
  - a) Biological significance.
  - b) Descriptive notes.
  - c) Structure and function.
  - d) Skeletal structure / Dentition.

**SPOTTERS LIST: CHORDATA**

1. AMPHIOXUS ENTIRE
2. ASCIDIA ENTIRE
3. ASCIDIAN TADPOLE
4. BALANOGLOSSUS ENTIRE
5. TORNARIA LARVA
6. PETROMYZON ENTIRE
7. AMMOCETES LARVA
8. BUCCAL FUNNEL OF PETROMYZON
9. SALPA
10. SHARK ENTIRE
11. SCALES- PLACOID, CTENOID
12. NARCINE
13. SACCOBRANCHUS
14. EXOCOETUS
15. ECHENEIS
16. HIPPOCAMPUS
17. FROG ENTIRE
18. FROG-DIGESTIVE SYSTEM
19. FROG-VENOUS SYSTEM
20. FROG- ARTERIAL SYSTEM
21. FROG-BRAIN
22. FROG-HYOID
23. FROG-PECTORAL AND PELVIC GIRDLE
24. ICHTHYOPHIS
25. SALAMANDER
26. AXOLOTYL LARVA
27. NECTURUS
28. ALYTES
29. RHACOPHORUS
30. CALOTES ENTIRE
31. CALOTES- HYOID
32. CALOTES-PECTORAL AND PELVIC GIRDLE

33. DRACO
34. CHAMAELEON
35. PYTHON
36. KRAIT
37. COBRA
38. COBRA-POISON APPARATUS
39. PIGEON ENTIRE
40. PECTEN OF BIRD
41. PIGEON FORE AND HIND LIMBS
42. SYNSACRUM OF BIRD
43. OSTRICH
44. PROTOTHERIA- PLATYPUS
45. METATHERIA - OPOSSUM
46. EUTHERIA – BAT
47. RABBIT ENTIRE
48. RABBIT – PECTORAL AND PELVIC GIRDLE
49. SKULL OF RABBIT
50. SKULL OF DOG

### SEMESTER III

#### UCZOD20 - CELL BIOLOGY AND BIOINSTRUMENTATION

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	UCZOD20	Cell Biology and Bioinstrumentation.	Theory	Core	7	6	100

#### Objectives:

- To learn the structure and function of various cellular components.
- To learn the basic principle, working and application of instruments.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Recall the cell theory, Distinguish between Prokaryotes and Eukaryotes.

**CO2:** Summarize the structure and functions of Cell Organelles.

**CO3:** Explain the structure and function of Nucleic acids.

**CO4:** Discuss the construction and applications of Microscopes, Centrifuges and Homogenizers.

**CO5:** Describe the types and applications of Chromatography and Electrophoresis.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	L	L
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	L
CO4	H	H	H	H	L	H
CO5	H	H	H	H	L	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	L
CO2	H	M	H	L	M	H
CO3	H	H	H	L	M	L
CO4	H	H	H	L	M	H
CO5	H	H	H	L	M	H

#### Unit 1: Cell Biology:

(21 Hours)

1.1: Introduction to cell biology. (K1, K2)

1.2: Brief account on cell theory. (K1, K2)

1.3: Prokaryotes – PPLO. (K1, K2)

1.4: Eukaryotes- animal cell (Structure and Comparison). (K1, K2, K3)

1.5: Cell cycle. Cell division- Mitosis - Meiosis. (K1, K2, K3)

1.6: Structure and functions of Cell organelles - Cell membrane. (K1, K2, K3)

**Unit 2:** (21 Hours)

- 2.1: Structure and functions of Cell organelles - Mitochondria, Golgi complex. (K1, K2, K3, K4)
- 2.2: Structure and functions of Cell organelles- Endoplasmic reticulum, Ribosomes. (K1, K2, K3, K4)
- 2.3: Structure and functions of Cell organelles- Lysosome and Centriole. (K1, K2, K3, K4)
- 2.4: Structure and functions of Cell organelles- Nucleus and Nucleolus. (K1, K2, K3, K4)
- 2.5: Structure and functions of Cell organelles -Chromosomes. (K1, K2, K3, K4)
- 2.6: Structure and functions of Cell organelles -Giant Chromosomes-Polytene-Lamp brush chromosome. (K1, K2, K3, K4)

**Unit 3:** (21 Hours)

- 3.1: Nucleic acids: DNA- Ultra structure. (K1, K2, K3, K4)
- 3.2: DNA Replication. (K1, K2, K3, K4)
- 3.3: RNA – Structure and types. (K1, K2, K3, K4)
- 3.4: Genetic code. (K1, K2, K3, K4)
- 3.5: Protein synthesis. (K1, K2, K3, K4)
- 3.6: Gene regulation - Lac operon. (K1, K2, K3, K4)

**Unit 4: Bioinstrumentation:** (21 Hours)

- 4.1: Principle, construction and application of– Compound microscope. (K1, K2, K3)
- 4.2: Principle, construction and application of– Inverted Microscope. (K1, K2, K3)
- 4.3: Principle, construction and application of– TEM. (K1, K2, K3)
- 4.4: Principle, construction and application of– SEM. (K1, K2, K3)
- 4.5: Principle, construction and application of– Centrifuge-Ultracentrifuge- Differential centrifugation. (K1, K2, K3)
- 4.6: Cell Homogenization – Fractionation. (K1, K2, K3)

**Unit 5:** (21 Hours)

- 5.1: Chromatography – Paper. (K1, K2, K3)
- 5.2: Thin layer and Column. (K1, K2, K3)
- 5.3: HPLC. (K1, K2, K3, K4)
- 5.4: Electrophoresis – SDS PAGE Gel electrophoresis. (K1, K2, K3, K4)
- 5.5: Disc-gel electrophoresis. (K1, K2, K3, K4)
- 5.6: Immuno-electrophoresis. (K1, K2, K3)

**Books for study and reference:**

**Textbooks:**

- 1. Verma P.S. and V.K. Agarwal – Cytology - Chand and Co., New Delhi, Revised Edition, 2015
- 2. M. Prakash, C.K. Arora - Microscopical Methods - Anmol Publications Pvt. Ltd., First Edition 1998.

**Reference Books:**

3. Philip Sheeler, Donald E. Bianchi - Cell and Molecular Biology - John Wiley and Sons, Inc, 3<sup>rd</sup> Edition, 1987.
4. E.D.P.De Robertis, E.M.F.De Robertis Jr. - Cell and Molecular Biology – Indian Edition, B.I. Publications Pvt. Ltd. 8<sup>th</sup> Ed. 2005
5. Bruce Alberts, Julian Lewis- Molecular Biology of the Cell- Taylor and Francis 5<sup>th</sup> Edition, 2008
6. A.G.E. Pearse - Histochemistry, Theoretical and Applied, Volume One: Preparative and Optical Technology - Churchill Livingstone, 4<sup>th</sup> Edition 1980.
7. M. Prakash, C.K. Arora - Laboratory Instrumentation - Anmol Publications Pvt. Ltd. First edition, 1998.

**E-Resources:**

<https://www.britannica.com>

<https://www.microscopemaster.com>

<https://www.ascb.org>

<http://www.ibiblio.org/virtualcell/index.htm>

## SEMESTER IV

### UCZOE20 – GENETICS AND EVOLUTION

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	UCZOE20	Genetics and Evolution	Theory	Core	5	4	100

#### Objectives:

- To learn the basics of Genes, heredity and variations.
- To learn the evolution of life and speciation.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Demonstrate the Mendelian inheritance. Understand the genetic interactions.

**CO2:** Discuss Linkage, Crossing over, cytoplasmic inheritance and sex determination.

**CO3:** Analyze the types of Gene Mutation, Chromosomal aberrations, syndromes and inborn errors in metabolism.

**CO4:** Explain Population Genetics

**CO5:** Recall the theories of Evolution, adaptations and human evolution.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	L	M	M	L
<b>CO2</b>	H	H	L	L	L	L
<b>CO3</b>	H	H	L	M	M	M
<b>CO4</b>	H	H	L	M	L	L
<b>CO5</b>	H	H	L	L	M	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	H	L
<b>CO2</b>	H	H	H	H	M	L
<b>CO3</b>	H	H	H	M	M	M
<b>CO4</b>	H	H	H	H	M	L
<b>CO5</b>	H	H	H	H	H	M

#### Unit 1: Genetics:

**(15 Hours.)**

1.1: Mendel's work. (K1, K2, K3)

1.2: Monohybrid cross and modifications of ratio. (K1, K2, K3)

1.3: Law of segregation. Law of independent assortment. (K1, K2, K3)

1.4: Dihybrid cross and modifications of ratio. (K1, K2, K3)

1.5: Genetic interactions- Epistasis, duplicate gene, complementary gene, atavism. (K1, K2, K3, K4)

1.6: Multiple alleles, blood grouping in man. (K1, K2, K3, K4)

**Unit 2:** (15 Hours)

- 2.1: Linkage and Crossing over. (K1, K2, K3, K4)
- 2.2: Sex linkage. (K1, K2, K3, K4)
- 2.3: Sex limited genes and sex influenced genes in Man. (K1, K2, K3, K4)
- 2.4: Cytoplasmic inheritance in Snail and Paramecium. (K1, K2, K3)
- 2.5: Non-disjunction and Gynandromorphs. (K1, K2, K3, K4)
- 2.6: Sex determination - Genic balance theory, theory of heterogenesis and environmental factors. (K1, K2, K3)

**Unit 3:** (15 Hours)

- 3.1: Gene mutation. (K1, K2, K3, K4)
- 3.2: Chromosomal aberrations. (K1, K2, K3, K4)
- 3.3: Genetic disorders – Chromosomal – Autosomal – Down Syndrome. (K1, K2, K3, K4)
- 3.4: Sex chromosomal – Turner's and Klinefelter's Syndrome. (K1, K2, K3, K4)
- 3.5: Inborn errors in Metabolism - Phenyl alanine metabolism. (K1, K2, K3, K4)
- 3.6: Genetic counseling. (K1, K2, K3, K4)

**Unit 4:** (15 Hours)

- 4.1: Gene Pool. (K1, K2, K3, K4)
- 4.2: Applied genetics: Population genetics. (K1, K2, K3, K4)
- 4.3: Hardy Weinberg Law. (K1, K2, K3)
- 4.4: Gene frequency, Factors affecting gene Frequency. (K1, K2, K3)
- 4.5: Pedigree Analysis. (K1, K2, K3, K4)
- 4.6: Eugenics, Euthenics and Euphenics. (K1, K2, K3)

**Unit 5: Evolution:** (15 Hours)

- 5.1: Theories of Evolution – Lamarck. (K1, K2, K3)
- 5.2: Theories of Evolution - Darwin. (K1, K2, K3)
- 5.3: Mimicry. (K1, K2, K3)
- 5.4: Isolation and Speciation. (K1, K2, K3)
- 5.5: Evolution of Man. (K1, K2, K3)
- 5.6: Geological time. (K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

- 1. Verma P.S. and V.K.Agarwal – Genetics - Chand and Co., New Delhi, 2006
- 2. Gopalakrishnan T.S. - Itta Sambasivaiah and A.P.Kamalakara Rao – Introduction to Genetics - Himalaya Publishing House, Bombay, 1996.

**Reference Books:**

3. Gardner - Principles of Genetics - Wiley Eastern Pvt. Ltd., 8<sup>th</sup> Edition, 2013.
4. Benjamin Lewin - Genes VII- Oxford University Press, 2000.
5. Philip Sheeler, Donald E. Bianchi - Cell and Molecular Biology - John Wiley and Sons, Inc, 3<sup>rd</sup> Edition, 1987.
6. E.D.P.De Robertis, E.M.F.De Robertis Jr. - Cell and Molecular Biology - Lea and Febiger, 2005.
7. T.S Gopalakrishnan, Itta Sambasivaiah, A P Kamalakara Rao -Principles of Organic evolution- Pearl Publications, 1983.
8. Kavitha- Organic Evolution - A.I.T.B.S Publishers India, 2009.
9. N. Arumugam - Organic Evolution - Saras Publications, 2005.
10. Bernard Wood- Human Evolution- A very short Introduction, Oxford University Press, 2005.

**E-Resources:**

<https://ghr.nlm.nih.gov>  
<https://www.genetics.org>  
<https://ncse.ngo>  
<http://www.evolutionoftheweb.com>  
<https://evolution.berkeley.edu/evolibrary/home.php>

## SEMESTER III & IV- CORE PRACTICAL II

### UCZOF20 - CELL BIOLOGY, BIOINSTRUMENTATION AND GENETICS

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III & IV	UCZOF20	Core Practical-II	Practical	Core	3	4	100

#### Objectives:

- To obtain practical skills in preparation of slides and basic hematological techniques.
- To learn about cell organelles and nucleic acid.
- To understand the principles in genetics and bioinstrumentation.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Observe the structure of different types of tissue and the stages of cell division.

**CO2:** Demonstrate preparation of buccal smear and squash preparation of onion root tip.

**CO3:** Demonstrate the skill of focusing, calibrating a microscope and learn the principle, working of laboratory instruments.

**CO4:** Enumerate the Differential count of WBC, total count of WBC and RBC. Identify the blood group, simple Mendelian traits and syndromes.

**CO5:** Observe and study the life cycle of drosophila, polytene giant chromosome and the common mutants.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	M	M
CO2	H	H	H	L	M	M
CO3	H	H	H	M	M	M
CO4	H	H	H	M	M	M
CO5	H	H	H	L	M	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	H	M
CO2	H	H	H	L	H	M
CO3	H	H	H	L	H	H
CO4	H	H	H	L	H	H
CO5	H	H	H	L	H	M

#### CELL BIOLOGY

1. Spotters: Tissue slides – T. S. of bone, striated, non – striated and cardiac muscles, Neuron, ciliated epithelium, columnar epithelium, germinal epithelium-Human sperm and ovum.
2. Mitosis: Squash preparation of Onion root tip.
3. Meiosis: Slides
4. Buccal epithelium - smear preparation.

5. Micrometry.
6. Camera Lucida.
7. Total Count of RBC.
8. Total Count of WBC.
9. Differential Count of WBC.
10. Structure of DNA – Model.
11. Structure of rRna, mRNA, tRNA- Charts.
12. Structure and function of cell organells- 80s Ribosome, Golgi Body, Centriole, Mitochondria- Chart.
13. Bioinstrumentation – Homogenizer, Centrifuge, Gel Electrophoresis, Light Microscope, TEM, SEM.

### **GENETICS**

14. ABO blood grouping and Rh typing.
15. Study of Simple Mendelian traits in Human – Any 2 traits.
16. Karyotypic study of Syndromes: Klinefelter's syndrome, Turners syndrome and Down syndrome- Chart.
17. Giant chromosome of Chironomous larva- Permanent Slide.
18. Drosophila mutants - vestigial wing, white eye, yellow body.
19. Drosophila medium preparation and observation of life cycle.
20. Drosophila male and female.

## SEMESTER V

### UCZOG20 - DEVELOPMENTAL BIOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	V	UCZOG20	Developmental Biology	Theory	Core	5	5	100

#### Objectives:

- To study the process of development from germ cell to individual.
- To study the recent advancements in the reproductive biology.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Discuss gametogenesis and types of eggs and egg membranes.

**CO2:** Explain the mechanism and physiology of Fertilization, parthenogenesis and cleavage.

**CO3:** Explain gastrulation and organogenesis in mammals.

**CO4:** Discuss human reproduction

**CO5:** Discuss Assisted Reproductive Technologies.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	M	L	L
CO2	H	H	L	M	L	L
CO3	H	H	L	M	L	L
CO4	H	H	L	M	L	L
CO5	H	H	H	H	H	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	L	M
CO2	H	M	H	M	L	M
CO3	H	M	H	M	L	M
CO4	H	M	H	M	L	M
CO5	H	M	H	L	M	M

#### Unit I:

**(15 Hours)**

1.1: Introduction and history of Developmental Biology. (K1, K2, K3)

1.2: Spermatogenesis. (K1, K2, K3)

1.3: Oogenesis. (K1, K2, K3)

1.4: Eggs-Types of eggs. (K1, K2, K3)

1.5: Polarity and symmetry of eggs. (K1, K2, K3)

1.6: Egg membranes- Extra embryonic membranes in Chick. (K1, K2, K3)

#### Unit II:

**(15 Hours)**

2.1: Fertilization – Mechanism. (K1, K2, K3)

2.2: Physiology of Fertilization. (K1, K2, K3)

2.3: Theories of Fertilization. (K1, K2, K3)

- 2.4: Experimental works of Spemann and Mangold. (K1, K2, K3)
- 2.5: Parthenogenesis. (K1, K2, K3)
- 2.6: Cleavage. (K1, K2, K3)

**Unit III:**

**(15 Hours)**

- 3.1: Fate map. (K1, K2, K3, K4)
- 3.2: Morphogenetic movements and Gastrulation in Mammals. (K1, K2, K3)
- 3.3: Organogenesis in Mammal – Development of eye. (K1, K2, K3)
- 3.4: Development of Ear. (K1, K2, K3)
- 3.5: Development of Brain. (K1, K2, K3)
- 3.6: Development of Heart. (K1, K2, K3)

**Unit IV:**

**(15 Hours)**

- 4.1: Human reproduction - Puberty, Menstrual cycle and Menopause. (K1, K2, K3)
- 4.2: Classification of Placenta. (K1, K2, K3)
- 4.3: Placenta in Mammals. (K1, K2, K3)
- 4.4: Hormonal changes in pregnancy. (K1, K2, K3)
- 4.5: Parturition and Lactation. (K1, K2, K3)
- 4.6: Contraception- Merits- Demerits. (K1, K2, K3)

**Unit V:**

**(15 Hours)**

- 5.1: Assisted Reproductive Technology. (K1, K2, K3, K4)
- 5.2: Super Ovulation. Artificial insemination. (K1, K2, K3, K4)
- 5.3: Cryopreservation. (K1, K2, K3, K4)
- 5.4: In Vitro Fertilization (IVF), Test tube babies, Embryo transfer. (K1, K2, K3, K4)
- 5.5: Amniocentesis. (K1, K2, K3, K4)
- 5.6: Bio ethics. (K1, K2, K3, K4)

**Books for Reference:**

**Textbooks:**

1. P.S.Verma, V.K. Agarwal and Tyagi - Chordate Embryology, S.Chand and Co.,New Delhi 2007.
2. Arumugam N. - Developmental Biology- Saras Publication-15<sup>th</sup> edition 2014.

**Reference Books:**

3. Balinsky B.L - Introduction to Embryology, 5<sup>th</sup> Edition. First Indian, Reprint 2012.
4. Mohan P.Arora –Embryology- Himalaya Publishing House, 2011.
5. Veer Bala Rastogi, Jayaraj- Developmental Biology,2<sup>nd</sup> Edition, Kedar Nath Ram Nath. 1994.
6. Robert S. Mcewen- Vertebrate Embryology, 4<sup>th</sup> Edition, Oxford & IBH Publishing Co. 1949.
7. Bradley M.Patten, Bruce M. Carlson-Foundations of Embryology, 3<sup>rd</sup> Edition. Tata McGraw Hill Publishing Company Ltd. 1977.

**E-Resources:**

<https://www.sdbonline.org>  
<https://embryology.med.unsw.edu.au>  
<http://www.embryology.ch>  
<https://human-embryology.org>

**SEMESTER V**  
**UCZOH20 – PHYSIOLOGY**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	V	UCZOH20	Physiology	Theory	Core	4	4	100

**Objectives:**

- To understand and appreciate the structure and function of organ systems.
- To study the basic physiological processes that supports life.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Interpret digestion and metabolism.

**CO2:** Analyse the interaction between circulatory system and respiratory system.

**CO3:** Analyse the function of excretory system and illustrate muscle contraction.

**CO4:** Illustrate the structure and function of nervous system.

**CO5:** Compare the structure and function of endocrine system.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	M	M	L
CO2	H	H	L	M	M	L
CO3	H	H	L	M	M	L
CO4	H	H	L	M	M	L
CO5	H	H	L	M	M	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	H
CO2	H	H	H	L	M	H
CO3	H	H	H	L	M	H
CO4	H	H	H	L	M	H
CO5	H	H	H	L	M	H

**Unit I:**

**(12 Hours)**

- 1.1: Introduction to Physiology. (K1, K2, K3)
- 1.2: Digestion- digestive system of man. (K1, K2, K3)
- 1.3: Process of digestion –absorption. (K1, K2, K3)
- 1.4: Metabolism of carbohydrate. (K1, K2, K3, K4)
- 1.5: Metabolism of protein. (K1, K2, K3, K4)
- 1.6: Metabolism of lipids. (K1, K2, K3, K4)

**Unit II:**

**(12 Hours)**

- 2.1: Circulation - structure and function of heart. (K1, K2, K3)
- 2.2: Cardiac cycle-Cardiac rhythm- factors affecting it. (K1, K2, K3)
- 2.3: Properties of cardiac muscles. (K1, K2, K3)
- 2.4: Respiration – Respiratory system of man.(K1, K2, K3)

2.5: Mechanism of gaseous exchange. (K1, K2, K3)

2.6: Role of hemoglobin in respiration. (K1, K2, K3)

**Unit III:**

**(12 Hours)**

3.1: Excretion -Structure of kidney and Nephron. (K1, K2, K3)

3.2: Physiology of urine formation. Hormonal regulation- urine formation. (K1, K2, K3)

3.3: Osmo- Iono regulation in man. (K1, K2, K3)

3.4: Muscles-Types of muscles. (K1, K2, K3)

3.5: Ultrastructure of skeletal muscle-composition. (K1, K2, K3)

3.6: Contraction – theories of contraction. (K1, K2, K3)

**Unit IV:**

**(12 Hours)**

4.1: Nervous system –Components of CNS. (K1, K2, K3)

4.2: Structure of human brain. (K1, K2, K3)

4.3: Structure of neuron, nerve impulse. (K1, K2, K3)

4.4: Synaptic transmission, neurotransmitters. (K1, K2, K3, K4)

4.5: Physiology of vision. (K1, K2, K3)

4.6: Physiology of hearing. (K1, K2, K3)

**Unit V:**

**(12 Hours)**

5.1: Endocrine system- Hypothalamus. (K1, K2, K3)

5.2: Structure and function of pituitary gland. (K1, K2, K3)

5.3: Structure and function of thyroid gland. (K1, K2, K3)

5.4: Structure and function of adrenal gland. (K1, K2, K3)

5.5: Structure and function of pancreas. (K1, K2, K3)

5.6: Sex hormones – estrogen and testosterone. (K1, K2, K3)

**Books for Study and Reference:**

**Text Books:**

1. P.S Verma, B.S Tyagi and VK. Agarwal- Animal Physiology -S.Chand and Co., Ltd, New Delhi, 1990.
2. Parameswaran, Anantakrishnan and Ananta subramanian - Outlines of Animal Physiology - S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1975.
3. N. Arumugam and A MariakuttikanSaras Publication; 12th edition , January 2019.

**Reference Book:**

4. Sambasivaiah, Kamalakara Rao and Augustine Chellappa - A Textbook of Animal Physiology and Ecology - S.Chand and Co., Ltd, New Delhi, 1990.
5. William S.Hoar - General and Comparative Physiology - Prentice Hall of India Pvt., Ltd., New Delhi, 1976.
6. Wood D.W. - Principles of Animal Physiology, 3<sup>rd</sup> Edition, 1983.
7. Prosser C.L. - Comparative Animal Physiology - Satish Book Enterprise, Agra, 1985.

**E-Resources:**

<https://www.physoc.org/exPSOre-physiology>

<https://www.physiology.org>

<https://www.innerbody.com/htm>

**SEMESTER V**  
**UCZOI20 – BIOSTATISTICS**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	V	UCZOI20	Biostatistics	Theory	Core	4	4	100

**Objectives:**

- To understand the basic concepts and application of biostatistics
- To understand the application of biostatistics in research findings

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Identify and collect different types of data and select samples for biological studies

**CO2:** Classify and tabulate the data and present them diagrammatically and graphically

**CO3:** Discuss theoretical distribution. Compute mean, median and mode.

**CO4:** Explain and compute measures of dispersion.

**CO5:** Compute t-test; F-test; Chi square test for biological studies.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	L	H	M	H	L	L
CO2	L	H	H	H	L	M
CO3	L	H	H	H	L	L
CO4	L	H	H	H	L	L
CO5	L	H	H	H	L	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	H
CO2	H	H	H	L	M	M
CO3	H	H	H	L	M	M
CO4	H	H	H	L	M	L
CO5	H	H	H	M	M	L

**Unit I:**

**(12 Hours)**

1.1: Biostatistics- Introduction, Definition and Scope. (K1, K2, K3)

1.2: Data Types of data- Raw data, Primary data, Secondary data. (K1, K2, K3)

1.3: Methods of collection of data. (K1, K2, K3, K4)

1.4: Constants and Variables - Discrete variables and continuous variables. (K1, K2, K3)

1.5: Sample- Need for sampling – Advantages and Disadvantages. (K1, K2, K3)

1.6: Methods of Sampling. (K1, K2, K3, K4)

**Unit II:****(12 Hours)**

- 2.1: Classification of Data- Types of Classification- Quantitative, Qualitative, Geographical, Chronological. (K1, K2, K3)
- 2.2: Tabulation- Components of Table. (K1, K2, K3)
- 2.3: Types of Tabulation- Simple, Complex, General and Special Purpose. (K1, K2, K3)
- 2.4: Diagrams- Types- Line, Pie, Bar simple, subdivided, multiple, percentage bar diagrams. (K1, K2, K3, K4)
- 2.5: Graphs- Types- Graph of time series- Line, Range Chart, Band Graph. (K1, K2, K3, K4)
- 2.6: Graph of frequency distribution- Histogram, Polygon, Cumulative frequency curve, Ogive. (K1, K2, K3, K4)

**Unit III:****(12 Hours)**

- 3.1: Theoretical (Frequency) distribution. Normal, Poisson and Binomial. (K1, K2, K3)
- 3.2: Measures of Central Tendency: Simple Arithmetic Mean, Median, Mode. (K1, K2, K3)
- 3.3: Mean-Individual and Grouped Observation, Discrete series. (K1, K2, K3, K4)
- 3.4: Mean-Continuous series. (K1, K2, K3, K4)
- 3.5: Median - Individual and Grouped Observation- Discrete series, Continuous series. (K1, K2, K3, K4)
- 3.6: Mode Individual Observation, Continuous series. (K1, K2, K3, K4)

**Unit IV:****(12 Hours)**

- 4.1: Dispersion- Measures of Dispersion- Absolute and Relative measures of dispersion. (K1, K2, K3)
- 4.2: Methods of measuring Dispersion. (K1, K2, K3, K4)
- 4.3: Mean Deviation- Individual and Grouped Observation, Discrete series, Continuous series. (K1, K2, K3, K4)
- 4.4: Standard Deviation - Individual and Grouped Observation-Discrete series.(K1, K2, K3, K4)
- 4.5: Standard Deviation - Continuous series. (K1, K2, K3, K4)
- 4.6: Standard Error -Coefficient of Variation. (K1, K2, K3, K4)

**Unit V:****(12 Hours)**

- 5.1: Hypothesis Testing Test for significance Small and Large samples. (K1, K2, K3)
- 5.2: Student's t test - Test for Significance of Means of Sample. (K1, K2, K3, K4)
- 5.3: Test for Significance of Difference between Two Sample mean. (K1, K2, K3, K4)
- 5.4: The Variance Ratio- F test (K1, K2, K3, K4)
- 5.5: Chi Square test and its significance. (K1, K2, K3, K4)
- 5.6: Contingency table – degree of freedom. (K1, K2, K3)

## **Books for Study and Reference:**

### **Textbooks:**

1. Palanichamy, S., Manoharan, M., Statistical Methods for Biologists, Palani Paramount Publications, 1999.
2. Gurumani, N., An Introduction to Biostatistics –N. 2<sup>nd</sup> edition. MJP Publishers, Chennai, 2008.

### **Reference Books:**

3. Alwin, E. Lewis, Biostatistics, East West Press, 1971.
4. Visweswara Rao K –Biostatistics- Jaypee Publication New Delhi 1996.
5. Rangaswamy, R. A Textbook of Agricultural Statistics New Age International Publishers Ltd., Wiley Eastern Ltd, 1995. .
6. Das, NG., Statistical Methods (Vol. II), Tata McGrawHill Publishing Company Ltd., 2009.
7. Pranab Kumar Banerjee, - Introduction to Biostatistics, S. Chand Revised Edition. 2015.
8. Bernard Rosner - Fundamentals of Biostatistics 5th edition – Duxbury Thomson Learning, USA 2000.
9. Clifford Blair R., Richard A. Taylor -Biostatistics for the Health Sciences – (Indian edition) Dorling Kindersley India Pvt. Ltd., New Delhi 2009.

### **E-Resources:**

<https://www.biostat.washington.edu>

<https://www.statistics.com>

<https://bms.ucsf.edu>

**SEMESTER VI**  
**UCZOJ20 – BIOTECHNOLOGY**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	VI	UCZOJ20	Biotechnology	Theory	Core	4	4	100

**Objective:**

- To learn the basics of biotechnology this is the integration of biology and technology
- To study the application of the subject in various fields

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Explain the scope and branches of Biotechnology and summarize Genetic Engineering.

**CO2:** Describe Cloning strategies.

**CO3:** Explain Gene transfer mechanism and Blotting Techniques.

**CO4:** Demonstrate Animal Cell Culture and explain the applications of cell culture.

**CO5:** Discuss the applications of Genetic Engineering in various fields.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	L
CO2	H	H	H	H	M	M
CO3	H	H	H	H	L	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	H	M
CO2	H	H	H	L	M	H
CO3	H	H	H	L	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	H	H

**Unit I:**

**(12 Hours)**

- 1.1: Biotechnology – Introduction, Scope and importance. (K1, K2, K3)
- 1.2: Definition and Branches of Biotechnology. (K1, K2, K3)
- 1.3: DNA Structure and Composition. (K1, K2, K3, K4)
- 1.4: Introduction to Gene. (K1, K2, K3, K4)
- 1.5: Introduction to Genetic Engineering. (K1, K2, K3)
- 1.6: Methodology of Genetic Engineering. (K1, K2, K3, K4)

**Unit II:**

**(12 Hours)**

- 2.1: Gene cloning – Cloning Strategies. Restriction Endonucleases. (K1, K2, K3, K4)
- 2.2: Cloning Vectors Plasmids – pBR322. (K1, K2, K3, K4)

- 2.3: Bacteriophages Lambda Phage. (K1, K2, K3, K4)
- 2.4: Cosmids – YAC. (K1, K2, K3, K4)
- 2.5: Ligases, Linkers and Adaptors, (K1, K2, K3, K4)
- 2.6: rDNA Technology – Construction of rDNA. (K1, K2, K3, K4)

**Unit III: (12 Hours)**

- 3.1: Gene Transfer Mechanism- Transformation, Transfection, Microinjection, Electroporation, Biolistics. Colony Hybridization, Plaque Hybridization. (K1, K2, K3, K4)
- 3.2: Expression of Cloned Genes. (K1, K2, K3, K4)
- 3.3: Sanger's Method of DNA Sequencing. (K1, K2, K3, K4)
- 3.4: Genomic Library; cDNA Library. (K1, K2, K3, K4)
- 3.5: Blotting Techniques Southern, Western, Northern Techniques. (K1, K2, K3, K4)
- 3.6: PCR and its Applications. (K1, K2, K3, K4)

**Unit IV: (12 Hours)**

- 4.1: Animal Cell Culture –Requirements of Cell Culture. Laboratory Equipments. (K1, K2, K3, K4)
- 4.2: Culture Media. (K1, K2, K3, K4)
- 4.3: Tissue Disaggregation; Primary and Secondary Cell Culture. (K1, K2, K3, K4)
- 4.4: Establishment of Cell Line –Monolayer Culture, Suspension Culture. (K1, K2, K3, K4)
- 4.5: Methods of Culture – Petridish, Test Tube, Flask Culture. (K1, K2, K3, K4)
- 4.6: Applications of Cell Culture. (K1, K2, K3, K4)

**Unit V: (12 Hours)**

- 5.1: Applications of Genetic Engineering in Medicine. (K1, K2, K3, K4)
- 5.2: Applications of Genetic Engineering in Agriculture. (K1, K2, K3, K4)
- 5.3: Applications of Genetic Engineering in Industry. (K1, K2, K3, K4)
- 5.4: SCP- Production of Spirulina. (K1, K2, K3, K4)
- 5.5: Genetically Modified Organisms- Transgenic Fish and Sheep. (K1, K2, K3, K4)
- 5.6: Introduction to Databases – Gen Bank, EMBL, DDBJ. (K1, K2, K3, K4)

**Books for Study and Reference:**

**Textbooks:**

- 1. Gupta P.K. Elements of Biotechnology Rastogi Publications, Meerut, 2001.
- 2. Dubey, R.C. Textbook of Biotechnology S. Chand and Co., New Delhi, 1993.

**Reference Books:**

- 3. James D. Watson, Gilman- Recombinant DNA- Scientific American Books, 2001
- 4. Purohit S.S., Mathur S.K. Fundamentals of Biotechnology Agrobotanical Publishers, Bikaner, India, 1990.
- 5. Dubey R.C.- Advanced Biotechnology, S.Chand and Company Pvt. Ltd. New Delhi, 2014.
- 6. Prakash S Lohar.- Textbook of Biotechnology- MJP Publishers, 2012.
- 7. Nicholl S.T. An Introduction to Genetic Engineering Cambridge University Press, London, 2005.
- 8. Satyanarayana-Biotechnology-New Delhi, Book and Allied Private Ltd.

**E-Resources:**

- <https://www.biointeractive.org>
- <https://www.bio.org>
- <https://www.ncbi.nlm.nih.gov>

## SEMESTER VI

### UCZOK20- ENVIRONMENTAL BIOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	VI	UCZOK20	Environmental Biology	Theory	Core	4	3	100

#### Objectives:

- To understand the network of the surrounding and other organism.
- To protect the environment and to use the resources sustainably.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Explain ecology its branches and abiotic and biotic components of ecosystem.

**CO2:** Discuss animal association, biogeochemical cycle and Ecosystem and its functions.

**CO3:** Discuss the structure and functions of terrestrial and aquatic ecosystems.

**CO4:** Describe the Characteristics of population, Community and Ecological Succession

**CO5:** Discuss the causes of pollution their control measures and wildlife management.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	M
CO2	H	H	M	H	H	M
CO3	H	H	M	H	H	M
CO4	H	H	M	H	H	M
CO5	H	H	M	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

#### Unit I:

**(12 Hours)**

1.1: Definition, Branches- Autecology – Synecology- Integrated. (K1, K2, K3)

1.2: Abiotic factors: Temperature-Thermal stratification. Range of Temperature tolerance, Effect of temperature on Plants and animals. (K1, K2, K3)

1.3: Light-Biological effects of light on plants and animals. (K1, K2, K3)

1.4: Water-Types and properties. (K1, K2, K3)

1.5: Soil- Soil profile-Pedogenesis. (K1, K2, K3)

1.6: Atmosphere- layers and functions. (K1, K2, K3)

#### Unit II:

**(12 Hours)**

2.1: Biotic factors: Intra and inter specific animal associations. (K1, K2, K3)

- 2.2: Biogeochemical cycles- Water, Carbon, Nitrogen, Phosphorus. (K1, K2, K3)
- 2.3: Structure of Ecosystem and functions. (K1, K2, K3, K4)
- 2.4: Energy flow, Productivity-primary and secondary. (K1, K2, K3, K4)
- 2.5: Ecological pyramids, food chain and food web. (K1, K2, K3, K4)
- 2.6: Decomposition and homeostasis.

**Unit III: (12 Hours)**

- 3.1: Terrestrial habitat-characters of biome, Tundra, Forest, Deserts. (K1, K2, K3)
- 3.2: Fresh water habitat-physico chemical nature. (K1, K2, K3, K4)
- 3.3: Adaptation of animals in lentic and lotic habitat. (K1, K2, K3)
- 3.4: Marine ecology-Characteristics, Zonation and stratification. (K1, K2, K3)
- 3.5: Inter-tidal zone (Rocky, Sandy & Muddy shore). (K1, K2, K3)
- 3.6: Mangroves. (K1, K2, K3)

**Unit IV: (12 Hours)**

- 4.1: Definition, characteristics-Density, Natality, Mortality. (K1, K2, K3)
- 4.2: Survivorship curves, Age pyramids. (K1, K2, K3)
- 4.3: Carrying capacity, Fluctuations, Equilibrium. (K1, K2, K3)
- 4.4: Population growth, Population dispersal, Density dependent factors. (K1, K2, K3)
- 4.5: Ecotone and Edge effect. (K1, K2, K3)
- 4.6: Ecological succession. (K1, K2, K3)

**Unit V: (12 Hours)**

- 5.1: Pollution- Causes and control- Air. (K1, K2, K3, K4)
- 5.2: Water, soil pollutions. (K1, K2, K3, K4)
- 5.3: Greenhouse effect, Global warming, Acid rains. (K1, K2, K3, K4)
- 5.4: Water treatment. (K1, K2, K3, K4)
- 5.5: Wild life conservation and its Management. (K1, K2, K3, K4)
- 5.6: Red data book, National parks and Wild life sanctuaries. (K1, K2, K3, K4)

**Books for Study and Reference:**

**Textbooks:**

1. Verma, P.S. and V.K. Agarwal- Environmental Biology, S. Chand & Co. Ltd, 1986.
2. Rastogi V.B. and M.S. Jayaraj- Animal Ecology and distribution of animals, Kedar Nath Ram Nath, Meerut-250 001, 1988-89.

**Reference Books:**

3. Clarke, G.L.- Elements of Ecology, John Wiley & Sons Inc, New York, London, 1954.
4. Eugene P. Odum- Fundamentals of Ecology, Saunders International Student Edition, W. B Saunders Company, Philadelphia, London, Toronto,1971.
5. Kotpal, R.L and N.P- Basic Concepts of Ecology, Vishal Publications, Delhi,1986.
6. Biswarup Mukherjee - Environmental Biology, Tata McGraw-Hill Publishing Company Ltd. New Delhi,1997.
7. Asthana, D.K. and Asthana, M- Environmental problems and solutions. S. Chand and Co., New Delhi, 2001.

**E-Resources:**

- <http://www.enviroindia.net>
- <http://aelsindia.com>
- <http://environment-ecology.com>

## SEMESTER V

### UEZOA20- MAJOR ELECTIVE I A: ECONOMIC ZOOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	V	UEZOA20	Economic Zoology	Theory	Core Elective	5	5	100

#### Objectives:

- To learn the economic importance of animals
- To motivate the students to become entrepreneurs

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Demonstrate culture techniques of apiculture, sericulture, lac culture and vermiculture.

**CO2:** Illustrate the preparation and management of fish culture ponds.

**CO3:** Differentiate breeds of fowl and describe poultry and piggery management.

**CO4:** Discuss Dairy farming and tanning process.

**CO5:** Explain processing of wool, fur and obtains insight of pharmaceutical products from animals.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

#### Unit I:

(15 Hours)

- 1.1: Introduction- Culture methods- equipments – Apiculture. (K1, K2, K3)
- 1.2: Apiculture- Products- disease and control measures. (K1, K2, K3)
- 1.3: Culture methods- equipments Sericulture. (K1, K2, K3)
- 1.4: Products- disease and control measures in Sericulture. (K1, K2, K3)
- 1.5: Culture methods- equipments Vermiculture. (K1, K2, K3)
- 1.6: Culture methods- equipments Lac culture. (K1, K2, K3)

#### Unit II:

(15 Hours)

- 2.1: Aquaculture-fresh water fishery-farm management. Seed collection-culture techniques.(K1,K2,K3)

- 2.2: Edible fishes. Equipments, nets and traps. (K1, K2, K3)
- 2.3: Marine fish culture. (K1, K2, K3)
- 2.4: Prawn culture. (K1, K2, K3)
- 2.5: Pearl culture. (K1, K2, K3)
- 2.6: By products of fishing industry- Diseases of Fish and prawn. (K1, K2, K3)

**Unit III:**

**(15 Hours)**

- 3.1: Poultry management – breeds of fowls - selection of breeds. (K1, K2, K3)
- 3.2: Fowl house – types of rearing – feeds. (K1, K2, K3)
- 3.3: Poultry products. (K1, K2, K3)
- 3.4: Preservation of eggs-by products of egg. (K1, K2, K3, K4)
- 3.5: Disease of fowls and control. (K1, K2, K3)
- 3.6: Piggery industry and byproducts. (K1, K2, K3)

**Unit IV:**

**(15 Hours)**

- 4.1: Dairy farming - breeds of milch animals. (K1, K2, K3)
- 4.2: Housing. (K1, K2, K3)
- 4.3: Feeds. (K1, K2, K3)
- 4.4: Disease and control. (K1, K2, K3)
- 4.5: Leather industry -processing of leather. (K1, K2, K3)
- 4.6: Tanning - oil and chrome tanning - finishing. (K1, K2, K3)

**Unit V:**

**(15 Hours)**

- 5.1: Wool – properties. (K1, K2, K3)
- 5.2: Wool- processing. (K1, K2, K3)
- 5.3: Fur industry – fur bearing animals. (K1, K2, K3)
- 5.4: Processing of fur. (K1, K2, K3)
- 5.5: Care of fur products. (K1, K2, K3)
- 5.6: Pharmaceutical products from animals. (K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

1. Ahsan J., and Sinha SP- Handbook of Economic zoology, S. Chand and Co., New Delhi, 2009.
2. Shukla GS, and Upadhyay SP- Economic Zoology, Ratogi Publication, Meerut, 1994.

**Reference Books:**

3. Mary Violet Christy A-Vermitechnology, MJP Publication Chennai,1976.
4. Ayyar TVT- Handbook of Economic Entomology for South India, Govt press, Madras, 1963.
5. Jhingran VG- Fish and fisheries of India, Hindustan Publishing Corp., New Delhi, 1982.
6. Jawaid Ahgan, Subhas Prasad Sinha- A Hand book on Economic Zoology, S. Chand & Co. Ltd., New Delhi, 2000.

**E-Resources:**

- <http://csb.gov.in>
- <http://www.fao.org>
- <http://nfdb.gov.in>

## SEMESTER V

### UEZOB20 – MAJOR ELECTIVE IB: VERMICULTURE

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	V	UEZOB20	Vermiculture	Theory	Core Elective	5	5	100

#### Objectives:

- To learn the production and importance of organic fertilizers.
- To motivate students for self-employment.

#### Course Outcomes (CO):

On completion of the course the student will be able to...

**CO1:** Identify various groups of earthworms and impact of earthworm on soil.

**CO2:** Describe large and small scale composting methods.

**CO3:** Explain the factors affecting vermicomposting and preparation of vermibed.

**CO4:** Discuss the use of vermicompost and vermivash in agriculture and horticulture.

**CO5:** Elaborate the role of earthworm in agriculture, fishing, medicine and pollution and promotion of vermiculture.

CO/PO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

#### Unit I:

(15 Hours)

1.1: Introduction and scope of Vermiculture. (K1, K2, K3)

1.2: Ecological groups of earthworms – Epigeic, Endogeic, Anegic. (K1, K2, K3)

1.3: Varieties of Earthworm – Night crawlers – Field crawlers.(K1, K2, K3)

1.4: Manure worms – Red worms. (K1, K2, K3)

1.5: Physical and chemical effects of earthworm on soil.(K1, K2, K3)

1.6: Biological effects of earthworm on soil.(K1, K2, K3)

**Unit II:** (15 Hours)

- 2.1: Organic waste sources.(K1, K2, K3)
- 2.2: Vermi composting definition and methods.(K1, K2, K3)
- 2.3: Small scale Pit method.(K1, K2, K3)
- 2.4: Large scale pit method.(K1, K2, K3)
- 2.5: Four tanks method.(K1, K2, K3)
- 2.6: Two tank method. (K1, K2, K3)

**Unit III:** (15 Hours)

- 3.1: Factors affecting vermicomposting: pH.(K1, K2, K3)
- 3.2: Factors affecting vermicomposting Moisture, Temperature.(K1, K2, K3)
- 3.3: Factors affecting vermicomposting Light, location operation site.(K1, K2, K3)
- 3.4: Preparation of vermibed.(K1, K2, K3)
- 3.5: Collection of compost.(K1, K2, K3)
- 3.6: Separation of earthworm.(K1, K2, K3)

**Unit IV:** (15 Hours)

- 4.1: Application of vermicomposting in agriculture.(K1, K2, K3)
- 4.2: Application of vermicomposting horticulture practices.(K1, K2, K3)
- 4.3: Economics of Vermiculture.(K1, K2, K3)
- 4.4: Vermi wash.(K1, K2, K3)
- 4.5: Preparation of Vermiwash.(K1, K2, K3)
- 4.6: Uses of Vermi wash.(K1, K2, K3)

**Unit V:** (15 Hours)

- 5.1: Role of earthworm in agriculture.(K1, K2, K3)
- 5.2: Role of earthworm in fishing. (K1, K2, K3)
- 5.3: Role of earthworm in medicine.(K1, K2, K3)
- 5.4: Role of earthworm in pollution control.(K1, K2, K3)
- 5.5: Schemes and projects available for the promotion of Vermiculture.(K1, K2, K3)
- 5.6: Loans to start vermicomposting.(K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

1. Edwards, C.A., and Bother, B.- Biology of Earthworms – Chapman Hall Publishers and Co., London, 1996.
2. Ismail, S.A.- Vermitechnology – The Biology of Earthworms- Orient Longman Publishers – India, 1997.

**Reference Books:**

3. Ranganathan, L.S- Vermibiotechnology from soil health to human health – Agrobios – India. 2006
4. Talashikar, S.C- Earthworms in Agriculture – Agrobios – India, 2008.
5. Gupta, P.K.- Vermicomposting for sustainable Agriculture ( 2nd Edition) – Agrobios – India, 2008.

**E-Resources:**

<https://communitycrops.org>

<https://composting.ces.ncsu.edu>

<https://www.in.gov>

## SEMESTER VI

### UEZOC20 – ELECTIVE - II A: MICROBIOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	VI	UEZOC20	Microbiology	Theory	Core Elective	5	5	100

#### Objectives:

- To study about the hidden world of microbes.
- To learn about the beneficial and harmful microbes.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Describe the structure and function of bacteria and virus.

**CO2:** Apply the process of media preparation and bacterial culture.

**CO3:** Discuss the various sterilization techniques and chemotherapeutic agents.

**CO4:** Discuss the role of microbes in food production and preservation.

**CO5:** Discuss the disease causing microorganisms.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	M	L	L
CO2	H	H	H	M	L	L
CO3	M	H	H	M	M	L
CO4	H	H	H	M	L	M
CO5	H	H	L	M	L	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	H	M	M	M
CO2	H	H	H	M	M	H
CO3	H	H	H	L	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	L	M

#### Unit I:

(15 Hours)

1.1: Introduction to Microbiology. (K1, K2, K3)

1.2: Shape and Morphological arrangements of Bacteria. (K1, K2, K3)

1.3: Structure – Cell Wall, Cytoplasmic Membrane, Flagella, Nucleoid. (K1, K2, K3)

1.4: Plasmid, Riobsomes, Capsule. (K1, K2, K3)

1.5: Gram staining positive and negative. (K1, K2, K3)

1.6: Fine structure of virus- T<sub>4</sub> Bacteriophage. (K1, K2, K3)

**Unit II:****(15 Hours)**

- 2.1: Nutritional requirements of bacteria. (K1, K2, K3)
- 2.2: Culture Media- Agar- Blood and Beef. (K1, K2, K3)
- 2.3: Bacterial culture methods- Broth, Agar Plate, Agar Slant, Agar Stab, Roll Tube, Deep Media. (K1, K2, K3, K4)
- 2.4: Isolation of Pure culture- Serial Dilution Technique, Streak Plate Technique. (K1, K2, K3, K4)
- 2.5: Pour Plate Technique, Spread Plate Technique.
- 2.6: Maintenance of Bacterial Culture –Lyophilization, Cryopreservation by Liquid Nitrogen. (K1, K2, K3, K4)

**Unit 3:****(15 Hours)**

- 3.1: Control of Microorganisms: Sterilization- Physical: Autoclaving; Tyndallization. (K1, K2, K3, K4)
- 3.2: Physical: Flaming; Filtrations; Laminar flow hood. (K1, K2, K3, K4)
- 3.3: Chemical methods: Acids and Alkalies. (K1, K2, K3, K4)
- 3.4: Halogens; Chlorine; Phenol and its derivatives. (K1, K2, K3, K4)
- 3.5: Alcohols; Dyes; Detergents; Heavy metals. (K1, K2, K3, K4)
- 3.6: Chemotherapy-Antibiotics. (K1, K2, K3, K4)

**Unit 4:****(15 Hours)**

- 4.1: Microbiology of food: Role of microbes in food production. (K1, K2, K3, K4)
- 4.2: Non Dairy products - Meat and Fish Products. (K1, K2, K3, K4)
- 4.3: Fermented Vegetables- Bread. (K1, K2, K3, K4)
- 4.4: Alcoholic Beverages and Vinegar. (K1, K2, K3, K4)
- 4.5: Dairy Microbiology-Sources and Microorganisms in Milk, Pasteurization of milk, Dairy Products. (K1, K2, K3, K4)
- 4.6: Food poisoning and preservation. (K1, K2, K3, K4)

**Unit 5:****(15 Hours)**

- 5.1: Microorganisms, pathogenesis and prophylaxis. (K1, K2, K3, K4)
- 5.2: Bacterial: *Mycobacterium tuberculosis* (K1, K2, K3, K4)
- 5.3: Bacterial: *Salmonella typhi*. (K1, K2, K3, K4)
- 5.4: Viral: Hepatitis B. (K1, K2, K3, K4)
- 5.5: Viral: H1N1. (K1, K2, K3, K4)
- 5.6: Fungal: *Candida albicans*. (K1, K2, K3, K4)

**Books for Study and Reference:****Textbooks:**

- 1. Powar C.B., Dagainwala H.F. General Microbiology. Himlaya Publishing House. 2015.
- 2. Sharma P.D. - Microbiology - Rastogi Publication, 1998: 5<sup>th</sup> reprint, 2005-2006.

**Reference Books:**

3. Pelczar Jr. M. J. Chan E.C.S and Kreig N.R. - Microbiology - McGraw Hill Inc. New York, 2001.
4. Stainer R.Y., Ingraham J.L., Wheelis M.L. and Painter P.R. - General Microbiology - Macmillan Education Ltd, London, 1999.
5. Prescott L.M. Harley J.O Klein D.A. – Microbiology - WCB Publishers Sydney, 1990.
6. Ananthanaryanan T., Paniker J.C.K. - Textbook of Microbiology - Orient Longman Ltd., Madras, 2000.
7. Dubey, R.C., and Maheswari, D.K. - A text book of Microbiology. S.Chand and Co., New Delhi, 2007.

**E-Resources:**

<https://microbe.net>

<https://asm.org>

<https://medicine.uiowa.edu>

## SEMESTER VI

### UEZOD20 – ELECTIVE - II B: BIOINSTRUMENTATION

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	VI	UEZOD20	Bioinstrumentation	Theory	Core Elective	5	5	100

**Objectives:**

- To understand the principle, construction and application of instruments.
- To aid the students to understand the usage of the instruments in research.

**Course Outcomes (CO):**

**On completion of the course the student will be able to...**

**CO1:** Apply the principle and construction of the instruments.

**CO2:** Demonstrate the usage of the instruments.

**CO3:** Illustrate the working method of various techniques.

**CO4:** Discuss the application of the techniques.

**CO5:** Apply the skill of instrumentation and micro techniques.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	M	H	L	L
<b>CO2</b>	H	H	M	H	L	L
<b>CO3</b>	H	H	M	H	L	L
<b>CO4</b>	H	H	M	H	L	L
<b>CO5</b>	H	H	M	H	L	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	L	M	M
<b>CO2</b>	H	H	H	L	M	M
<b>CO3</b>	H	H	H	L	M	M
<b>CO4</b>	H	H	H	L	M	M
<b>CO5</b>	H	H	H	L	M	M

**Unit I:**

**(15 Hours)**

1.1: Introduction.(K1, K2, K3)

1.2: Scope.(K1, K2, K3)

1.3: Importance and application of Bioinstrumentation.(K1, K2, K3)

1.4:Microscopes – Compound.(K1, K2, K3)

1.5: Fluorescent Microscope.(K1, K2, K3)

1.6: U-V Microscopes.(K1, K2, K3)

**Unit II:**

**(15 Hours)**

2.1: TEM, and SEM.(K1, K2, K3, K4)

2.2: Phase contrast.(K1, K2, K3)

2.3: Ocular and stage micrometer.(K1, K2, K3)

2.4: Camera Lucida.(K1, K2, K3)

- 2.5: Cell homogenization- Fractionation.(K1, K2, K3)  
2.6: Centrifugation and Isolation of Cellular components.(K1, K2, K3)

**Unit III:** (15 Hours)

- 3.1: Laboratory instruments- Autoclave, Hot air oven.(K1, K2, K3)  
3.2: Water bath, Incubator.(K1, K2, K3)  
3.3: Centrifuge, pH meter.(K1, K2, K3)  
3.4: Spectrophotometer.(K1, K2, K3)  
3.5: Hemoglobinometer, Hemocytometer.(K1, K2, K3)  
3.6: Microtome.(K1, K2, K3)

**Unit IV:** (15 Hours)

- 4.1: Electrophoresis- Zone.(K1, K2, K3, K4)  
4.2: Immunoelectrophoresis.(K1, K2, K3)  
4.3: SDS PAGE.(K1, K2, K3)  
4.4: Chromatography- Paper, Thin layer.(K1, K2, K3)  
4.5: Ion exchange chromatography.(K1, K2, K3)  
4.6: Gas chromatography.(K1, K2, K3)

**Unit V:** (15 Hours)

- 5.1: Micro technique.(K1, K2, K3)  
5.2: Fixation.(K1, K2, K3)  
5.3: Dehydration.(K1, K2, K3)  
5.4: Embedding.(K1, K2, K3)  
5.5: Sectioning. (K1, K2, K3)  
5.6: Staining.(K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

- 1.M. Prakash, C.K. Arora- Laboratory instrumentation, Anmol publications pvt ltd. First edition, 1998.
2. L. Veerakumari –Bioinstrumentation-MJP Publisher- 2019.

**Reference Books:**

3. Philip Sheeler, Donald E. Bianchi- Cell and molecular biology, John Wiley & Sons, Inc, third edition, 1987.
3. A.G.E. Pearse. Churchill Livingstone Histochemistry, theoretical and applied. Volume one: Preparative and optical technology, fourth edition, 1980.
4. M. Prakash, C.K. Arora- Microscopically methods, Anmol publications pvt ltd. First edition, 1998.
4. L.R. Patki, B.L. Bhalchandra, I.H. Jeevaji.
5. An introduction to micro technique, S.Chand & Company ltd, 1989.

**E-Resources:**

- <https://bioeng.berkeley.edu>  
<https://www.vanderbilt.edu>  
<https://worldwidescience.org>

## SEMESTER VI

### UEZOE20 – ELECTIVE -III A: IMMUNOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	VI	UEZOE20	Immunology	Theory	Core Elective	5	5	100

#### Objectives:

- To study the structure and function of immune system
- To understand the application of immunology in medical field

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Describe the primary and secondary lymphoid organs.

**CO2:** Categorize types of immunity and the cells involved in immunity.

**CO3:** Analyse the structure and function of antigens and antibodies.

**CO4:** Examine the antigen antibody reaction and its role in transplantation, hypersensitivity, autoimmunity and AIDS.

**CO5:** Analyse immunization and its importance in prevention of diseases.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	H	L	L
CO2	H	H	L	H	L	L
CO3	H	H	L	H	L	L
CO4	H	H	L	H	L	L
CO5	H	H	L	H	L	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	L	H
CO2	H	H	M	L	L	H
CO3	H	H	M	L	L	H
CO4	H	H	M	L	L	H
CO5	H	H	M	H	L	H

#### Unit I:

**(15 Hours)**

1.1: History and scope. (K1, K2, K3)

1.2: Lymphoid organs. - Primary and secondary. (K1, K2, K3)

1.3: Structure and role - Bone marrow – Thymus. (K1, K2, K3)

1.4: Structure and role - Lymph node. (K1, K2, K3)

1.5: Structure and role - Spleen. (K1, K2, K3)

1.6: Structure and role - Payer's patches and Kuffer cells. (K1, K2, K3)

#### Unit II:

**(15 Hours)**

2.1: Immunity types - Innate Active and Passive. (K1, K2, K3, K4)

- 2.2: Acquired Active and Passive. (K1, K2, K3, K4)
- 2.3: Characteristics of Immune response. (K1, K2, K3, K4)
- 2.4: Humoral and Cell mediated immunity. (K1, K2, K3, K4)
- 2.5: Cells involved in immune response – T. (K1, K2, K3, K4)
- 2.6: Cells involved in immune response - B Cells and Macrophages.(K1, K2, K3, K4)

**Unit 3:**

**(15 Hours)**

- 3.1: Antibodies – functions.(K1, K2, K3)
- 3.2: Immunoglobulin - structure and functions. (K1, K2, K3, K4)
- 3.3: Human Immunoglobulin Classes. (K1, K2, K3)
- 3.4: Antigens- Types. (K1, K2, K3)
- 3.5: Epitopes, Paratopes. (K1, K2, K3)
- 3.6: Adjuvants. (K1, K2, K3).

**Unit 4:**

**(15 Hours)**

- 4.1: Antigen Antibody reactions-Precipitation. (K1, K2, K3)
- 4.2: Agglutination, Cytolysis, Opsonization. (K1, K2, K3)
- 4.3: Transplantations and Graft rejections. (K1, K2, K3)
- 4.4: Hypersensitivity. (K1, K2, K3)
- 4.5: Autoimmunity. (K1, K2, K3)
- 4.6: AIDS/HIV. (K1, K2, K3)

**Unit 5:**

**(15 Hours)**

- 5.1: Viral and parasitic infections. (K1, K2, K3)
- 5.2: Principles and Types of vaccines used in humans. (K1, K2, K3)
- 5.3: Clinical Immunology – Immunization schedule for children. (K1, K2, K3)
- 5.4: Prevention of diseases in new born babies/children- Whooping cough. (K1, K2, K3)
- 5.5: Mumps. (K1, K2, K3)
- 5.6: Measles and Rubella. (K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

1. Dulsy Fatima and Arumugam – Immunology - Saras, Nagercoil, India, 1998.
2. S.K.Gupta- Essentials of Immunology – 2<sup>nd</sup> edition- Arya Publication
3. I. Kannan- Immunology- MJP Publishers- 2019

**Reference Books:**

4. Tizard I.R. – Immunology: An Introduction, IV Ed. - Saunders College, Publication, Philadelphia, 1995.
5. Janis Kuby, Thomas J. Kindt, Richard A. Goldsby, Barbara A. Osborne, W.H. Freeman and company - Immunology - sixth edition, 2007
6. Ivan M. Riot - Essentials of Immunology - Blackwell Scientific Publications, 2000.
7. Paul W.E.M. - Fundamental Immunology - Raven Press, New York, 1998

**E-Resources:**

<https://www.immunology.org>  
<https://www.ncbi.nlm.nih.gov>  
<https://www.aai.org>

**SEMESTER VI**  
**UEZOF20 - ELECTIVE - III B: PARASITOLOGY**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	VI	UEZOF20	Parasitology	Theory	Core Elective	5	5	100

**Objectives:**

- To learn the life cycle, disease and treatment of various parasites of Human
- To create awareness about health and hygiene

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Discuss about parasites.

**CO2:** Describe host parasite interaction.

**CO3:** Discuss pathology of protozoan parasites.

**CO4:** Describe the pathology of Helminth parasites.

**CO5:** Explain Arthropod role as parasites and vectors.

CO/PO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	M	H	L
CO2	H	H	L	M	H	L
CO3	H	H	L	M	H	L
CO4	H	H	L	M	H	L
CO5	H	H	L	M	H	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	M	M	M
CO4	H	H	H	M	M	M
CO5	H	H	H	M	M	M

**Unit 1:**

**(15 Hours)**

- 1.1: Terminology - nature of Parasitism.(K1, K2, K3)
- 1.2: Parasites and food habits.(K1, K2, K3)
- 1.3: Origin of parasitism-kinds of parasitism.(K1, K2, K3)
- 1.4: General relation to hosts.(K1, K2, K3)
- 1.5: Definitive and intermediate hosts.(K1, K2, K3)
- 1.6: Parasitic adaptation.(K1, K2, K3)

**Unit 2:**

**(15 Hours)**

- 2.1: Effects of parasites on hosts.(K1, K2, K3)
- 2.2: Immunity.(K1, K2, K3)

- 2.3: Age resistance.(K1, K2, K3)
- 2.4: Tolerance to injurious effects.(K1, K2, K3)
- 2.5: Spread to new hosts.(K1, K2, K3, K4)
- 2.6: Community spread.(K1, K2, K3, K4)

**Unit 3:**

**(15 Hours)**

- 3.1: Morphology, Life cycle, mode of infection, pathogenesis, treatment and prophylaxis of Protozoan parasites – *Plasmodium vivax*.(K1, K2, K3)
- 3.2: *Entamoeba histolitica*.(K1, K2, K3)
- 3.3: *Balantidium*.(K1, K2, K3)
- 3.4: *Leshmania*.(K1, K2, K3)
- 3.5: *Trypanosoma*.(K1, K2, K3)
- 3.6:*Giardia intestinalis*. (K1, K2, K3)

**Unit 4:**

**(15 Hours)**

- 4.1:Morphology, Life cycle, mode of infection, pathogenesis, treatment and prophylaxis of Helminthes parasites- *Ascaris*.(K1, K2, K3)
- 4.2: *Ancylostoma*.(K1, K2, K3)
- 4.3: *Wuchereria*. (K1, K2, K3)
- 4.4: *Schistoma*.(K1, K2, K3)
- 4.5: *Taenia solium*.(K1, K2, K3)
- 4.6: *Trichuris trichiura*. (K1, K2, K3)

**Unit 5:**

**(15 Hours)**

- 5.1: Parasitic Arthropods- degree of parasitism.(K1, K2, K3)
- 5.2: As vectors Indirect, direct and biological transmission.(K1,K2, K3)
- 5.3: Indirect, direct and biological transmission-Mosquitoes.(K1, K2, K3)
- 5.4: Indirect, direct and biological transmission- Flies.(K1, K2, K3)
- 5.5: Indirect, direct and biological transmission- Fleas and bugs.(K1, K2, K3)
- 5.6: Indirect, direct and biological transmission – Ticks and Mites. (K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

1. Panicker - Textbook of Medical Parasitology, 4<sup>th</sup> edition, Jaypee Brothers, 1977.
2. Subhash Chandra Parija – Text book of Parasitology, All India Publishers and Distributors, 2000.

**Reference Books:**

3. Chandler C. - ASA and Read C.P, Wiley Eastern University Ed, 10<sup>th</sup> edition, 1970.
4. Bush *et al.* – Parasitism - Cambridge University Press, 2001.
5. R.L.Ichhpujari, Rajesh Bhatia – Medical Parasitology, Jaypee Brothers, 1994.
- 6.Clark .P Read – Animal Parasitism , Prentice, Hall of India, 1977.
7. W. Crave- A Guide to Human Parasitology, 10<sup>th</sup> edition, the English Language Book Society and H.K.Lewis and Co, 1970.

**E-Resources:**

- <https://www.cdc.gov>
- <https://parasite.org.au>
- <http://www.parasitesinhumans.org>

**SEMESTER VI – CORE PRACTICAL III**  
**UCZOL20 – PHYSIOLOGY, DEVELOPMENTAL BIOLOGY, AND ECONOMIC ZOOLOGY.**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	V & VI	UCZOL20	Core Practical-III	Practical	Core	3	5	100

**Objectives:**

- To obtain practical skills physiology.
- To learn about development of animals.
- To understand the economic importance of animals.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Demonstrate experiments in Physiology.

**CO2:** Demonstrate expertise in handling instruments.

**CO3:** Identify developmental stages, placenta and histology in development biology.

**CO4:** Apply equipments used in rearing techniques.

**CO5:** Discuss the economic importance of animals.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	L
CO2	H	H	H	H	L	H
CO3	H	H	H	H	L	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	L
CO2	H	H	M	L	M	L
CO3	H	H	H	L	M	L
CO4	H	H	H	L	M	H
CO5	H	H	H	H	M	H

**PHYSIOLOGY:**

1. Detection of nitrogenous waste products in Fish Tank Water, Bird's Excreta and Cow's Urine.
2. Study of Human Salivary Amylase Activity in relation to pH.
3. Study of Human Salivary Amylase Activity in relation to Temperature.
4. Oxygen Consumption in Fish with reference to Body Weight.
5. Differential Count of WBC.
6. Estimation of Haemoglobin - Sahli's Method.
7. Kymograph, Respirometer.

**DEVELOPMENTAL BIOLOGY:**

1. Frog – 4 cell, 8 cell and 32 celled stages, Blastula, Gastrula.
2. Chick-18, 24, 48hr Embryos.
3. T.S of Testis and Ovary.
4. Human Ovum and Sperm.
5. Placenta - Sheep, Human, Yolk Sac Placenta of Shark.

**ECONOMIC ZOOLOGY:**

1. Spotters / Charts of equipments of sericulture and apiculture- Chandraki, Rearing tray, Rearing stand, Honey extractor, Smoker, Modern Hive.
2. Egg, Honey, Lac, Silk, Pearl, Hide and Leather
3. Edible fish: Tilapia, Anabas, Shark, Catla.
4. Field Visit Report.

**SEMESTER VI- COREPRACTICAL IV**  
**UCZOM20 – ENVIRONMENTAL BIOLOGY, BIOTECHNOLOGY,**  
**MICROBIOLOGY AND IMMUNOLOGY**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	VI	UCZOM20	Core Practical IV	Practical	Core	3	5	100

**Objectives:**

- To obtain practical skills Ecology, Immunology and Biotechnology.
- To learn about adaptation of animals to their ecosystem.
- To understand the basic interpretations in medical field.

**Course Outcomes:**

**On completion of the course the student will be able to...**

- CO1: Demonstrate procedures in Ecology and immunology.  
 CO2: Identify the adaptation of animals in the ecosystem.  
 CO3: Apply the principle, working and application of instruments used biotechnology.  
 CO4: Discuss microbes and the disease caused by them.  
 CO5: Describe Lymphoid organs and immunoglobulins.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	M	L
CO2	H	H	H	M	M	L
CO3	H	H	H	M	M	L
CO4	H	H	H	M	M	L
CO5	H	H	H	M	M	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	L
CO2	H	H	H	H	M	L
CO3	H	H	H	H	M	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	M	L

**ENVIRONMENTAL BIOLOGY:**

1. Instruments - Rain gauge, Max-Min thermometer, Hygrometer, Luxmeter, Anemometer, Aneroid barometer.
2. Estimations - Oxygen, Carbon-dioxide, Salinity, Carbonate and Bicarbonate and pH in different water samples
3. Study of museum specimen based on Benthic, Sandy shore, Rocky shore and Flying adaptations.
4. Planktons: Fresh water and Marine Planktons five each(**Spotters**)

**BIOTECHNOLOGY:**

1. Plasmids pBR322
2. PCR
3. DNA sequencing- Sanger Method
4. Blotting techniques-Southern, Northern and Western

**MICROBIOLOGY:**

1. *Mycobacterium tuberculosis*,
2. *Salmonella typhi*,
3. *Clostridium tetani*,
4. *Vibrio cholerae*,
5. *Haemophilus influenzae*.

**IMMUNOLOGY:**

1. Blood grouping and Rh typing - Antigen and Antibody Reaction
2. Ig A, Ig G
3. Organs of immune system:TS of – Spleen, Thymus and Bone marrow

## SKILL-BASED COURSE - I

### USZOA120/USZOA220 - PUBLIC HEALTH AND HYGIENE

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I & II	USZOA120/ USZOA220	Public Health And Hygiene	Theory	Skill Based Elective	2	2	100

**Objective:**

- To highlight the various dimensions of human health with reference to nutrition, environment and disease.
- To gain basic knowledge about health and hygiene

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Impart knowledge about health and diseases.

**CO2:** Acquire knowledge about nutrition and classification of food.

**CO3:** Analyze the interaction and impact of the environment on health.

**CO4:** Expand knowledge about communicable diseases and its prevention.

**CO5:** Improve the quality of life through prevention and treatment of non-communicable disease.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO2	H	H	M	H	H	M
CO3	H	H	M	H	H	M
CO4	H	H	M	H	H	M
CO5	H	H	M	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit 1:**

**(6 Hours)**

1.1: Introduction. (K1, K2, K3)

1.2: Terms and definitions. (K1, K2, K3)

1.3: Scope of Public Health and Hygiene. (K1, K2, K3)

1.4: Concepts of Health and Disease. (K1, K2, K3)

1.5: Sources and function of macro nutrients. (K1, K2, K3)

1.6: Sources and function of micro nutrients. (K1, K2, K3)

**Unit 2:**

**(6 Hours)**

2.1: Nutrition and Health. (K1, K2, K3)

2.2: Classification of foods. (K1, K2, K3)

2.3: Carbohydrates, Proteins, fats. (K1, K2, K3)

- 2.4: Vitamins deficiency, food hygiene. (K1, K2, K3)
- 2.5: Balance diet. (K1, K2, K3)
- 2.6: Nutritional requirements of special groups. (K1, K2, K3, K4)

**Unit 3:**

**(6 Hours)**

- 3.1: Environment and Health. (K1, K2, K3)
- 3.1: Pollution effect on health- Water, Air. (K1, K2, K3)
- 3.3: Pollution effect on health- Noise. (K1, K2, K3)
- 3.4: Pollution effect on health - Land. (K1, K2, K3)
- 3.5: Climate change. (K1, K2, K3)
- 3.6: Pandemic diseases. (K1, K2, K3)

**Unit 4:**

**(6 Hours)**

- 4.1: Epidemiology of Communicable Diseases. (K1, K2, K3)
- 4.2: A brief account of respiratory infections. (K1, K2, K3)
- 4.3: Measles. (K1, K2, K3)
- 4.4: Intestinal infections- Amoebiasis. (K1, K2, K3)
- 4.5: Arthropod borne diseases- Malaria. (K1, K2, K3)
- 4.6: STD and AIDS. (K1, K2, K3)

**Unit 5:**

**(6 Hours)**

- 5.1: Non – Communicable Diseases and Conditions. (K1, K2, K3)
- 5.2: Diabetes mellitus. (K1, K2, K3)
- 5.3: Obesity. (K1, K2, K3)
- 5.4: Mental health: Causes of mental ill-health. (K1, K2, K3)
- 5.5: Stress and strain. (K1, K2, K3)
- 5.6: Eating disorders. (K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

1. Park J.E. and Park K. - A Textbook of Preventive and Social Medicine - M/S. Banarsidas Bhanot Publishers, Jabalpur, 1986.
2. Verma S. - Medical Zoology - Rastogi Publications, New Delhi, 1998.

**Reference Books:**

3. Group Nutrition Intervention, Management Manual - Dept. of Food, Ministry of Agriculture, Govt. of India, 1982.
4. Raven, Peter, H. and Johnson, George B. - Understanding Biology - Mosby Year Book, U.S.A., 1994.
5. Swaminathan M. - Advanced Text Book on Food and Nutrition Vol. I and Vol. II – The Bangalore Printing and Publishing Co., Ltd., Bangalore, 1993.

**E-Resources:**

<https://www.cdcfoundation.org>  
<https://www.publichealth.pitt.edu>  
<https://www.tnhealth.org>

**SKILL-BASED ELECTIVE**  
**USZOC320– SERICULTURE**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	USZOC320	Sericulture	Theory	Skill Based Elective	2	2	100

**Objectives:**

- To help the non-science students to understand the life cycle and culture technique of silkworm
- To motivate the students for self-employment

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Enlist different variety of silkworms and their economic status

**CO2:** Explain about mulberry cultivation

**CO3:** Expand knowledge on utilizing silkworm rearing appliances.

**CO4:** Elucidate an indulgent of silkworm mounting, silkworm rearing, and silkworm reeling operations.

**CO5:** Indicate and identify diseases in silkworms and recognize their enemies to take necessary control measures.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	L	M	H
CO4	H	H	H	L	M	H
CO5	H	H	H	M	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	L	M	H
CO4	H	H	H	L	M	H
CO5	H	H	H	M	M	H

**Unit 1:**

**(6 Hours)**

1.1: Scope of sericulture in India and in global market. (K1, K2, K3)

1.2: Economics; Central Silk Board (CSB). (K1, K2, K3)

1.3: Training Facilities in Sericulture. (K1, K2, K3)

1.4: Types of silk worm Mulberry, Tasar, Eri, Muga. (K1, K2, K3)

1.5: Life cycle of *Bombyx mori*. (K1, K2, K3)

1.6: Silk. (K1, K2, K3)

**Unit 2:**

**(6 Hours)**

2.1: Varieties of Mulberry. (K1, K2, K3)

- 2.2: Mulberry Cultivation. (K1, K2, K3)
- 2.3: Propagation, Plantation. (K1, K2, K3)
- 2.4: Manuring, Pruning. (K1, K2, K3)
- 2.5: Harvesting, Storing. (K1, K2, K3)
- 2.6: Transporting. (K1, K2, K3)

**Unit 3:**

**(6 Hours)**

- 3.1: Silkworm Rearing-Rearing House. (K1, K2, K3, K4)
- 3.2: Appliances used for Rearing, Feeding. (K1, K2, K3, K4)
- 3.3: Cleaning and Spinning. (K1, K2, K3)
- 3.4: Factors for rearing. (K1, K2, K3, K4)
- 3.5: Temperature. (K1, K2, K3)
- 3.6: Humidity. (K1, K2, K3)

**Unit 4:**

**(6 Hours)**

- 4.1: Rearing operations – Disinfection. (K1, K2, K3)
- 4.2: Brushing, Feeding. (K1, K2, K3)
- 4.3: Bed Cleaning, Spacing. (K1, K2, K3)
- 4.4: Care during Moulting, Mounting. (K1, K2, K3)
- 4.5: Harvesting of cocoons. (K1, K2, K3)
- 4.6: Storing. (K1, K2, K3)

**Unit 5:**

**(6 Hours)**

- 5.1: Silkworm Diseases and Control- Pebrine. (K1, K2, K3, K4)
- 5.2: Flacherie. (K1, K2, K3, K4)
- 5.3: Muscardine, Grasserie. (K1, K2, K3, K4).
- 5.4: Natural Enemies. (K1, K2, K3)
- 5.5: Cocoon Marketing. (K1, K2, K3)
- 5.6: Loans to start sericulture. (K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

1. Sukla G.S. and Upadhyay V.B. – Economic Zoology – ISBN Rastogi Publications, Meerut, India, 1992.
2. Ganga G. and Sulochana Chetty J. An Introduction to Sericulture Oxford Publication, New Delhi, India, 1997.

**Reference Books:**

3. Ganga G. Comprehensive Sericulture Vol. II: Silkworm Rearing and Silk Reeling – ISBN Oxford Publication, New Delhi, India, 2003.
4. Ganga G. Comprehensive sericulture Vol. I: Moriculture – Oxford Publication, New Delhi, India, 2003.

**E-resources:**

- <http://csb.gov.in>
- <http://www.csrtimys.res.in>
- <https://tnsericulture.gov.in>

**SKILL BASED ELECTIVE  
USZOD420-POULTRY KEEPING**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	USZOD420	Poultry Keeping	Theory	Skill based Elective	2	2	100

**Objectives:**

- To learn the types of breeds and housing methods for successful poultry keeping.
- To guide and motivate self-employment.

**Course Outcomes:**

On completion of the course the student will be able to...

**CO1:** Acquire Knowledge on different types of breeds of Fowls

**CO2:** Describe the essentials and maintenance of a good house

**CO3:** Compare the different types of rearing methods

**CO4:** Discuss the feeding requirements and its management

**CO5:** Explain the nutritive value and products of poultry. Identify Poultry diseases and vaccination Schedule.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**Unit 1:**

**(6 Hours)**

1.1: Introduction to Poultry Keeping- Importance. (K1, K2, K3)

1.2: Breeds of fowls- Desi Breeds. (K1, K2, K3)

1.3: Exotic Breeds- American Class. (K1, K2, K3)

1.4: Asiatic Class. (K1, K2, K3)

1.5: English Class. (K1, K2, K3)

1.6: Mediterranean Class. (K1, K2, K3)

**Unit 2:**

**(6 Hours)**

2.1: Essentials of a good house. (K1, K2, K3)

2.2: Maintenance-Summer and Winter. (K1, K2, K3)

- 2.3: Management of Free –Range System, Semi-Intensive System. (K1, K2, K3, K4)
- 2.4: Intensive System- Deep Litter System. (K1, K2, K3, K4)
- 2.5: Battery System, Folding Unit System. (K1, K2, K3, K4)
- 2.6: Equipments- Types of Feeder and Water troughs. (K1, K2, K3)

**Unit 3:**

**(6 Hours)**

- 3.1: Reproduction in Fowl- Male and Female Reproductive system. (K1, K2, K3)
- 3.2: How is egg formed? Types of Abnormal Eggs, Grading of Egg. (K1, K2, K3)
- 3.3: Breeding in Fowls- Cross Breeding- Selection of Best Layer. (K1, K2, K3)
- 3.4: Selection of Eggs, Fertility and quality of eggs. (K1, K2, K3)
- 3.5: Hatchery Equipment- Incubator, Egg tray, Tray Cart and Racks, Egg Candler, Chick boxes. (K1, K2, K3)
- 3.6: Natural and Artificial methods of Incubation and Hatching. (K1, K2, K3)

**Unit 4:**

**(6 Hours)**

- 4.1: Poultry Feeding –Food Ration. (K1, K2, K3)
- 4.2: Poultry feed ingredient – Energy rich feed stuffs, Protein-rich feed stuffs, Mineral and Vitamin Sources, Feed additives. (K1, K2, K3)
- 4.3: Nutrient requirement of Poultry, Feed formulation for different age groups.(K1, K2, K3, K4)
- 4.4: Feeding systems of Poultry, Feeding Management. (K1, K2, K3, K4)
- 4.5: Nutritive value of Egg, Preservation of Egg, Products of Egg- Albumen flakes, Frozen Yolk, Egg Powder. (K1, K2, K3, K4)
- 4.6: By products of Poultry, Processing of Meat. (K1, K2, K3)

**Unit 5: (6 hrs)**

- 5.1: Care and Management of Poultry- Layer, Grower, Broiler, Pullet. (K1, K2, K3)
- 5.2: Symptoms, Transmission, Treatment and Control of Ranikhet, Fowl Pox, Coryza, Coccidiosis, Polyneuritis. (K1, K2, K3, K4)
- 5.3: Egg Drop Syndrome, Avian Influenza, Fowl Cholera. (K1, K2, K3)
- 5.4: Chronic Respiratory Disease. (K1, K2, K3)
- 5.5: Endoparasitic and Ectoparasitic diseases. (K1, K2, K3)
- 5.5: Vaccination Schedule. (K1, K2, K3)

**Book for study and Reference:**

**Textbooks:**

- 1) Jayasurya, Arumugam N. – Economic Zoology- Saras Publication, Nagercoil, 2013.
- 2) Nilotpal Ghosh- Poultry Science and Practice- A Textbook- CBS Publishers and Distributors Pvt. Ltd. 2015.

**Reference Book:**

- 3) Gnanamani M.R. – Modern Aspects of Commercial Poultry Keeping – Ezhil offset printers, Madurai- 2010
- 4) Tomar B.S. and Neera Singh- Economic Zoology- Emkay publications, Delhi- 2004.
- 5) Shukla G.S. and Upadhyay V.B. –Economic Zoology- Rastogi Publications, Meerut- 1997.

**E-Resources:**

- <https://thepoultrysite.com>
- <https://www.poultryworld.net>
- <http://www.agritech.tnau.ac.in>

**SEMESTER V**  
**SKILL-BASED ELECTIVE**  
**USZOE520 -ORNAMENTAL FISH KEEPING**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	V	USZOE520	Ornamental Fish Keeping	Theory	Core Elective	2	2	100

**Objectives:**

- To learn about the rearing techniques in fish keeping
- To motivate for self-employment

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Discuss the importance, design and maintenance of an aquarium.

**CO2:** Explain the aquarium plants and usage of various accessories required for an aquarium.

**CO3:** Discuss the feed requirement, formulation and various live bearing fishes.

**CO4:** Differentiate the Egg laying fishes, marine fishes and other organisms in an aquarium.

**CO5:** Attain understanding on loan availability and export potential.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	H	M	H	M	M
CO3	H	M	H	H	H	H
CO4	H	H	H	H	H	M
CO5	M	H	M	M	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**Unit 1:**

**(6 Hours)**

1.1: Construction of home aquarium: Materials used- wooden and metal frames. (K1, K2, K3)

1.2: Frameless tanks- Sealants and gums. (K1, K2, K3)

1.3: Design and construction of aquarium tank. (K1, K2, K3)

1.4: Accessories used in aquarium tanks- aerators, filters. (K1, K2, K3)

1.5: Heaters, thermostat, hand nets. (K1, K2, K3)

1.6: Gravel/pebble - objects. (K1, K2, K3)

**Unit 2:**

**(6 Hours)**

2.1: Aquarium plants. (K1, K2, K3)

2.2: Nutritional requirements. (K1, K2, K3)

2.3: Kinds of feed - live feeds - artificial feed. (K1, K2, K3)

- 2.4: Feed formulation - balanced diet. (K1, K2, K3, K4)  
2.5: Culture of live food organisms - Chironomous, mosquito larva, tubifex. (K1, K2, K3)  
2.6: Problems of over feeding. (K1, K2, K3)

**Unit 3:** (6 Hours)

- 3.1: Popular ornamental fish - live bearers - Red sword tail. (K1, K2, K3)  
3.2: Guppy, Molly. (K1, K2, K3)  
3.3: Egg layers - Gold fish, Siamese fighting fish, Gowrami. (K1, K2, K3)  
3.4: Angel fish, Oscar. (K1, K2, K3)  
3.5: Neon tetra, Discus. (K1, K2, K3)  
3.6: Fish handling. (K1, K2, K3)

**Unit 4:** (6 Hours)

- 4.1: Aquarium maintenance - water quality-pH. (K1, K2, K3, K4)  
4.2: O<sub>2</sub>, CO<sub>2</sub>, hardness. (K1, K2, K3)  
4.3: Ammonia, Nitrite and Nitrate. (K1, K2, K3)  
4.4: Common diseases - diagnosis – treatment. (K1, K2, K3)  
4.5: Common marine fish - Anemone fish, Butterfly fish. (K1, K2, K3)  
4.6: Other marine organism. (K1, K2, K3)

**Unit 5:** (6 Hours)

- 5.1: Budget for commercial scale. (K1, K2, K3)  
5.2: Loan availability. (K1, K2, K3)  
5.3: Credit policies. (K(K1, K2, K3)1, K2, K3)  
5.4: Export potentials. (K1, K2, K3)  
5.5: Value addition in ornamental fish culture. (K1, K2, K3)  
5.6: Transportation. (K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

1. K.V. Jayashree, C.B. Thara Devi, N. Arumugam, Home Aquarium and Ornamental Fish Culture, Saras Publication, 2015.
2. Dick Mills- Tropical aquarium fishes, Salamander Books Ltd, London, 1982.
3. J.D. Jameson and R. Santhanam- Manual of ornamental fishes and farming technologies- Fisheries College and Research Institute TANVASU, Tuticorin, 1996.

**Reference Books:**

4. R. Santhanakumar *et al.*, - Manual of fresh water ornamental fish culture, Dept. of Fisheries extension, Fisheries College and research institute TANVASU, Tuticorin, 2004.
5. V.K. Venkataraman *et al.*, - Biodiversity and stock assessment of marine ornamental fishes. Dept. of Fisheries biology and capture fisheries, Fisheries College and Research Institute TANVASU, Tuticorin, 2004.

**E-Resources:**

<http://www.cifa.nic.in>  
<http://agritech.tnau.ac.in>  
<http://aquaculturetraining.com.au>  
<http://www.oftri.org>

**SEMESTER VI**  
**SKILLBASED ELECTIVE**  
**USZOF620 - ANIMAL BEHAVIOUR**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	VI	USZOF620	Animal Behaviour	Theory	Core Elective	2	2	100

**Objective:**

- To learn the basics in behaviour of animal
- To help in designing the research work based on the behaviour of animals

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Familiarize with various techniques to study the animal behaviour in lab and in Wild.

**CO2:** Analyze the various modes of communication, locomotion foraging and Caching.

**CO3:** Comprehend the process of learning, memory, hormonal and neural systems.

**CO4:** Compute the social organization and to differentiate behaviour.

**CO5:** Study the adverse effects and cure for abnormal behaviour among the Wild domestic and pet animals.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	M	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	H	M
CO2	H	H	M	H	H	M
CO3	H	H	M	H	H	M
CO4	H	H	M	H	H	M
CO5	H	H	M	H	H	M

**Unit 1:**

**(6 Hours)**

1.1: Introduction to Behavior. (K1, K2, K3)

1.2: Branches of Ethology. (K1, K2, K3)

1.3: Types of studying behavior- In Lab and In Wild- Ad libitum. (K1, K2, K3, K4)

1.4: Focal animal, Scan. (K1, K2, K3)

1.5: All occurrence, Sequence one Zero. (K1, K2, K3)

1.6: Constructing Ethogram, interpreting and presenting data. (K1, K2, K3, K4)

**Unit II:**

**(6 Hours)**

2.1: Rhythm. (K1, K2, K3)

2.2: Sleep. (K1, K2, K3)

2.3: Methods and models of Communication. (K1, K2, K3)

2.4: Locomotion. (K1, K2, K3)

2.5: Foraging and Catching. (K1, K2, K3)

2.6: Nest construction. (K1, K2, K3)

**Unit III:**

**(6 Hours)**

3.1: Homing, Migration. (K1, K2, K3)

3.2: Territorialism, Courtships. (K1, K2, K3)

3.3: Parental care. (K1, K2, K3)

3.4: Play. (K1, K2, K3)

3.5: Learning. (K1, K2, K3)

3.6: Memory. (K1, K2, K3)

**Unit IV:**

**(6 Hours)**

4.1: Innate behavior – Neural and Hormonal control of behavior. (K1, K2, K3)

4.2: Social behavior – aggregation. Schooling in fish. (K1, K2, K3)

4.3: Flocking in birds. (K1, K2, K3)

4.4: Herding in mammals. (K1, K2, K3)

4.5: Social organization in insects. (K1, K2, K3)

4.6: Advantages of being social. (K1, K2, K3)

**Unit V:**

**(6 Hours)**

5.1: Abnormal behavior. (K1, K2, K3)

5.2: Wild animals under natural conditions and in Zoo. (K1, K2, K3)

5.3: Domestic livestock. (K1, K2, K3)

5.4: Pets- causes of abnormal behavior. (K1, K2, K3)

5.5: Prevention of abnormal behaviour. (K1, K2, K3)

5.6: Curing of Abnormal behavior. (K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

1. V.K. Agarwal – Animal Behaviour – S. Chand Publications, New Delhi, 2018.
2. Reena Mathur - Animal Behaviour-Rastogi and Co., 1996.
3. M.M Ranga - Animal Behaviour- Saraswati Purohit for student's edition, 2007.

**Reference Books:**

4. Amita Sarkar - Social behaviour in animal- Discovery Publishing house, 2004.
5. Niko Tinbergen - Animal Behaviour-LIFE young readers' library, 1968.
6. Aubrey Manning, Marian Stamp Dawkins - An Introduction to Animal Behaviour 5<sup>th</sup> ed- Cambridge University press, 2008.
7. Michael J. Ryan, Walter Wilczynski - An introduction to Animal Behaviour- An integrative approach- Cold Spring Harbour Laboratory Press, 2011.

**E-Resources:**

<https://www.animalbehaviorsociety.org>

<https://www.asab.org>

<http://www.behavecol.com/>

**NON MAJOR ELECTIVE**  
**UGZOA520/UGZOA620-MATERNAL AND CHILD PSYCHOLOGY**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
III	V	UGZOA520/ UGZOA620	Maternal and child psychology	Theory	Core Elective	3	2	100

**Objectives:**

- To understand the complexity of Mother and Child psychology.
- To help the students understand the Biological and Psychological changes in child.
- To overcome the difficulty of motherhood.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Comprehend the puberty, natal periods and maternal changes.

**CO2:** Explain the growth, developmental stages and motor skills

**CO3:** Gains insights on the stages of cognitive development and personality.

**CO4:** Familiarize different emotions, emotional development and moral development.

**CO5:** Identify, classify and differentiate the gifted, mentally retarded and backward children.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	H	M	M
CO2	H	M	M	H	M	H
CO3	H	M	M	M	M	M
CO4	H	M	M	H	H	H
CO5	H	M	M	L	M	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	H	M
CO2	H	H	H	L	H	M
CO3	H	H	H	L	H	M
CO4	H	H	H	L	H	M
CO5	H	H	H	L	H	M

**Unit 1: BIOLOGY OF REPRODUCTION**

**(9 Hours)**

1.1: Hormonal changes of Puberty. (K1, K2, K3)

1.2: Mechanism of Genetic Transmission. (K1, K2, K3)

1.3: Prenatal period- Hazards during the prenatal period. (K1, K2, K3)

1.4: Physical – psychological- maternal stress. (K1, K2, K3)

1.5: Pregnancy – Maternal body changes. (K1, K2, K3)

1.6: Premenstrual syndrome and peri menopausal behaviour. (K1, K2, K3, K4)

**Unit 2: GROWTH AND DEVELOPMENT**

**(9 Hours)**

2.1: Growth and Development- Stages. (K1, K2, K3, K4)

2.2: Influence of Heredity. (K1, K2, K3)

2.3: Influence of Environment. (K1, K2, K3)

2.4: Physical growth during Infancy. (K1, K2, K3)

- 2.5: Physical growth during Early Childhood. (K1, K2, K3)  
2.6: Motor Development- Gross and Fine Motor skills. (K1, K2, K3)

**Unit 3: COGNITIVE DEVELOPMENT**

**(9 Hours)**

- 3.1: Cognitive development-Sensorimotor stage. (K1, K2, K3)  
3.2: Preoperational-concrete operational, formal operation. (K1, K2, K3)  
3.3: Personality theories- Carl Roger's Self theory. (K1, K2, K3, K4)  
3.4: Dollard and Miller's Learning theory. (K1, K2, K3)  
3.5: Bandura and Walter's Social Learning theory. (K1, K2, K3)  
3.6: Self – Understanding and Identity. (K1, K2, K3)

**Unit 4: SOCIO-EMOTIONAL DEVELOPMENT**

**(9 Hours)**

- 4.1: Emotions in Babyhood- Early Childhood- Late Childhood. (K1, K2, K3)  
4.2: Emotional problems of Childhood. (K1, K2, K3)  
4.3: Psychosocial Development. (K1, K2, K3)  
4.4: Moral Development- Pre Conventional level. (K1, K2, K3)  
4.5: Conventional. (K1, K2, K3)  
4.6: Post Conventional level. (K1, K2, K3)

**Unit 5: EXCEPTIONAL CHILDREN**

**(9 Hours)**

- 5.1: Gifted Children- Needs and Problems of Gifted Children. (K1, K2, K3, K4)  
5.2: Identification of Gifted children. Education of the Gifted Children. (K1, K2, K3, K4)  
5.3: Mentally retarded – Identifying. (K1, K2, K3)  
5.4: Classifying the Mentally retarded. (K1, K2, K3)  
5.5: Causes- Clinical types of Mentally retarded- Prevention. (K1, K2, K3)  
5.6: Backward children- Kinds-causes- Education. (K1, K2, K3)

**Books for Study and Reference:**

**Textbooks:**

1. Elizabeth B. Hurlock– Developmental Psychology – A Life Span approach 5<sup>th</sup> Ed.- Tata McGraw-Hill Education, 2001.
2. Laura E. Berk – Child Development- New Delhi, Pearson Prentice Hall, 2003.

**Reference Books:**

3. Ernest R. Hilgard, Richard C. Atkinson - Introduction to Psychology 6<sup>th</sup> Ed, 1975.
4. George Butterworth, Margaret Harris– Developmental psychology: A student's Handbook- Tata McGraw Hill Education Private Ltd., 2002.
5. Mangal S.K. – Advanced Educational Psychology 2<sup>nd</sup> Ed. – Phi Learning, 2010.
6. Thomas L. Crandell, Corinne Haines – Human Development 9<sup>th</sup> Ed.- Tata McGraw-Hill Education, 2012.
7. Rohall David E., Mikie Melissa A., Lucas Jeffrey W. - Social Psychology: Sociological Perspectives 2<sup>nd</sup> Ed. – Prentice Hall, 2011.

**E-Resources:**

<https://www.who.int>  
<https://www.mcsprogram.org>  
<http://www.nrhmtn.gov.in>  
<https://www.ifrc.org>

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# **Department of Commerce (UG)**

**(Banking & Insurance)**

## **SYLLABUS AND REGULATIONS**

**Under**

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)*

**Gandhi Nagar, Vellore-632 006.**

**Department of Commerce  
(Banking & Insurance)**

**OUTCOME BASED EDUCATION - 2020  
(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighboring districts.

**B) NAME OF THE PROGRAMME: B.com (Banking & Insurance)**

**VISION**

The Department of B. Com (Banking & Insurance) strives to provide an intellectual environment that fosters the search for new knowledge in highly Competitive Banking and Insurance sectors through its integrated quality education.

**ELIGIBILITY CRITERIA OF THE PROGRAMME**

A candidate who have passed the Higher Secondary Examinations (Academic [10 + 2] Stream) with Commerce, Accountancy, Economics, Computer Science/Statistics/Business Mathematics as subjects, conducted by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the Syndicate of the Thiruvalluvar University shall be eligible for admission to B.com (Banking & Insurance) Degree Course.

Sem	Part	Subject Code	Title of Subject	Hours/Week	Exam Hours	Credits	Marks
I	I	ULTAA20	Tamil Paper – I	6	3	3	40+60
	II	UENGA20	English Paper – I	6	3	3	40+60
	III	UCBIA20	Fundamentals of Banking	5	3	4	40+60
	III	UCBIB20	Principles of Accounting	5	3	4	40+60
	III	UABMA20	Allied I: Business Mathematics and Statistics	5	3	5	40+60
	IV		Skill Based Elective I:	2	2	2	
	IV	UVEDA20	Value Education	1	-	-	-
	<b>TOTAL</b>			<b>30</b>		<b>21</b>	
II	I	ULTAB20	Tamil Paper II	6	3	3	40+60
	II	UENGB20	English Paper II	6	3	3	40+60
	III	UCBIC20	Principles of Insurance	5	3	4	40+60
	III	UCBID20	Financial Accounting	5	3	4	40+60
	III	UASOR20	Allied II: Statistics & Operations Research	5	3	5	40+60
	IV		Skill Based Elective II	2	2	2	
	IV	UVEDA20	Value Education	1	2	-	
	<b>TOTAL</b>			<b>30</b>		<b>21</b>	

Sem	Part	Subject Code	Title of Subject	Hours /Week	Exam Hours	Credits	Marks
III	III	UCBIE20	Banking Legalities and Regulations.	6	3	4	40+60
	III	UCBIF20	Cost Accounting	6	3	4	40+60
	III	UCBIG20	Principles of Management	5	3	4	40+60
	III	UEBIA20	Elective I A: Marketing in Banking and Insurance	5	3	5	40+60
	III	UEBIB20	Elective I B: Entrepreneurship Management				
	III	UAMEA20	Allied III: Managerial Economics	5	3	5	40+60
	IV	USBIC20	Skill Based Elective III: Banking and Insurance Practical	2	2	2	
	Human Resource Management		2	2	2		
	IV	UVEDA20	Value Education	1	2	-	
	<b>TOTAL</b>			<b>30</b>		<b>24</b>	

Se m	Part	Subject Code	Title of Subject	Hours/ Week	Exam Hours	Credits	Marks
IV	III	UCBIH20	Regulatory Framework of Business and Insurance	5	3	4	40+60
	III	UCBII20	Accounting for Management	5	3	4	40+60
	III	UCBIJ20	Research Methodology	5	3	4	40+60
	III	UCBIK20	Taxation \: Law and Practice	5	3	5	40+60
	III	UAIBA20	Allied IV: International Business	5	3	5	40+60
	IV	UNEVS20	Environmental Studies	2	2	2	40+60
	IV	USBID20	Skill Based Elective IV: Banking and Insurance Practical Human Resource Management.	2	2	-	
	IV	UVEDA20	Value Education	1	2	-	
	<b>TOTAL</b>				<b>30</b>		<b>24</b>

Sem	Part	Subject Code	Title of Subject	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
V	III	UCBIL20	Accounting for Banking and Insurance	6	3	-	4	40+60
	III	UCBIM20	Corporate Laws	6	3	-	4	40+60
	III	UCBIN20	Practical Auditing	6	3	-	5	40+60
	III	UCBIO20	Project	6	-	3	5	40+60
	IV	UGBIA20	Non-Major Elective – I: Banking System in India	3	3	-	2	40+60
	IV	USBIE520 USBIF520	Skill Based Elective -V: Practical Aspects of Income Tax and E-Filing/ Banking and Business Correspondence	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	2	-	-	
	<b>TOTAL</b>			<b>30</b>			<b>22</b>	

VI	III	UCBIP20	Analytical Skills for Banking and Insurance Examination	6	3	-	4	40+60
	III	UCBIQ20	Financial Management	6	3	-	4	40+60
	III	UCBIR20	E-Commerce, E-Banking and Tally	4	3	-	3	40+60
	III	UCBIS20	Tally Practical	2	-	3	2	40+60
	III	UEBIE20	Elective – II A: Financial Services Management	6	3	-	5	40+60
	III	UEBIF20	Elective – II B: Marketing					
	IV	UGBIA20	Non-Major Elective – I: Banking System in India	3	3	-	2	40+60
	IV	USBIE620 USBIF620	Skill Based Elective -VI: Practical Aspects of Income Tax and E-Filing/ Banking and Business Correspondence	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	2	-	-	
	<b>TOTAL</b>				<b>30</b>			<b>22</b>
V	-	Extension Activities		-	-	1	-	
<b>Grand Total</b>							<b>140</b>	<b>3900</b>

## **PROGRAM OUTCOME (PO)**

### **Undergraduate Programme (UG)**

On completion of the UG Programme, students will be able to:

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:** Emulate positive social values and exercise leadership qualities and team work.

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

### **PROGRAM SPECIFIC OUTCOMES (PSO)**

**PSO1:** To understand and apply the knowledge of Accounting & finance in the domain of Commerce, Banking and Insurance.

**PSO2:** Identify, analyse and synthesize problems related to the field of Banking and Insurance.

**PSO3:** To encourage teamwork and skills for effective Collaboration towards the changing needs of the environment.

**PSO4:** Engaging in Lifelong Learning, apply ethical principles and excel as a socially committed individual having empathy for the needs of the society.

**PSO5:** Enhance Eco-consciousness for sustainable development of the society through application of green Banking and Insurance services.

**PSO6:** Acquire competence to efficiently handle technology and communicate in the field of Banking and Insurance Sector through internship and project.

**MAPPING OF PROGRAMME SPECIFIC OUTCOME WITH PROGRAMME  
OUTCOME**

PSO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	H	H	H	H	M	M
PSO2	H	H	M	L	H	H
PSO3	H	M	H	L	M	H
PSO4	H	M	H	M	L	M
PSO5	H	M	H	H	H	H
PSO6	H	H	M	M	H	H

**(H- HIGH M- MODERATE L- LOW)**

## **PATTERN OF QUESTION PAPER**

### **CONTINUOUS ASSESSMENT EXAMINATIONS: (50 Marks)**

**Time : 2 Hours**

**Section A – 7 x 2 = 14 marks**

Answer **all** questions

7 questions

**Section B – 3 x 7 = 21 marks**

Answer **any three** questions

3 out of 5 questions

**Section C– 1 x 15 = 15 marks**

Answer **any one** question

2 Questions (1 question from each unit)

**SBE :**

**Section A – 10 x 1 = 10 marks**

Answer **all** questions

**Section B - 2 x 5 = 10 marks**

Either or questions – Answer all

**Section C – 1 x 10 = 10 marks**

Answer **any one** question

2 Questions (1 question from each unit)

### **SEMESTER EXAMINATION (100 MARKS)**

**Time: 3 Hours**

**Section A – 10 x 2 = 20 marks**

Answer **all** questions

10 questions (2 questions from each unit)

**Section B – 5 x 7 = 35 marks**

Answer **all** questions

5 questions with internal choice (1 question from each unit)

**Section C – 3 x 15 = 45 marks**

Answer **any three** questions

5 questions (1 question from each unit)

**SBE**

**Section A – 10 x 2 = 20 marks**

Answer **all** questions

10 questions (2 questions from each unit)

**Section B – 4 x 5 = 20 marks**

Answer **4 out of 6** questions

**Section C – 2 x 10 = 20 marks**

Answer **any two out of three** question

## SEMESTER – I

### UCBIA20 - FUNDAMENTALS OF BANKING

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
SEM: I	UCBIA20	Fundamentals of Banking	Theory	Core	5	4	40+60

#### Course Objectives

- a. To Provide in-depth knowledge about the evolution of banks, banking structure in India and its function.
- b. To develop the capability to operate bank accounts.
- c. To make them aware of various negotiable instruments.
- d. To enable to understand duties and responsibilities of paying banker
- e. To impart knowledge about the role of Collecting Banker and Banking ombudsman

#### Course Outcomes (CO)

The Learners will be able to

- ☐ Identifies various types of Banks.
- ☐ Able to access Bank account
- ☐ Able to utilize variety of negotiable instruments
- ☐ Able to analyze the role of paying Banker
- ☐ Able to identify customer rights and Sort-out issues through Banking ombudsman

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	H
CO3	H	H	M	M	M	H
CO4	H	M	M	M	M	H
CO5	H	H	M	M	M	H

**(High – H Medium – M Low- L)**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	M	H	M	M	H
CO3	H	M	H	M	M	H
CO4	H	M	M	H	M	M
CO5	H	H	M	H	M	H

### **Unit I: An Introduction to Banking (15 hours)**

- 1.1 Introduction - Definition of Banking (K1, K2)
- 1.2 Banking Structure in India (K1, K2,)
- 1.3 Small Finance Bank and payment Banking (K1, K2,)
- 1.4 Commercial Banking - Functions (K1, K2)
- 1.5 Role of Banks in Economic Development (K1, K2,)
- 1.6 COVID-19 and its impact on Banking Sector (K1, K2, )

### **Unit II: Opening of Accounts (15 hours)**

- 2.1 Bank Accounts – Types – Steps in Opening Accounts – Savings and Current Accounts (K1, K2, K3)
- 2.2 Pay-in-slip Book – Passbook. Bank Customer- Definition - Relationship – Types (K1, K2)
- 2.3 KYC Norms – Banking Lending – Significance (K1, K2, K3)
- 2.4 Lending Sources – Principles – Forms of Lending (K1, K2, K3)
- 2.5 Loan Evaluation Process – Securities of Lending (K1, K2, K3, K4)
- 2.6 Factors Influencing Bank Lending (K1, K2)

### **Unit III: Negotiable Instruments (15 hours)**

- 3.1 Meaning – Characteristics – Nature – Features and Similarities- Types – Crossing (K1, K2, K3)
- 3.2 Definition – Objective – Crossing and Negotiability – Need for crossing – Types (K1, K2, K3)
- 3.3 Persons Eligible to do crossing – Consequences (K1, K2)
- 3.4 Endorsement – Meaning – Definition (K1, K2, K3)
- 3.5 Components of Endorsements – Types – Effects (K1, K2, K3, K4)
- 3.6 Duration – Rules regarding Endorsement (K1, K2, K3, K4)

### **Unit IV: Paying Banker (15 hours)**

- 4.1 Meaning – Bankers duty (K1, K2)
- 4.2 Dishonoring Customers Cheque (K1, K2)
- 4.3 Discharge of Paying Banker (K1, K2, K3)
- 4.4 Payment of Cheque by Mistake – Material Alteration (K1, K2, K3)
- 4.5 Liability of Paying Banker (K1, K2, K3, K4)
- 4.6 Statutory Protection - Refusal of Payment (K1, K2, K3, K4)

## **Unit V: Collecting Banker, Customer Grievances, Redressal and Ombudsman (15 hours)**

5.1 Meaning of Collecting Banker – Role (K1, K2)

5.2 Statutory Protection – Duty -RBI's Instruction (K1, K2)

5.3 Collection of Bills of Exchange – Paying Banker Vs Collecting Banker (K1, K2, K3)

5.4 Customer Grievances – Grievances Redressal (K1, K2, K3)

5.5 Banking Ombudsman (K1, K2, K3, K4)

5.6 Procedure for Redressal OF Grievance (K1, K2, K3, K4)

### **BOOKS**

#### **Textbook:**

**Banking Theory Law and Practice – E. Gordon & K. Natarajan.**

**Himalaya publishing house**

**New Delhi. Reprint – 2016**

#### **Books for Reference:**

1. Kandasamy K.P., Natarajan S. And Parameswaran R. – Banking – S. Chand and Co. Ltd., New Delhi (Latest Ed)
2. P.N. Varshney - Banking Law and Practice – Sultan Chand & Sons New Delhi - 24 th Edition.
3. Natarajan S. And Parameswaran R. – Indian Banking – S. Chand and Co. Ltd., New Delhi (Latest Ed)
4. Vasudevan S.V.- Theory of Banking – S. Chand and Co. Ltd. New Delhi (Latest Ed.)
5. Sundaram and Varshney – Banking Law and Practice – S. Chand and Co. Ltd., New Delhi (Latest Ed.)

### **WEB RESOURCE**

1. [rbi.org.in](http://rbi.org.in)
2. [www.bankingfinace.in](http://www.bankingfinace.in)
3. [www.indianmoney.Com](http://www.indianmoney.Com)
4. Shankar banking academy
5. Anil Agarwal –YouTube channel

**SEMESTER – I**  
**UCBIB20 - PRINCIPLES OF ACCOUNTING**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of The Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>
<b>SEM: I</b>	UCBIB20	Principles of Accounting.	Theory	Core	<b>5</b>	4

**Course Objectives**

- a. To give insight into the basic accounting principles and Concept
- b. To prepare ledger accounts and trial balance.
- c. To prepare final accounts
- d. To enable students to prepare various subsidiary books.
- e. To prepare Bank Reconciliation statement

**Course Outcomes (CO)**

The Learners will be able to

- ☐ Acquire conceptual knowledge on basics of accounting
- ☐ Identity events that need to be recorded in the accounting statements.
- ☐ Prepares final accounts
- ☐ Identify and prepare various subsidiary books
- ☐ Able to prepare Bank Reconciliation statement.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

(HIGH M-MEDIUM L-LOW)

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	M	M
CO2	H	H	M	H	M	H
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

## **COURSE SYLLABUS:**

**Unit – I:** (15 hours)

### **Introduction to accounting**

- 1.1 Principles of Double Entry System (K1,K2)
- 1.3 Types of Accounts (K1,K2)
- 1.4 Persons interested in accounting (K1,K2)
- 1.5 Accounting concepts and conventions (K1,K2)
- 1.6 Accounting Equation (K1,K2,K3)

**Unit – II** ( 15 hours)

- 2.1 Journal Entries ((K1,K2)
- 2.2 Journal for Adjusting Entries (K1,K2,K3)
- 2.3 Ledgers (K1,K2,K3)
- 2.4 Ledger for Subsidiary Books (K1,K2,K3)
- 2.5 Trial Balance (K1,K2,K3)
- 2.6 Trial Balance (Corrected Method) (K1,K2,K3,K4)

**Unit – III** (15 hours)

- 3.1 Final Accounts (K1,K2,K3,K4)
- 3.2 Provision for Bad and Doubtful Debts (K1,K2,K3)
- 3.3 Trading Account (K1,K2,K3,K4)
- 3.5 Profit and loss Account (K1,K2,K3,K4)
- 3.4 Adjusting Entries (K1,K2,K3,K4)
- 3.6 Balance Sheet with adjustments (K1,K2,K3,K4)

**Unit – IV** (15 hours)

- 4.1 Subsidiary Books (K1, K2)
- 4.2 Purchase, Sales – Returns (K1, K2)
- 4.3 Cash Book – Single Column (K1, K2)
- 4.4 Double Column Cash Book (K1, K2, K3)
- 4.5 Triple Column Cash Book(K1, K2,K3,K4)
- 4.6 Petty Cash(K1, K2,K3,K4)

**Unit – V** (15 hours)

- 5.1 Rectification of Errors (with Suspense Account) (K1, K2, K3,K4)
- 5.2 Error of Commission (K1, K2, K3, K4)
- 5.3 Error of Omission (K1,K2,K3,K4)
- 5.4 Purchase, Sales and Returns (K1,K2,K3,K4)
- 5.5 Bank Reconciliation Statement. (As per Cash book or Overdraft as per passbook) (K1,K2,K3,K4)
- 5.6 Bank Reconciliation Statement. (As per Passbook or Overdraft as per Cash book) (K1,K2,K3,K4)

## **BOOK**

### **Textbook:**

Reddy T.S.and Murthy A. -Financial Accounting -Margham Publications, Chennai, Reprint 2014.

### **Reference Books**

1. Jain S. P. and Narang K.L. - Advanced Accounting -Kalyani Publishers, New Delhi, Revised 2013.
2. Nagarajan K.L. and Vinayagam N. and Mani P.L. - Principles of Accountancy - Eurasia Publishing House, New Delhi, Revised 2014
3. Grewal T.S. - Double Entry Book – S. Chand and Co. Ltd, New Delhi, Reprint 2010.
4. Tulsian P.C. - Financial Accounting - Tata McGraw Hill, New Delhi, Edition 2009.

### **WEB RESOURCE:**

1. MIT open Courseware for accounting
2. Accounting student network
3. Accounting.Com
4. [www.icaai.org](http://www.icaai.org)
5. Devika's Commerce and management academy – YouTube channel

## SEMESTER – II

### UCBIC20 - PRINCIPLES OF INSURANCE

<b>Year: I</b> <b>SEM: II</b>	<b>Course Code:</b> UCBIC20	<b>Title of The Course:</b> Principles of Insurance	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> <b>40+60</b>
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#### Course Objectives:

- To provide basic knowledge about various types of insurance
- To impart thorough knowledge about life insurance Policies
- To give knowledge about various types of fire insurance Policy
- To make the students aware of various marine insurance Policies and their claim settlement process.
- To give them overview about various miscellaneous insurance.

#### Course Outcomes (CO):

The Learners will be able to

- ☐ Understands basic Concepts and principles of insurance
- ☐ Able to differentiate Life and Non-Life insurance policies
- ☐ Able to follow the procedures to apply for fire insurance Policy and settlement of claim
- ☐ Able to claim settlement from marine insurance Policy
- ☐ Able to choose various insurance Policies based on their needs

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	M	M	M	H
CO4	H	H	H	M	H	H
CO5	H	M	H	M	H	M

(H- HIGH M-MEDIUM L-LOW)

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	M	M	H	M	H	H
CO2	H	H	M	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	M	M	H	H

## **COURSE SYLLABUS:**

### **Unit I: Principles and Importance of Insurance (15 hours)**

- 1.1 Insurance – Meaning – Definition – Nature – Functions – Types of Insurance: Life Insurance – General Insurance (K1, K2)
- 1.2 Fire Insurance – Marine Insurance – Miscellaneous Insurance Interest – Specific Principles – Essentials of Insurable Interest – Existence of Insurable Interest (K1, K2)
- 1.3 Material Fact – Material Fact - Meaning – Examples of Material Facts Requiring Disclosure – Material Fact not to be Disclosed (K1, K2, K3)
- 1.4 Breach of Utmost Good Faith – Types of Indemnity provided under different policies (K1, K2)
- 1.5 How does Subrogation arise – Essentials of Doctrine of Subrogation (K1, K2)
- 1.6 Importance/ Advantages of Insurance - Importance to an Individual to Business – Important to Society –Terms used in Insurance (K1, K2, K3)

### **Unit II: Life Insurance (15 hours)**

- 2.1 Life Insurance – Meaning – Definition Characteristics - Economic Uses – Advantages of Life Insurance Vs Non - Life Insurance (K1, K2)
- 2.2 Fundamental Principles of Life Insurance – Procedure for effecting Life Insurance (K1, K2, K3)
- 2.3 Life Insurance product of policies – Whole of Life Policies – Endowment Policies – Children’s Policies (K1, K2, K3)
- 2.4 Money Back Policies – Joint Life Policies – JeevanSaathi – Plan No. 89 – Women’s Policy – Term Policies – Special Policies (K1, K2)
- 2.5 Group Insurance Policies – Group Insurance Policies (K1, K2)
- 2.6 Difference Between Group Insurance and Individual Insurance (K1, K2)

**Unit III: Fire Insurance****( 15 hours)**

- 3.1 Fire Insurance – Meaning – Definition – Functions – Features – Scope – Add-on cover - Special Coverage – Hazards in Fire Insurance (K1, K2)
- 3.2 Principles of Fire Insurance – Essential Requirements of the Doctrine of Contribution – Example – Procedure of effecting a Fire Insurance Policy (K1, K2)
- 3.3 Rights of Insurer – Kinds of Fire Policies (K1, K2)
- 3.4 Fire Policy Conditions – Example – Rate Fixation Fire Insurance – System of Rate Fixation (K1, K2)
- 3.5 Tariff Rates – The Tariff Provides (K1, K2)
- 3.6 Procedures for settlement of Claims under Fire Insurance (K1, K2, K3)

**Unit IV: Marine Insurance****(15 hours)**

- 4.1 Marine Insurance – Meaning – Definition – Subject Matter (K1, K2)
- 4.2 Types – Development of Marine Insurance – Lloyd’s Association (K1, K2)
- 4.3 Procedure Involved in Taking a Marine Policy –Differences between Marine Insurance and Fire Insurance (K1, K2, K3)
- 4.4 Essential Characteristics (or) fundamental Principles of Marine Insurance (K1, K2)
- 4.5 Kinds of Marine Insurance Policies (K1, K2)
- 4.6 Settlement of Claims in Marine Insurance (K1, K2, K3)

**Unit V: Miscellaneous Insurance****(15 hours)**

- 5.1 Miscellaneous Insurance: Motor Insurance – Fundamental principles – Types – Exceptions – Extension of Cover – Reasonable expenses and minor repairs (K1, K2)
- 5.2 Procedure for effecting motor insurance – Motor Policy Conditions – Discount on premium – Settlement of Claims – under Motor Insurance (K1, K2, K3)
- 5.3 Social Sector Insurance – Bhagyashree Child Welfare Policy – Unique features – Raja Rajeshwar iMahila Kalyan Yojana policy – Unique Features – For and disablement of insured women (K1, K2)
- 5.4 Business Insurance – Burglary Insurance – Types of policies – Cash/Money in Transit Insurance – Scope of Cover – Extended Covers available Fidelity Guarantee Insurance (K1, K2)
- 5.5 Types of Fidelity Insurance – Neon Sign Insurance – Jewelers Block Insurance – Duty Insurance – Shopkeepers Insurance – Personal Package – Baggage Insurance (K1, K2)
- 5.6 All Risk Insurance – Amartya Shiksha Yojana Insurance – Pedal Cycle Insurance – Mobile Phone Insurance – Householders’ Insurance (K1, K2)

## **Textbook**

1. Dr. Murthy A. – Principles and practice of Insurance – Margham Publications, Chennai, Reprint 2010.

## **Reference Books**

1. Periasamy P. – Fundamentals of Insurance – Vijay Nicole Imprints Pvt.Ltd. Chennai, 2013 Ed.
2. Dr. Ramavath N. – Elements of Insurance – Sri Vishnu Publications., 3rd Edition, 2009
3. JyotsnaSethi and Nishwan Bhatia – Elements of Banking and Insurance – PHI Learning Private Limited., 2nd Edition, 2012
4. Dr. Balu V. and Dr. Premila N. – Elements of Insurance – Sri Venkateswara Publications – Feb 2009
5. Mishra M.N. and Mishra S.B – Insurance Principles and Practice – S. Chand Company Private Limited – 21st Revised Edition,2014.

## **WEB RESOURCE**

1. [www.licindia.in](http://www.licindia.in)
2. [www.gicouncil.com](http://www.gicouncil.com)
3. [www.Policyx.com](http://www.Policyx.com)
4. **academy of insurance**

## SEMESTER – II

### UCBID20 - FINANCIAL ACCOUNTING

<b>Year: I SEM: II</b>	<b>Course Code:</b> UCBID20	<b>Title of The Course:</b> Financial Accounting	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 40+60
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#### Course Objectives:

- To enable the students to Compute Depreciation under various methods
- To understand the accounting procedures for both Single and Double entry system.
- To impart knowledge about recording transactions related to Bills of Exchange.
- To make them understand the accounting procedures in Hire Purchase System.
- To build up capability of students in preparation of Fire Insurance Claims.

#### Course Outcomes (CO):

The Learners will be able to

- ☐ Able to calculate depreciation for fixed assets.
- ☐ Able to Compare, Contrast, and solve single entry to double entry system.
- ☐ Able to prepare Bill of exchange account
- ☐ Identifies and differentiate hire purchase and instalment system
- ☐ Prepare Fire Insurance Claim Statements.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

## **COURSE SYLLABUS:**

### **Unit I:**

**( 15 hours)**

- 1.1 Depreciation - Meaning - Definition - Causes - Method of Charging Depreciation (K1, K2, K3)
- 1.2 Straight Line Method and Written Down Value Method (K1, K2, K3)
- 1.3 Change in Methods of Charging Depreciation (K1, K2, K3)
- 1.4 Annuity Method - Depletion – Revaluation (K1, K2, K3)
- 1.5 Machine Hour Rate (K1, K2, K3, K4)
- 1.6 Sinking Fund - Insurance Policy Method. (K1, K2, K3, K4)

### **Unit II:**

**( 15 hours)**

- 2.1 Single Entry - Meaning - Definition (K1, K2)
- 2.2 Methods - Difference between Single Entry and Double Entry System (K1, K2)
- 2.3 Statement of Affairs Method (K1, K2, K3, K4)
- 2.4 Computation of Profit or Loss (K1, K2, K3, K4)
- 2.5 Conversion Method (K1, K2, K3, K4)
- 2.6 Prepare Trading Profit and Loss Account and Balance Sheet according to Conversion Method (K1, K2, K3, K4)

### **Unit III:**

**( 15 hours)**

- 3.1 Bills of Exchange- Meaning - Definition- Features (K1, K2)
- 3.2 Parties to Bills of Exchange (K1, K2)
- 3.3 Advantages - Types of Bills (K1, K2)
- 3.4 Recording Transaction in Journal and Ledger (K1, K2, K3)
- 3.5 Retiring a Bill under Rebate (K1, K2, K3, K4)
- 3.6 Dishonour of Bill (K1, K2, K3, K4)

### **Unit IV:**

**( 15 hours)**

- 4.1 Hire Purchase & Instalment Purchase Systems (K1, K2)
- 4.2 Difference between Hire Purchase and Instalment System (K1, K2)
- 4.3 Calculation of Interest (K1, K2, K3, K4)
- 4.4 Default and Repossession (K1, K2, K3, K4)
- 4.5 Complete Repossession (K1, K2, K3, K4)
- 4.6 Partial Repossession (K1, K2, K3, K4)

### **Unit V:**

**( 15 hours)**

- 5.1 Fire Insurance Claim (K1, K2)
- 5.2 Memorandum of Trading A/c (K1, K2, K3)
- 5.3 Actual Loss of Claim (K1, K2, K3)

5.4 Unrecorded Stock (K1,K2,K3)

5.5 Loss of Stock (K1,K2,K3,K4)

5.6 Loss of Profit (K1,K2,K3, K4)

## **BOOK**

### **Textbook:**

1. Reddy T.S. and Murthy A. -Financial Accounting -Margham Publications, Chennai, Reprint 2014.

### **Reference Books**

1. Jain S. P. and Narang K.L. - Advanced Accounting -Kalyani Publishers, New Delhi, Revised 2013.
2. Nagarajan K.L. and Vinayaka N. and Mani P.L. - Principles of Accountancy - Eurasia Publishing House, New Delhi, Revised 2014.
3. Grewal T.S. - Double Entry Book – S. Chand and Co. Ltd, New Delhi, Reprint 2010.
4. Tulsian P.C. - Financial Accounting - Tata McGraw Hill, New Delhi, Edition 2009

### **WEB RESOURCE**

1. MIT open Courseware for accounting
2. Accounting student network
3. Accounting.Com
4. [www.icai.org](http://www.icai.org)
5. Devika's Commerce and management academy – YouTube channel

**SEMESTER I / II**  
**USBIA120/ USBIA220- SKILL-BASEDELECTIVE-I: BUSINESS**  
**COMMUNICATION**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>SEM: I/II</b>	USBIA120/ 220	Business communication	Theory	Skill based Elective	2	2	40+60

**Course Objective:**

- a) To Understand business communication skills
- b) To understand the layout of Business letters
- c) To draft Bank related letters
- d) To draft Insurance related letters
- e) To enable them to prepare Business reports

**Course Outcome (CO):**

- ☐ Demonstrate students for Effective Business communication skills
- ☐ Able to prepare business related letters
- ☐ Able to prepare various types of Bank correspondence
- ☐ Able to prepare Insurance correspondence
- ☐ Able to prepare Business reports

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	M	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

## **COURSE SYLLABUS:**

### **UNIT I**

**(6 HOURS)**

- 1.1 Business Communication – Meaning – Definition (K1)
- 1.2 General Objectives – Specific Objectives (K1, K2)
- 1.3 Process of Communication (K1, K2, K3)
- 1.4 Types of Communication (K1, K2, K3)
- 1.5 Directions of Communications (K1, K2, K3)
- 1.6 Barriers to Effective Communication. (K1, K2, K3)

### **UNIT II**

**(6 HOURS)**

- 2.1 7Cs for Effective Business Communication (K1, K2)
- 2.2 Layout of Business Letter (K1, K2, K3)
- 2.3 Features in Layout (K1, K2)
- 2.4 Kinds of Business Letters (K1, K2)
- 2.5 Need for Business Letter (K1, K2)
- 2.6 Functions of a Business Letter (K1, K2, K3)

### **UNIT III**

**(6 HOURS)**

- 3.2 Bank Correspondence (K1)
- 3.3 Essential Features of Bank Correspondence (K1, K2)
- 3.3 Letters from Customers to Bank (K1, K2, K3)
- 3.4 Letters from Bank to Customers (K1, K2, K3)
- 3.5 Correspondence within the Bank (K1, K2, K3)
- 3.6 Kinds of Bank letters (K1, K2, K3)

### **UNIT IV**

**(6 HOURS)**

- 4.1 Insurance Correspondence (K1)
- 4.2 Features (K1, K2)
- 4.3 Specific terms used in Insurance Correspondence (K1, K2, K3)
- 4.4 Specimen letters related to Life Insurance (K1, K2, K3)
- 4.5 Specimen letters related General Insurance (K1, K2, K3)
- 4.6 Specimen letters related Marine Insurance (K1, K2, K3)

## UNIT V

(6HOURS)

5.1 Business Reports – Importance (K1, K2)

5.2 Guidelines for Effective Report (K1, K2)

5.3 Memorandum Reports (K1, K2)

5.4 Kinds of Reports (K1, K2, K3)

5.5 Main Features - Various Sections (K1, K2, K3)

5.6 Miscellaneous Reports – Sales Reports/ Production Reports/ News Reports.

### **Textbook:**

Study material will be provided to the student

### **WEB RESOURCES:**

1. <https://g.co/kgs/e69Kfp>
2. <https://www.managementstudyguide.com/seven-cs-of-effective-communication.htm>
3. [www.elionline.com](http://www.elionline.com)
4. [www.isis-papyrus.com](http://www.isis-papyrus.com)
5. [courses.lumenlearning.com](http://courses.lumenlearning.com)

## SEMESTER - III

### UCBIE20 - BANKING LEGALITIES AND REGULATIONS

Year: II SEM: III	Course Code:	Title of The Course:	Course Type:	Course Category:	H/W	Credits	Marks
	UCBIE20	Banking Legalities and Regulations	Theory	Core	6	5	40+60

#### Course Objectives:

- To impart knowledge on legal and regulatory framework of the banking system
- To make aware of legal aspects of banking operations
- To give them overview about banking related laws
- To provide knowledge on debt recovery procedure determined by tribunals.
- To educate students about Consumer protection act 1986.

#### Course Outcomes (CO):

The Learners will be able to

- ☐ Understands basic legal and regulatory framework of the banking system
- ☐ Able to access various banking operations
- ☐ Acquire knowledge about banking laws and their regulations
- ☐ Aware of debt recovery procedures
- ☐ Aware of Consumer Rights.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	M
CO2	H	M	M	M	M	H
CO3	H	H	H	M	M	M
CO4	H	M	M	M	M	M
CO5	H	M	H	M	H	M

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	M	M	M	M	H
CO3	H	H	H	M	M	M
CO4	H	M	M	M	M	M
CO5	H	M	M	M	H	M

## **COURSE SYLLABUS**

### **UNIT I: Regulations and Compliance**

**(15 Hours)**

- 1.1 Definition of Non-Banking Financial Companies. (K1)
- 1.2 Concepts of Non-Banking Financial Companies (K1, K2)
- 1.3 Banking Regulation Act 1949 – Important terms (K1, K2)
- 1.4 Regulation Act 1949- Provisions (K1,K2,K3)
- 1.5 Control over Organization of Banks. (K1, K2)
- 1.6 Licensing of Banking companies. (K1, K2)

### **UNIT II: Legal Aspects of Banking**

**(15 Hours)**

- 2.1 Indemnities – Bank Guarantees (K1)
- 2.2 Letter of Credit (K1, K2)
- 2.3 Deferred Payment Guarantee (K1, K2)
- 2.4 Laws Relating to Bill Finance (K1, K2)
- 2.5 Laws Relating to Securities and Modes of Charging I – Law Relating to Securities and Modes of Charging II. (K1, K2)
- 2.6 Registration of Firms, Incorporation of Companies. (K1, K2, K3)

### **UNIT III: Banking Related Laws (Insolvency Act)**

**(15 Hours)**

- 3.1 Insolvency and Bankruptcy Code, 2016 – Definition (K1, K2)
- 3.2 Regulations (K1, K2)
- 3.3 Central Registry (K1, K2)
- 3.4 Offences and Penalties (K1, K2)
- 3.5 Non-Performing Assets (NPA): Introduction, categories (K1, K2)
- 3.6 Types, NPA Management Strategies (K1, K2, K3, K4)

### **UNIT IV: Recovery of Debts due to Banks and Financial Institutions Act (DRT Act)**

#### **Preliminary**

**(15 Hours)**

- 4.1 Establishment of Tribunal and Appellate Tribunal (K1)
- 4.2 Jurisdiction, Powers and Authority of Tribunals (K1, K2)
- 4.3 Procedure of Tribunals (K1, K2)
- 4.4 Recovery of Debts determined by the Tribunal Miscellaneous Provisions (K1, K2)
- 4.5 The Banker's Evidence Act, 1891 – Lok Adalat's. (K1, K2)
- 4.6 Miscellaneous Provisions (K1, K2)

## **UNIT V: Other Aspects**

**(15 Hours)**

- 5.1 The Consumer Protection Act, 1986: Introduction, Features (K1, K2, K3)
- 5.2 Consumer Rights (K1, K2, K3)
- 5.3 Preamble, Extent and Definitions (K1)
- 5.4 Consumer Disputes Redressal Agencies. (K1, K2)
- 5.5 The Banker's Evidence Act, 1891 – LokAdalat's. (K1, K2, K3)
- 5.6 Powers of Consumer Disputes Redressal Agencies. (K1, K2, K3, K4)

## **BOOKS**

### **TEXTBOOKS**

Legal and Regulatory Aspects of Banking - Indian Institute of Banking and Finance – Macmillan Publisher – Third Edition – Reprint 2016.

### **REFERENCE**

1. Kandasamy K.P., Nagarajan S and Parameswaran R. – Banking – S. Chand &Co. Ltd., New Delhi, Reprint 2010.
  2. Dr. Guruswamy S. – Banking Theory, Law and Practice – Vijay Nicole Imprints Pvt. Ltd., Reprint 2017.
  3. Natarajan S. and Parameswaran R. – Indian Banking – S. Chand & Co. Ltd., New Delhi, Reprint 2013.
  4. Vasudevan S.V. – Theory of Banking – S. Chand & Co. Ltd., New Delhi, Reprint 2015
- Sundaram and Varshney – Banking Law and practice – S. Chand & Co. Ltd., New Delhi, Reprint 2015

### **WEB RESOURCES**

1. <https://www.investopedia.Com/>
2. <https://vikaspedia.in/social-welfare/financial-inclusion/financial-literacy/non-banking-financial-Companies>
3. <https://g.CLO/kgs/JyYmMk>
4. <https://www.mondaq.Com/>
5. <http://ncdre.nic.in>

**SEMESTER- III  
COST ACCOUNTING**

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code:</b> UCBIF20	<b>Title of The Course:</b> Cost Accounting	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 40+60
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**COURSE OBJECTIVES**

- a) To understand the concepts and methods of cost accounting
- b) To make them aware of material control techniques.
- c) To impart knowledge about the labour turnover and overhead cost measurement.
- d) To prepare the process accounts
- e) To develop the students to determine the Contract Costing

**COURSE OUTCOMES (CO)**

- ☐ Familiarize the concepts of Cost accounting
- ☐ Apply material control techniques.
- ☐ Measures labor cost and overhead cost.
- ☐ Prepares Process accounts
- ☐ Evaluates profit or loss of a contract.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	H	H	M	M	M	H
CO3	H	H	M	H	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	H
CO2	M	H	M	H	H	H
CO3	H	M	M	M	M	H
CO4	H	H	H	H	M	M
CO5	H	M	H	M	H	M

## **COURSE SYLLABUS**

### **UNIT I**

**(15 Hours)**

- 1.1 Definition of Cost Costing (K1)
- 1.2 Cost Accounting and Cost Accountancy –  
Cost Accounting Vs Financial Accounting (K1, K2)
- 1.3 Classification of Cost (K1, K2)
- 1.4 Methods of Cost Accounting (K1, K2)
- 1.5 Preparation of Cost Statement (K1, K2, K3)
- 1.6 Tenders and Quotations. (K1, K2, K3, K4)

### **UNIT II**

**(15 Hours)**

- 2.1 Meaning of Material Control – Purchase Procedure (K1, K2)
- 2.2 Stock Levels – Economic Ordering Quantity (K1, K2)
- 2.3 Bin Card Vs Stores Ledger – Pricing of Issue of Materials (K1, K2)
- 2.4 Actual Price Methods (FIFO, LIFO, HIFO, Base Stock and Specific Price) (K1, K2, K3)
- 2.5 Average Price Methods (Simple, Average, Weighted Average  
with returns and losses (K1, K2, K3)
- 2.6 Pricing of Issue of Materials (K1, K2)

### **UNIT III**

**(15 Hours)**

- 3.1 Labour Turnover – Causes - Measurement – Calculation of Labour Cost – Calculation of  
Normal and Overtime wages (K1, K2, K3)
- 3.2 Methods of Payment of remuneration and incentive (K1, K2, K3)
- 3.3 Time and piece wages – Taylor, Merrick, Halsey and Rowan. (K1, K2)
- 3.4 Allocation and Apportionment of Overheads (K1, K2)
- 3.5 Primary Distribution Summary (K1, K2)
- 3.6 Secondary Distribution Summary (Direct Re apportionment, Step Ladder, Simultaneous  
Equation, Repeated Distribution and Trial and Error Method). (K1, K2)

### **UNIT IV**

**(15 Hours)**

- 4.1 Process Costing – Introduction, Meaning (K1)
- 4.2 Characteristics features of Process costing (K1, K2)
- 4.3 Important aspects of process Costing (K1, K2, K3)
- 4.4 Process Accounts (K1, K2)
- 4.5 Normal Loss and Scrap (K1, K2)
- 4.6 Calculation and Treatment of Abnormal Loss and Abnormal Gain. (K1, K2, K3)

## **UNIT V**

**(15 Hours)**

5.1 Contract Costing (K1)

5.2 Profit or loss on Contracts (K1, K2)

5.3 Treatment of Plant (K1, K2)

5.4 Completed Contracts – Incomplete Contracts (K1, K2)

5.5 Treatment of Profit (K1, K2, K3)

5.6 Contracts with losses (including balance sheet problems) (K1, K2, K3)

## **BOOKS**

### **TEXTBOOK**

Reddy T.S Hari Prasad Reddy Y – Cost Accounting – Margham Publications, Chennai (Latest Ed.)

### **REFERENCE**

1. Jain S.P & Narang K.L – Cost Accounting, Kalyani Publishers, New Delhi (Latest Ed.)
2. Khanna Ahuja and Pandey – Cost Accounting – S. Chand & CLO Ltd., New Delhi (Latest Ed.)
3. Lall Nigam B.M and Jain I.c Cost Accounting – Prentice Hall of India Pvt Ltd., New Delhi (Latest Ed.)
4. Pillai R.S.N and Bagavathi V – Cost Accounting Sultan Chand & Sons New Delhi (Latest Ed.)

### **WEB RESOURCES**

1. [www.accountingnotes.net](http://www.accountingnotes.net)
2. [www.yourarticlelibrary.Com](http://www.yourarticlelibrary.Com)
3. <https://www.yourarticlelibrary.Com/Cost-accounting/labour-turnover>
4. <https://g.CLO/kgs/epCQEj>

<https://www.iedunote.Com/CLOntract-Costing>

## SEMESTER - III

### UCBIG20 – PRINCIPLES OF MANAGEMENT

<b>Year: II SEM: III</b>	<b>Course Code: UCBIG20</b>	<b>Title of The Course: Principles of Management</b>	<b>Course Type: Theory</b>	<b>Course Category: Core</b>	<b>H/W  5</b>	<b>Credits  4</b>	<b>Marks  40+60</b>
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#### COURSE OBJECTIVES

- To understand the concepts of business management.
- To develop the knowledge of planning and decision making.
- To familiarize the students with principles of the organizing.
- To enable students to understand theories of motivation.
- To impart knowledge on various leadership styles.

#### COURSE OUTCOMES (CO)

The Learners will be able to

- ☐ Understands the Conceptual idea of management.
- ☐ Demonstrate the skills of planning and decision making.
- ☐ Aware of principles of organizing.
- ☐ Familiarize with motivational factors.
- ☐ Identifies various leadership styles.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	M	H	M	M	M	H
CO3	H	H	M	H	H	M
CO4	H	M	H	M	M	H
CO5	H	H	H	M	M	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	H
CO2	M	H	M	H	H	H
CO3	H	M	H	M	M	H
CO4	M	H	H	H	M	M
CO5	H	M	H	M	H	M

## **COURSE SYLLABUS**

### **UNIT I**

**(15 Hours)**

- 1.1 Management - Meaning - Definition (K1)
- 1.2 Characteristics, Importance (K1, K2)
- 1.3 Contribution of F.W. Taylor (K1)
- 1.4 Henri Fayol & Peter F Drucker (K1)
- 1.5 Concept of Management by Objectives (M.B.O) and Management by Exception (M.B.E) (K1, K2, K3, K4)
- 1.6 Conceptual idea of Corporate Social Responsibility (C.S.R) (K1, K2, K3, K4)

### **UNIT II**

**(15 Hours)**

- 2.1 Planning - Meaning - Definition (K1)
- 2.2 Nature, Importance (K1)
- 2.3 Types of Plans, Importance (K1, K2)
- 2.4 Advantages and Limitations (K1, K2)
- 2.5 Steps in the process planning (K1, K2, K3)
- 2.6 Decision Making - Meaning and Process (K1, K2, K3)

### **UNIT III**

**(15 Hours)**

- 3.1 Organizing - Meaning - Nature – Importance (K1)
- 3.2 Principles – Steps (K1, K2)
- 3.3 Types - Line, Functional, Line and Staff, Committee (K1, K2, K3)
- 3.4 Styles - Functions – Importance (K1)
- 3.5 Types and Principles (K1, K2)
- 3.6 Centralization - Decentralization - Differences between both. (K1, K2)

### **UNIT IV**

**(15 Hours)**

- 4.1 Staffing- Meaning – Importance (K1)
- 4.2 Directing - Meaning - Nature and Characteristics (K1, K2)
- 4.3 Leadership - Meaning - Nature - Styles - Functions – Importance (K1, K2, K3)
- 4.4 Styles - Functions – Importance (K1, K2)
- 4.5 Motivation Meaning - Monetary and Non-Monetary Incentives (K1, K2, K3)
- 4.6 Theories of Motivation - Maslow, McGregor and Herzberg (K1, K2)

## **UNIT V**

**(15 Hours)**

- 5.1 Communication - Meaning - Nature - Process – Importance (K1, K2)
- 5.2 Essentials of good Communication (K1, K2)
- 5.3 Barriers to Communication - Steps to overcome the barriers. (K1, K2, K3)
- 5.4 Control -Definition - Meaning - Elements - Process. (K1, K2, K3)
- 5.5 Co-ordination – Meaning, Importance, Types, Problems (K1, K2, K3)
- 5.6 Difference between Co-ordination and Co-operation (K1, K2)

### **BOOKS**

#### **TEXTBOOKS**

Dr. Gupta C.B.-Business Management – Sultan Chand& Sons, New Delhi, (Latest Ed.)

#### **REFERENCE**

1. Prasad L.M. - Management: Principles and Practices - Sultan Chand& CLO., New Delhi, (Latest Ed.)
2. Harold Koontz & Cyril O'Donnell - Essentials of Management - Tata McGraw Hill Publishing Co. Ltd., New Delhi, (Latest Ed.)
3. Sharma R.K. and Shashi K. Gupta - Principles of Management - Kalyani Publishers, New Delhi, (Latest Ed.)
4. Kumkum Mukherjee - Principles of Management - Tata McGraw Hill, New Delhi, (Latest Ed.)

#### **WEB RESOURCES**

1. <https://g.CLO/kgs/1Zu9Pz>
2. <https://Courses.lumenlearning.Com/>
3. <https://study.Com/academy/lesson/principles-of-organizational-management.html>
4. [https://www.mindtools.Com/pages/article/newLDR\\_74.htm](https://www.mindtools.Com/pages/article/newLDR_74.htm)
5. <https://www.toppr.Com/guides/business-studies/directing/Communication>

## SEMESTER - III

### UEBIA20 - MARKETING IN BANKING AND INSURANCE

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of The Course:</b>	<b>Course Type:</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>SEM: III</b>	UEBIA20	Marketing in Banking and Insurance	Theory	Elective I A	5	5	40+60

#### COURSE OBJECTIVES

- To understand the classification of service.
- To develop knowledge on 7P's in service marketing.
- To familiarize with the concepts of internal marketing and external marketing.
- To identify the need for customer Relationship Management in service sector.
- To enhance the knowledge on marketing mix for Banking and Insurance sector.

#### COURSE OUTCOMES (CO):

The Learners will be able to

- ☐ Understands the Concepts of service marketing.
- ☐ Identifies the role of 7P's in service marketing
- ☐ Differentiates internal marketing from external marketing.
- ☐ Identifies customer relationship management of any service sector.
- ☐ Acquires the knowledge on marketing mix in marketing Banking and Insurance products.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	H	L	H	H
CO2	H	H	M	M	H	M
CO3	H	H	H	M	H	H
CO4	H	M	H	H	M	H
CO5	H	H	M	H	H	H

(H- HIGH M-MEDIUM L-LOW)

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	M	H	H	H

## **COURSE SYLLABUS:**

### **UNIT I**

**(15 Hours)**

- 1.1 Service - Meaning and Definition (K1)
- 1.2 Components of service (K1)
- 1.3 Characteristics (K1, K2)
- 1.4 Classification of Services by Adrian Payne (K1, K2)
- 1.5 Classification of Services - Christopher, Philip Kotler (K1, K2)
- 1.6 Differences between Goods and Services

### **UNIT II**

**(15 Hours)**

- 2.1 Services Marketing - Meaning – Definition (K1)
- 2.2 Characteristics (K1, K2)
- 2.3 7p's of Service Marketing -Product, Levels of product (K1, K2, K3, K4)
- 2.4 Price – meaning, objectives (K1, K2, K3, K4)
- 2.5 Promotion-meaning, promotion mix, tools (K1, K2, K3, K4)
- 2.6 Place, People, Physical Evidence and Processes. (K1, K2, K3, K4)

### **UNIT III**

**(15 Hours)**

- 3.1 Types of Marketing in Service Firms and Quality of Services (K1, K2)
- 3.2 Definition of Internal and External Marketing, Components
  - Internal Marketing (K1, K2, K3)
- 3.2 Steps in Developing Internal Marketing (K1, K2, K3, K4)
- 3.3 Services Triangle (K1, K2)
- 3.4 Goals of Relationship Marketing (K1, K2)
- 3.5 Quality of Service Dimensions (K1, K2)

### **UNIT IV**

**(15 Hours)**

- 4.1 Managing Demand and Supply of Services (K1, K2)
- 4.2 Meaning - Strategies for managing Demand and Supply (K1, K2, K3)
- 4.3 Understanding capacity constraints (K1, K2)
- 4.4 Understanding demand patterns (K1, K2)
- 4.5 Capacity Planning - Managing capacity to match demand (K1, K2, K3)
- 4.6 Customer Relationship Management (CRM) (K1, K2, K3)

## **UNIT V**

**(15 Hours)**

- 5.1 Marketing of Banking Services: Meaning - Characteristics – Importance (K1, K2)
- 5.2 Marketing Mix of Banking Services (K1, K2)
- 5.3 Role and Importance of Personal selling in Financial Services. (K1, K2, K3)
- 5.4 Marketing of Insurance Services: Market Segmentation and its significance in the Insurance Organization (K1, K2)
- 5.5 Formulation of Marketing Mix for Insurance companies- Creation of advertisement (K1, K2, K3, K4)
- 5.6 Crisis management – marketing during Covid -19 by Banking and Insurance Companies(K1,K2K3)

## **BOOKS**

### **TEXTBOOK**

Dr. Natarajan L. - Services Marketing - Margham Publications, Chennai - Reprint 2015

### **REFERENCE**

1. Dr. L. Natarajan - Services Marketing - Margham Publications, Chennai - Reprint 2013.
2. Dr. V. Balu, Dr. N. Premila - Services Marketing - Sri Vekateswara Publications - Oct - 2006
3. Valarie A. Zeithaml, Ajay Pandit - Services Marketing - Tata McGraw Hill Education Pvt. Ltd., - 4<sup>th</sup> Edition, 8<sup>th</sup> Edition - 2010.
4. Balaji B. - Services Marketing and Management - S. Chand and Co. Ltd., - 1<sup>st</sup> Edition, 2002.

### **WEB RESOURCES:**

1. <https://youtu.be/1zYsQSJvbog>
2. <https://www.managementstudyguide.Com/seven-p-of-services-marketing.htm>
3. <https://www.bmmagazine.CLO.uk/marketing/whats-the-difference-between-internal-and-external-marketing/>
4. <https://g.co/kgs/4AuqXJ>
5. <https://theintactone.Com/2018/12/12/sm-u4-topic-5-marketing-applications-in-banking-and-insurance-services/>

## SEMESTER -III

### UEBIB20 - ENTREPRENEURSHIP DEVELOPMENT

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code:</b> UEBIB20	<b>Title of The Course:</b> Entrepreneurship Development	<b>Course Type:</b> Theory	<b>Course Category</b> : Elective I B	<b>H/W</b>  5	<b>CREDITS</b>  5	<b>MARKS</b>  40+60
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#### COURSE OBJECTIVES

- To understand the Concept of Entrepreneurship.
- To identify financial institutions providing funds.
- To encourage students to generate business ideas.
- To familiarize the students about different phases of entrepreneurial development programme.
- To enable the student to understand the importance of women entrepreneurship and related schemes.

#### COURSE OUTCOMES (CO)

The Learners will be able to

- ☐ Understands the Concepts of Entrepreneurship.
- ☐ Apply for financial assistance.
- ☐ Develops new business ideas.
- ☐ Evaluates entrepreneurial development programmed and related schemes.
- ☐ Establish as a woman entrepreneur and Contribute to the society.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	H	H	H
CO4	H	M	H	H	M	H
CO5	H	H	H	H	H	H

(H- HIGH M-MEDIUM L-LOW)

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	H	H	H
CO4	H	M	H	H	M	H
CO5	H	H	H	H	H	H

## **COURSE SYLLABUS:**

### **UNIT I (15 Hours)**

- 1.1 Entrepreneur ad Entrepreneurship-Meaning and Definition (K1)
- 1.2 Concept of Intrapreneur (K1, K2)
- 1.3 Characteristics and Qualities of Entrepreneurs (K1, K2, K3)
- 1.4 Functions (K1, K2)
- 1.5 Classification of Entrepreneurs (K1, K2, K3)
- 1.6 Factors influencing Entrepreneurship (K1, K2)

### **UNIT II (15 Hours)**

- 2.1 Entrepreneurial Development-Agencies: commercial Banks- District Industries Centre (DIC) (K1)
- 2.2 National Small Industries Corporation (K1, K2)
- 2.3 Small Industries Development Organization (K1, K2)
- 2.4 Small Industries Service Institute (K1, K2)
- 2.5 All India Financial Institutions- IDBI, IFCI (K1, K2)
- 2.6 History, functions of ICICI-IRDBI (K1, K2)

### **UNIT III (15 Hours)**

- 3.1 Business Idea Generation (K1, K2, K3)
- 3.2 Business Idea Generation (K1, K2)
- 3.3 Feasibility study (K1, K2)
- 3.4 Appraisal (K1, K2)
- 3.5 Project Report (K1, K2)
- 3.6 Legal requirements for the establishment of a Business unit (K1, K2)

### **UNIT IV (15 Hours)**

- 4.1 Entrepreneurial Development programmes (K1)
- 4.2 Phases of Entrepreneurial Development Programme (K1, K2)
- 4.3 Institutional efforts and Role of Government in developing Entrepreneurship (K1, K2)
- 4.4 Evaluation of EDP (K1, K2)
- 4.5 Problems in the conduct of EDP, Suggestions to make EDP successful (K1, K2, K3)
- 4.6 MSME Schemes: Stand Up India Scheme (K1, K2, K3, K4)

### **UNIT V (15 Hours)**

- 5.1 Role of Entrepreneur in Economic development (K1, K2)

5.2 Role of Small Business (K1, K2)

5.3 Strategies in change in Economic during COVID pandemic

environment Economic Scenario (K1, K2, K3)

5.4 New Venture Expansion (K1, K2)

5.5 Woman Entrepreneurship: Meaning, Factors influencing, categories of women entrepreneurs Women Entrepreneurs schemes: Pradhan Mantri MUDRA Yojana (PMMY)

5.6 Problem faced by women entrepreneurs, suggestions for Women entrepreneurs

## **BOOKS**

### **TEXTBOOKS**

Renu Arora and Sood S.K.-Entrepreneurial Development – Kalyani Publishers, New Delhi.

### **REFERENCE**

1. Khanka S.S. – Entrepreneurial Development – S. Chand Publications, New Delhi. Reprint 2011.
2. Vasant Desai- Small Scale Industries and Entrepreneurship-Himalaya Publishing House.
3. Mohanty S.K. – Fundamentals of Entrepreneurship – Prentice Hall of India.
4. Gordon E. and Natarajan K. “Entrepreneurship Development” Himalaya Publishing House, Mumbai, Reprint 2012.
5. C.B. Gupta and N.P. Srinivasan – Entrepreneurial Development- Sultan Chand Publications, New Delhi, revised Edition 2013, Reprint 2014.

### **WEB RESOURCES**

1. <https://Courses.lumenlearning.Com/boundless-business/chapter/introduction-to-entrepreneurship/>
2. <https://www.toppr.Com/guides/business-studies/entrepreneurship-development/process-of-entrepreneurship-development/>
3. <https://www.quora.Com/What-is-role-of-government-in-entrepreneurship>
4. <https://www.slideshare.net/DakshGoyal3/entrepreneurship-development-programmes>
5. <https://www.tandfonline.Com/doi/full/10.1080/08985626.2016.1255438>

### SEMESTER III

#### UAMEA20 - MANAGERIAL ECONOMICS

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of The Course:</b>	<b>Course Type:</b>	<b>Course Category</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>SEM: III</b>	UAMEA20	Managerial Economics	Theory	Allied	5	5	40+60

#### COURSE OBJECTIVES

- To understand the role of managers in Business firms.
- To impart knowledge on demand analysis.
- To familiarize with Concept of supply.
- To Provide knowledge on pricing methods
- To make them aware of various types of market structure.

#### COURSE OUTCOMES (CO)

The Learners will be able to

- ☐ Understand the Concepts of Managerial Economics.
- ☐ Able to analyze the demand patterns of the market.
- ☐ Able to compute Breakeven Point.
- ☐ Able to Compare various pricing strategies prevailing in the market.
- ☐ Demonstrates the decision -making skills under different marketing structure.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	H
CO2	H	H	H	M	H	H
CO3	M	H	H	M	H	H
CO4	H	M	H	H	M	H
CO5	H	H	M	H	H	H

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	H	M	M	H	H
CO3	M	H	H	H	M	H
CO4	H	M	H	H	M	H
CO5	H	H	H	H	H	H

## **COURSE SYLLABUS**

### **UNIT I**

**(15 Hours)**

- 1.1 Introduction to Managerial Economics, Definition (K1)
- 1.2 Characteristics (K1, K2)
- 1.3 Scope of Managerial Economics (K1, K2)
- 1.4 Uses (K1, K2)
- 1.5 Economic tools in Managerial Economics (K1, K2)
- 1.6 Role and Responsibility of Managerial Economist. (K1, K2, K3)

### **UNIT II**

**(15 Hours)**

- 2.1 Demand Analysis – Meaning (K1)
- 2.2 Law of Demand (K1, K2)
- 2.2 Types of Demand (K1, K2, K3)
- 2.3 Prices of related goods and Demand (K1, K2)
- 2.5 Indifference curve Analysis (K1, K2, K3)
- 2.6 Demand Forecasting (K1, K2, K3, K4)

### **UNIT III**

**(15 Hours)**

- 3.1 Supply – Meaning (K1)
- 3.2 Law of Supply (K1, K2)
- 3.3 Contraction and Expansion of supply (K1, K2, K3)
- 3.4 Elasticity of supply and its measurement (K1, K2, K3)
- 3.5 Break Even Analysis (K1, K2, K3, K4)
- 3.6 Cost -Types -Cost reduction - Cost control. (K1, K2, K3)

### **UNIT IV**

**(15 Hours)**

- 4.1 Law of returns (K1)
- 4.2 Production Function (K1, K2)
- 4.3 Pricing Methods and strategies -Objectives (k1, k2)
- 4.4 Factors Influencing pricing (K1, K2, K3, K4, K5)
- 4.5 Price discrimination. (K1, K2)
- 4.6 Role of Government in Pricing (K1, K2, K3)

### **UNIT V**

**(15 Hours)**

- 5.1 Perfect competition -Definition - Features and conditions (K1, K2)
- 5.2 Price determination under perfect competition (K1, K2, K3)
- 5.3 Equilibrium price (K1, K2, K3)
- 5.4 Monopoly - Definition -determination of price difference  
between perfect and monopoly (K1, K2, K3, K4)

5.5 Monopolistic Competition - Assumptions- features – Defects

5.6 Duopoly - Oligopoly. (K1, K2, K3, K4)

## **BOOKS**

### **TEXTBOOK**

Varshney R.L &Maheshwari K.L – Managerial Economics – Sultan Chand &Sons, Educational Publishers, latest Edition.

### **REFERENCE**

1. Joel Dean –Managerial Economics – Prentice Hall of India, Latest Edition
2. Dwivedi D.N – Managerial Economics – Vikas Publishing House,6<sup>th</sup> Edition, 2006.
3. Sankaran S. Indian Economy – Margham Publications,
4. Mehta P. L – Analysis, Problem and Cases, Managerial Economics, S. Chand& CO., New Delhi,2014.
5. Varshney and Maheshwari – Managerial Economics – Sultan Chand and Sons, New Delhi, 2010.

### **WEB RESOURCES:**

- 1.<https://aits-tpt.edu.in/wp-Content/uploads/2018/08/Introduction-to-Managerial-Economics.pdf>
2. <https://businessjargons.Com/demand-analysis.html>
- 3.<https://www.investopedia.Com/terms/l/law-of-supply-demand.asp>
- 4.[www.investopedia.Com](http://www.investopedia.Com)
5. <https://g.co/kgs/Ykqx6K>

**SEMESTER -III**  
**USBIC20 -BANKING AND INSURANCE PRACTICALS**

<b>Year: II</b> <b>SEM:</b> III	<b>Course Code:</b> USBIC20	<b>Title of The Course:</b> Banking and Insurance Practical	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
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**COURSE OBJECTIVES**

- a. To educate students to fill the banking relevant forms
- b. To enable the students to know the procedures for applying jewel loan
- c. To enhance the knowledge on E banking procedures
- d. To familiarize about the various forms regarding insurance Policies
- e. To make the students to fill the claim forms and IT forms

**COURSE OUTCOMES (CO)**

- ☐ Able to fill the forms related to banking sector
- ☐ Able to fill the various loan applications forms
- ☐ Access the E - banking facilities
- ☐ Able to fill the Insurance forms
- ☐ Ability to fill the claim forms

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	H	M	M	M	M	H
CO3	H	H	H	M	M	M
CO4	H	M	M	M	M	H
CO5	H	M	M	M	M	M

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	M	M	M	M	H
CO3	H	H	H	M	M	M
CO4	H	H	M	M	M	H
CO5	H	M	M	M	H	H

## **COURSE SYLLABUS**

### **UNIT 1**

**(6 Hours)**

- 1.1 Drawing Endorsing and Crossing of Cheques (K1, K2)
- 1.2 Filling up of pay in slips Demand draft application (K1, K2, K3)
- 1.3 Making entries in the passbook and filling up of Account Opening Forms for SB account, Current Account (K1, K2, K3)
- 1.4 FDR's- both online and offline forms (K1, K2, K3)
- 1.5 Drawing and endorsing of Bills of Exchange and Promissory notes (K1, K2, K3)
- 1.6 Preparation of Demand Drafts. (K1, K2, K3)

### **UNIT II**

**(6 Hours)**

- 2.1 Filling up of Application Forms for Admission in cooperative societies (K1, K2, K3)
- 2.2 Filling up of Loan Application form (K1, K2, K3, K4)
- 2.2 Filling up of Deposit Challan (K1, K2, K3, K4)
- 2.4 Filling up of Jewel Loan Application form (K1, K2, K3)
- 2.5 Procedure for Jewel loan (K1, K2, K3)
- 2.6 Procedure for repayment of Jewel Loan (K1, K2, K3, K4)

### **UNIT III**

**(6 Hours)**

- 3.1 Activation of Net Banking, Account Summary (K1, K2, K3, K4)
- 3.2 E –Statement, Add Beneficiary (K1, K2)
- 3.3 Funds Transfer- NEFT: Service availability durations minimum/ maximum amount for transactions (K1, K2, K3, K4)
- 3.4 Transaction flow, Processing Charges/ Service Charges (K1, K2, K3)
- 3.5 RTGS: Making Payment, Procedure, Working of RTGS (K1, K2, K3)
- 3.6 IMPS: Modes of transfer, Process flow, Advantages & Disadvantages (K1, K2, K3)

### **UNIT IV**

**(6 Hours)**

- 4.1 Filling up of an application form of LIC (K1, K2, K3, K4)
- 4.2 How to fill a various insurance policy form (K1, K2, K3, K4)
- 4.3 Filling up the premium form (K1, K2, K3, K4)
- 4.4 Filling up the claim form (K1, K2, K3, K4)
- 4.5 filling up the challan for remittance of premium through Online (K1, K2, K3)
- 4.6 filling up the challan for remittance of premium through Offline. (K1, K2, K3)
- 4.7

### **UNIT V**

**( 6 Hours)**

- e.1 Filling up of a Claim Forms of about LIC Policies (K1, K2, K3)
- e.2 Filling up of a Claim Forms of General Insurance Policies (K1, K2, K3)
- e.3 Filling up Income tax returns (K1, K2)
- e.4 Banking Ombudsman Scheme (K1, K2)

e.5 Insurance Ombudsman Scheme (K1, K2)

e.6 Filling up Application of Permanent Account Number (K1, K2)

## **TEXTBOOK**

## STUDY MATERIAL

## **WEB SOURCES**

1.<https://g.cokgs/q6fUxa>

2.<https://1firstcashadvance.org/how-to-fill-out-a-loan-application-form/>

3.[www.onlinesbi.Com](http://www.onlinesbi.Com)

4.<https://youtu.be/mjrn79ADO2I>

5.<https://www.Policyholder.gov.in/ombudsman.aspx>

## SEMESTER-IV

### UCBIH20 - REGULATORY FRAMEWORK OF BUSINESS AND INSURANCE

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code:</b> UCBIH20	<b>Title of The Course:</b> Regulatory Framework of Business and Insurance	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 40+60
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#### COURSE OBJECTIVES

- To provide an adequate knowledge on Indian Contract Act 1972 and its Provisions.
- To make aware of Sale of Goods ACT 1930 and its various Components.
- To impart knowledge about the History of Insurance and its acts.
- To familiarize with Insurance Regulatory Development Authority (IRDA)act.
- To educate about various Rural Insurance Schemes.

#### COURSE OUTCOMES (CO):

The Learners will be able to

- ☐ Able to understand the provisions of Indian Contract Act 1972.
- ☐ Acquire knowledge on the sale of goods act.
- ☐ Aware of various acts related to Insurance.
- ☐ Understands the provisions of IRDA act.
- ☐ Able to choose suitable insurance Policies based on their needs.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	M	M	M	H	M
CO3	H	M	M	M	M	M
CO4	H	M	M	M	M	H
CO5	H	H	M	M	H	M

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	M
CO2	H	M	M	M	H	M
CO3	H	H	M	M	M	H
CO4	H	M	M	H	H	H
CO5	H	H	H	M	H	M

## **COURSE SYLLABUS**

### **UNIT I**

**(15 Hours)**

- 1.1 Indian Contract Act 1972: Law of contract (K1)
- 1.2 Offer and Acceptance (K1, K2, K3)
- 1.3 Consideration and capacity (K1, K2, K3)
- 1.4 Free Consent (K1, K2, K3)
- 1.5 Discharge of Contract (K1, K2, K3, K4)
- 1.6 Breach of Contract (K1, K2, K3, K4)

### **UNIT II**

**(15 Hours)**

- 2.1 Sale of Goods Act 1930: Definition of Sale – Actual Sale – Agreement to Sell Distinction between sale and agreement to sell – Consideration (K1, K2, K3)
- 2.2 Considerations and Warranties (K1, K2)
- 2.3 Doctrine of Caveat Emptor (K1, K2, K3, K4)
- 2.4 Delivery of Goods (K1, K2, K3)
- 2.5 Transfer of Property – Transfer of title by non-owners Resale (K1, K2, K3, K4)
- 2.6 Auction sale. (K1, K2, K3, K4)

### **UNIT III**

**(15 Hours)**

- 3.1 History of Insurance – An Introduction to the Legal aspects Insurance, The Insurance Act, 1938 (K1, K2)
- 3.2 The Life Insurance Corporation of India Act, 1956 (K1, K2)
- 3.3 The General Insurance Business Nationalization Act, 1972 (K1, K2, K3)
- 3.4 Insurance Regulatory and Development Authority Act, 1999 (K1, K2)
- 3.5 Insurance Regulatory and Development Authority (Appointed Actuary) Regulation, 2000 (K1, K2, K3)
- 3.6 Powers and procedure for Appointment of an Appointed Actuary (K1, K2, K3)

### **UNIT IV**

**(15 Hours)**

- 4.1 Insurance Regulatory and Development Authority (General Insurance - Reinsurance) Regulation, 2000 (K1, K2, K3)
- 4.2 Insurance Regulatory and Development Authority (Protection of Policyholder's Interests) Regulation, 2000 (K1, K2, K3)
- 4.3 Insurance Regulatory and Development Authority (Licensing of Corporate Agents) Regulations, 2002 (K1, K2, K3)
- 4.4 Insurance Regulatory and Development Authority (Obligations of Insurer to Rural Social Sectors) Regulation, 2002. (K1, K2, K3)
- 4.5 Insurance Ombudsman: Eligibility, terms. (K1, K2, K3, K4)
- 4.6 Powers & Duties, procedure for Removal from office. (K1, K2, K3, K4)

### **UNIT V**

**(15 Hours)**

- 5.1 Rural Insurance in India, Introduction, Rural Insurance Schemes, Special Features Benefits (K1, K2)
- 5.2 Challenges to be encountered in the Indian Rural Insurance Market – Scope of Collaborative Action (K1, K2)
- 5.3 Health Insurance in India – Introduction – Definition (K1)
- 5.4 Health Insurance Schemes (K1, K2, K3)
- 5.5 Health Insurance Initiatives by State Governments (K1, K2)
- 5.6 Concerns, Challenges, and the Way ahead. (K1, K2, K3)

## **TEXTBOOK**

1. Murthy A – Principles and Practice of Insurance – Margham Publication, Chennai, Reprint 2016.
2. Kapoor N. D – Business Law – Sultan Chand & Publications, New Delhi, 30<sup>th</sup> Ed, 2017.

## **REFERENCE**

1. Saravana Val P. and Sumathi S – Legal Systems in Business – Himalaya Publishing House, 7<sup>th</sup> Ed. 2013.
2. Kaushal M.C – Business Law – Vikas Publications, 4<sup>th</sup> Edition, 2005
3. Akhileshwar Pathak – Legal Aspects of Business – Tata McGraw Hill, 3<sup>rd</sup> Edition, 2005
4. Periasamy P – Fundamentals of Insurance – Vijay Nicole Imprints Pvt. Ltd. Chennai, 2013.
5. Periasamy P & Veer Selvam M – Risk and Insurance Management – Vijay Nicole Imprints Pvt. Ltd. Chennai, 2013.

## **WEB RESOURCES**

1. <https://g.co/kg>
2. <https://g.co/kgs/6Yg99W>
3. <https://youtu.be/oH7vUV9g8ys>
4. <https://youtu.be/GE0ckHRBPls>
5. <https://youtu.be/tL0a7uWrmB>

## SEMESTER - IV

### UCBII20- ACCOUNTING FOR MANAGEMENT

Year: II SEM: IV	Course Code: UCBII20	Title of The Course: Accounting for Management	Course Type: Theory	Course Category: Core	H/W 5	Credits 4	Marks 40+60
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#### COURSE OBJECTIVES

- To understand the concept of management accounting.
- To make them aware of the Ratio Analysis.
- To prepare Fund Flow statement.
- To prepare cashflow statement.
- To calculate marginal cost.

#### COURSE OUTCOMES

The Learners will be able to

- ☐ Understands management accounting.
- ☐ Analyze various ratios and develops capability to make decision.
- ☐ Prepares Fund Flow statement.
- ☐ Prepares cashflow statement.
- ☐ Calculates marginal cost.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	M
CO2	H	M	M	M	H	M
CO3	H	M	H	M	M	M
CO4	H	M	M	H	M	H
CO5	H	H	M	M	H	M

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	M
CO2	H	M	M	M	H	M
CO3	H	H	M	H	M	H
CO4	H	M	M	H	H	H
CO5	H	M	H	M	H	M

## **COURSE SYLLABUS:**

### **UNIT I (15 Hours)**

- 1.1 Management Accounting: Meaning - Definition (K1)
- 1.2 Nature and Scope, Objectives and Functions (K1, K2)
- 1.3 Installation of Management Accounting System (K1, K2)
- 1.4 Relationship Between financial, Cost and Management Accounting (K1, K2)
- 1.5 Financial Statement Analysis - Meaning - Comparative and Common Size financial statement (K1, K2, K3)
- 1.6 Trend percentages (K1, K2, K3)

### **UNIT II (15 Hours)**

- 2.1 Ratio analysis: Introduction, Meaning (K1, K2)
- 2.2 Steps in Ratio Analysis (K1, K2)
- 2.3 Advantages and Limitations of ratio analysis (K1, K2)
- 2.4 Classification of ratio analysis (K1, K2, K3)
- 2.5 Calculation of Profitability (K1, K2, K3)
- 2.6 Solvency and Turnover Ratios (including Reconstruction of Profit and Loss Account and Balance Sheet (K1, K2, K3)

### **UNIT III (15 Hours)**

- 3.1 Fund Flow Analysis - Meaning – Definition (K1)
- 3.2 Importance (K1, K2)
- 3.3 Advantages – Limitations (K1, K2)
- 3.4 Guidelines for Transaction Analysis (K1, K2, K3)
- 3.5 Statement of Changes in Working Capital (K1, K2, K3)
- 3.6 Preparation of Funds Flow Statement (K1, K2, K3)

### **UNIT IV (15 Hours)**

- 4.1 Cash Flow Analysis Meaning – Definition (K1)
- 4.2 Importance (K1, K2)
- 4.3 Advantages – Limitations (K1, K2)
- 4.4 Statement of Change in Working Capital (K1, K2, K3)
- 4.5 Preparation of Funds Flow Statement (K1, K2, K3)
- 4.6 Application of AS -3 (K1, K2, K3)

### **UNIT V (15 Hours)**

- 5.1 Marginal Costing – Features (K1)
- 5.2 Marginal and Absorption Costing (K1, K2)
- 5.3 Some Important Concepts and Terms in Cost (K1, K2)
- 5.4 Profit Analysis (K1, K2)
- 5.5 Limitations of Marginal Costing (K1, K2)
- 5.6 Break Even Analysis (K1, K2)

## **TEXTBOOK:**

Reddy T.S. and Hari Prasad Reddy Y. - Management Accounting - Margham publications, Chennai, Revised Edition 2013

## **BOOKS FOR REFERENCE**

1. Khan M.Y and Jain S.P. - Management Accounting - Tata McGraw Hill, New Delhi, Reprint 2013
2. Pillai R.S.N. and Bagavathi V. - Management Accounting - S. Chand and Co. Ltd, New Delhi, Reprint 2013
3. Dr. Murthy A. and Bagavathi V. - Management Accounting - Margham publications, Chennai, Revised 2012
4. Manmohan S.P. and Goyal P.S. - Management Accounting - S. Chand and CLO Ltd, New Delhi, Reprint 2012
5. Saravana P. - Management Accounting - Crown publication, Chennai, Reprint 2012
6. Sumathi S – Legal Systems in Business – Himalaya Publishing House, 7<sup>th</sup> Ed. 2013.
7. Akhileshwar Pathak – Legal Aspects of Business – Tata Mc Graw Hill, 3<sup>rd</sup> Edition, 2005
8. Periasamy P – Fundamentals of Insurance – Vijay Nicole Imprints Pvt. Ltd. Chennai, 2013.
9. Periasamy P & Veer Selvam M – Risk and Insurance Management – Vijay Nicole Imprints Pvt. Ltd. Chennai, 2013.

## **WEB RESOURCES**

- 1.<https://youtu.be/9XTrTqOBtN0>
- 2.<https://www.educba.Com/ratio-analysis-types/>
- 3.<https://youtu.be/Ao3UPLOKshzI>
- 4.<https://www.investopedia.Com/investing/what-is-a-cash-flow-statement/>
- 5.<https://g.co/kgs/sbsdno>

**SEMESTER-IV**  
**UCBIJ20- RESEARCH METHODOLOGY**

<b>Year:</b> <b>SEM:</b> <b>IV</b>	<b>Course Code:</b> UCBIJ20	<b>Title of The Course:</b> Research Methodology	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective IIA	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 40+60
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**Course Objectives**

- a) To understand research and its process.
- b) To identify research problem and appropriate tools to analyse it.
- c) To impart knowledge on various sampling methods in research.
- d) To make familiarize with data collection methods suitable for various type of research.
- e) To enhance the knowledge for preparation of project report.

**Course Outcomes (CO):**

The Learners will be able to

- ☐ Understands research and its procedures.
- ☐ Identifies problem and use SPSS to analyse it.
- ☐ Identifies appropriate sample size and sampling methods for research
- ☐ Apply a suitable data collection method to extract reliable information
- ☐ Prepares project report with appropriate suggestions contributing to the society

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	M
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	M
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

## **Course Syllabus**

### **Unit I: Introduction of Research and Research Process (15 Hours)**

- 1.1 Definition of Research – Meaning (K1)
- 1.2 Objectives (K1, K2)
- 1.3 Types of Research (K1, K2)
- 1.4 Research Process (K1, K2, K3)
- 1.5 Qualities of a Researcher – Criteria of Good research (K1, K2)
- 1.6 Problems Encountered in research (K1, K2, K3)

### **Unit II: Research Design (15 Hours)**

- 2.1 Defining Research Problem (K1)
- 2.2 Research Design – Features of Good Research Design (K1, k2)
- 2.3 Types of Research Design – Factors Affecting Research Design (K1, k2)
- 2.4 Hypothesis – Meaning – Definition (K1, k2)
- 2.5 Need for Hypothesis – Formulation of Hypothesis – Types of Hypothesis (K1, k2)
- 2.6 Test of Hypothesis – Type I and Type II Error. (K1, k2, k3)

### **Unit III: Sampling (15 Hours)**

- 3.1 Sampling – meaning (K1)
- 3.2 Techniques (K1, K2)
- 3.3 Types (K1, K2, K3)
- 3.4 Steps (K1, K2, K3)
- 3.5 Merits (K1, K2)
- 1.6 Demerits. (K1, K2)

### **Unit IV: Primary and Secondary Data (15 Hours)**

- 4.1 Collection of Primary and Secondary Data (K1, K2)
- 4.2 Sources of Secondary Data (K1, K2, K3)
- 4.3 Interview Techniques - Survey and Interview Method (K1, K2)
- 4.4 Interview Techniques - Merits and Demerits (K1, K2)
- 4.5 Questionnaire – Pre-Requisites of Using Questionnaire (K1, K2)
- 4.6 Structure and Unstructured Questionnaire (K1, K2, K3)

### **Unit V: Report Writing and SPSS Application (15 Hours)**

- 5.1 Measurement and Scaling Techniques (K1, K2)
- 5.2 Analysis (K1, K2)
- 5.3 Interpretation (K1, K2)
- 5.4 Report Writing (K1, K2, k3)
- 5.5 Application of SPSS (K1, k2, K3, K4)
- 5.6 Advantages of SPSS (K1, k2)

**Textbook:**

1. P. Ravilochanan – Research Methodology – Margham Publication, Chennai, Latest Edition.

**Books for Reference:**

1. B.N. Ghosh – Scientific Methods and Social Research – Sterling Publishers Pvt. Ltd., Delhi (Latest Ed.)
2. Dipakkumar Bhattacharya – Research Methodology – Excel Books, 2<sup>nd</sup> Edition 2010.
3. C.R. Kothari – Research Methodology Methods and Techniques – New Age International Publishers, Latest Edition.
4. Suresh Chandra and Mohit Kr. Sharma – Research Methodology, Narosa Publishing House – New Delhi – Second Edition

**WEB RESOURCE**

1. [www.researchgate.net](http://www.researchgate.net)
2. [www.research-methodology.net](http://www.research-methodology.net)
3. [www.academia.edu](http://www.academia.edu)
4. Indian Academic researcher's association (IARA)

## SEMESTER-IV

### UCBIK20- TAXATION - LAW AND PRACTICE

<b>Year:</b> II	<b>Course Code:</b>	<b>Title of The Course:</b> Taxation- Law and Practice	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>CREDITS</b> 5	<b>MARKS</b> 40+60
<b>SEM:</b> IV	UCBIK20						

#### COURSE OBJECTIVES

- To provide a thorough knowledge on concepts of Income tax, its provisions related to salary head.
- To impart knowledge on Income from House Property with deductions.
- To compute Capital Gain and with its exemptions.
- To Compute profits and gains from Business or Profession.
- To calculate income from other sources.

#### COURSE OUTCOME (CO):

The Learners will be able to

- ☐ Able to understand the provision and Compute Salary Income.
- ☐ Able to compute income from house property.
- ☐ Compute income from Capital Gain.
- ☐ Able to compute profit and gain of Business or Profession.
- ☐ Able to calculate income chargeable to Tax under other sources

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	M
CO2	H	M	H	M	M	M
CO3	H	M	H	M	M	M
CO4	H	M	H	M	M	M
CO5	H	M	H	M	M	M

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	H
CO2	H	M	H	H	M	M
CO3	H	H	M	H	H	M
CO4	H	M	H	H	M	M
CO5	H	M	H	M	H	M

## **COURSE SYLLABUS:**

### **UNIT I (15 Hours)**

- 1.1 Income Tax Act, 1961 – Important Definitions: Assessee, Assessment Year, Income, Person, Previous Year (K1, K2)
- 1.2 Incidence of Tax (K1, K2, K3)
- 1.3 Income exempt from Tax (K1, K2)
- 1.4 Salaries – Definition (K1)
- 1.5 Perquisites – Valuation and taxability of perquisites (K1, K2, K3)
- 1.6 Allowances – Deductions. (K1, K2, K3)

### **UNIT II (15 Hours)**

- 2.1 Income from House Property: Introduction (K1)
- 2.2 Municipal tax and standard Rent (K1, K2, K3)
- 2.3 Determination of Annual Value (K1, K2, K3)
- 2.4 Computation of Income from House property for Let out house (K1, K2, K3)
- 2.5 Computation of Income from House property for Self-occupied house (K1, K2, K3)
- 2.6 Deductions. (K1, K2, K3)

### **UNIT III (15 Hours)**

- 3.1 Capital Gains: Introduction – Definition (K1)
- 3.2 Kinds of Capital Assets (K1, K2)
- 3.3 Transfer – Transfer not regarded as transfer (K1, K2)
- 3.4 Computation of Short-term capital gain (Simple Problems) (K1, K2, K3)
- 3.5 Computation of Long-Term capital gain (Simple problems) (K1, K2, K3)
- 3.6 Exemption u/s 54(Simple Problems) (K1, K2, K3)

### **UNIT IV (15 Hours)**

- 4.1 Profits and Gains of Business or Profession: Introduction, Definition of business, Definition of Profession (K1, K2)
- 4.2 Income chargeable to Income tax under the head Profits and Gains of Business or Profession (K1, K2)
- 4.3 Profits and Gains of Business or Profession-Depreciation: Meaning, Assets eligible for Depreciation (K1, K2)
- 4.4 Profits and Gains of Business or Profession–Depreciation (Simple problems)
- 4.5 Computation of Business Income (K1, K2, K3)
- 4.6 Computation of professional Income. (K1, K2, K3)

### **UNIT V (15 Hours)**

- 5.1 Income from other Sources: Introduction, Definition (K1)
- 5.2 Income from other sources u/s 56 (K1, K2)
- 5.3 Incomes chargeable to tax (K1, K2)
- 5.4 Procedure for computing income from other sources (Simple Problems) (K1, K2, K3)
- 5.5 Deductions (K1, K2, K3)
- 5.6 Tax treatment of Income from other sources (Simple Problems) (K1, K2, K3)

## **TEXTBOOK**

Mehrotra H.C. – Income Tax Law and Practice – Sahithya Bhawan Publications, Agra (Latest Ed.)

## **REFERENCE**

1. Vinod K. Singhania – Students Guide to Income Tax – Taxman Publications Pvt. Ltd., (Latest Ed.)
2. Gaur and Narang – Income Tax – Sultan Chand and CLO. (Latest Ed.)
3. Hariharan – Income Tax Law and Practice – Vijay Nicole Imprints Pvt. Ltd., Chennai (Latest Ed.)
4. Reddy T.S. and Hari Prasad Reddy Y. – Income Tax – Margham Publications, Chennai. (Latest Ed.)

## **WEB RESOURCES**

- 1.<https://www.aegonlife.Com/insurance-investment-knowledge/inCome-tax-act-1961/>
- 2.<https://youtu.be/zchTfweoMHs>
- 3.<https://youtu.be/eTeMhqzl30A>
- 4.<https://youtu.be/sDXkWU2s5u0>
- 5.<https://youtu.be/5SH9z-afsA0>

## SEMESTER-IV

### UAIBA20- INTERNATIONAL BUSINESS

<b>Year: II SEM: IV</b>	<b>Course Code: UAIBA20</b>	<b>Title of The Course: International business</b>	<b>Course Type: Theory</b>	<b>Course Category: Elective II B</b>	<b>H/W 5</b>	<b>Credits 5</b>	<b>Marks 40+60</b>
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#### COURSE OBJECTIVES

- To introduce the concept of LPG and its impact on international business
- To make the students aware about the International trade organization WTO, UNCTAD.
- To develop investment decision making skills in International Financial Environment.
- To provide knowledge about operation management in International business.
- To enable the students aware of Export and Import procedures.

#### COURSE OUTCOMES (CO):

The Learners will be able to

- ☐ Understands the impact of globalization towards International business
- ☐ Aware about the functions of WTO, and UNCTAD.
- ☐ Ability to make money management decisions.
- ☐ Understands various operations involved in International business.
- ☐ Aware of documents required for export and import.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	M
CO2	H	M	H	M	M	M
CO3	H	M	H	M	M	M
CO4	H	M	H	M	M	M
CO5	H	M	H	M	M	M

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	L	M
CO2	H	H	H	M	M	M
CO3	H	H	H	L	L	M
CO4	H	M	H	M	M	M
CO5	H	M	H	M	M	M

## **COURSE SYLLABUS:**

### **UNIT I Introduction to International Business (15Hours)**

- 1.1 Globalization – Drives of Globalization – Difference between Domestic Business and International Business – Advantages (K1, K2)
- 1.2 Problems in International Business (K1, K2)
- 1.3 Mode of Entry into International Business (K1, K2, K3)
- 1.4 International Business Environment (K1, K2)
- 1.5 Economic Indicators (K1, K2)
- 1.6 Principles of International Business Law (K1, K2)

### **UNIT II International Trade Organization (15 Hours)**

- 2.1 An Overview – Policy framework for Global Trade (K1)
- 2.2 Instruments of Trade Policy – Development of World Trade System (K1, K2)
- 2.3 World Trade Organization (WTO) – Establishment – Principles – World Trade Organization (WTO) and India (K1, K2, K3)
- 2.4 World Trade Organization (WTO) – Establishment – Principles – World Trade Organization (WTO) and India (K1, K2, K3)
- 2.5 United Nations Conference on Trade and Development (UNCTAD)(K1, K2)
- 2.6 2.6 Export Promotion Council. (K1, K2)

### **UNIT III Regional Economic Cooperation (15 Hours)**

- 3.1 Integration and its Impact (K1, K2)
- 3.2 Integration efforts among countries in Europe and Asia (K1, K2)
- 3.3 International Financial Environment (K1, K2)
- 3.4 Investment Decisions (K1, K2)
- 3.5 Financial decisions (K1, K2, K3)
- 3.6 Money management decisions (K1, K2, K3)

### **UNIT IV Organizational Structure for International Business Operations (15 Hours)**

- 4.1 Operation Management (K1, K2, K3)
- 4.2 Financial Management (K1, K2, K3)
- 4.3 Human Resource Management (K1, K2, K3)
- 4.4 Marketing Management (K1, K2)
- 4.5 Conflicts and Negotiation in International Business. (K1, K2)
- 4.6 Negotiation International Business. (K1, K2, K3)

### **UNIT V Export Import Procedure and Documentation (15 Hours)**

- 5.1 Export Procedures in India – Export/Import Documents – Import Finance (K1, K2)
- 5.2 Multinational Enterprises – Types of Multinational Enterprises – Characteristics (K1, K2)
- 5.3 Impact of MNEs on Host Countries (K1, K2)
- 5.4 Factors influencing growth of Multinational Enterprises (MNEs) (K1, K2, K3)
- 5.5 Trade Agreement and Tariff (K1, K2)
- 5.6 Bill of Lading – Bill of Entry – Clearing and Forwarding Agents.

## **TEXTBOOK**

Jeyaranthanam. M – International Business Management – Himalaya Publishing House, Mumbai 2016.

## **REFERENCE**

1. Dr. C. B. Gupta – International Business – Sultan Chand Publications, New Delhi, 2014.
2. Sankaran. S – International Business and Environment, Margham Publications, 1<sup>st</sup> Edition, 2012.
3. Francis Cherunilam – International Business, Prentice Hall of India, 5<sup>th</sup> Edition, 2010.
4. Charles W.L. Hill and Arun Kumar Jain – International Business: Competing in the Global Market Place – McGraw Hill, 2013.
5. Justin Paul – International Business, Prentice Hall of India, 5<sup>th</sup> Edition, 2016.

## **WEB RESOURCES**

1. [https://youtu.be/P3\\_UONlthQg](https://youtu.be/P3_UONlthQg)
2. [www.wto.org](http://www.wto.org)
3. <https://www.careerlauncher.Com/rbi-grade-b/regional-Economic-CLOoperation/>
4. [www.yourarticlelibrary.Com](http://www.yourarticlelibrary.Com)
5. <https://www.slideshare.net/sabzdavid/exPLOrt-imPLOrt-procedure-and-documentation>

## SEMESTER-IV

### USBID20-HUMAN RESOURCE MANAGEMENT

<b>Year: II SEM  IV</b>	<b>Course Code: USBID20</b>	<b>Title of The Course: Human Resource Management</b>	<b>Course Type: Theory</b>	<b>Course Category: Skill Based Elective</b>	<b>H/W  2</b>	<b>Credits  2</b>	<b>Marks  40+60</b>
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#### COURSE OBJECTIVES

1. To impart knowledge about Human resource management.
2. To understand the concept of job evaluation and job analysis
3. To identify various motivational factors.
4. To develop the knowledge about Recruitment and Selection Procedures
5. To evaluate various Training and Performance appraisal methods.

#### COURSE OUTCOMES (CO):

1. Understands the need for Human resource management.
2. Demonstrates the knowledge of differentiating Job evaluation and job analysis.
3. Identifies various motivational factors.
4. Understands the Recruitment procedure and selection Policy of various sectors.
5. Able to identify the type of Training method and performance appraisal method required.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	M	H	M	H	M
CO3	H	M	H	H	M	M
CO4	H	M	H	H	M	H
CO5	H	M	H	H	H	H

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	M	M	H	M	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	M	H
CO4	H	H	H	M	M	H
CO5	H	H	M	M	H	H

## **COURSE SYLLABUS:**

### **UNIT I**

**(6 Hours)**

- 1.1 Introduction of Human Resource Management – Meaning – Definition (K1)
- 1.2 Characteristics (K1, K2)
- 1.3 Functions (K1, K2, K3)
- 1.4 Nature (K1, K2)
- 1.5 Role of HR Manager (K1, K2, K3)
- 1.6 Objectives of HRM (K1, K2)

### **UNIT II**

**(6 Hours)**

- 2.1 Job Analysis and Evaluation – Meaning –Definition (K1)
- 2.2 Advantages of Job Analysis (K1, K2)
- 2.3 Job Description (K1, K2)
- 2.4 Job Specification (K1, K2)
- 2.5 Job Evaluation: Introduction, Meaning (K1, K2)
- 2.6 Advantages and Limitations of Job evaluation. (K1, K2, K3)

### **UNIT III**

**(6 Hours)**

- 3.1 Motivation – Meaning- Definition (K1)
- 3.2 Nature of Motivation (K1, K2)
- 3.3 Characteristics of Motivation (K1, K2)
- 3.4 Characteristics of Motivation (K1, K2)
- 3.5 Importance of Motivation (K1, K2, K3)
- 3.6 Various Process of Motivation (K1, K2, K3)

### **UNIT IV**

**(6 Hours)**

- 4.1 Recruitment – Meaning and Definition (K1)
- 4.2 Sources of Recruitment (K1, K2, K3)
- 4.3 Merits and Demerits of Recruitment (K1, K2)
- 4.4 Factors Determining Recruitment (K1, K2)
- 4.5 Selection – Definition (K1)
- 4.6 Steps involved in Selection process. (K1, K2, K3, K4)

### **UNIT V**

**(6 Hours)**

- 5.1 Training – Needs for Training (K1, K2)
- 5.2 Importance of training (K1, K2, K3)
- 5.3 Methods of Training (K1, K2, K3)
- 5.4 Merits and Demerits (K1, K2)
- 5.5 Performance Appraisal (K1, K2, K3, K4)
- 5.6 Steps involved in Selection process. (K1, K2, K3, K4)

## **TEXTBOOK**

1. Dr. Ashwatthama, Human Resource management, McGraw Hill Education
2. S.S. Kanga, Human Resource management, S. Chand & sons
3. Edwin Phillip – Personnel Management
4. L. M. Prasad – Human Resource Management.

## **WEB RESOURCES**

1. <https://youtu.be/d8FpuHxd7MQ>

2. <http://www.whatishumanresource.Com/>

3. <https://youtu.be/oJ8y7HjUBCA>

4. [www.yourarticlelibrary.Com](http://www.yourarticlelibrary.Com)

5. <https://g.CLO/kgs/j5yQ5a>

**SEMESTER - V**  
**UCBIL20- ACCOUNTING FOR BANKING AND INSURANCE**

<b>Year: SEM: V</b>	<b>Course Code: UCBIL20</b>	<b>Title of The Course: Accounting for Banking and Insurance</b>	<b>The</b>	<b>Course Type: Theory</b>	<b>Course Category: Core</b>	<b>H/W 6</b>	<b>Credits 5</b>	<b>Marks 40+60</b>
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**Course Objective**

- a) To understand the procedures for issue of shares, forfeitures and reissue.
- b) To provide knowledge on redemption of preference shares.
- c) To enable students to prepare final statements of insurance Company.
- d) To give knowledge on preparation of final accounts of Banking Companies.

**Course Outcomes (CO):**

The Learners will be able to

- ☐ Understands the procedures for issue of shares and able to apply for shares in the Companies.
- ☐ Able to Compute accounts related to redemption of preference shares
- ☐ Prepares final accounts life insurance Companies as per IRDA regulations.
- ☐ Prepares final accounts of marine insurance Companies as per IRDA regulations.
- ☐ Prepares profit & loss accounts and Balance sheet of Banking Companies

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	M	H	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**COURSE SYLLABUS:**

**Unit I: Joint Stock Companies**

**(15 Hours)**

- 1.1 Joint Stock Companies meaning, definition (K1, K2)
- 1.2 Issue of share – Meaning (K1, K2)

- 1.3 Types of shares and share capital (K1, K2, K3)
- 1.4 Forfeiture of share – Meaning (K1, K2)
- 1.5 Re-issue of share (K1, K2, K3, K4)
- 1.6 Calculation of Capital Reserve of shares (K1, K2, K3, K4)

## **Unit II: Redemption of Shares**

**(15 Hours)**

- 2.1 Redemption of Preference shares –meaning (K1, K2)
- 2.2 Redemption of Preference shares (K1, K2, K3, K4)
- 2.3 Issue of debentures (K1, K2, K3, K4)
- 2.4 Redemption of debentures (K1, K2, K3, K4)
- 2.5 Underwriting of Shares (K1, K2, K3, K4)
- 2.6 Underwriting of Debentures (K1, K2, K3, K4)

## **Unit III: Insurance Company Accounts–LIC**

**(15 Hours)**

- 3.1 Insurance Company Accounts – Meaning (K1, K2)
- 3.2 Life insurance – Meaning (K1, K2)
- 3.3 Life Insurance - IRDA Regulations (K1, K2, K3)
- 3.4 Preparation of Profit and Loss account per IRDA Regulations (K1, K2, K3, K4)
- 3.5 Preparation of Balance sheet as per IRDA Regulations (K1,K2.K3.K4)
- 3.6 Valuation of Balance Sheet (K1, K2, K3, K4)

## **Unit IV: Insurance Company Accounts–GIC**

**(15 Hours)**

- 4.1 Insurance Company Accounts – General insurance – Meaning (K1, K2)
- 4.2 Format to Prepare Financial statements as per IRDA Regulations (K1, K2, K3, K4)
- 4.3 Fire Insurance – Introduction (K1, K2)
- 4.4 Fire Insurance – Preparation of Financial statements as per IRDA Regulations (K1, K2, K3, K4)
- 4.5 Marine Insurance – Introduction (K1, K2)
- 4.6 Marine Insurance – Preparation of Financial statements as per IRDA Regulations (K1, K2, K3, K4)

## **Unit V: Accounts of Banking Companies**

**(15 Hours)**

- 5.1 Accounts of Banking Companies – Introduction (K1, K2)
- 5.2 Accounts of Banking Companies – Schedules (K1, K2)
- 5.3 Calculation of Rebate on bills discounted (K1, K2, K3)
- 5.4 Accounts of Banking Companies - Profit & Loss (K1, K2, K3, K4)
- 5.5 Accounts of Banking Companies– Balance sheet (Simple problems) (K1, K2, K3, K4)
- 5.6 Preparation of Financial Statement (K1, K2, K3, K4)

## **Textbook**

Reddy T. S. & Murthy A. –Corporate Accounting - Margham Publications, Chennai (latest Ed.)

### **Books for Reference:**

1. Jain S.P. & Narang K.L. - Advanced Accounts - Vol. II - Kalyani Publishers., New Delhi, (Latest Ed.)
2. Gupta R.L. & Radhasamy M. - Advanced Accounts - II - S. Chand & CLO, Ltd., New Delhi, (Latest Ed.)
3. Dr. Maheshwari S.N. –Corporate Accounting - Vikas Publishing House, New Delhi, (Latest Ed.)
4. Dr. Arulanandam M.A. & Raman K.S. - Advanced Accountancy - Himalaya Publishing House, (Latest Ed.)
5. Shukla M.C., Grewal T.S. and Gupta - Advanced Accounts – Vol. II - S. Chand & Sons, New Delhi, (Latest Ed.)
6. Jain S.P. & Narang K.L. –Corporate Accounting - I – Kalyani Publishers., New Delhi, (Latest Ed.)

### **WEB RESOURCE**

1. [www.finance.ucla.edu](http://www.finance.ucla.edu)
2. [www.mca.gov.in](http://www.mca.gov.in)
3. Accounting coach
4. Saheb academy – YouTube channel

## SEMESTER- V

### UCBIM20 - CORPORATE LAWS

Year: Sem: V	Course code: Ucbim20	Title Of The Course: Corporate Laws	Course Type: Theory	Course Category: Core	H/W 6	Credits 4	Marks 40+60
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#### Course Objective

- Understands provisions of the Companies Act 2013.
- To develop knowledge on structure of Company management.
- To enable students to understand the procedures followed in conducting various meeting in Companies.
- To provide an overview of various Acts related to employees.
- To make students aware of winding up and modes of winding up of Companies.

#### Course Outcomes (CO):

The Learners will be able to

- ☐ Understands the frameworks of The Companies Act 2013.
- ☐ Identifies the procedures of appointment and role of directors.
- ☐ Understands and differentiates the need for articles of association and memorandum of association.
- ☐ Aware and apply the knowledge about rights of employees.
- ☐ Finds out the reason for winding up of Companies.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	H	M	M	M	H	H
CO3	H	M	M	M	M	H
CO4	H	H	H	H	H	H
CO5	H	M	M	M	M	H

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	H	M	M	M	H	H
CO3	H	M	M	M	M	H
CO4	H	H	H	H	H	H
CO5	H	M	M	M	M	H

## **COURSE SYLLABUS:**

### **Unit I: The Companies Act, 2013 (15 Hours)**

- 1.1 Companies Act, 2013- Introduction (K1)
- 1.2 Tabulation of all important Changes in the provisions between the Companies Act 1956 and the Companies, Act 2013(K1, K2)
- 1.3 Kinds of Companies (K1, K2)
- 1.4 Registration – Documents for Registration (K1, K2, K3)
- 1.5 Memorandum and Articles of Association – Preliminary Prospectus (K1, K2, K3)
- 1.6 Lifting the Corporate Veil – Doctrine of Indoor Management – Doctrine of Constructive Notice (K1, K2)

### **Unit II: Company Management (15 Hours)**

- 2.1 Reasons for Separation of Ownership and Management (K1, K2)
- 2.2 Structure of Company Management (K1, K2)
- 2.3 Legal position of Directors – Appointment of Directors – Retirement of Directors – By Rotation (K1, K2)
- 2.4 Re-appointment of retiring Directors – Appointment of new directors other than retiring directors (K1, K2)
- 2.5 Appointment of Independent Directors (K1, K2, K3)
- 2.6 Code of Conduct for Independent Directors (K1, K2, K3)

### **Unit III: Company Meetings: Law, Practice and Procedure (15 Hours)**

- 3.1 Meaning – Kinds of Company Meetings(K1)
- 3.2 General objects and purposes of Meetings (K1, K2)
- 3.3 Statutory Meetings (K1, K2)
- 3.4 Annual General Meeting – Statutory Provisions relating to Annual General Meeting – Duties of Company Secretary during Annual General Meeting (K1, K2)
- 3.5 Extraordinary General Meetings – Board Meetings- Committee Meetings – Class Meetings – Creditors’ Meetings (K1, K2)
- 3.6 Statutory Meeting – Statutory Report – Provisions relating to holding of Statutory Meeting – Secretarial Duties relating to Statutory Meetings - Proxies – Minutes of Resolutions (K1, K2, K3)

### **Unit IV: Laws relating to the Employees (15 Hours)**

- 4.1 The Employee’s Provident Fund and Miscellaneous Act, 1952 – Definitions (K1, K2)
- 4.2 Scheme and Features (K1, K2)
- 4.3 Determination of Moneys due from Employer - Recovery of Money due from Employers (K1, K2, K3)
- 4.4 The Payment of Bonus Act, 1956 – Objectives – Definitions – Determination of Bonus (K1, K2)
- 4.5 The Payment of Gratuity Act, 1972 – Definitions – Payment of Gratuity (K1, K2)
- 4.6 The Employees State Insurance (ESI) Act, 1948 – Definitions –Types of Benefits under the Act (K1)

### **Unit V: Winding Up of the Company (15 Hours)**

- 5.1 Meaning of Winding Up (K1, K2)
- 5.2 Winding Up and Dissolution (K1, K2)

5.3 Modes of Winding Up – Winding Up by the Tribunal- Official Liquidator (K1, K2)

5.4 Power exercisable with the sanction of the Tribunal (K1, K2)

5.5 Voluntary Winding Up – Procedure of Compulsory and Voluntary winding up (K1, K2, K3)

5.6 Powers and duties of Company liquidator in Voluntary winding up (K1, K2)

**Text Books:**

Santhi. J - company Law – Margham Publications, Chennai, 2018, Latest edition.

**Books for Reference:**

1. Kapoor N.D – Business Law – Sultan Chand & Publications, New Delhi, 2016.
2. Kapoor N.D – Mercantile Law – Sultan Chand & Publications, New Delhi, 2013.
3. company Law and Secretarial Practice – Balachandarn - Sultan Chand & Publications, New Delhi, 2016

**WEB RESOURCE**

1. Law 360: Corporate
2. Corporate law blog
3. [www.mca.gov.in](http://www.mca.gov.in)
4. Corporate law academy – YouTube channel

**SEMESTER – V**  
**UCBIN20 - PRACTICAL AUDITING**

<b>Year:</b> <b>III</b> SEM: V	<b>Course Code:</b> UCBIN20	<b>Title of The Course:</b> Practical Auditing	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
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**Course Objectives**

- a. To provide knowledge on fundamental Concepts of auditing
- b. To impart knowledge about various audit programme
- c. To make them aware about vouching of trading transactions
- d. To provide knowledge about verification and valuation of various types of assets and liabilities
- e. To enable students to prepare audit report

**Course Outcomes (CO):**

- ☐ Students will be versed in Concepts of auditing
- ☐ Apply various audit programme
- ☐ Able to vouch various trading transactions
- ☐ Able to evaluate various assets and liabilities
- ☐ Able to prepare audit report

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	M	M	H	M
CO5	H	H	M	H	H	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	M	M	H	H	M	H
CO2	M	M	H	H	H	H
CO3	H	M	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	M	M	H	H

## **COURSE SYLLABUS:**

### **Unit I: Introduction of Auditing (15 Hours)**

- 1.1 Meaning and Definition of Auditing (K1, K2)
- 1.2 Nature and Scope of Auditing (K1, K2)
- 1.3 Accountancy and Auditing, Auditing and Investigation (K1, K2)
- 1.4 Objectives of Auditing (K1, K2)
- 1.5 Limitations of Audit - Advantages of Audit (K1, K2)
- 1.6 Classification of Audit (K1, K2)

### **Unit II: Audit Programme and Internal Check (15 Hours)**

- 2.1 Meaning and Definition of Audit Programme (K1)
- 2.2 Advantages and Disadvantages (K1, K2)
- 2.3 Audit File, Audit Notebook (K1, K2)
- 2.4 Audit Working Papers - Purpose and Importance of Working Papers (K1, K2, K3)
- 2.5 Internal Check – Meaning, Objectives of Internal Check (K1, K2)
- 2.6 Features of Good Internal Check System - Auditors duty with regards to Internal Check System - Internal Check and Internal Audit. (K1, K2)

### **Unit III: Vouching (15 Hours)**

- 3.1 Vouching – Meaning (K1)
- 3.2 Objects (K1, K2)
- 3.3 Importance of Vouching (K1, K2)
- 3.4 Meaning of Voucher (K1, K2)
- 3.5 Vouching of Cash receipts and Cash Payments (K1, K2, K3)
- 3.6 Vouching of Trading Transactions. (K1, K2, K3)

### **Unit IV: Verification and Valuation of assets and liability (15 Hours)**

- 4.1 Verification and Valuation of assets (K1, K2, K3)
- 4.2 Verification and Valuation of liabilities (K1, K2, K3)
- 4.3 Meaning Verification (K1, K2, K3)
- 4.4 Objects of Verification (K1, K2)
- 4.5 Vouching and Verification (K1, K2)
- 4.6 Verification and Valuation of Different kinds of Assets and Liabilities (K1, K2, K3)

### **Unit V: Audit of Limited Companies and Auditors Report (15 Hours)**

- 5.1 The Audit of Limited Companies (K1, K2)
- 5.2 Necessity of Company Audit (K1, K2)
- 5.3 Qualification and Disqualification of Auditors (K1, K2)
- 5.4 Appointment - Removal - Remuneration - Status of Auditors (K1, K2, K3)
- 5.5 Rights - Power - Duties and Liabilities of Auditors (K1, K2)
- 5.6 Auditor's Report - Importance and Contents (K1, K2)

### **Textbook:**

Dr. Sundar J. and Parekh - Practical Auditing - Vijay Nicole Imprints, Chennai (Latest Ed.)

**Books for Reference:**

1. B.N. Tandon - A handbook of Practical Auditing Sultan Chand, New Delhi (Latest Ed.)
2. Tandon B.N., Sundharsanama and Sundharabahu - Practical Auditing - S. Chand, New Delhi (Latest Ed.)
3. Sharma - Auditing - SahityaBhawan Publication, Agra
4. Dr. N. Premavathy, Practical Auditing, Sri Vishnu Publications, Chennai.
5. DinakarPagare - Principles and Practice of Auditing - Sultan Chand & Sons, New Delhi, 2014.

**WEB RESOURCE**

1. [www.icaew.Com](http://www.icaew.Com)
2. [www.auditnet.org](http://www.auditnet.org)
3. [www.isaca.org](http://www.isaca.org)
4. Pwcinternal audit academy

## SEMESTER-V

### UCBIO20 – PROJECT

- During the fifth semester every student shall undertake a Project under the guidance of a supervisor/ guide from among the Staff members in the Department.
- The student shall select a topic related to Banking/ Insurance sectors and carry out the research study in a Public/ Private Sector Banks/ Insurance Companies.
- A Questionnaire shall be framed, and Sample Size shall be of 35.
- The student shall submit the dissertation at the fifth semester.
- The dissertation shall be valued for 100 marks.
- The allotment of marks shall be as follows:  
Internal Valuation – 40 Marks.  
External Valuation of the dissertation – 40 Marks.  
Viva Voce by the External Examiner – 20 Marks.

#### Course Objectives

- a) To enable students to undertake a relatively major research work related to Bank and Insurance sector.
- b) To enable students to write the research work in an effective manner.
- c) To provide a holistic knowledge on overall management, operation and functions of bank and insurance sector.

#### Course Outcomes (CO):

The Learners will be able to

- ☐ Identify Research Problem.
- ☐ Able to identify sample and collect data.
- ☐ Conduct research independently
- ☐ Demonstrate the skill of working on SPSS
- ☐ Carry out research in specialized areas like Bank and Insurance sector.  
Transmit their knowledge to the society.

CO/ PO	PO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	M	H	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	H	H
<b>CO4</b>	H	H	H	M	H	H
<b>CO5</b>	H	H	H	M	H	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	M	M	H	H	H	H
<b>CO2</b>	H	H	M	H	H	H
<b>CO3</b>	H	H	M	H	H	H
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	M	H	M	H	M	H

## SEMESTER V/VI

### UGBIA520/ UGBIA620- BANKING SYSTEM IN INDIA

<b>Year:</b> III <b>SEM:</b> V/VI	<b>Course Code:</b> UGBIA520/ UGBIB620	<b>Title of The Course:</b> Banking System In India	<b>Course Type:</b> Theory	<b>Course Category:</b> Non- major Elective	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 40+60
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#### Course Objectives

- ☐ To provide basic knowledge about banking and its operation.
- ☐ To impart thorough knowledge on banking structure in India.
- ☐ To understand the functions of Reserve Bank of India.
- ☐ To understand and access Digital Banking.
- ☐ To transact using different modes of Digital payment.

#### Course Outcomes (CO):

The Learners will be able to

- ☐ Understands the concepts of Banking operation.
- ☐ Able to differentiate private and public sector banks.
- ☐ Understands the functions of RBI.
- ☐ Able to access digital banking.
- ☐ Able to transfer money through digital payment.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	H	H	M	H	M	H
CO3	H	M	H	M	M	M
CO4	H	H	M	H	M	H
CO5	H	H	H	M	H	H

#### H- HIGH M- MEDIUM L- LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	H	M	M	M	M	H
CO3	H	M	H	H	M	M
CO4	H	H	H	H	M	H
CO5	H	H	H	M	H	H

## **COURSE SYLLABUS:**

### **Unit I: Introduction to Banking**

**(8 Hours)**

- 1.1 Origin of Banking – Banker (K1, K2)
- 1.2 Banking and Other Business (K1, K2)
- 1.3 Customer – The relationship between a Banker and Customer (K1, K2)
- 1.4 General relationship (K1, K2)
- 1.5 Statutory Obligation to Honor Cheques (K1, K2, K3)
- 1.6 Banker's Lien – Duty to maintain secrecy of Customer's Account (K1, K2, K3)

### **Unit II: Banking Structure**

**(8 Hours)**

- 2.1 Indigenous Bankers – Commercial Banks – Cooperative Banks – RRBs (K1, K2)
- 2.2 Foreign Banks – Development Banks (DB) (K1, K2, K3)
- 2.3 Industrial Development Bank of India (IDBI) (K1, K2, K3)
- 2.4 Industrial Finance Corporation of India (IFCI) – Industrial Reconstruction Bank of India (IRBI) (K1, K2)
- 2.5 National Bank for Agricultural and Rural Development (NABARD) – Export and Import Bank (EXIM) – National Housing Bank (NHB) (K1, K2)
- 2.6 Small Banking – Non- Banking Financial Company (NBFC) (K1, K2)

### **Unit III: Reserve Bank of India**

**(8 Hours)**

- 3.1 Introduction - Reserve Bank of India – Meaning (K1, K2)
- 3.2 Functions of RBI – Monetary functions (K1, K2)
- 3.3 Functions of RBI – Non - Monetary functions (K1, K2)
- 3.4 Introduction - Credit Control (K1, K2)
- 3.5 Methods of Credit Control – Quantitative or General Methods (K1, K2, K3)
- 3.6 Methods of Credit Control – Quantitative or General Methods (K1, K2, K3)

### **Unit IV: Introduction to Digital Banking**

**(8 Hours)**

- 4.1 Introduction to Digital Banking (K1, K2)
- 4.2 Brief History - Need for Digital Channels (K1, K2)
- 4.3 Customer preference for Digital Banking (K1, K2)
- 4.4 Types of Cards (K1, K2, K3)
- 4.5 Cards - Features – Benefits (K1, K2)
- 4.6 Magnetic Strip Card and Euro pay Master card Visa (EMV) Technology (K1, K2)

### **Unit V: Modes of Digital Payment**

**(8 Hours)**

- 5.1 Automatic Teller Machine (ATM) - History – Product Features – Instant Money Transfer (IMT) (K1, K2, K3)
- 5.2 Cash Deposit Machine (CDM) – Mobile Banking – Product Features (K1, K2, K3)
- 5.3 Immediate Payment System (IMPS) (K1, K2)
- 5.4 Online Banking – Product Features – Point-of-Sale (POS) – Features – Types (K1, K2, K3)
- 5.5 Aadhaar Enabled Payment System (AEPS) – Real Time Gross Settlement (RTGS) (K1, K2, K3, K4)
- 5.6 National Electronic Funds Transfer (NEFT) (K1, K2, K3, K4)

## **BOOK**

Study material will be provided to the students.

## **WEB RESOURCE**

1. [www.ebanking.Com](http://www.ebanking.Com)
2. [www.bigCommerce.Com](http://www.bigCommerce.Com)
3. [www.rbi.org](http://www.rbi.org)
4. [www.businessinsider.in](http://www.businessinsider.in)

## SEMESTER-V

### USBIE520- PRACTICAL ASPECTS OF INCOME TAX AND E- FILLING

<b>Year:</b> III <b>SEM:</b> V	<b>Course Code:</b> USBIE520	<b>Title of The Course:</b> Practical aspects of income tax and e- filling	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 40+60
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#### Course Objective

- a) To understand Set off and Carry forward of losses.
- b) To impart knowledge in Computing Total Income.
- c) To provide k
- d) knowledge on E-filing and its process.
- e) To understand instructions for filing out ITR forms
- f) To make them learn various procedure in XBRL

#### Course Outcomes (CO):

The Learners will be able to

- ☐ Understands set off and carry forward of losses.
- ☐ Able to Compute Total Income.
- ☐ Able to identify E-filing from regular filing returns.
- ☐ Able to file ITR online.
- ☐ Understands the Concept of XBRL.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	H	H
CO3	H	M	H	M	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	H	H	H	M	H
CO3	H	H	M	H	M	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

## **COURSE SYLLABUS:**

- Unit – I:** (6 Hours)
- 1.1 Set off and Carry forward of Losses (K1,K2,K3)
  - 1.2 Speculation Income (K1,K2,K3)
  - 1.3 Specific Business Income (K1,K2,K3)
  - 1.4 Horse Race Income (K1,K2,K3)
  - 1.5 Clubbing of Income (K1,K2,K3)
  - 1.6 Deemed Income (K1,K2,K3)
- Unit – II:** (6 Hours)
- 2.1 Gross Total Income (K1,K2,K3)
  - 2.2 Deductions form Gross Total Income (K1, K2,K3)
  - 2.3 Computation of Total Income (K1,K2,K3)
  - 2.4 Tax Deducted at Source (K1,K2,K3)
  - 2.5 Tax Collected at Source (K1,K2,K3)
  - 2.6 Computation of Tax Liability (K1,K2,K3)
- Unit – III** (6 Hours)
- 3.1 E-filing Practice: Introduction to E-filing (K1,K2,K3)
  - 3.2 E-filing different from the regular filling of returns (K1,K2,K3)
  - 3.3 Benefits – Limitation (K1,K2,K3)
  - 3.4 Types of E- Filing (K1,K2,K3)
  - 3.5 E-Filing process – IT Returns – Relevant Notification – E Filing security (K1,K2,K3)
  - 3.6 Introduction to GST – GSTIN - Procedure for Registration (K1, K2,K3)
- Unit – IV** (6 Hours)
- 4.1 Tax Return (K1,K2,K3)
  - 4.2 Tax Return Online (K1, K2, K3)
  - 4.3 Instructions for filling the Tax Return online (K1, K2, K3)
  - 4.4 ITR Tax -payer Guide Part I and Part II (K1, K2, K3)
  - 4.5 Instructions for Filing out ITR Forms (K1, K2, K3)
  - 4.6 Instructions for Filing out GST Forms (K1, K2, K3)
- Unit – V** (6 Hours)
- 5.1 XBRL Meaning (K1, K2)
  - 5.2 An introduction to Extensible business reporting language (XBRL) (K1, K2)
  - 5.3 E- filling procedure towards XBRL (K1, K2)
  - 5.4 E-Filing of ROC (K1, K2)
  - 5.5 Digital Signature (K1, K2, K3)
  - 5.6 Verification of Electronic Records. (K1, K2)

**Textbook:**

1. Mehrotra H.C.-Income Tax Law and Practice – Sahithya Bhawan Publications, Agra. (Latest.)
2. Web based material for E-Filing

**Reference Book:**

1. Vinod K. Singhania -students Guide to Income Tax – Taxman Publications Pvt. Ltd., (Latest.)
2. Gaur and Narang – Income Tax – Sultan Chand and CLO. (Latest Ed.)
3. Hariharan - Income Tax Law and Practice – Vijay Nicole Imprints Pvt. Ltd., Chennai (Latest.)
4. Reddy T.S. and Hari Prasad Reddy Y. – Income Tax – Margham Publications. Chennai. (Latest)

**WEB RESOURCE**

1. [www.incometaxindia.gov.in](http://www.incometaxindia.gov.in)
2. [www.taxsmile.Com](http://www.taxsmile.Com)
3. National academy for direct taxes
4. [www.cbic.gov.in](http://www.cbic.gov.in)

**SEMESTER- VI**  
**UCBIP20- ANALYTICAL SKILLS FOR BANKING AND INSURANCE**  
**EXAMINATION**

<b>Year: III SEM:VI</b>	<b>Course Code: UCBIP20</b>	<b>Title of The Course: Analytical Skills for Banking and Insurance Examination</b>	<b>Course Type: Theory</b>	<b>Course Category: Core</b>	<b>H/W 6</b>	<b>Credits 4</b>	<b>Marks 40+60</b>
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**Course Objectives**

- a. To enable students to acquire Competency in case of verbal
- b. To acquire knowledge in analytical skills
- c. To develop students to acquire Competency in case of non-verbal
- d. To make students aware of general knowledge related to Competitive exams.
- e. To provide Computer literacy related to the field

**Course Outcomes (CO)**

The Learners will be able to

- ☐ Demonstrate the knowledge in verbal reasoning.
- ☐ Demonstrates analytical skills in Mathematical operation
- ☐ Able to show skills in non -verbal reasoning
- ☐ Acquire updated knowledge in current affairs
- ☐ Demonstrate the knowledge of Computer technology.

CO/PO	PO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	M	H	M
<b>CO2</b>	H	H	M	H	H	H
<b>CO3</b>	H	H	M	M	H	H
<b>CO4</b>	H	M	H	M	H	M
<b>CO5</b>	H	H	M	H	H	M

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	M	H	M	H	M	H
<b>CO2</b>	H	M	H	M	H	H
<b>CO3</b>	H	H	M	H	M	H
<b>CO4</b>	H	H	M	H	M	H
<b>CO5</b>	H	H	H	M	H	M

## Course Syllabus

### Unit – I Verbal Reasoning – I (15 Hours)

- 1.1 Analogy Test (K1, K2, K3)
- 1.2 Coding – Decoding (K1, K2, K3)
- 1.3 Blood relations (K1, K2, K3)
- 1.4 Direction sense test (K1, K2, K3)
- 1.5 Sitting arrangement - Logical arrangement of words (K1, K2, K3)
- 1.6 Data Sufficiency - analytical reasoning statements, assumptions, arguments, and conclusion. (K1, K2, K3)

### Unit – II Verbal Reasoning – II (15 Hours)

- 2.1 Comparison of ranks – Logical based Venn diagrams (K1, K2, K3, K4)
- 2.2 Logical alphabet, number and time sequence test (K1, K2, K3, K4)
- 2.3 Letter series – Number series (K1, K2, K3, K4)
- 2.4 Mathematical operations (K1, K2, K3, K4)
- 2.5 Number Puzzles – Clock (K1, K2, K3, K4)
- 2.6 Calendar – Arithmetical Reasoning. (K1, K2, K3, K4)

### Unit – III Non -Verbal Reasoning (15 Hours)

- 3.1 Completion of series – Analogy (K1, K2, K3, K4)
- 3.2 Classification (K1, K2, K3, K4)
- 3.3 Counting of figures – Completion of figures (K1, K2, K3, K4)
- 3.4 Mirror image – Water Image (K1, K2, K3, K4)
- 3.5 Dot situation (or placement) (K1, K2, K3, K4)
- 3.6 English for competitive examination. (K1, K2, K3, K4)

### Unit – IV General Awareness (15 Hours)

- 4.1 History of India – Geography (K1, K2)
- 4.2 Economics – International Trade (K1, K2)
- 4.3 India's five years plans (K1, K2)
- 4.4 Banking – Indian Constitution – Culture (K1, K2)
- 4.5 Everyday Science- Sports – Books and Authors – Honors and Awards – Days and Commission (K1, K2)
- 4.6 Current Affairs (K1, K2)

### Unit – V Computer Knowledge (15 Hours)

- 5.1 Definition of computers – The Language of the Computer, Software – The History of Computers (K1, K2)
- 5.2 The development of computers – The characteristics of a computer – The different computing systems (K1, K2)
- 5.3 The need of computer literacy – Representing Information in computers (K1, K2)
- 5.4 Some Popular Operating systems (K1, K2)
- 5.5 Role of computers in Banking (K1, K2)
- 5.6 Important terms linked in Computer Technology (K1, K2)

**Textbooks:**

1. Agarwal R. S – A Modern Approach to Verbal Reasoning – S. Chand & Company Ltd., Ram Nagar, New Delhi-Reprint 2005.

**Books for Reference:**

1. Abhjit Gupta – Quantitative Aptitude for Competitive examinations – Tata McGraw Hill Publishing Company Limited, New Delhi, Seventh Reprint 2007.
2. Sewali B S & Indu Sijwali Reasoning Verbal and Nonverbal – Arihant Publications (I) Pvt Ltd, Meerut Single Ed, 2014.
3. R Gupta Popular master guide – Bank Clerical Cadre – Ramesh Publishing House, New Delhi, 2014
4. Sanjay Kumar – Unique Master Guide – State Bank of India: Clerical Recruitment Examination - Unique Publishers, New Delhi, 2012

**WEB RESOURCES**

1. [www.examsdaily.in](http://www.examsdaily.in)
2. [www.educationforever.in](http://www.educationforever.in)
3. Banking academy
4. [www.exambazaar,Com](http://www.exambazaar.Com)

**SEMESTER-VI**  
**UCBIQ20- FINANCIAL MANAGEMENT**

<b>Year:</b> <b>SEM:</b> VI	<b>Course Code:</b> UCBIQ20	<b>Title of The Course:</b> Financial Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 40+60
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**Course Objectives**

- a) To understand the role of modern financial manager.
- b) To enable students to analyse cost of capital.
- c) To impart knowledge on identifying optimum capital structure and factors determining it.
- d) To compute leverage of a company
- e) To provide thorough knowledge on various source of finance.

**Course Outcomes (CO):**

The Learners will be able to

- ☐ Understands the role of financial manager.
- ☐ Analyse the complexities associated with management of cost of funds in the capital structure.
- ☐ Recognize the factors that determine optimum capital structure.
- ☐ Compute leverage of a company
- ☐ Identify and analyse various sources of capital.

CO/PO	PO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	H	H	H
<b>CO2</b>	H	H	H	M	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	H	M	H	H
<b>CO5</b>	H	H	H	H	H	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	H	H	H
<b>CO2</b>	H	H	M	H	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	M	H	H	H
<b>CO5</b>	H	H	H	H	H	H

## **COURSE SYLLABUS:**

### **Unit – I (15 hours)**

- 1.1 Financial management meaning and definition (K1, K2)
- 1.2 Scope of Financial management (K1, K2)
- 1.3 Objectives of Financial management (K1, K2)
- 1.4 Functions of Financial management (K1, K2)
- 1.5 Role of Financial manager (K1, K2)
- 1.6 Methods and Tools of Financial management (K1, K2)

### **Unit – II (15 hours)**

- 2.1 Cost of Capital meaning and definition (K1, K2)
- 2.2 Components and Importance of Cost of capital (K1, K2)
- 2.3 Types – Cost of Debt (K1, K2, K3, K4)
- 2.4 Cost of Preference share capital (K1, K2, K3, K4)
- 2.5 Cost of Equity (K1, K2, K3, K4)
- 2.6 Factors determining cost of capital. (K1, K2, K3)

### **Unit – III (15 hours)**

- 3.1 Capital structure – meaning and definitions (K1, K2)
- 3.2 Difference between capital structure and capitalization (K1, K2)
- 3.3 Optimum capital structure- features (K1, K2, K3, K4)
- 3.4 Factors determining capital structure (K1, K2, K3)
- 3.5 Theories of capital structure – NI, NOI (K1, K2, K3)
- 3.6 Traditional approach and Modigliani and Miller Approach (K1, K2, K3)

### **Unit – IV (15 hours)**

- 4.1 Leverage - meaning and Types (K1, K2)
- 4.2 Types of leverage and degree of leverage (K1, K2, K3)
- 4.3 Dividend policy meaning, definition and nature. (K1, K2)
- 4.4 Factors determining dividend policy (K1, K2)
- 4.5 Dividend theories – Walter's model and Gordon's model (K1, K2, K3)
- 4.6 Modigliani Miller Approach. (K1, K2, K3)

### **Unit – V (15 hours)**

- 5.1 Sources of finance – Short term finance (K1, K2)
- 5.2 Purpose of short -term source (K1, K2)
- 5.3 Source of short- term finance (K1, K2, K3)
- 5.4 Long – term finance – purpose (K1, K2)
- 5.5 Factors determining financial requirements (K1, K2, K3)
- 5.6 Source of long -term finance. (K1, K2, K3)

**Textbook:**

1. Murthy A. – Financial Management – Margham Publications, Chennai, Reprint 2015

**Books for Reference:**

1. I.M. Pandey – Financial Management – Vikas publishing house Pvt ltd, New Delhi, 10<sup>th</sup> Edition, Reprint 2014
2. Dr. S. N. Maheswari – Financial Management – Principles and Practice – Sultan Chand & Sons Educational Publishers, New Delhi, 9<sup>th</sup> Edition 2014.
3. Prasanna Chandra – Financial Management – Theory & Practice – Tata McGraw Hill Publishing Company Ltd., New Delhi, 7<sup>th</sup> Edition 2011
4. Dr. N. Premavathy, Dr. M. Inbalakshmi – Financial Management – Sri Vishnu Publishers – Chennai, 1<sup>st</sup> Edition 2012.

**WEB RESOURCES:**

1. [www.toppr.com](http://www.toppr.com)
2. [www.tutorsglobe.com](http://www.tutorsglobe.com)
3. [www.bbamantra.com](http://www.bbamantra.com)
4. [www.corporatefinanceinstitute.com](http://www.corporatefinanceinstitute.com)
5. [www.accountingnotes.net](http://www.accountingnotes.net)

## SEMESTER- VI

### UCBIR20 - E –COMMERCE, E BANKING AND TALLY

<b>Year: III SEM: VI</b>	<b>Course Code:</b> UCBIR20	<b>Title of The Course:</b> E –Commerce, E Banking and Tally	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 40+60
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#### Course Objectives:

- To understand and learn about various activities and Components of E- Commerce
- To provide knowledge about application of Mobile Commerce
- To learn various e banking technologies
- To make aware of emerging trends in banking
- To create awareness on preparation of various accounts in TALLY

#### Course Outcomes (CO):

The Learners will be able to

- Logically observes and experience the activities of E –Commerce
- Able to access various mobile applications and mobile payments
- Able to make e payment
- Able to transact through new technologies
- Apply knowledge and work on tally software

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	M	H	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	M	H	M	H	H

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	M	H
CO2	H	M	H	M	H	H
CO3	H	M	M	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	M	H	H	H

## **COURSE SYLLABUS:**

### **Unit I: (15 Hours)**

- 1.1 Concept – elements – E-Commerce in Indian Scenario – Economic potential of E-Commerce (K1, K2, K3)
- 1.2 M-Commerce – Implementation of E-Commerce (K1, K2, K3)
- 1.3 Creation of website – technology – constraints on implementation (K1, K2, K3)
- 1.4 Advantages of E-Commerce (K1, K2, K3)
- 1.5 Business models of E-Commerce – B2B, B2C (K1, K2, K3, K4)
- 1.6 C2B, G2B and E-Governance. (K1, K2, K3, K4)

### **Unit II: (15 Hours)**

- 2.1 Mobile Commerce- Introduction – Factors that drive M-Commerce (K1, K2, K3)
- 2.2 Difference between E-Commerce and M-Commerce – Growth of M-Commerce in India (K1, K2, K3)
- 2.3 Advantages of mobile commerce (K1, K2, K3)
- 2.4 Technology behind Mobile commerce (K1, K2, K3)
- 2.5 Application of M-Commerce – Types of mobile payment (K1, K2, K3, K4)
- 2.6 Future of mobile commerce. (K1, K2, K3, K4)

### **Unit III: (15 Hours)**

- 3.2 E-Banking- Meaning – Benefits – Internet banking services – mobile banking (K1, K2, K3)
- 3.2 Tele banking – call Centre banking – features – ATM, credit card, debit card, smart card (K1, K2, K3)
- 3.3 Biometric and MICR Cheques – Benefits (K1, K2, K3)
- 3.4 Electronic clearing system – RBI Guidelines – benefits – Cheque transactions – E-Cheques (K1, K2, K3)
- 3.5 E-Money – digital cash – benefits to banker and customer (K1, K2, K3)
- 3.6 Single window – concept and benefits. (K1, K2)

### **Unit IV: (15 Hours)**

- 4.1 Emerging trends in banking – E-Banking (K1, K2, K3)
- 4.2 Centralized Online Realtime Electronic Banking CORE – Core banking solutions CBS (K1, K2, K3, K4)
- 4.3 Electronic clearing service ECS – Electronic fund transfer (K1, K2, K3, K4)
- 4.4 EFT – Realtime gross settlement RTGS (K1, K2, K3)
- 4.5 National electronic fund transfer NEFT (K1, K2, K3)
- 4.6 Society for worldwide interbank financial telecommunication SWIFT (K1, K2, K3, K4)

### **Unit V: (15 Hours)**

- 5.1 Introduction to Tally: Accounting and inventory – an outline – ledger and accounts – Trial balance (K1, K2, K3)
- 5.2 Trading and Profit and Loss account – Balance sheet (K1, K2, K3)
- 5.3 Fundamental of inventory – Account creation, Account information – Groups Introduction to GST - Enable GST feature in Tally - Structure of GST- (CGST – SGST – UTGST & IGST) - (K1,K2,K3)
- 5.4 Multiple groups – Ledger ( Multiple ledger). (K1,K2,K3)

- 5.5 Inventory master creation: Stock groups and stock items – entering vouchers and invoices: Different types of accounting vouchers and inventory vouchers (K1,K2,K3)
- 5.6 Reports in tally – Balance sheet, Profit and Loss account – Trial Balance – Day book – Ratio analysis – Reconciliation of bank account. (K1,K2,K3)

## **BOOK**

Study material will be provided to the students.

## **WEB RESOURCE**

1. [www.ecommerceguide.com](http://www.ecommerceguide.com)
2. [www.bigcommerce.com](http://www.bigcommerce.com)
3. [www.ibef.org](http://www.ibef.org)
4. [www.businessinsider.in](http://www.businessinsider.in)
5. ECommerce Academy

**SEMESTER- VI**  
**UCBIS20- PRACTICAL TALLY**

<b>Year: III</b> <b>SEM: VI</b>	<b>Course:</b> <b>Code:</b> UCBIS20	<b>Title of The</b> <b>Course:</b> Practical Tally	<b>Course</b> <b>Type:</b> Practical	<b>Course</b> <b>Category:</b> Core	<b>H/W</b>  2	<b>Credits</b>  2	<b>Marks</b>
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**Course Objectives:**

- a) To create Trading, Profit and Loss account.
- b) To Prepare Balance sheet using Single and Multiple Ledger.
- c) To calculate GST
- d) To prepare Bank Reconciliation Statement.
- e) To prepare stock summary.

**Course Outcomes (CO):**

- ☐ Creates Trading, Profit and Loss account.
- ☐ Prepares Balance sheet using Single and Multiple Ledger.
- ☐ Calculates GST and prepares tax statement
- ☐ Prepares Bank Reconciliation Statement.
- ☐ Analyze and prepares stock summary.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	H	M	H	M	H
CO3	H	M	M	H	H	H
CO4	H	M	H	M	H	H
CO5	H	H	M	M	H	H

## **COURSE SYLLABUS:**

<b>Exercise – I</b>	<b>(6 hours)</b>
Create a Trading and Profit and Loss Account	
<b>Exercise – II</b>	<b>(6 hours)</b>
Prepare a Balance Sheet Using Single and Multiple Ledger	
<b>Exercise – III</b>	<b>(6 hours)</b>
Enable GST feature and Prepare Tax Statement	
<b>Exercise – IV</b>	<b>(6 hours)</b>
Prepare a Bank Reconciliation Statement	
<b>Exercise – V</b>	<b>(6 hours)</b>
Analysing Inventory and Stock Summary	

### **Textbooks:**

Material will be given to students

### **Web Resources:**

1. [www.tally.com](http://www.tally.com)
2. [www.genesisaccounting.com](http://www.genesisaccounting.com)
3. [www.infosys.com](http://www.infosys.com)
4. [www.accountingstandards.com](http://www.accountingstandards.com)

## SEMESTER- VI

### UEBIE20- FINANCIAL SERVICES MANAGEMENT

<b>Year:</b> <b>III</b>	<b>Course Code:</b> UEBIE20	<b>Title of The Course:</b> Financial Services Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Core Elective	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
<b>SEM:</b> <b>IV</b>							

#### Course Objective

- ☐ To provide knowledge on merchant banking
- ☐ To impart thorough knowledge about factoring and leasing
- ☐ To make the students aware of venture capital.
- ☐ To impart knowledge about various credit rating institution in India
- ☐ To enhance knowledge on capital market and DEMAT Account.

#### Course Outcomes (CO):

The Learners will be able to

- ☐ Understands the Concepts of merchant banking
- ☐ Able to follow the procedures of leasing and factoring
- ☐ Assess various methods of financing
- ☐ Understand the functions of credit rating agencies
- ☐ Create DEMAT account and access online stock trading

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	M	M	M	H	H
CO2	H	M	M	M	H	H
CO3	H	M	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

#### H- HIGH M-MEDIUM L-LOW

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	H	H
CO2	H	M	M	M	H	H
CO3	H	M	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

## **COURSE SYLLABUS**

### **Unit I: (15 Hours)**

- 1.1 Financial services – Meaning (K1, K2,)
- 1.2 Type of merchant banking (K1,K2)
- 1.3 Merchant banking – meaning (K1, K2, K3)
- 1.4 Scope (K1,K2,K3)
- 1.5 Limitations of merchant bankers in public issues (K1,K2,K3)
- 1.6 Rights Issue (K1,K2)

### **Unit II: (15 Hours)**

- 2.1 Factoring – Definition – Types – Steps (K1,K2)
- 2.2 Key elements of Factoring (K1, K2)
- 2.3 Factoring (K1,K2,K3)
- 2.4 Leasing – Meaning – Terms in Leasing (K1,K2,K3)
- 2.5 Steps – Legal aspects – Advantages and Disadvantages (K1,K2,K3)
- 2.6 Types of Leasing (K1,K2,K3,K4)

### **Unit III: (15 Hours)**

- 3.1 Venture capital – Meaning (K1,K2)
- 3.2 Features, Importance of Venture Capital (K1, K2)
- 3.3 Methods of financing (K1, K2)
- 3.4 Forms of Venture Capital Investment (K1, K2)
- 3.5 Venture Capital Investment in India (K1, K2)
- 3.6 Moratorium Banking (K1, K2)

### **Unit IV: (15 Hours)**

- 4.1 Credit Rating – Objectives – Basis of Rating, Benefits- Defects (K1,K2,K3)
- 4.2 CRISIL (K1, K2, K3, K4)
- 4.3 ICRA (K1, K2, K3, K4)
- 4.4 CARE – International Credit Rating Centre (K1, K2, K3, K4)
- 4.5 Institutions (Moody's, Standard and poor, DCR) (K1, K2, K3, K4)
- 4.6 CIBIL – Calculation of CIBIL Score (K1, K2, K3, K4)

### **Unit V: (15 Hours)**

- 5.1 Capital Market – Need and Importance (K1,K2,K3)
- 5.2 NIM – Classification (K1, K2)
- 5.3 Stock Exchanges – Functions – Powers (K1,K2,K3)
- 5.4 SEBI Regulations – Weakness of stock exchanges (K1,K2,K3)
- 5.5 Types of Stock Traders – Stock Trading System (K1,K2,K3)
- 5.6 Online stock Trading - DEMAT account (K1,K2,K3,K4)

**Textbook:**

1. Santhanam B. – Financial services – Margham Publications Chennai,2007

**Book for Reference:**

1. Santhanam B. – Banking and financial systems – Margham Publications Chennai (ED-2015)
- 2.Sharma – Indian stock market – Regulation, Performance and Policy perspective, Deep and Deep publications (ED-2007)

**WEB RESOURCE**

1. [www.ibef.org](http://www.ibef.org)
2. [www.financialservices.gov.in](http://www.financialservices.gov.in)
3. Financial planning academy
4. [www.lifp.in](http://www.lifp.in)

**SEMESTER- VI**  
**UEBIF20- MARKETING**

<b>Year:</b> <b>III</b> <b>SEM:</b> <b>VI</b>	<b>Course Code:</b> UEBIF20	<b>Title of The Course:</b> Elective-II B: Marketing	<b>Course Type:</b> Theory	<b>Course Category:</b> Core Elective	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
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**Course Objectives**

- a) To understand the concepts of marketing and consumer behavior.
- b) To familiarize students about product and its brand loyalty
- c) To give knowledge about pricing policies
- d) To impart knowledge about promotion and its need
- e) To create awareness about Tele-marketing, E-marketing and Service marketing.

**Course Outcomes (CO):**

The Learners will be able to

- ☐ Understands the concept of marketing and consumer behavior
- ☐ Able to identify brand and build brand loyalty.
- ☐ Understands different methods of pricing
- ☐ Able to promote a product.
- ☐ Able to buy and sell through online marketing.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	M
CO2	H	H	M	H	H	M
CO3	H	H	M	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**H- HIGH M-MEDIUM L-LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	M	M	H	M	H	H
CO2	H	H	M	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

## **COURSE SYLLABUS:**

### **Unit –I (15 Hours)**

- 1.1 Marketing – Meaning (K1, K2)
- 1.2 Functions of Marketing (K1, K2)
- 1.3 Marketing Mix (K1, K2, K3)
- 1.4 Market Segmentation (K1, K2, K3)
- 1.5 Classification of Goods (K1, K2, K3)
- 1.6 Consumer Behavior – Meaning and Importance (K1, K2, K3)

### **Unit –II (15 Hours)**

- 2.1 Product – Meaning – Features (K1, K2)
- 2.2 New Product Planning and Development (K1, K2)
- 2.3 Product Life Cycle (K1, K2, K3)
- 2.4 Branding-Brand Loyalty and Equity, Copyrights, Trademarks (K1, K2, K3)
- 2.5 Patents (K1, K2, K3)
- 2.6 Packaging (K1, K2, K3)

### **Unit – III (15 Hours)**

- 3.1 Pricing – Meaning (K1)
- 3.2 Objectives (K1, K2)
- 3.3 Factors affecting Pricing (K1, K2, K3)
- 3.4 Methods of Pricing (K1, K2, K3)
- 3.5 Types of Pricing (K1, K2, K3)
- 3.6 Importance of Pricing (K1, K2, K3)

### **Unit - IV (15 Hours)**

- 4.1 Promotion – Meaning (K1, K2)
- 4.2 Need (K1, K2)
- 4.3 Promotion Mix (K1, K2, K3)
- 4.4 Methods of Promotion – Meaning (K1, K2, K3)
- 4.5 Advantages (K1, K2, K3)
- 4.6 Limitations (K1, K2, K3)

### **Unit – V (15 Hours)**

- 1.1 Channels of Distribution – Meaning (K1)
- 1.2 Types of Middlemen – Agent Middlemen and Merchant Middleman (K1, K2, K3)
- 1.3 Wholesalers and retailers (K1, K2, K3)
- 1.4 Tele-marketing, E-Marketing (K1, K2, K3)
- 1.5 Services Marketing (K1, K2, K3)
- 1.6 Recent Developments in Marketing (K1, K2, K3)

**Textbook:**

2. Pillai R.S.N. and Bagavathi V. – Modern Marketing – S. Chand and Co. Ltd., New Delhi, (Latest Ed.)

**Books for Reference:**

1. Rajan Nair and Sanjith R. Nair – Marketing – S. Chand and Co. Ltd., New Delhi, (Latest Ed.)
2. Philip Kotler – Marketing Management – Prentice Hall of India, New Delhi, (Latest Ed.)
3. Stanton William J.S. and Charles Futrell – Fundamentals of Marketing – Tata McGraw Hill, New Delhi, (Latest Ed.)
4. Gupta C.B. and Rajan Nair N. – Marketing Management – S. Chand and Co. Ltd., New Delhi, (Latest Ed.)
5. William M.O.C. Ferrel – Marketing: Concepts and Strategies – Himalaya Publishing House, New Delhi, (Latest Ed.)

**WEB RESOURCE**

1. Digital marketing academy India
2. [www.businessjargons.com](http://www.businessjargons.com)
3. [www.marketing-school.org](http://www.marketing-school.org)
4. web marketing academy

## SEMESTER VI

### USBIF620 - BANKING AND BUSINESS CORRESPONDENCE

<b>Year:</b> <b>III</b> <b>SEM:</b>  VI	<b>Course Code:</b>  USBIF620	<b>Title of The Course:</b>  Banking and Business Correspondence	<b>Course Type:</b>  Theory	<b>Course Category:</b>  Skill Based Elective	<b>H/W</b>  2	<b>Credits</b>  2	<b>Marks</b>  40+60
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#### Course Objectives

- a) To understand techniques of effective communication.
- b) To enable students to prepare various banking correspondence letters.
- c) To make students aware of specific terms used in insurance correspondence.
- d) To develops improve various skills to attend interview.
- e) To provide knowledge on preparation of resume and self -assessment.

#### Course Outcomes (CO):

The Learners will be able to

- ☐ Able to communicate effectively.
- ☐ Able to draft letters to Banks
- ☐ Able to draft letter to an insurance company
- ☐ Demonstrates better performance in interview
- ☐ Create own resume and able to self -evaluate.

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	H
CO2	H	M	H	M	M	H
CO3	H	H	M	H	M	M
CO4	H	M	H	M	M	H
CO5	H	M	M	M	M	H

**H- HIGH M- MEDIUM L- LOW**

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	M	M	H	M	H
CO3	H	H	H	M	M	M
CO4	H	M	M	H	M	H
CO5	H	M	H	M	M	H

## **COURSE SYLLABUS:**

### **UNIT I: Introduction to Business Communication (6 Hours)**

- 1.1 Business Communication – Meaning – Definition – Objectives (K1, K2)
- 1.2 Process of Communication (K1, K2)
- 1.3 Types of Communication (K1, K2)
- 1.4 Directions of Communication – Barriers to Effective Communication (K1, K2)
- 1.5 7Cs for Effective Business Communication (K1, K2)
- 1.6 Layout of Business Letter – Features in Layout (K1, K2, K3)

### **UNIT II: Bank Correspondence (6 Hours)**

- 2.1 Bank Correspondence – Essential Features of Bank Correspondence (K1, K2)
- 2.2 Letters from Customers to Bank (K1, K2, K3)
- 2.3 Letters from Bank to customers (K1, K2, K3)
- 2.4 Correspondence within the Bank (K1, K2, K3)
- 2.5 Proposal to Bank (K1, K2, K3)
- 2.6 Reply to Authorities Letter (K1, K2, K3)

### **UNIT III: Insurance Correspondence (6 Hours)**

- 3.1 Insurance Correspondence – Introduction (K1, K2)
- 3.2 Specific terms used in Insurance Correspondence (K1, K2)
- 3.3 Specimen letters – Meaning (K1, K2)
- 3.4 Specimen letters related to Life Insurance (K1, K2, K3, K4)
- 3.5 Specimen letters General Insurance (K1, K2, K3, K4)
- 3.6 Specimen letters Marine Insurance (K1, K2, K3, K4)

### **UNIT IV: Interview (6 Hours)**

- 4.1 Interview – Types – Job Interview (K1, K2)
- 4.2 Interview Process – Specialized Interview Formats – Mock Interview (K1, K2, K3)
- 4.3 Tips for Interviewee and Interviewer (K1, K2)
- 4.4 Qualities of Good Interviewer (K1, K2, K3, K4)
- 4.5 Do's and Don'ts in Interview (K1, K2, K3, K4)
- 4.6 Common Interview Questions (K1, K2, K3, K4)

### **UNIT V: Self Appraisal and Personality Development (6 Hours)**

- 5.1 Self -Assessment – Meaning (K1, K2)
- 5.2 Self –Assessment – way to Improve (K1, K2, K3, K4)
- 5.3 Market Assessment (K1, K2, K3, K4)
- 5.4 Resume (K1, K2, K3, K4)
- 5.5 Covering Letter to Resume (K1, K2, K3, K4)
- 5.6 Group Discussions (K1, K2, K3, K4)

### **BOOK:**

Study Material

### **WEB RESOURCES:**

1. [www.webcommuni.com](http://www.webcommuni.com)
2. [www.bankingadda.com](http://www.bankingadda.com)
3. [www.ibpsguide.com](http://www.ibpsguide.com)

# **Department of BBA (Hospital Administration) (UG)**

## **SYLLABUS AND REGULATIONS**

**Under**

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**(Effective for the Batch of Students Admitted from 2020-2021)**

## A) INSTITUTION LEVEL

**Vision:** The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:** To impart higher education to the economically weak, socially backward and needy students of Vellore and neighboring districts.

**Goal:** The goal of our educative endeavor is to produce in a Salesian atmosphere, intellectually enlightened, spiritually inspired, emotionally balanced, morally upright, socially committed, accomplished – in a word – integrally formed young women who will be agents of social transformation

## B) NAME OF THE PROGRAMME: BBA (HOSPITAL ADMINISTRATION)

### Objective of the Programme

Inspire young women to be involved in nation building through their knowledge, virtue and professional skills.

### Mission

Deliver teaching to young women who will be capable of shifting from academics to industry with technical knowhow and professional skills

## C) ELIGIBILITY CRITERIA OF THE PROGRAMME

+2 female candidates from any discipline can apply for this programmed.

## D) LIST OF COURSES

Sem	Part	Code	Title	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
I	I	ULTAA20	Tamil Paper II/ Hindi Paper II/ French Paper II	6	3	-	3	40+60
	II	UENGA20	English paper I	6	3	-	3	40+60
	III	UCHAA20	Fundamentals of Management	5	3	-	4	40+60
	III	UCHAB20	Foundation in Hospital Administration	5	3	-	4	40+60
	III	UAMST20	Allied I: Medical Statistics	5	3	-	5	40+60
	IV	USHAA120	Skill Based Elective I: Life Skills	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
			<b>Total</b>				<b>21</b>	<b>600</b>
II	I	ULTAB20	Tamil Paper II/ Hindi Paper II/ French Paper II	6	3	-	3	40+60
	II	UENGB20	English Paper II	6	3	-	3	40+60
	III	UCHAC20	Healthcare Ethics	5	3	-	4	40+60
	III	UCHAD20	Medical Terminology for Administration	5	3	-	4	40+60
	III	UAORA20	Allied II: Operations Research	5	3	-	5	40+60
	IV	USHAB220	Skill Based Elective II: Practical: Communication Skills in English	2	2	-	2	40+60

Sem	Part	Code	Title	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
	IV	UVEDA20	Value Education	1	-	-	-	
			<b>Total</b>				<b>21</b>	<b>600</b>
III	III	UCHAE20	Healthcare Laws	6	3	-	4	40+60
	III	UCHAF20	Hospital Operations Management – I	5	3	-	4	40+60
III	III	UCHAG20	Accounting for Hospital Administrators - I	6	3	-	4	40+60
	III	UAHCE20	Allied III: Health Care Economics	5	3	-	5	40+60
	III	UEHAA20	Elective I A: Business Environment	5	3	-	5	40+60
		UEHAB20	Elective I B: Logistics and Supply Chain Management					
	IV	USHAC320	Skill Based Elective III: Wellness Management	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
			<b>Total</b>				<b>24</b>	<b>600</b>
IV	III	UCHAH20	Human Resource Management and Development	6	3	-	4	40+60
	III	UCHAI20	Hospital Operations Management – II	5	3	-	4	40+60
	III	UCHAJ20	Introduction to Research Methodology	5	3	-	4	40+60
	III	UCHAK20	Accounting for Hospital Administrators – II	6	3	-	4	40+60
	III	UAHSM20	Allied IV: Health servicesMarketing	5	-	3	5	40+60
	IV	USHAD420	Skill Based Elective IV: Practical: Communication Skill in Hindi	2	2	-	2	40+60
	IV	UNEVS20	Environmental Studies	2	3	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
			<b>Total</b>				<b>25</b>	<b>700</b>
V	III	UCHAL20	Quality in Health Care	6	3	-	4	40+60
	III	UCHAM20	Organizational Behavior	6	3	-	4	40+60
	III	UCHAN20	Global Healthcare System	5	3	-	4	40+60
	III	UCHAO20	Project	2	2	-	4	80+20
	III	UEHAC20	Elective II A: Health Care Insurance	5	3	-	5	40+60
		UEHAD20	Elective II B: E -Banking					
	III	UGHAA521	Non Major Elective I: Management Information System	3	-	3	3	40+60

Sem	Part	Code	Title	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
	IV	USHAE520	Skill Based Elective V: Practical: Accounting Packages	2	2	-	2	40+60
	IV	UVEDA20	Value Education	1	-	-	-	-
			<b>Total</b>				<b>26</b>	<b>700</b>
VI	III	UCHAP20	Public Health and Community	8	3	-	4	40+60
	III	UCHAQ20	Materials and Equipment Management	8	3	-	5	40+60
	III	UCHAR20	Internship (2 Months)	-	-	-	8	60+40
	III	UGHAB620	Non Major Elective II: Practical: Advanced Excel	3	-	3	3	40+60
	IV	USHAF20	Skill Based Elective VI: Social Entrepreneurship	2	3		2	40+60
	IV	UVEDA20	Value Education	1	3	-	2	40+60
			<b>Total</b>				<b>24</b>	<b>600</b>
	V	UXTEN20	Extension Activities				1	
			<b>Grand Total</b>				<b>142</b>	<b>3800</b>

#### A) PROGRAMME OBJECTIVES

**PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:** Emulate positive social values and exercise leadership qualities and team work.

**PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

#### B) PROGRAMME SPECIFIC OUTCOME (PSO)

**PSO1** - Possess the basic knowledge and skills in managerial domain and healthcare domain.

**PSO2** - Demonstrate managerial knowledge and analytical skills in healthcare sector through reflective learning.

**PSO3** - Apply appropriate quantitative and qualitative techniques in solving business problems.

**PSO4** - Contribute to the sustainable development to the society through professional and entrepreneurial skills.

**PSO5** - Attain practical experience through analyzing the past and existing trends.

**PSO6** - Understand the ethical implications of decision-making and recognize

ethical dilemmas in managerial and healthcare domain.

PSO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	3	2	2	2	3	3
PSO2	3	2	2	2	3	3
PSO3	3	2	3	2	2	3
PSO4	3	3	2	3	2	3
PSO5	1	1	2	2	3	2
PSO6	2	2	2	3	3	2

(STRONGLY CORRELATED -3, MODERATELY CORRELATED – 2, WEAKLY CORRELATED -1)

## SEMESTER I

### UCHAA20 – FUNDAMENTALS OF MANAGEMENT

<b>Year:</b> I	<b>Course Code:</b> UCHAA20	<b>Title of the Course:</b> Fundamentals of Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### OBJECTIVES

1. To understand the evolution and fundamental concepts related to business.
2. To develop cognizance of the importance of management principles.
3. To demonstrate the roles, skills and functions of a manager.
4. To diagnose issues and develop optimal managerial decisions in an organizational set up.
5. To understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.

#### COURSE OUTCOMES (CO)

1. Understand the management theories, functions and responsibilities of managers.
2. Formulate and design plans by suitably applying SWOT in decision making.
3. Relate and discuss the process of organising, delegating and staffing in an organisation.
4. Recognise the need of directing, coordinating and controlling in the work environment.
5. Classify and determine reporting and budgeting process.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	L	L	M
CO2	H	H	M	M	L	M
CO3	H	H	M	L	L	M
CO4	H	H	M	L	L	M
CO5	H	H	M	L	L	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	M	M	H
CO2	M	M	H	M	H	H
CO3	H	L	M	H	M	M
CO4	H	L	M	M	M	H
CO5	H	L	M	M	M	M

(Low - L, Medium - M, High - H)

## **Syllabus**

### **Unit I: Introduction**

- Introduction - Definition - Nature (K1, K2)
- Scope of Management (K1, K2)
- Functions of Management (K1, K2)
- Contributions of F W Taylor (K1, K2)
- Contributions of Henry Fayol (K1, K2)
- Contributions of Peter Drucker (K1, K2)

### **Unit II: Planning**

- Planning – characteristics - Importance (K1, K2)
- Types of planning – Process (K1, K2)
- SWOT Analysis to formulate strategy (K1, K2, K3, K4)
- Decision Making - Types of decision (K1, K2)
- Process of decision making (K1, K2)
- Barriers to decision and steps to overcome (K1, K2)

### **Unit III: Organizing and Staffing**

- Organizing - Types of organization (K1, K2, K3)
- Organization charts - Formal and informal organization (K1, K2, K3)
- Authority – sources – types of authority – pros and cons (K1, K2)
- Delegation – principles of delegation – distinction between centralization and decentralization (K1, K2)
- Staffing – Meaning – Nature – Importance - Recruitment (K1, K2)
- Selection – Training (K1, K2, K3)

### **Unit IV: Direction, Coordination and Controlling**

- Directing – Nature – Meaning - Significance (K1, K2, K3)
- Coordination Principles – Distinction between coordination and cooperation (K1, K2)
- Need for coordination Techniques (K1, K2)
- Control – principles Types (K1, K2, K3, K4)
- Control Techniques (K1, K2, K3, K4)
- Principles of control process – pros and cons (K1, K2, K3, K4)

### **Unit V: Reporting and Budgeting**

- Reporting – Meaning - Nature (K1, K2, K3, K4)
- Types of Reports (K1, K2, K3, K4)
- Budgeting Principles (K1, K2, K3, K4)
- Objective and Purpose of Budgeting (K1, K2, K3, K4)
- Modern Types of budgeting (K1, K2, K3, K4)
- Traditional Procedures (K1, K2, K3, K4)

### **Case Study for all chapters** **Textbooks**

1. L.M. Prasad, Principles of Management, Sultan Chand and Sons, 8<sup>th</sup> Edition, 2012.
2. C.B. Gupta, Business Management, Sultan Chand and Sons, 7<sup>th</sup> Edition, 2013.

**Reference Books**

1. Stephens R. Robbins and David A Decenzo, Fundamentals of Management Pearson Education 7<sup>th</sup> Edition, 2013
2. H. Koontz and Wehrich, Essentials of Management, Tata McGraw Hill, 8<sup>th</sup> Edition, 2010.
3. Samuel C.Certo, Modern management: concepts and skills 15<sup>th</sup> Edition, 2019.

## SEMESTER I

### UCHAB20 – FOUNDATION IN HOSPITAL ADMINISTRATION

<b>Year : I Sem: I</b>	<b>Course Code:</b> UCHAB20	<b>Title of the Course:</b> Foundation in Hospital Administration	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objectives

1. To understand the overall healthcare systems.
2. To develop effective communication skills.
3. To develop essential analytical skills.
4. To develop effective computer skills.
5. To develop the personality skills of an individual.

#### COURSE OUTCOMES (CO)

1. Understand the functions of various healthcare systems and learn relevant medicalterminology.
2. Understand, recognize the importance of communication skills and develop iteffectively.
3. Understand and enhance analytical skills.
4. Understand, recognise the importance of computer skills and develop it.
5. Develop the personality skills of an individual.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	M
CO2	H	M	M	L	L	M
CO3	H	H	M	L	L	M
CO4	H	M	M	L	L	M
CO5	H	M	M	L	L	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	L	L	L
CO2	L	M	L	L	L	M
CO3	M	H	H	L	M	L
CO4	L	M	L	M	L	L
CO5	L	L	M	M	L	L

(Low - L, Medium - M, High - H)

#### Syllabus

##### Unit I: Over view of health services

Medicine - Alternative Medicine (K1, K2)

Hospitals - Types of Hospitals (K1, K2, K3)

Types of Patient - Hospital Departments (K1, K2, K3)

Diseases, treatment and technology (K1, K2, K3)  
Medical Vocabulary (K1, K2, K3)  
Current Trends in Healthcare (K1, K2, K3)

#### **Unit II: Communication skills**

Communication - Compelling Communication (K1, K2, K3)  
Enhancing group activity – Interpersonal Listening (K1, K2, K3)  
Teamwork - Verbal Communication (K1, K2, K3)  
Written Communication (K1, K2, K3)  
Audio-visual Presentations (K1, K2, K3)  
Etiquette (K1, K2, K3)

#### **Unit III: Analytical Skills**

Creativity - Problem-solving (K1, K2, K3)  
Critical Thinking- Solve problems - Decision making (K1, K2, K3)  
Logical thinking - Understanding and analyzing issues and problems (K1, K2, K3)  
Diagramming Numerical techniques and analysis (K1, K2, K3)  
Study and research skills (K1, K2, K3)  
SWOT Analysis (K1, K2, K3)

#### **Unit IV: Computer skills**

Microsoft Office - Spreadsheets (K1, K2, K, K4)  
PowerPoint (K1, K2, K, K4)  
Access (K1, K2, K, K4)  
Excel (K1, K2, K, K4)  
Email Web and Social Skills (K1, K2, K, K4)  
Graphic and Writing Skills (K1, K2, K, K4)

#### **Unit V: Personality Development**

Time management (K1, K2, K, K4)  
Thinking Skills - Determination and Persistence (K1, K2, K, K4)  
Presentation Skills (K1, K2, K, K4)  
Developing Leadership Skills (K1, K2, K, K4)  
Interpersonal Skills (K1, K2, K, K4)  
Positive attitude – Integrity – Treat people with respect (K1, K2, K, K4)

#### **Text Books**

1. Asha Kaul, Effective Communication Methods, PHI Learning, 2000.
2. Peter Norton, Introduction to Computers, Tata McGraw-Hill, 6<sup>th</sup> Edition, 2008.

#### **Reference Books**

1. V.K.Mahajan, Health Education, 2002.
2. John Adair, Effective Communication (Revised Edition): The most important management skill of all (Most Important Management Tool of All) Paperback–Unabridged, 2009.
3. B.S. Sijwali and Indu Sijwali, A new approach to reasoning verbal & nonverbal,

2014.

**SEMESTER I**  
**UAMST20 – ALLIED I: MEDICAL STATISTICS**

<b>Year:</b> I	<b>Course Code:</b> UAMST20	<b>Title of the Course:</b> Medical Statistics	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Objectives**

1. To introduce the basic concepts of statistics.
2. To make decisions based on statistical representation related to hospital administration.

**COURSE OUTCOMES (CO)**

1. Solve basic mathematical problems using matrices
2. Use various differentiation techniques
3. Give graphical representation of statistical data
4. Understand the concepts related to statistics
5. Analyze problems related to statistical measures

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	L	H
CO2	H	M	M	M	M	H
CO3	L	L	L	L	L	H
CO4	H	H	L	M	M	H
CO5	M	M	M	M	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	L
CO4	H	H	H	H	H	L
CO5	H	H	H	H	H	M

(Low - L, Medium - M, High - H)

**Syllabus**

**Unit I: Matrices**

- Definition - Types of matrices (K1, K2)
- Matrix operations - Determinant of a matrix (K1, K2, K3, K4)
- Singular and non-singular matrices (K1, K2, K3, K4)
- Inverse of a matrix by co-factor method (K1, K2, K3, K4)
- Rank of a matrix (K1, K2, K3, K4)

Solution of system of linear simultaneous equations using Cramer's rule (K1, K2, K3, K4)

### **Unit II: Differentiation**

Derivatives of standard functions  $x^n$ ,  $e^x$ ,  $\log x$ , constant (without proof) (K1, K2, K3)

Rules of differentiation (Addition, difference, product, quotient) (K1, K2, K3, K4)  
chain rule, Successive differentiation (up to 2<sup>nd</sup> derivative) (K1, K2, K3, K4)

Uses: Marginal Concepts, Elasticity of demand (K1, K2, K3, K4)

Increasing and decreasing functions (K1, K2, K3, K4)

maxima and minima – break-even point (K1, K2, K3, K4)

### **Unit III: Classification and Graphical Representation**

Introduction - meaning of classification - chief characteristics of classification (K1, K2)

Objects of classification - rules of classification (K1, K2)

Frequency distributions (K1, K2, K3, K4)

Cumulative frequency distribution - bivariate frequency distributions (K1, K2, K3, K4)

Graph of frequency distribution - histogram (K1, K2, K3, K4)

frequency polygon - frequency curve (K1, K2, K3, K4)

### **Unit IV: Measures of Central Tendency**

Arithmetic mean (K1, K2, K3, K4)

Median (K1, K2, K3, K4)

Mode – Empirical formulae (K1, K2, K3, K4)

Combined and Weighted arithmetic mean (K1, K2, K3, K4)

Geometric mean (K1, K2, K3, K4)

Harmonic mean (K1, K2, K3, K4)

### **Unit V: Measures of Dispersion and Skewness**

Range - quartile deviation (K1, K2, K3, K4)

Mean deviation (K1, K2, K3, K4)

Standard deviation (K1, K2, K3, K4)

Karl Pearson's and Bowley's coefficient of Skewness (K1, K2, K3, K4)

Correlation (K1, K2, K3, K4)

Regression (K1, K2, K3, K4)

### **Textbooks:**

1. P.A. Navnitham, Business Mathematics and Statistics, Jai Publishers, Trichy, 2007.
2. R.S.N. Pillai and Bagavathi, Statistics, S. Chand and Company, New Delhi, 17<sup>th</sup> Edition, 1984.

### **Reference Books:**

1. S.P. Gupta, Statistical Methods, Sultan Chand, 2012.
2. Levin and Rubin, Statistics for Management, Pearson Publication, 8<sup>th</sup> Edition, 2017.

## SEMESTER I

### USHAA120 - SKILL BASED ELECTIVE I: LIFE SKILLS

<b>Year:</b> I	<b>Course Code:</b> USHAA120	<b>Title of the Course:</b> Life Skills	<b>Course Type:</b> Theory	<b>Course Category:</b> : Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 60
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#### Objectives

1. To understand the importance of Basic Life Support (BLS).
2. To understand the essentials of Chemical and Radiation Safety.
3. To understand the significance of Hand Hygiene.
4. To understand the aspects of Occupational Health.
5. To understand the mandates of Fire Safety and Disaster Management.

#### COURSE OUTCOMES (CO)

1. Understand and deliver Basic Life Support (BLS) in case of emergency.
2. Recognise the sources and effects of radiation and learn the principles of Radiation Protection and Safety.
3. Understand and demonstrate the various steps of hand hygiene.
4. Comprehend several occupational health hazards and its preventive measures.
5. Acquire knowledge on the Fire Safety and Disaster Management and practical exposure to handle fire extinguishers.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	L	L	M
CO2	H	L	M	L	L	M
CO3	H	L	M	L	L	M
CO4	H	L	M	L	L	M
CO5	H	L	M	L	L	M

CO	PSO					
	1	2	3	4	5	6
CO1	L	L	L	L	M	L
CO2	L	L	L	L	L	L
CO3	L	L	L	L	L	L
CO4	L	L	L	L	M	L
CO5	L	L	L	L	M	L

(Low - L, Medium - M, High - H)

## **Syllabus**

### **Unit I: Basic Life Support (BLS) and Chemical Safety**

- Immediate Life Support (ILS) (K1, K2, K3, K4)
- Sequence of Actions (K1, K2, K3, K4)
- Procedure (K1, K2, K3, K4)
- Choking (K1, K2, K3, K4)
- Chemical Safety (K1, K2, K3, K4)
- Physical, health and Environment Hazards (K1, K2, K3, K4)

### **Unit II: Radiation Safety**

- Safety Data Sheet (K1, K2, K3, K4)
- Personal Protective Equipment (K1, K2, K3, K4)
- Radiation Safety (K1, K2, K3, K4)
- Radiation and Radioactivity (K1, K2, K3, K4)
- Biological Effects – ALARA (K1, K2, K3, K4)
- General Radiation safety (K1, K2, K3, K4)

### **Unit III: Hand Hygiene**

- Hand hygiene techniques (K1, K2, K3, K4)
- Stages of effective hand hygiene (K1, K2, K3, K4)
- General rules of hand hygiene at work (K1, K2, K3, and K4)

### **Unit IV: Occupational Health**

- Introduction to OSHA (K1, K2, K3, K4)
- OSHA standards (K1, K2, K3, K4)
- Safe and Healthful workplace (K1, K2, K3, K4)
- Employer Responsibilities (K1, K2, K3, K4)

### **Unit V: Fire Safety and Disaster Management**

- Fire- Classes of fire (K1, K2, K3, K4)
- Types of Fire extinguisher - Dos and Don'ts during fire (K1, K2, K3, and K4)
- Disaster Management Preparedness – Response – Recovery – Mitigation (K1, K2, K3, K4)
- Types of disaster – Natural and Manmade disaster (K1, K2, K3, K4)
- Characteristics and phases of disaster (K1, K2, K3, K4)
- Disaster impact (K1, K2, K3, K4)

## **Text Books**

1. K.V.Ramani, Hospital Management: Text and Cases, 1<sup>st</sup> edition, Pearson EducationIndia, 2013.
2. D.C.Joshi, Mamta Joshi, Hospital Administration, Jaypee Brothers Medical Publishers, 2009.

**Reference Books**

1. National Disaster Management Guidelines, Hospital Safety: A publication of National Disaster Management, Authority Government of India, NDMA February, 2016.
2. OSHA Field Safety and Health Manual, Occupational Safety and Health Administration, (OSHA).
3. Patient safety assessment manual, WHO, 2<sup>nd</sup> Edition, 2016.

**SEMESTER II**  
**UCHAC20 – HEALTH CARE ETHICS**

<b>Year:</b> I	<b>Course Code:</b> UCHAC20	<b>Title of the Course:</b> Healthcare Ethics	<b>Course Type:</b> Theory	<b>Course Category:</b> : Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> II							

**Objectives**

1. To understand and recognize the roles, aspects and importance of business ethics.
2. To understand and distinguish the various aspects of social responsibilities of business.
3. To understand and recognize the fundamental aspects and legal implications of medical ethics.
4. To understand, recognize and interrelate various ethical issues within the healthcare context.
5. To develop and implement effective ethical systems in business and clinical areas of the hospital.

**COURSE OUTCOMES (CO)**

1. Understand and recognize the role of ethics in business.
2. Understand and recognize the social responsibilities of business entities towards staff, stakeholders and community.
3. Understand and interrelate fundamental aspects of medical ethics.
4. Recognize and infer various aspects of healthcare and research which may infringe on patient rights.
5. Distinguish various aspects of end and beginning of life ethical issues and ensure ethical compliance.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	H
CO2	H	H	M	M	H	H
CO3	H	H	M	M	H	H
CO4	H	H	M	M	H	H
CO5	H	H	M	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	M	L	L	M	M	H
CO2	M	L	L	H	M	H
CO3	H	M	L	M	M	H
CO4	H	M	L	L	M	H
CO5	H	H	M	L	L	H

(Low - L, Medium - M, High - H)

## **Syllabus**

### **Unit I: Corporate Ethics**

Role and importance of Business Ethics and Values in Business (K1, K2, K3)  
Definition of Business Ethics Impact on Business Policy (K1, K2, K3)  
Business Strategy and its impact (K1, K2, K3)  
Types of Ethical Issues – Bribes – Coercion – Deception – Theft – Unfair  
Discrimination (K1, K2, K3)  
Professional ethics (K1, K2, K3)  
Ethics in India (K1, K2, K3)

### **Unit II: Corporate Social Responsibility and Distributive Justice**

Corporate Social Responsibilities - Purpose (K1, K2, K3)  
Social Responsibilities towards Shareholders (K1, K2, K3)  
Employees – Customers, Dealers, Vendors and Government (K1, K2, K3)  
Examples of CSR in India (K1, K2, K3)  
Social Audit Principles (K1, K2, K3)  
Distributive Justice (K1, K2, K3)

### **Unit III: Codes of Conduct**

Principles of Medical Ethics (K1, K2, K3)  
International Code of Ethics (K1, K2, K3)  
Duties of a Doctor Patient –Paramedical (K1, K2, K3)  
Health Resources (K1, K2, K3)  
Malpractice and Negligence (K1, K2, K3)  
Medical Negligence (K1, K2, K3)

### **Unit IV: Professional and Personal**

Confidentiality: (Professional Secrecy) (K1, K2, K3)  
Rights of Patients (K1, K2, K3)  
Consent Informed Consent (K1, K2, K3)  
Privileged Communication (K1, K2, K3)  
Irrational Drug Therapy Human Experimentation (K1, K2, K3)  
Clinical Trials (K1, K2, K3)

### **Unit V: Emerging Issues**

Sex Pre-selection and Female Feticide (K1, K2, K3)  
Reproductive Medicine Ethical Issues in Transplantation (K1, K2, K3)  
Assisted Reproductive Technologies (K1, K2, K3)  
Surrogacy (K1, K2, K3)  
Abortion Euthanasia (K1, K2, K3)  
Organ Donation (K1, K2, K3)

### **Textbooks**

1. CM Francis, Medical Ethics, Jaypee, 2<sup>nd</sup> edition, 2007.

2. Shaw William, Business Ethics, Cenage Publishers, 2016.

**Reference Book**

1. Sankaran S, Business Ethics, Margham Publications, 2005.

2. Erich E.H. Loewy, Roberta Springer Loewy, Textbook of Healthcare Ethics, Springer, 2<sup>nd</sup> Edition, 2005.

3. Morrison, Elizabeth Furlong, Healthcare Ethics Critical Issues for the 21<sup>st</sup> century, 4<sup>th</sup> Edition, 2014.

**SEMESTER II**  
**UCHAD20 - MEDICAL TERMINOLOGY FOR ADMINISTRATION**

<b>Year:</b> I <b>Sem:</b> II	<b>Course Code:</b> UCHAD20	<b>Title of the Course:</b> Medical Terminology for Administration	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand and recognize the whole organization of the body.
2. To understand and distinguish the various Muscular-Skeletal system.
3. To understand and distinguish the various Digestive system.
4. To understand and read standard medical abbreviations.
5. To understand and implement right usage of medical terms.

**COURSE OUTCOMES (CO)**

1. Understand and recognize the fundamentals of Anatomy and Physiology.
2. Comprehend various Musculoskeletal System of a human body.
3. Recognize and understand cardiovascular system, respiratory system, digestivesystem and excretory system.
4. Develop ability to read and understand medical documentation and medicalliterature.
5. Recognize and learn the meanings of Standard Medical Abbreviations.

CO	PO					
	1	2	3	4	5	6
CO1	H	L	H	L	L	M
CO2	H	L	H	L	L	M
CO3	H	L	H	L	L	M
CO4	H	L	H	L	L	M
CO5	H	L	H	L	L	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	L	L	L	L
CO2	M	H	L	L	L	L
CO3	M	H	L	L	L	L
CO4	H	H	L	L	M	M
CO5	M	H	L	L	L	L

(Low - L, Medium - M, High - H)

**Syllabus**

**Unit I: Anatomy and Physiology**

Definition of the terms Anatomy (K1, K2)

Definition of the terms Physiology (K1, K2)

Types of Anatomy Definition of terms used to describe the parts of the body (K1, K2)

Definition of various regions of the body (K1, K2)

The body as a whole organization of the body: Cells, tissues, organs (K1, K2)

Membranes and glands. (K1, K2)

## **Unit II: Anatomic and Physiological Description**

Musculoskeletal System Bone types, structure, functions Joints, structure and functions Ligaments, and tendons Muscles, types, structure and functions of muscles – Related Diseases, types of fractures. (K1, K2, K3)

Nervous System functions of neurons – Central, Peripheral nervous and Autonomous nerves systems Related Diseases (K1, K2, and K3)

Cardiovascular System Heart position, structure, conduction system, functions and cardiac cycle Blood vessels, Circulation of blood; Systemic, pulmonary and portal Blood pressure and pulse – Related Diseases (K1, K2, K3)

Lymphatic system Lymph vessels, glands, ducts and lymph circulation Lymph nodes in the body, spleen – Related Diseases (K1, K2, K3)

Respiratory System Structure and function of respiratory organs Physiology of respiration –Related Diseases. (K1, K2, K3)

Sensory organs: Structure and function of the Eye [vision], the Ear [hearing],and Taste [tongue]. (K1, K2, K3)

## **Unit III: Anatomic and Physiological Description**

Digestive System Structure and functions of organs of digestion and accessory organs Process of digestion and absorption – Related Diseases (K1, K2, K3)

Excretory Systems Structure and function of the organs of the Urinary system Structure and functions of Skin [Integumentary System] Regulation of body temperature – Related Diseases (K1, K2, K3)

Endocrine System Structure and functions of endocrine glands (Pituitary Pancreas, thyroid, parathyroid, thymus, adrenal) – Related Diseases (K1, K2, K3)

Sense Organs Structure and functions of Eye, Ear, Nose and tongue Physiology of vision, hearing and equilibrium – Related Diseases (K1, K2, K3)

Genito Urinary System Female reproductive system: Structure and functions of female reproductive organs [Uterus, fallopian tube, and ovary] menstrual cycle, menopause and process of reproduction Male reproductive system: Structure and functions of organs Diseases related to reproductive system, antenatal, maternal and neonatal conditions (K1, K2, and K3)

Psychiatry conditions – Anxiety, depression, mental retardation, personality disorder, psychosis, psycho physiologic disorder (K1, K2, K3)

## **Unit IV: Basic Medical Terminology**

Basic concepts (K1, K2)

Definition of medical terminology (K1, K2)

Purpose of learning Medical Terminology (K1, K2)  
Origin of Medical Terms (K1, K2)  
Derivations from other languages, living creatures, colors, weapons (K1, K2)  
Phobias (K1, K2)

#### **Unit V: Components of Medical Terms**

Roots Prefixes Suffixes (K1, K2)  
Systems wise Symptomatic (K1, K2)  
Diagnostic Terms related to whole body (K1, K2)  
Operative Terms related to whole body (K1, K2)  
Analysis of medical terms (K1, K2)  
Standard Medical Abbreviations (K1, K2)

#### **Text Books**

1. Mr. Immanuel Ratinaraj Asher – Introduction to Medical Terminology.
2. Mr. Immanuel Ratinaraj Asher – Handbook of Medical Record Policies and procedures – for Medical Record professionals.

#### **Reference Books**

1. Barbara J. Cohen and Ann De Petris, An Illustrated Guide: Medical Terminology, 1 February 2016.
2. Medical Review – Medical Abbreviations For Medical Students And Healthcare Professionals Kindle Edition, 2014.
3. Dorland – Dorland's Pocket Medical Dictionary, 29<sup>th</sup> Edition, 2013.

## SEMESTER – II

### UAORA20 - ALLIED II: OPERATIONS RESEARCH

<b>Year:</b> I	<b>Course Code:</b> UAORA20	<b>Title of the Course:</b> Operations Research	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> II							

#### Objectives

1. To introduce the techniques of solving problems in the field of industry, marketing and finance
2. To create awareness about optimization in the utility of resources

#### COURSE OUTCOMES (CO)

The learners will be able to

1. Understand the basic operations research concepts and solve linear programming problems.
2. Analyze real-life situation using transportation models.
3. Assign jobs to different machines using assignment models.
4. Use knowledge of Network Analysis in Hospital Administration.
5. Acquire wide knowledge in Game Theory.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	L	H
CO2	H	M	M	M	M	H
CO3	L	L	L	L	L	H
CO4	H	H	L	M	M	H
CO5	M	M	M	M	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	L
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	L
CO4	H	H	H	H	H	L
CO5	H	H	H	H	H	M

(Low- L, Medium - M, High - H)

#### Unit I: Introduction and Linear Programming

Operations research: Definition – Scope (K1, K2)

Characteristics (K1, K2)

Linear programming (K1,K2)  
Formulation (K1,K2, K3)  
Graphical method (K1, K2, K3, K4)  
Regular simplex method (Simple Problems) (K1, K2, K3, K4)

### **Unit II: Transportation Model**

Transportation Problem – Introduction (K1, K2)  
Initial basic feasible solution (North West Corner) (K1, K2, K3, K4)  
Initial basic feasible solution (Least Cost VAM) (K1, K2, K3, K4)  
Unbalanced Transportation problem (K1, K2, K3, K4)  
Maximization problem (K1, K2, K3, K4)  
Test of Optimality using MODI method (excluding Degeneracy) (K1, K2, K3, K4)

### **Unit III: Assignment Model**

Assignment problem – Introduction (K1, K2)  
Minimal assignment problem - Balanced (K1, K2, K3, K4)  
Minimal assignment problem - Unbalanced (K1, K2, K3, K4)  
Restricted Assignment problem (K1, K2, K3, K4)  
Maximization problem – Balanced (K1, K2, K3, K4)  
Maximization problem – Unbalanced (K1, K2, K3, K4)

### **Unit IV: Network Analysis: CPM and PERT Computations**

Construction – The Network – Numbering the events (K1, K2)  
Different time calculations – representation in tabular form (K1, K2, K3, K4)  
Total, Independent and Free float (K1, K2, K3, K4)  
Calculation of critical path and project duration (K1, K2, K3, K4)  
Basic steps in PERT – Difference between CPM and PERT (K1, K2, K3, K4)  
Calculation of critical path and project duration (K1, K2, K3, K4)

### **Unit V: Game Theory**

Game theory – Meaning – Saddle point (K1, K2)  
Pure Strategy (K1, K2, K3, K4)  
Mixed Strategy (K1, K2, K3, K4)  
Dominance property (K1, K2, K3, K4)  
Solving 2 x m game using graphical method (excluding L.P.P) (K1, K2, K3, K4)  
Solving n x 2 game using graphical method (excluding L.P.P) (K1, K2, K3, K4)

### **Textbooks:**

1. Premkumar Gupta and Hira D.S. - Introduction to Operations Research, 1<sup>st</sup> Edition – S.Chand Company Ltd., 1998.
2. Vittal P.R - Introduction to Operations Research, 1<sup>st</sup> Edition - Margham Publishers – 1999.
3. V. Sundaresan, K.S. Ganapathy Subramanian and K. Ganesan - Resource Management Techniques - A.R. Publications, 2009.

### **Reference Books:**

1. Kalavathy. S - Operations Research, 2<sup>nd</sup> Edition - Vikas Publishing Ltd., 2002.
2. K. Pandian, C.Kayalvizhi - Applied Operations Research for Management, 2<sup>nd</sup> Edition -Thirumalaa Publications, 2004.
3. R.Paneerselvam - Operation Research -PHI Learning Pvt. Ltd., 2<sup>nd</sup> Edition 2006.

**SEMESTER II**  
**USHAB220 – SKILL BASED ELECTIVE II: PRACTICAL:**  
**COMMUNICATION SKILLS IN ENGLISH**

<b>Year:</b> I <b>Sem:</b> II	<b>Course Code:</b> USHAB220	<b>Title of the Course:</b> Communication Skills in English	<b>Course Type:</b> Practical	<b>Course Category:</b> Skill Based Elective	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 60
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**Objectives**

1. To gain knowledge about the concepts of communication.
2. To communicate effectively by drafting letters for business and banking correspondence.
3. To develop English language skills in listening, speaking, reading and writing by having learners engage in a range of communicative tasks and activities.
4. To increase vocabulary through the study of word parts, use of context clues and Practice with a dictionary.
5. To develop public speaking abilities by giving opportunities to speak in class, both informally and formally.

**COURSE OUTCOMES (CO)**

1. Understand the elements, types, process and barriers in communication.
2. Develop the skill of communicating through drafting various types of letters for business and banking correspondence.
3. Improve the vocabulary for daily usage.
4. Be able to write discharge summary and consent form related to hospitals. Also prepare the students for group discussions and role plays.
5. Develop the skill to make students prepare PowerPoint presentations.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	H
CO2	H	M	M	L	L	H
CO3	H	M	M	L	L	H
CO4	H	M	M	L	L	H
CO5	H	M	M	L	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	L	L	L	L
CO2	H	M	M	H	M	H
CO3	M	M	L	H	L	H
CO4	M	M	H	H	L	M

CO5	H	M	L	M	H	H
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(Low- L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction to Communication

Definition of Communication – Elements – Types and Media's of communication  
–Process of communication Barriers in communication (K5)

### Unit II: Letter writing skills

Structure of letter – Leave letter – Complaint letter – Letter of Application Enquiry  
–Sales Letter – Banking Correspondence (K5)

### Unit III: Vocabulary and Phrases

Every day words General statements – Past – Present – Future (K5)

### Unit IV: Professional Skills

Aptitude Test – Logical and Reasoning – Basic Interview Questions Preparation  
of Resume Writing discharge summary Consent for admission (K5)

### Unit V: Practical Sessions

Group discussions – Role-play – Email – Browsing for assignments Presentation  
skills Use of Google scholars (K5)

### Textbooks

1. P. D. Chaturvedi and MukeshChaturvedi, Communication Skills, Pearson Education, 1<sup>st</sup> Edition, 2012.
2. B. S. Verma and R. T. S. Pundir, Professional Communication, Vayu Education of India, 1<sup>st</sup> Edition, 2011.

### Reference Books

1. B. S. Sijwali and InduSijwali, You & the Interview Board, Arihant Publications 1<sup>st</sup> Edition, 2009
2. Hari Mohan Prasad and Rajnish Mohan, How to prepare for Group discussion & Interview, Tata Macgraw Hill Education Private Limited, 1<sup>st</sup> Edition 2012.

**SEMESTER III**  
**UCHAE20 – HEALTH CARE**  
**LAWS**

<b>Year:</b> II <b>Sem:</b> III	<b>Course Code:</b> UCHAE20	<b>Title of the Course:</b> Health Care Laws	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand the structure of judiciary in India and its functions.
2. To identify and understand various Acts applicable to labor relations.
3. To describe medical professionals and their duties to society.
4. To elaborate on various Acts applicable to Hospitals.
5. To understand various Acts applicable to Hospital Administration.

**COURSE OUTCOMES (CO)**

1. Understand the principles and nature of forming Society, basics of constitution required for the hospital and applicability of the Companies Act.
2. Recognize and interrelate various Labor laws and its applicability to Hospitals.
3. Gain knowledge in the duties of medical practitioners and Laws relating to it and list the Acts and Rules that are connected with medical practice.
4. Understand the Medical Jurisprudence in India and have in depth knowledge about precautionary steps to avoid litigation.
5. Recognize the applicability of Laws on Hospital Administration and understand the obligations pertaining to the implementation of Laws applicable to hospitals.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	H
CO2	H	M	M	L	H	H
CO3	H	M	M	M	M	M
CO4	H	M	M	L	M	M
CO5	H	M	M	L	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	M
CO2	H	H	M	M	M	M
CO3	H	H	M	H	M	M
CO4	H	H	M	H	M	M
CO5	H	H	M	H	M	H

**(Low - L, Medium - M, High - H)**

## **Syllabus**

### **Unit I: Promotion**

Forming Society (K1, K2, K3)

The Companies Act (K1, K2, K3)

Law of Partnership (K1, K2, K3)

A Sample Constitution for the Hospital (K1, K2, K3, K4)

The Tamil Nadu Clinical Establishment (Regulation) Rules, 2018 (K1, K2, K3)

Clinical Trial Schedule of DAC Act 1940 – I.C.M.R.Guidelines (K1, K2, K3)

### **Unit II: Labor Relations**

Factories Act Shops and Establishment Act (K1, K2, K3)

The Workmen's Compensation Act the Employee's State Insurance Act the Employees' Provident Funds Act (K1, K2, K3)

The Payment of Gratuity Act the Maternity Benefit Act the Payment of Wages Act (K1, K2, K3)

The Minimum Wages Act the Industrial Disputes Act the Industrial Employment(Standing Orders) Act (K1, K2, K3)

The Trade Union Act the Apprentices Act (K1, K2, K3)

The Employment Exchanges (Compulsory Notification of Vacancies) Act the Collection of Statistics Act (K1, K2, and K3)

### **Unit III: Medical Care**

Medical Council of India Medical Licensure Law (K1, K2, K3)

Doctors Patient Relationship Medical Malpractice (K1, K2, K3)

Quality and Standard of Medical Care Negligence (K1, K2, K3)

Medical Consent Emergency Care (K1, K2, K3)

The Consumer Protection Act (K1, K2, K3)

Patient's Rights and Responsibilities Medical Ethics (K1, K2, K3)

### **Unit IV: Medico Legal Commitments**

Mental Illness – Tuberculosis Drugs Addicts and Alcoholics (K1, K2, K3)

Legal Issue in Death Cases Legal Testimony in Medico legal cases Narcotic Laws (K1, K2, and K3)

The Drugs and Cosmetic Act Drug Control Policy Clinical Investigation Blood Transfusion (K1, K2, K3)

The Medical Termination of Pregnancy Act the Prenatal Diagnostic Techniques Act Dying Declaration Medical Jurisprudence (K1, K2, K3)

The Human Organ Transplantation Act – Toxicology – Mental Health Care Act 2017 (K1, K2, K3)

Abandon Children in Hospital and Procedure mandated in the Juvenile Justice (CARE AND PROTECTION OF CHILDREN) Act, 2015 (K1, K2, K3)

**Unit V: Hospital Administration**

The Biomedical Waste (Management and Handling) Rules (K1, K2, K3)

Radiation Safety System (K1, K2, K3)

Law of Insurance (K1, K2, K3)

Export Import Policy (K1, K2, K3)

Exemption of Income Tax for Donations (K1, K2, K3)

Tax Obligations: Filling Returns and Deductions at Source (K1, K2, K3)

**Textbooks**

1. Raj Kumar, Acts Applicable to Hospitals in India (The Christian Medical Association of India, New Delhi, 2017).
2. Samuel Abraham, Human Resource Management in Hospital (Jefflin Rimon Publications, Vellore),2017.

**Reference Books**

1. Ram Krishna Chaube, Consumer Protection and The Medical Profession with Legal Remedies, Jaypee Brothers, 2017.
2. Samuel Abraham, Laws on Hospital Administration (CMAI, Delhi),2017.
3. Dr Sairam Bhat Healthcare in India: An Introduction to Law and Legal System Hardcover, 2016.

**SEMESTER III**  
**UCHAF20 - HOSPITAL OPERATIONS MANAGEMENT – I**

<b>Year:</b> II <b>Sem:</b> III	<b>Course Code:</b> UCHAF20	<b>Title of the Course:</b> Hospital Operations Management I	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand the hospital organization and management model.
2. To illustrate the importance and functions of Outpatient and Inpatient services inhospital.
3. To recognize the role of nursing services and factors which influence the number ofnurses
4. To understand and determine the factors which contribute to the development ofhospital.
5. To learn the infection and implementation of Hospital Infection Controlprogramme.
6. To elaborate on various clinical support services in the hospital.

**COURSE OUTCOMES (CO)**

1. Understand the classifications of hospitals, roles of hospital administrators, essential hospital operations indicator and current trends in healthcare.
2. Recognize and interrelate functions and layout of OPD, inpatient services and different forms of ward.
3. Understand the role and tasks of a nurse and determine the nursing staff requirement in a hospital.
4. Gain knowledge in function of Hospital Infection Control Committee in the hospital and Understand the prevalence of infection and the role of Hospital Infection Control
5. Understand the functions of these clinical support services and able to categorize the same.

CO	PO					
	1	2	3	4	5	6
CO1	H	L	M	M	L	H
CO2	H	L	M	M	L	H
CO3	H	L	M	M	L	H
CO4	H	L	M	M	L	H
CO5	H	L	M	M	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	M
CO2	H	M	L	M	L	M

<b>CO3</b>	M	M	L	H	M	M
<b>CO4</b>	H	M	L	M	L	M
<b>CO5</b>	M	M	L	H	M	M

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Organization of the Hospital

- Over view of health services Types of Patient (K1, K2, and K3)
- Healthcare Models and Emerging Models Types of Hospitals (K1, K2, K3)
- Management Structure of Hospitals (K1, K2, K3)
- Hospital Committees (K1, K2, K3)
- Relationship with other Organization Essential Hospital Operations Indicator (K1, K2, K3)
- Current trends in healthcare (K1, K2, and K3)

### Unit II: Outpatient and Inpatient Service

- Outpatient Service Inpatient Service & Admitting Department (K1, K2, K3)
- Surgical Services and Operating Theatre – ICU (K1, K2, K3)
- Specialty Services Accident and Emergency (K1, K2, K3)
- Surgical Specialties and Anesthesiology Medical Specialties (K1, K2, K3)
- Community Medicine and Family Medicine Paramedical Services (K1, K2, K3)
- Alternative Health Care System (K1, K2, K3)

### Unit III: Nursing Service

- Objectives (K1, K2, K3)
- Responsibilities of Nursing Services (K1, K2, K3)
- Organization of Nursing Services (K1, K2, K3)
- Nursing Process (K1, K2, K3)
- Patient Care (K1, K2, K3)
- Ward Management (K1, K2, K3)

### Unit IV: Hospital Infection Control

- Surveillance and Reporting of Infection (K1, K2, K3)
- Roots of spread of infection High Risk areas in Hospital
- Employee Health (K1, K2, K3)
- Preventing Transmission of Infection (K1, K2, K3)
- Infection control committee Hospital infection control programme (K1, K2, K3)
- Biomedical Waste Disposal (K1, K2, K3)

### Unit V: Clinical Support Services

- Chaplain and Counseling (K1, K2, K3)
- Pharmacy – Laboratories Blood Bank (K1, K2, K3)
- Occupational therapy – Physiotherapy Speech therapy (K1, K2, K3)
- Radiology Diagnostics service (K1, K2, and K3)
- Nuclear Medicine Catheterization Lab (K1, K2, K3)

## Radiation therapy ALC (K1, K2, K3)

### **Textbooks**

1. Harris M G & Assoc Managing Health Service: Concept & Practices. MacLennan & Petty: Sydney, 2003.
2. Kunders G.D Facilities Planning and Arrangement in Healthcare, Prison Books Pvt. LTD, 2004.

### **Reference Books**

1. Sakharkar B.M Principles of Hospital Administration and Planning, 2<sup>nd</sup> edition, Jaypee, New Delhi, 2009.
2. Syed Amin Tablish, Hospital and Nursing Homes Planning, Organisations and Management, 1<sup>st</sup> edition, Jaypee, New Delhi, 2005.
3. Sharma Step By Step Hospital Designing and Planning With Photo Cd Rom (Dr. Malhotra'S Series), 2010.

### SEMESTER III

#### UCHAG20 - ACCOUNTING FOR HOSPITAL ADMINISTRATORS - I

<b>Year:</b> II <b>Sem:</b> III	<b>Course Code:</b> UCHAG20	<b>Title of the Course:</b> Accounting for Hospital Administrators I	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objectives

1. To understand the accounting concepts, principles and framework to analyse and effectively communicate information to a variety of stakeholders.
2. To develop the ability to use the fundamental accounting equation to analyze the effect of business transactions on an organization's accounting records and financial statements.
3. To apply the dual entry recording framework to a series of transactions that results in a balance sheet.
4. To develop the skill of recording financial transactions and preparation of reports in accordance with GAAP.
5. To equip with the knowledge of accounting process and preparation of final accounts of sole trader.
6. To equip with the knowledge of accounting process and preparation of final accounts of sole trader.

#### COURSE OUTCOMES (CO)

1. Acquire conceptual knowledge of basics of accounting and understand the accounting concepts, principles and conventions.
2. Understand and apply the rule of accounting equation and the dual entry recording framework to a series of transactions that results in a balance sheet.
3. Apply the golden rules of accounting and able to record journal entries and prepare ledger accounts using double entry book keeping.
4. Be able to prepare various subsidiary books like sales book, purchases book, purchase returns book, sales returns book, bills receivable book, bills payable book and cash book.
5. Understand the purpose of balance sheet, prepare financial statements in accordance with appropriate standards and report the results of a firm.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	L	L	H
CO2	H	H	M	L	L	H
CO3	H	H	M	L	L	H
CO4	H	H	M	L	L	H
CO5	H	H	M	L	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	M
CO2	H	M	M	M	H	M

<b>CO3</b>	H	M	M	H	H	M
<b>CO4</b>	H	M	H	H	H	M
<b>CO5</b>	H	M	H	H	H	H

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction to Concepts

- Definition of Accounting – Financial Accounting (K1, K2)
- Functions of Financial Accounting (K1, K2)
- Limitations (K1, K2)
- Meaning of Accounting Principles (K1, K2, K3)
- Accounting Concepts (K1, K2, K3)
- Conventions – Features (K1, K2)

### Unit II: Double Entry System

- System of Book keeping (K1, K2)
- Single Entry System – Double Entry System (K1, K2, K3)
- Meaning of Debit and Credit – Advantages of Double Entry System (K1, K2, K3)
- Distinction between Double Entry and Single Entry (K1, K2, K3)
- Accounting Equation – Rules for Accounting Equation (K1, K2, K3, K4)
- Uses of Computer in Accounting (K1, K2)

### Unit III: Journal and Ledger

- Accounting Cycle – Introduction (K1, K2)
- Journal and Journalizing (K1, K2, K3, K4)
- Classification of Accounts (K1, K2)
- Ledger – Meaning of Ledger (K1, K2)
- Method of preparing an Account – Posting in the Ledger – Balancing of Ledger (K1, K2, K3, K4)
- Distinction between Journal and Ledger (K1, K2)

### Unit IV: Books of Accounts

- Subsidiary Books – Preparation of different Subsidiary Books (K1, K2)
- Sales Book – Sales Returns Book (K1, K2, K3, K4)
- Purchase Book – Purchase Return Book (K1, K2, K3, K4)
- Cash Book – Types- Petty Cash Book (K1, K2, K3, K4)
- Bill Receivable Book – Bills Payable Book (K1, K2, K3, K4)
- General Journal or Journal Proper (K1, K2)

### Unit V: Final Accounts

- Trial Balance – Meaning (K1, K2)
- Definition – Objectives (K1, K2)
- Preparation of Manufacturing Account (K1, K2, K3)
- Final Accounts – Trading Account (K1, K2, K3)
- Profit and Loss Account (K1, K2, K3)

Balance Sheet with adjustments (Simple problems) (K1, K2, K3, K4)

**Textbooks**

1. Jain S.P. and Narang K.L., Advanced Accounting, Kalyani Publishers, New Delhi, 2005.
2. S.N.Maheswari and Sharad K Maheswari, Principles of Financial Accounting, Vikas Publishing House Pvt Ltd, 2013.

**Reference Books**

1. Reddy T.S. and Murthy A Financial Accounting Margham Publications, Chennai, 2007.
2. Nagarajan K.L., Vinayagam N. and Mani P.L., Principles of Accountancy, Eurasia Publishing House, New Delhi, 2006.
3. Grewal T.S, Double Entry Book, S. Chand and Co, New Delhi, 2005.

**SEMESTER III**  
**UAHCE20 –ALLIED III: HEALTHCARE ECONOMICS**

<b>Year:</b> II	<b>Course Code:</b> UAHCE20	<b>Title of the Course:</b> Healthcare Economics	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Objectives**

1. To enable and understand the basic concepts of economics.
2. To analyze how health care outcomes are influenced by changing market forces, social forces, and government forces.
3. To understand the fundamentals of hospital and physician services production, including the concepts of input factor substitution, economies of scale and scope, and technology adoption decision.
4. To develop skills to evaluate the economic condition and market of the healthcare industry.
5. To evaluate various health programs and its impact on the economy.

**COURSE OUTCOMES (CO)**

1. Gain Knowledge in basic concepts of economics including managerial economics, macro and microeconomics, types of economy and understand the size and relevance of health economics.
2. Develop skills to manage demand for health care and understand behavior of consumers in the health care sector.
3. Understand the concept fundamentals of hospital and physician services production including the concepts of economies of scale, and technology adoption decision.
4. Acquire the ability to evaluate health economics and understand the concept of healthcare market and health insurance.
5. Analyze the environmental influences on the health care sector and identify the impact of tobacco, alcohol, drugs and other communicable diseases on the economy.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	H
CO2	H	M	M	L	L	H
CO3	H	M	M	L	L	H
CO4	H	M	M	L	L	H
CO5	H	M	M	L	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	L	H
CO5	H	H	M	H	L	H

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction to Health Economics

Introduction to Economics and Basic Problems of Economy (K1, K2, K3)

Types of Economy and Microeconomics and Macroeconomics (K1, K2, K3)

Circular Flow and Interdependence of Economic Activity, Scarcity and Efficiency (K1, K2, K3)

Managerial Economics and basic economic concepts (K1, K2, K3)

Introduction to Health Economics (K1, K2, K3)

The relevance of Health Economics and the size and scope of the Health Economy (K1, K2, K3)

### Unit II: Basic Microeconomics: Concepts in Health Economics

Basic concepts of market (K1, K2, K3)

Basic Elements of Demand and Supply (K1, K2, K3)

Market equilibrium (K1, K2, K3)

Elasticity of demand and supply (K1, K2, K3)

Approaches to consumer behavior (K1, K2, K3)

Demand for Health (K1, K2, K3)

### Unit III: Production and Cost of Healthcare

Production Function (K1, K2, K3)

Isoquants and Marginal Products (K1, K2, K3)

Elasticity of Substitution (K1, K2, K3)

Cost Function (K1, K2, K3)

Economies of Scale (K1, K2, K3)

Technological Change (K1, K2, K3)

### Unit IV: Economic Evaluation and Markets in Healthcare

Economic Evaluation (K1, K2, K3)

Types of market (K1, K2, K3)

Markets in Healthcare (K1, K2, K3)

Government Interventions in Healthcare (K1, K2, K3)

Health Financing from Various Sources (K1, K2, K3)

Health Insurance and TPA (K1, K2, K3)

**Unit V: Economics of Health Programs**

Environmental Influences on Health and its Economic Impact (K1, K2, K3)

Healthcare System in Different Countries (K1, K2, K3)

Economics Impact of Tobacco use (K1, K2, K3)

Economics Impact of Alcohol use (K1, K2, K3)

Models of Addiction (K1, K2, K3)

Aging of Population (K1, K2, K3)

**Textbooks**

1. Sherman Folland, Allen C. Goodman and Miron Stano, The Economics of Health and Health Care, Prentice Hall Inc, New Jersey, 2017.
2. Michael Drummond and et al, Methods for Economics: Evaluation of Healthcare Programme, Oxford University Press, 4<sup>th</sup> Edition, 2015.

**Reference Books**

1. Shuvendu Bikash Dutta, Health Economics for Hospital Management, Jaypee Brothers Medical Publishers, 1<sup>st</sup> edition, 2013.
2. Government of India, Five Year Plans.
3. Charles E., Phelps Health Economics: International Edition Paperback, 2009.

**SEMESTER III**  
**UEHAA20 - ELECTIVE I A: BUSINESS ENVIRONMENT**

<b>Year:</b> II <b>Sem:</b> III	<b>Course Code:</b> UEHAA20	<b>Title of the Course:</b> Business Environment	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Objectives**

1. To understand the nature of business environment.
2. To gain insight regarding the business cycle and its impact on business.
3. To impart knowledge of the governing acts related to business.
4. To acquire knowledge about the strategic decision making involved in business environment.
5. To relate the measures adopted by various firms.

**COURSE OUTCOMES (CO)**

1. Understand the concepts in business environment globally and in Indian context
2. Learn the concept of business cycle.
3. Understand social responsibility and social audit.
4. Acquire an overview about the Consumer Protection Act.
5. Understand the concepts of privatization and liberalization.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	H
CO2	H	M	M	L	L	H
CO3	H	M	M	L	L	H
CO4	H	M	M	L	L	H
CO5	H	M	M	L	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	L	L	L	M
CO2	M	L	L	M	L	M
CO3	M	L	L	M	L	M
CO4	H	L	M	L	L	M
CO5	M	L	L	L	L	M

(Low - L, Medium - M, High - H)

## **Syllabus**

### **Unit I: Introduction**

- The Concept of Business Environment (K1, K2, K3)
- Meaning and definition - nature and significance (K1, K2, K3)
- Brief overview of political, cultural, legal environment (K1, K2, and K3)
- Economic and social environment (K1, K2, K3)
- Impact on business and strategic decisions (K1, K2, K3)
- Cultural heritage (K1, K2, K3)

### **Unit II: Environment**

- Political environment (K1, K2, K3)
- Rights according to Indian Constitution (K1, K2, K3)
- Economic roles of Government in business (K1, K2, K3)
- Legal environment (K1, K2, K3)
- Laws applicable in Indian context (K1, K2, K3)
- Environmental influence on business (K1, K2, K3)

### **Unit III: Business Cycle**

- Economic Systems and their impact of business (K1, K2, K3)
- Business cycle (K1, K2, K3)
- Inflation and deflation – meaning – causes – effects control (K1, K2, K3)
- Measures to be adopted by business firms to reduce the evil effects of business cycle (K1, K2, and K3)
- Financial Environment (K1, K2, K3)
- Financial system Commercial Banks. (K1, K2, K3)

### **Unit IV: Governing Acts**

- Consumer Protection Act (K1, K2, K3)
- Environment Protection Act (K1, K2, K3)
- Social responsibility towards customers and community (K1, K2, K3)
- Business Giving (K1, K2, K3)
- Social Audit (K1, K2, K3)
- Corporate Social Responsibility (K1, K2, K3)

### **Unit V: Privatization and Liberalization**

- Privatization – meaning (K1, K2, K3)
- Ways of privatization (K1, K2, K3)
- Privatization in India (K1, K2, K3)
- Liberalization – meaning (K1, K2, K3)
- Globalization – meaning – merits and demerits. (K1, K2, K3)

Examples and case studies of Globalization (K1, K2, K3)

**Textbooks**

1. Sankaran S, Business Environment, Margham Publications, Chennai, Latest Edition.
2. Shaw William, Business Ethics, Delmar Thomas Learning, Latest Edition.

**Reference Books**

1. Francis Cherunilam, Business Environment: Text and Cases, Latest Edition.
2. Jayaprakash Reddy, Business Environment, APH Publishing Corporation, 2004.
3. Velasquez, Business Ethics, Prentice Hall of India, 5<sup>th</sup> Edition, 2004.

**SEMESTER III**  
**UEHAB20 – ELECTIVE I B: LOGISTICS & SUPPLY**  
**CHAINMANAGEMENT**

<b>Year:</b> II <b>Sem:</b> III	<b>Course Code:</b> UEHAB20	<b>Title of the Course:</b> Logistics & Supply Chain Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To acquire insight in the fundamentals of supply chain management.
2. To learn the drivers involved in Supply Chain.
3. To correlate the network design options suitable for various organisations.
4. To describe the impact of revenue management and coordination in managerial levers.
5. To relate the logistics concept in a healthcare set up.

**COURSE OUTCOMES (CO)**

1. Understand and identify the stages and scope of logistics and supply chain management.
2. Develop the conceptual knowledge about the process of supply chain and its drivers.
3. Relate the various network decision options available.
4. Compare the pricing strategies adopted by various firms.
5. Identify and relate the stakeholders and their impact on supply chain in healthcare sector.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	L	M	M
CO2	H	M	H	L	M	M
CO3	H	M	H	L	M	M
CO4	H	M	H	L	M	M
CO5	H	M	H	L	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	M	L	M
CO2	H	M	M	M	L	M

<b>CO3</b>	H	M	M	M	L	M
<b>CO4</b>	H	M	M	M	L	M
<b>CO5</b>	H	M	M	M	L	M

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Understanding Supply Chain

- Introduction – Definition- Importance of supply chain (K1, K2, K3)
- Objective- Process of Supply chain Decision Phases (K1, K2, K3)
- Competitive and Supply Chain Strategies (K1, K2, K3)
- Value Chain (K1, K2, K3)
- Efficiency and Responsiveness (K1, K2, K3)
- Achieving Strategic Fit- Scope (K1, K2, K3)

### Unit II: Drivers of Supply Chain and Distribution Network

- Framework Facilities Inventory (K1, K2, K3)
- Transportation Information (K1, K2, K3)
- Sourcing Pricing (K1, K2, K3)
- Factors influencing distribution network (K1, K2, and K3)
- Types of Distribution Network (K1, K2, K3)
- Service factor and Cost factor (K1, K2, and K3)

### Unit III: Demand and Planning in Supply Chain

- Forecasting- Meaning- Definition (K1, K2, K3)
- Forecasting Methods (K1, K2, K3)
- Aggregate planning in supply chain management (K1, K2, and K3)
- Levers in aggregate planning (K1, K2, K3)
- Pricing in supply chain management- Multiple Customer Segment (K1, K2, K3)
- Perishable Products Seasonal Demand Bulk and Spot Contracts (K1, K2, K3)

### Unit IV: IT and Coordination in Supply Chain Management

- Role of IT in supply chain management (K1, K2, K3)
- Customer Relationship Management (K1, K2, K3)
- Internal Supply Chain Management (K1, K2, K3)
- Supplier Relationship Management (K1, K2, K3)
- Coordination in supply chain management- Bullwhip Effect (K1, K2, K3)
- Obstacles and Levers in coordination (K1, K2, K3)

### Unit V: Logistics Management in Healthcare Sector

- Flow of Logistics in Healthcare sector (K1, K2, K3)
- Application in Hospitals (K1, K2, K3)
- Features in LSCM in health sector (K1, K2, K3)
- Models (K1, K2, K3)
- Analysis in the logistics system. (K1, K2, K3)

## Framework of logistics in Healthcare sector (K1, K2, K3)

### **Textbooks**

1. Chopra S and P Mendil, Supply Chain Management: Strategy, Planning and Operations, Pearson Education, 2<sup>nd</sup> Edition, 2006.
2. Ronald H Ballou and Samir K. Srivastava, Business Logistics/ Supply Chain Management, 5<sup>th</sup> Edition, 2012.

### **Reference Books**

1. Donald J. Bowersox and David J. Closs, Logistical Management, Tata McGraw Hill, 2<sup>nd</sup> Edition, 2013.
2. David Simchi, Levi, Designing and Managing Supply Chain, Tata McGraw Hill, New Delhi, 3<sup>rd</sup> Edition, 2008.

### SEMESTER III

#### USHAC320 - SKILL BASED ELECTIVE III: WELLNESS MANAGEMENT

<b>Year:</b> II <b>Sem:</b> III	<b>Course Code:</b> USHAC320	<b>Title of the Course:</b> Wellness Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective III	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 60
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#### Objectives

1. To develop skills to improve personality and emotional intelligence.
2. To improve skills in stress management.
3. To enhance skills in time management.
4. To develop skills to manage conflict, crisis and events.
5. To inculcate the habit of healthy eating and art of living.

#### COURSE OUTCOMES (CO)

1. Enhance personality management and emotional intelligence with SWOT analysis.
2. Develop skills to identify stressors to manage stress.
3. Develop skills to give priority to urgent and important work to save time.
4. Improve skills to manage conflict, crisis, events and responsible use of technology.
5. Cultivate the habit of taking nutritious diet and exercise for physical fitness.

CO	PO					
	1	2	3	4	5	6
CO1	M	L	H	L	M	H
CO2	M	H	H	L	M	H
CO3	H	M	M	M	H	H
CO4	H	L	H	L	L	M
CO5	M	H	M	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	L	M
CO2	H	H	M	H	L	L
CO3	H	H	M	H	L	M
CO4	H	H	M	H	L	M
CO5	M	L	M	L	L	M

(Low - L, Medium - M, High - H)

## **Syllabus**

### **Unit I: Self-Management**

- Self-awareness (K1, K2, K3)
- Dimensions of Personality Development (K1, K2, K3)
- Interpersonal Relations (K1, K2, K3)
- Types of complexes (K1, K2, K3)
- Emotional Intelligence (K1, K2, K3)
- SWOT analysis (K1, K2, K3)

### **Unit II: Stress Management**

- Meaning, definition and sources of stress (K1, K2, K3)
- Lifestyle stressors (K1, K2, K3)
- Symptoms of stress (K1, K2, K3)
- Guidelines to reduce stress (K1, K2, K3)
- Workplace humor (K1, K2, K3)
- Anger Management (K1, K2, K3)

### **Unit III: Time Management**

- Tips for Time Management (K1, K2, K3)
- Advantages of Time Management (K1, K2, K3)
- Common mistakes student make in time management (K1, K2, K3)
- Goals of Time Management (K1, K2, K3)
- Procrastination (K1, K2, K3)
- Techniques of conquering procrastination (K1, K2, K3)

### **Unit IV: Situations Management**

- Conflict Management (K1, K2, K3)
- Crisis Management (K1, K2, K3)
- Event Management (K1, K2, K3)
- Responsible use of technology (K1, K2, K3)
- Responsible use of social media (K1, K2, K3)
- Change management (K1, K2, and K3)

### **Unit V: Health and Nutrition Management**

- Need for a healthy diet (K1, K2, and K3)
- Balanced diet (K1, K2, K3)
- Meditation (K1, K2, K3)
- Simple exercises for a healthy living (K1, K2, K3)
- Lifestyle and disease (K1, K2, K3)
- Health and hygiene (K1, K2, K3)

**Textbooks**

1. Richard Regis, Stress Management, National HRD Network Publication, 1<sup>st</sup> Edition.
2. Swati Y. Bhave, Anger Management, SAGE Publication, 3rd Edition, 2010.

**Reference Books**

1. Carol A. Beatty, Building Smart Teams, SAGE Publication, 1<sup>st</sup> Edition, 2004.
2. <https://www.healthline.com/health/balanceddiet#importance>
3. <https://www.gaiam.com/blogs/discover/meditation101techniquesbenefitsandabeginnershowto>

**SEMESTER IV**  
**UCHAH20 - HUMAN RESOURCE MANAGEMENT AND DEVELOPMENT**

<b>Year:</b> II <b>Sem:</b> IV	<b>Course Code:</b> UCHAH20	<b>Title of the Course:</b> Human Resource Management and Development	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To enable and understand the HR Management and system at various levels in general and in certain specific industries or organizations.
2. To focus and analyze the issues and strategies required to select and develop manpower resources.
3. To develop relevant skills necessary for application in HR related issues.
4. To integrate the understanding of various HR concepts along with the domain concept to make correct business decisions.
5. To understand the development, implementation, and evaluation of organizational health and safety policies and practices.

**COURSE OUTCOMES (CO)**

1. Gain knowledge in basic concepts of Human Resource Management and enable in drafting an HR planning model.
2. Develop the competency to recruit select, train employees and appraise the performance of the employees.
3. Understand the nature of a job and role of employees using job analysis and job design to attain Quality Work Life and participate in the decision making process.
4. Understand the various employee benefits safety, health and welfare measures adopted in an organization to acquire the ability to handle employee issues and learn the new trends in HRM
5. Inculcate values and ethics in Human Resource Management.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	L	M	M
CO2	H	M	L	M	M	M
CO3	H	M	M	M	M	M
CO4	H	L	L	L	M	M
CO5	H	L	M	M	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	H

<b>CO2</b>	H	M	H	H	M	H
<b>CO3</b>	H	M	M	M	M	H
<b>CO4</b>	H	M	M	M	M	H
<b>CO5</b>	H	M	M	M	M	H

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction

- Introduction, scope and objectives of HRM (K1, K2, K3)
- HRM Planning need and advantages (K1, K2, K3)
- HRM planning process (K1, K2, K3)
- Human Resource Information System (K1, K2, K3)
- Difference between HRM and personnel management. (K1, K2, K3)
- Qualities of HR Manager (K1, K2, K3)

### Unit II: HR Functions I

- Recruitment (K1, K2, K3)
- Selection (K1, K2, K3)
- Induction and Orientation (K1, K2, K3)
- Performance Appraisal (K1, K2, K3)
- Methods of Performance Appraisal (K1, K2, K3)
- Training (K1, K2, K3)

### Unit III: HR Functions II

- Talent acquisition and retention (K1, K2, K3)
- Career planning (K1, K2, K3)
- Quality work life (K1, K2, K3)
- Job Analysis (K1, K2, K3)
- Job design (K1, K2, K3)
- Participative Management (K1, K2, K3)

### Unit IV: Welfare Measures and Disputes

- Employee welfare (K1, K2, K3)
- Safety Programs (K1, K2, K3)
- Health (K1, K2, K3)
- Job stress (K1, K2, K3)
- Trade Union (K1, K2, K3)
- Causes and Settlement of Disputes (K1, K2, K3)

### Unit V: Ethics and Challenges

- Separations (K1, K2, K3)
- HR audit (K1, K2, K3)
- Values and Ethics in HRM (K1, K2, K3)
- Ethical issues in HRM (K1, K2, K3)

Challenges in HRM (K1, K2, K3)

Evolution of Human Resource management and its role in hospitals (K1, K2, K3)

**Textbooks**

1. Aswatappa, Human Resource Management and Personnel Management, Tata McGraw Hill Publications, Eighth Edition, 2017.
2. V.S.P.Rao, Human Resource Management: Text and Cases, Excel Books, 3rd Edition, 2010.

**Reference Books**

1. P L Rao, Human Resource Management, Excel Books, 2004.
2. P C Tripathi, Human Resource Development, Sultan Chand & Sons, 1999.
3. R.C. Goyal and D. K. Sharma, Hospital Administration and Human Resource Management, 7th Revised Edition, 2017.

**SEMESTER IV**  
**UCHAI20 - HOSPITAL OPERATIONS MANAGEMENT – II**

<b>Year:</b> II <b>Sem:</b> IV	<b>Course Code:</b> UCHAI20	<b>Title of the Course:</b> Hospital Operations ManagementII	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand the overall objectives of public relations in hospital.
2. To understand the importance of materials management in hospital.
3. To describe the role of Medical records and billing in hospital.
4. To understand the roles and functions of engineering services in hospital.
5. To elaborate on various support services in the hospital.

**COURSE OUTCOMES (CO)**

1. Understand the factors responsible for good public relations and discuss on common problems of public relations in the hospitals.
2. Recognize and interrelate the structure and the overall functioning of materials department.
3. Familiarize with the Billing system and payment systems in a hospital and understand the functions of MRD.
4. Perceive the functions of engineering service department and its service types.
5. Categorize various support services in a hospital and understand its functions.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	H	M	H
CO2	M	H	M	H	M	H
CO3	M	H	H	M	M	H
CO4	H	H	M	H	M	M
CO5	H	H	M	M	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	M	M	M
CO2	M	H	M	M	L	M
CO3	M	H	M	M	L	M
CO4	M	H	M	M	L	M
CO5	M	H	M	M	L	M

(Low - L, Medium - M, High - H)

## **Syllabus**

### **Unit I: Public Relations and Marketing**

- PRO – Objectives (K1, K2, K3)
- Functions (K1, K2, K3)
- Methods of PRO (K1, K2, K3)
- Dealing with the Press and the Public (K1, K2, K3)
- Reception and Front Office (K1, K2, K3)
- Duties of receptionist (K1, K2, K3)

### **Unit II: Material Management**

- Purchase (K1, K2, K3)
- Procurement- Quote (K1, K2, K3)
- 2.3 CRS (K1, K2, K3)
  - Quality and Quantity (K1, K2, K3)
  - Stores (K1, K2, K3)
  - Warehouse & Distribution (K1, K2, K3)

### **Unit III: Medical Records & Billing and Insurance**

- Function & Importance of MRD (K1, K2, K3)
- Registration and Appointment System (K1, K2, K3)
- Storage and Organization of Medical Records Planning and Managing the MRDepartment (K1, K2, K3)
- Billing system (OP and IP) & Cash Collection (K1, K2, K3)
- Patient Deposit and Prepayment Systems- Smartcards (K1, K2, K3)
- Company and Credit Patients Health Insurance (K1, K2, K3)

### **Unit IV: Engineering Services**

- Hospital Planning and Design (K1, K2, K3)
- Civil Engineering and Buildings Maintenance (K1, K2, K3)
- Electrical Engineering Mechanical Engineering (K1, K2, K3)
- Biomedical Engineering-Water Supply and Sewage (K1, K2, K3)
- Central Medical Gas- Environment Engineering- Bioengineering (K1, K2, K3)
- Management information System- Air Condition Engineering (K1, K2, K3)

### **Unit V: Support Services**

- Central Sterile Supply- Department Human Resource (K1, K2, K3)
- Finance Department – Laundry (K1, K2, K3)
- Housekeeping- Estate Management (K1, K2, K3)

Transport- Nutrition & Dietary – Mortuary (K1, K2, K3)  
Telemedicine – Audit (K1, K2, K3)  
Security – Fire and Disaster (K1, K2, K3)

### **Textbooks**

1. Kunders G.D, Facilities Planning and Arrangement in Healthcare, Prison BooksPvt. LTD, 2004.
2. B.M. Sagarkhar, Principles of Hospital Administration and Planning, Jaypee Publications, New Delhi, 2<sup>nd</sup> Edition, 2009.

### **Reference Books**

1. Syed Amin Tablish, Hospital and Nursing Homes Planning, Organizations and Management, Jaypee Publications, New Delhi, 1st Edition, 2005.
2. Sharma, Step By Step Hospital Designing and Planning, Paperback, 2010.
3. Gupta Shakti, Modern Trends in Planning and Designing Of Hospitals: Principles And Practice With Cd Rom Hardcover, 2007.

**SEMESTER IV**  
**UCHAJ20 - INTRODUCTION TO RESEARCH METHODOLOGY**

<b>Year:</b> II <b>Sem:</b> IV	<b>Course Code:</b> UCHAJ20	<b>Title of the Course:</b> Introduction to Research Methodology	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand and apply research approaches techniques and strategies in the appropriate manner for managerial decision making.
2. To apply a range of quantitative and / or qualitative research techniques to business and management problems / issues.
3. To demonstrate knowledge and understand data analysis and interpretation in relation to the research process.
4. To illustrate various types of data and methods for collecting data.
5. To utilize statistical tools to analyze aspects of research and to draft research report.

**COURSE OUTCOMES (CO)**

1. Understand the various types of research and apply it in real life study.
2. Distinguish the types of research design, understand the concept of Hypothesis and formulate the same.
3. Comprehend the various types of sampling techniques, scaling techniques and measurements.
4. Distinguish various types of data collection methods and enable the students to draft questionnaire incorporating the scaling techniques.
5. Enable the students to analyze data using statistical packages and to follow a systematic process to write a research report.

CO	PO					
	1	2	3	4	5	6
CO1	H	L	H	L	M	L
CO2	H	L	H	L	H	L
CO3	H	M	H	L	H	M
CO4	H	L	H	M	H	L
CO5	H	L	H	M	H	L

CO	PSO

	1	2	3	4	5	6
<b>CO1</b>	H	M	H	M	H	M
<b>CO2</b>	H	M	H	M	H	M
<b>CO3</b>	H	M	H	M	M	M
<b>CO4</b>	H	M	H	M	M	M
<b>CO5</b>	H	M	H	M	H	M

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction

- Definition of research – meaning – objectives (K1, K2)
- Types of research (K1, K2, K3, K4)
- Research process (K1, K2, K3)
- Qualities of a researcher (K1, K2)
- Criteria of good research (K1, K2, K3, K4)
- Problems encountered in research (K1, K2, K3)

### Unit II: Research Design

- Defining research problem (K1, K2)
- Research design- Features of good research design (K1, K2, K3)
- Types of research design – factors affecting research design (K1, K2, K3)
- Hypothesis- Meaning – Definition – Need for hypothesis (K1, K2, K3, K4)
- Formulation of hypothesis – Types of hypothesis (K1, K2, K3, K4)
- Test of hypothesis – Type I and Type II error (K1, K2, K3, K4)

### Unit III: Sampling and Scaling

- Sampling techniques (K1, K2, K3)
- Types of sampling (K1, K2, K3, K4)
- Merits and demerits of Probability Sampling (K1, K2, K3)
- Merits and demerits of Non Probability Sampling (K1, K2, K3)
- Scaling – Types (K1, K2, K3, K4)
- Measurements – Classification (K1, K2, K3)

### Unit IV: Data Collection

- Collection of primary and secondary data (K1, K2, K3)
- Interview techniques (K1, K2, K3)
- Survey and interview method – merits and demerits (K1, K2, K3)
- Questionnaire – pre requisites of using questionnaire (K1, K2, K3, K4)
- Structured and Unstructured questionnaire (K1, K2, K3, K4)
- Types of secondary data (K1, K2, K3)

### Unit V: Data analysis and Report writing

- Steps in report writing (K1, K2, K3, K4)
- Introduction to Statistical Packages (K1, K2, K3)
- Descriptive: Percentage Analysis – Charts (K1, K2, K3, K4)
- Inferential Analysis: Mean- Median- Mode (K1, K2, K3, K4)
- Range- Variance- Standard Deviation (K1, K2, K3, K4)
- Correlation – Regression- Chi-square – ANOVA (Only Theory) (K1, K2, K3)

**Textbooks**

1. C.R. Kothari, Research Methodology Methods and Techniques, New Age International Publishers, 4<sup>th</sup> Edition, 2019.
2. P. Ravilochanan, Research Methodology, Margham Publication, First Edition 2012.

**Reference books**

1. B.N. Ghosh, Scientific Methods and Social Research, Sterling Publishers Pvt. Ltd., Delhi, 4<sup>th</sup> Edition 2015.
2. Dipak Kumar Bhattacharyya, Research Methodology, Excel Books, 2<sup>nd</sup> Edition, 2006.
3. Ajai Gaur, Statistical Methods for practice and Research, 1<sup>st</sup> Edition, 2006.

## SEMESTER IV

### UCHAK20 - ACCOUNTING FOR HOSPITAL ADMINISTRATORS – II

<b>Year:</b> II <b>Sem:</b> IV	<b>Course Code:</b> UCHAK20	<b>Title of the Course:</b> Accounting for Hospital Administrators II	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Objectives

1. To understand the evolution and role of cost and management accounting in business and its application in decision making.
2. To compute core financial ratios that communicates essential information.
3. To familiarize the concepts of cost accounting and material control with pricing methods.
4. To present and analyze variety of managerial decisions by preparing cash and funds flow statement.
5. To apply and analyze various tools and techniques of management accounting and determine optimal managerial decision.

#### COURSE OUTCOMES (CO)

1. Gain knowledge in basic concepts, tools and techniques of management accounting.
2. Be able to analyze the annual reports of an organisation and interpret the required financial information by calculating various ratios.
3. Classify the costs to better understand the business expenses and prepare cost sheet by breaking cost based on its types.
4. Prepare funds flow statement, cash flow statement and evaluate the fund movements and cash position of an organization.
5. Apply the cost, volume and profit concepts, prepare various budgets like cash budget, production budget, sales budget that aids in decision making.

CO	PO					
	1	2	3	4	5	6
CO1	H	L	H	L	H	M
CO2	M	L	H	L	H	M
CO3	H	L	H	L	H	H
CO4	H	M	H	L	H	H
CO5	H	M	H	L	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	H	M
CO2	H	M	M	M	H	M
CO3	H	M	M	M	H	M
CO4	H	M	M	M	H	M
CO5	H	M	M	M	H	M

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction

Introduction to Management Accounting – Meaning - Characteristics (K1, K2, K3)  
Principles – Scope – Objectives/Functions/Role (K1, K2, K3)  
Advantages – Limitations of Management (K1, K2, K3)  
Tools and Techniques of Management Accounting (K1, K2, K3)  
Introduction to Cost Accounting - Functions - Limitations (K1, K2, K3)  
Need for Cost Accounting - Difference between Cost & Management Accounting (K1, K2, K3)

### Unit II: Ratio Analysis

Ratio Analysis Calculation of various ratios (K1, K2, K3)  
Profitability ratios (K1, K2, K3, K4)  
Liquidity ratios (K1, K2, K3, K4)  
Solvency ratios (K1, K2, K3, K4)  
Turnover ratios (K1, K2, K3, K4)  
Capital Structure ratios (K1, K2, K3, K4)

### Unit III: Funds Flow and Cash Flow

Funds Flow Analysis – Working Capital (K1, K2, K3, K4)  
Current Assets – Current Liabilities (K1, K2, K3, K4)  
Preparation of Funds Flow Statement (Simple problems with sale of Fixed Assets under Indirect Method) (K1, K2, K3, K4)  
Cash Flow Analysis – Meaning – Importance (K1, K2, K3, K4)  
Difference between Funds Flow and Cash Flow (K1, K2, K3, K4)  
Preparation of Cash Flow Statement (Simple problems with sale of Fixed Assets under Indirect Method) (K1, K2, K3, K4)

### Unit IV: Cost Accounting

Classification of costs – Methods of Costing (K1, K2, K3)  
Elements of Cost sheet (K1, K2, K3, K4)  
Pricing of Materials – Methods of pricing (K1, K2, K3)  
FIFO (K1, K2, K3, K4)  
LIFO (K1, K2, K3, K4)  
Process Costing (K1, K2, K3, K4)

### Unit V: Marginal Costing & Budgetary Control

Marginal Costing – Meaning – Introduction to all concepts (K1, K2, K3)  
Cost Volume Profit Analysis excluding managerial decision making (K1, K2, K3, K4)

Budget and Budgetary Control – Meaning – Explanation – Advantages – Disadvantages (K1, K2, K3)

Types of Budgets – Cash Budget (K1, K2, K3, K4)

Flexible Budget (K1, K2, K3, K4)

Production Budget (K1, K2, K3, K4)

Sales Budget (K1, K2, K3, K4)

**Note: 80% Problems and 20% Theory**

### **Textbooks**

1. Khan and Jain, Management Accounting, Tata McGraw Hill, New Delhi, 2007.
2. R.S.N.Pillai and Bagavathi, Management Accounting, S. Chand and Co., NewDelhi, 2010.

### **Reference Books**

1. Prasanna Chandra, Fundamentals of Financial Management, Tata McGraw Hill, New Delhi, 2007.
2. Sahaf M.A, Management Accounting, Vikas Publishing House, New Delhi, 2006.
3. Subir Kumar Banarjee, Financial Management, S.Chand & Co., New Delhi, 2006.

**SEMESTER IV**  
**UAHSM20 - ALLIED IV: HEALTH SERVICES MARKETING**

<b>Year:</b> II <b>Sem:</b> IV	<b>Course Code:</b> UAHSM20	<b>Title of the Course:</b> Health Services Marketing	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Objectives**

1. To understand the concepts, functions, and techniques of the craft of marketingservices.
2. To identify critical issues in service design including the nature of service products & markets, building the service model and creating customer value.
3. To develop relevant skills to identify and manage demand, customer expectation,perception, customer service experiences and outcomes.
4. To provide an in-depth appreciation and understanding of the unique challengesinherent in managing and delivering quality services.
5. To evaluate the intertwined role of service personnel and customers concerningservice delivery, failures, and recovery issues.

**COURSE OUTCOMES (CO)**

1. Understand the similarities and differences in service based and physical productbased marketing activities.
2. Develop the competency to plan, create, price and distribute new service.
3. Understand the various strategies used for competition analysis, promotion andbranding the service to avoid service failure.
4. Acquire the ability to manage and improve service quality and customer relationships.
5. Understand and identify the role of employee and consumer in service deliveryprocess to manage critical issues in demand and capacity of service.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	H
CO2	H	M	M	L	L	H
CO3	H	M	M	L	L	H
CO4	H	M	M	L	L	H
CO5	H	M	M	L	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	M	M
CO2	H	M	H	H	H	M
CO3	H	M	H	H	H	M
CO4	H	M	H	H	H	M
CO5	H	M	H	H	H	M

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction to Marketing and Service Marketing

- Basic Marketing concepts (K1, K2, K3)
- Evolution of marketing concepts (K1, K2, K3)
- Marketing and service marketing mix (K1, K2, K3)
- Concept of service (K1, K2, K3)
- Classification of service (K1, K2, K3)
- Challenges and issues in services marketing. (K1, K2, K3)

### Unit II: Building Service Model

- Growth of service (K1, K2, K3)
- Career opportunities in service sector (K1, K2, K3)
- Planning and creating services (K1, K2, K3)
- Development of new services (K1, K2, K3)
- Distribution of services (K1, K2, K3)
- Pricing Service (K1, K2, K3)

### Unit III: Competition Analysis and Strategies

- Competitive Threats (K1, K2, K3)
- Competition analysis (K1, K2, K3)
- Competitive Advantage (K1, K2, K3)
- Service failures and Recovery (K1, K2, K3)
- Service branding (K1, K2, K3)
- Promotion (K1, K2, K3)

### Unit IV: Customer Behavior

- Consumer behavior in services (K1, K2, K3)
- Customer expectations and perceptions of service (K1, K2, K3)
- Service quality (K1, K2, K3)
- Determinants of service quality (K1, K2, K3)
- CRM (K1, K2, K3)
- Framework of CRM (K1, K2, K3)

### Unit V: Delivering and Performing of Services

- Managing service demand (K1, K2, K3)
- Managing service capacity (K1, K2, K3)
- A Service encounter (K1, K2, K3)
- Moment of truth (K1, K2, K3)
- Service Interaction Process (K1, K2, K3)
- Enhancing employee participation and customer participation (K1, K2, K3)

## Textbooks

1. Rama Mohana Rao. K, Services Marketing, 2<sup>nd</sup> Edition, 2011.

- Philip Kotler et al, Marketing, 14<sup>th</sup> Edition, 2013.

### Reference Books

- K. Douglas Hoffman et al, Essentials of Service Marketing: Concepts, Strategies and Cases, Thomson Learning, 2<sup>nd</sup> Edition, 2010.
- Kenneth E Clow, et al, Services Marketing Operation Management and Strategy, Biztantra, New Delhi, 2<sup>nd</sup> Edition, 2011.
- Lovelock, Services Marketing: People, Technology and Strategy, 7<sup>th</sup> Edition, 2011.

**SEMESTER IV**  
**USHAD420 – SKILL BASED ELECTIVE IV: PRACTICAL:**  
**COMMUNICATION SKILLS IN HINDI**

Year: II Sem: IV	Course Code: USHAD420	Title of the Course: Communication Skills in Hindi	Course Type: Practical	Course Category: Skill Based Elective IV	H/ W 2	Credits 2	Marks 60
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### Objectives

- To gain knowledge about basic words and phrases.
- To communicate effectively.
- To increase vocabulary for regular usage.
- To acquire ability to converse politely.
- To develop public speaking abilities by giving opportunities to speak in class, both informally and formally.

### COURSE OUTCOMES (CO)

- Learn the basic words and phrases.
- Develop the skill of communicating in a hospital scenario through practice
- Learn Hindi numerals.
- Be able to direct and speak politely and with due respect.
- Develop the skill to use appropriate terms and statements.

CO	PO					
	1	2	3	4	5	6
CO1	L	L	M	L	M	L
CO2	L	M	M	L	M	L
CO3	L	L	L	L	L	M
CO4	L	M	M	L	L	L
CO5	L	L	L	L	L	L

CO	PSO					
	1	2	3	4	5	6
CO1	M	L	L	M	L	L
CO2	M	L	M	H	M	H

<b>CO3</b>	M	M	L	H	L	M
<b>CO4</b>	M	M	H	H	M	H
<b>CO5</b>	M	M	L	M	H	L

**(Low - L, Medium - M, High - H)**

## **Syllabus**

### **Unit I: Basics**

Words - Meaning - Translating Sentences  
(K5)

### **Unit II: Words**

Numbers/Weeks/Days/Years/Months (K5)

### **Unit III: Pronunciation**

Proper Pronunciation. (K5)

### **Unit IV: Rules**

Avoiding Rude Language/ Using Polite Language Phrases (K5)

### **Unit V: Statements**

Commonly used Statements - Greetings. (K5)

### **Text Books**

1. N. Sreedharan, Spoken Hindi, Sura Books, 2012.
2. Rupert Snell, Get Started in Hindi Absolute Beginner Course, 2014.

### **Reference Books**

1. Suresh Kumar, Ramanath Sahai, English-English-Hindi Dictionary, 2015.
2. Krishna Gopal Vikal, Learn Hindi in 30 Days through English, 2005.
3. Ajay Kumar Bhalla, Learn Hindi Through English, 2013.

**SEMESTER V**  
**UCHAL20 – QUALITY IN HEALTHCARE**

<b>Year:</b> III	<b>Course Code:</b> UCHAL20	<b>Title of the Course:</b> Quality in Healthcare	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand the basic concepts and definitions of quality.
2. To understand the basic concepts and importance of Healthcare quality.
3. To recognize, evaluate and design patient safety considerations in healthcare.
4. To understand types, steps and benefits of auditing and accreditation.
5. To understand roles of quality steering committee in a hospital.

**COURSE OUTCOMES (CO)**

1. Gain Knowledge in the history of quality and quality principles and understand the seven tools of quality.
2. Analyze the need for healthcare quality management in hospitals and identify the variation in medical practice and implication for quality.
3. Recognize, categorize and evaluate clinical and operational issues and ways to address it for efficient patient safety.
4. Understand and differentiate types of audit and gain knowledge in various accreditations and its benefits.
5. Analyze, interpret and understand the role of quality team and quality steering committee in a hospital.

CO	PO					
	1	2	3	4	5	6
CO1	M	H	M	L	M	H
CO2	H	H	M	L	M	M
CO3	M	H	H	M	M	H
CO4	H	H	M	L	H	H
CO5	H	H	M	L	M	M

CO	PSO

	1	2	3	4	5	6
<b>CO1</b>	H	H	M	M	M	H
<b>CO2</b>	M	H	M	H	M	M
<b>CO3</b>	M	H	H	H	H	M
<b>CO4</b>	H	H	M	H	H	M
<b>CO5</b>	H	H	M	H	H	H

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction to Quality

- Concept and definitions - Dimensions of service quality (K1, K2, K3)
- History of quality principles (K1, K2, K3)
- Customer and types of customer - Continuous quality improvement (K1, K2, K3)
- Seven tools of quality - Check Sheet - Control chart (K1, K2, K3)
- Stratification - Pareto chart - Histogram - Scatter Diagram (K1, K2, K3)
- 5s - Six Sigma - Kaisen - Lean Management and Reengineering (K1, K2, K3)

### Unit II: Healthcare Quality

- Healthcare Quality and the patients (K1, K2, K3)
- Basic concepts of Healthcare quality (K1, K2, K3)
- Variation in medical practice and implication for quality (K1, K2, K3)
- Quality improvement system (K1, K2, K3)
- Need for healthcare quality management in hospitals (K1, K2, K3)
- Measure and improve patient care experience (K1, K2, K3)

### Unit III: Patient Safety and Medical Errors

- Scope of Patient Safety Considerations in Healthcare (K1, K2, K3)
- Use of Patient Safety Considerations in Healthcare (K1, K2, K3)
- Clinical and Operational Issues (K1, K2, K3)
- Improve patient safety (K1, K2, K3)
- Adverse event (K1, K2, K3)
- Using Technology to Improve Patient Safety (K1, K2, K3)

### Unit IV: Audit & Accreditation in Healthcare

- Clinical quality (K1, K2, K3)
- Auditing - Meaning - Types (K1, K2, K3)
- Auditing - steps and benefits (K1, K2, K3)
- Accreditation ISO - NABH (K1, K2, K3)
- JCI and other standards (K1, K2, K3)
- Benefits of accreditation (K1, K2, K3)

### Unit V: Organization and Roles in Quality

- Quality Policy (K1, K2, K3)
- Quality Steering committee (K1, K2, K3)
- Quality Council (K1, K2, K3)

Quality team (K1, K2, K3)

Healthcare performance indicator (K1, K2, K3)

Importance and concept of patient safety - Implementing strategies (K1, K2, K3)

### **Textbooks**

1. Bagad, V.S., Total Quality Management, Technical Publications, Pune, 1<sup>st</sup> Edition 2019.
2. Scott B. Ransom, The Healthcare Quality Book, Health Administration Press, Chicago, Illinois AUPHA Press, Washington, D.C., 2004.

### **Reference Books**

1. Raj Kumar, Acts Applicable to Hospitals in India, The Christian Medical Association of India, New Delhi, 2009.
2. Jayakumar, Total Quality Management, Lakshmi Publication, 7<sup>th</sup> Edition, 2014.
3. Sharma Karun Dev, Quality System Implementation in Health Care Establishments, Jaypee Brothers Medical Publishers, 1<sup>st</sup> Edition, 2014.

**SEMESTER V**  
**UCHAM20 - ORGANIZATIONAL BEHAVIOUR**

<b>Year:</b> III <b>Sem:</b> V	<b>Course Code:</b> UCHAM20	<b>Title of the Course:</b> Organizational Behavior	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To enable and understand the basic concepts of Organizational behavior.
2. To analyze individual and group behavior, and understand the implications of organizational behavior on the process of management.
3. To understand the concept of perception and learning and demonstrate skills required for working in groups.
4. To develop skills to resolve organizational conflicts and to overcome stress.
5. To evaluate the appropriateness of various leadership styles and Motivational concepts.

**COURSE OUTCOMES (CO)**

1. Understand the basic concepts, theories and models of Organizational behavior.
2. Develop the perceptual skills and its application in the decision making process and gain knowledge in the factors affecting learning and effective learning process.
3. Understand the group dynamics and acquire skills required for working in groups.
4. Understand the various determinants of Stress and coping strategies to develop skills to resolve organizational conflicts.
5. Analyze and compare different theories used to explain individual behavior.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	L	M	M
CO2	H	M	L	M	M	M
CO3	H	M	M	M	M	M
CO4	H	L	L	L	M	M
CO5	H	L	M	M	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	H
CO2	H	M	H	H	M	H
CO3	H	M	M	M	M	H
CO4	H	M	M	M	M	H
CO5	H	M	M	M	M	H

(Low -

L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction

- Nature and concept of OB (K1, K2, K3)
- Challenges of OB (K1, K2, K3)
- Ethical issues in OB (K1, K2, K3)
- Role of OB (K1, K2, K3)
- OB model (K1, K2, K3)
- Hawthorne Experiments (K1, K2, K3)

### Unit II: Perception and Learning

- Nature of human behavior (K1, K2, K3)
- Models of man (K1, K2, K3)
- Perception (K1, K2, K3)
- Managerial applications of developing perceptual skills (K1, K2, K3)
- Learning (K1, K2, K3)
- Factors affecting learning (K1, K2, K3)

### Unit III: Personality and Group Dynamics

- Personality theories (K1, K2, K3)
- Measurement of personality (K1, K2, K3)
- Attitude (K1, K2, K3)
- Attitudes relevant for OB (K1, K2, K3)
- Group Dynamics (K1, K2, K3)
- Types of group dynamics (K1, K2, K3)

### Unit IV: Conflict

- Organization Conflict (K1, K2, K3)
- Role conflict (K1, K2, K3)
- Conflict resolution (K1, K2, K3)
- Stress (K1, K2, K3)
- Coping strategies of stress (K1, K2, K3)
- Management by objectives (K1, K2, K3)

### Unit V: Motivation and Leadership Theories

- Maslow's need hierarchy theory (K1, K2, K3)
- Herzberg two factor theory (K1, K2, K3)
- Vroom's expectancy theory and McClelland's need theory (K1, K2, K3)
- X and Y theory (K1, K2, K3)

Leadership theories (K1, K2, K3)

Leadership styles (K1, K2,

**K3)Case study for all chapters.**

**Textbooks**

1. Keith Davis and John W. Newstrom, Organizational Behavior: Human Behavior at Work, Tata McGraw Hill, Delhi, 12<sup>th</sup> Edition, 2017.
2. L.M.Prasad, Organizational Behavior, Sultan Chand & Sons, 5<sup>th</sup> Edition, 2014.

**Reference Books**

1. Stephen. P. Robbins and Timothy A Judge, Organizational Behavior, Prentice Hall India, 18<sup>th</sup> Edition, 2018.
2. Udai Pareek, Understanding Organizational Behavior, Oxford University Press, 3<sup>rd</sup> Edition, 2011.
3. Stephen P. Robbins and Seema Sanghi, Organizational Behaviour, Pearsons Education, 11<sup>th</sup> Edition, 2005.

**SEMESTER V**  
**UCHAN20 – GLOBAL HEALTHCARE SYSTEM**

<b>Year:</b> III <b>Sem:</b> V	<b>Course Code:</b> UCHAN20	<b>Title of the Course:</b> Global Healthcare System	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand the role of medical tourism in the global healthcare system.
2. To understand, recognize and distinguish various aspects of healthcare delivery of developed nations from Indian healthcare system.
3. To understand, recognize and distinguish various aspects of healthcare delivery of developing nations from Indian healthcare system.
4. To understand, recognize and compare the governance, finance and technology aspects of healthcare systems of various countries.
5. To appraise the healthcare systems of other countries and apply the best aspects of their system to hospital systems for improved outcomes.

**COURSE OUTCOMES (CO)**

1. Realize the challenges faced by hospitals which have implemented medical tourism in their system.
2. Recognize and distinguish various aspects of healthcare delivery of NHS UK from Indian healthcare system and compare the governance, finance and technology aspects of NHS UK with other countries.
3. Recognize and distinguish various aspects of healthcare delivery of Canadian healthcare from Indian healthcare system and compare the governance, finance and technology aspects of Canadian healthcare with other countries.
4. Recognize and distinguish various aspects of healthcare delivery of Japanese healthcare from Indian healthcare system and compare the governance, finance and technology aspects of Japanese healthcare with other countries.
5. Recognize and distinguish various aspects of healthcare delivery of Malaysian healthcare from Indian healthcare system and compare the governance, finance and technology aspects of Malaysian healthcare with other countries.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	L	M	L
CO2	H	M	L	L	M	L
CO3	H	M	L	L	M	L
CO4	H	M	L	L	M	L
CO5	H	M	L	L	M	L

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	L	L	H
CO2	H	H	M	L	L	H
CO3	H	H	M	L	L	H
CO4	H	H	M	L	L	H
CO5	H	H	M	L	L	H

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction and Medical Tourism

- Global healthcare - Meaning - History (K1, K2, K3)
- Evaluation of Global healthcare (K1, K2, K3)
- Medical Tourism (K1, K2, K3)
- Global Economy in Healthcare (K1, K2, K3)
- Medical Tourism Destination (K1, K2, K3)
- Challenges and Opportunities (K1, K2, K3)

### Unit II: National Health Service

- Leadership and Governance (K1, K2, K3)
- Health information system (K1, K2, K3)
- Health Financing (K1, K2, K3)
- Medical products and technologies (K1, K2, K3)
- Human resource for health (K1, K2, K3)
- Service Delivery (K1, K2, K3)

### Unit III: Canadian Healthcare

- Leadership and Governance (K1, K2, K3)
- Health information system (K1, K2, K3)
- Health Financing (K1, K2, K3)
- Medical products and technologies (K1, K2, K3)
- Human resource for health (K1, K2, K3)
- Service Delivery (K1, K2, K3)

### Unit IV: Japan Healthcare

- Leadership and Governance (K1, K2, K3)
- Health information system (K1, K2, K3)
- Health Financing (K1, K2, K3)
- Medical products and technologies (K1, K2, K3)
- Human resource for health (K1, K2, K3)
- Service Delivery (K1, K2, K3)

### Unit V: Malaysia Healthcare

- Leadership and Governance (K1, K2, K3)
- Health information system (K1, K2, K3)
- Health Financing (K1, K2, K3)
- Medical products and technologies (K1, K2, K3)

Human resource for health (K1, K2, K3)  
Service Delivery (K1, K2, K3)

**Textbooks**

1. Helen Deresky, International Management: Managing Across Borders and Cultures, Text and Cases, Pearson Education, 8<sup>th</sup> Edition, 2014.
2. Haruka Sakamoto et al, Health Care in Japan: Volume 9 (Rutledge Library Editions: Japan) Hardcover, 2010.

**Reference Books**

1. Hardwar Praveen, Latest in Healthcare Management Paperback, 2015.
2. NHS, The Handbook to the NHS Constitution , 2019.
3. Richard Nadeau , Eric Beranger, et al, Health Care Policy and Opinion in theUnited States and Canada, 2014.

**SEMESTER V**  
**UCHAP20 -**  
**PROJECT**

<b>Year:</b> III <b>Sem:</b> V	<b>Course Code:</b> UCHAP20	<b>Title of the Course:</b> Project	<b>Course Type:</b> Practical/ Theory	<b>Course Category:</b> Core	<b>H/W</b> 2	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To discover potential research areas in the field of management and hospitaladministration.
2. To enable students to understand the challenges in the work environment.
3. To develop better insight in the existing literature.
4. To enable students to use analytical techniques and provide suitable solutions forthe problems.
5. To improve the decision making skills of the students.

**COURSE OUTCOMES (CO)**

1. Identify the existing problem in the work environment.
2. Devise a suitable plan for solving the problem.
3. Understand and interrelate fundamental aspects based on the available literatures.
4. Analyse and interpret data for decision making.
5. Document and provide feasible solutions which will promote the organisationgrowth and the student's career growth.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	M
CO2	H	M	H	H	H	M
CO3	H	M	M	M	H	H
CO4	H	M	H	M	H	M
CO5	H	M	H	H	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	H	H	M	M	H	H
CO3	M	M	M	M	H	H
CO4	H	M	M	H	H	H
CO5	H	M	M	M	H	H

(Low - L, Medium - M, High - H)

## Syllabus

Each student shall belong to a team of 5 and are required to prepare the report on the basis of investigation carried out in a particular problem area identified by them in a hospital. The report should demonstrate the capability of the students for some creative potential and original approach to solve the practical problems in day today activities in a hospital.

The report should include surveys, interpretation, planning and design of improved integrated management systems in a hospital, presented in a comprehensive manner and viva voce examination will be conducted on the basis of the report.

### Evaluation Pattern

- The mode of evaluating the project will consist of two parts. One on the basis of report writing and the other will be through Viva Voce Examination
- The valuation of the report writing and Viva Voce Examination will be done by the internal and external examiner.
- 60 marks will be awarded for report writing and 20 marks for overall review and 20 marks for oral examination.
- Project will be for a period of 1 month which will be during the II year in the month of May.
- Each team should find a reputed hospital to carry out her investigation with the approval of the department.
- After completing the Project, the students should get an Attendance Certificate from the hospital.

The following are the components for report writing

Content	40 Marks
Methodology	10 Marks
Layout	10 Marks
Overall Performance Review	20 Marks (CA – 80 Marks)
Viva Voce	(Semester 20 Marks)
Oral Presentation	10 Marks
Question and Answer	10 Marks

## SEMESTER V

### UEHAC20 - ELECTIVE II A: HEALTHCARE INSURANCE

<b>Year:</b> III	<b>Course Code:</b> UEHAC20	<b>Title of the Course:</b> Health Care Insurance	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> V							

#### Objectives

1. To understand the evolution of Health Insurance in India, the basics of Insurance and its role in economic development.
2. To familiarize with the role of regulatory bodies of Insurance sectors.
3. To comprehend the various policies of Health Insurance.
4. To equip with the knowledge of basic principles, tools, methods and process of underwriting.
5. To understand the claim management process in health insurance.

#### COURSE OUTCOMES (CO)

1. Acquire knowledge on basic terminologies of insurance and describe the role of health insurance for individuals.
2. Understand the various types of health insurance policies offered to individuals in India and the rules that govern and protect policy holders.
3. Familiarize with various health insurance policies offered by Government for poorer sections of the society.
4. Understand the basic tools and principles of underwriting and the rules governing the same.
5. Comprehend the claims management in insurance and understand the role of Third Party Administrators (TPA).

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	M
CO2	H	H	M	L	L	M
CO3	H	H	M	L	L	M
CO4	M	M	M	L	L	H
CO5	M	M	M	L	L	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	L	L	M
CO2	H	H	M	M	L	M
CO3	H	H	M	M	L	M
CO4	H	M	M	M	L	M
CO5	H	M	M	M	L	M

**(Low - L, Medium - M, High - H)**

## **Syllabus**

### **Unit I: Introduction**

- Introduction to Insurance (K1, K2, K3)
- Concept of Health insurance (K1, K2, K3)
- Health care - Determinants - Levels of Healthcare (K1, K2, K3)
- Types - Factors affecting Health system in India (K1, K2, K3)
- Evolution of Health Insurance in India (K1, K2)
- Health insurance market (K1, K2, K3)

### **Unit II: Products of Health Insurance I**

- Health Insurance Products: Classification of Health Insurance products (K1, K2, K3)
- IRDA guidelines on Standardization in health insurance (K1, K2, K3)
- Hospitalization indemnity product (K1, K2, K3)
- High Deductible plans – Senior citizen policy (K1, K2, K3)
- Fixed benefit covers (K1, K2, K3)
- Long term care Insurance (K1, K2, K3)

### **Unit III: Products of Health Insurance II**

- Combo products –Package policies (K1, K2, K3)
- Health insurance for poorer sections –Government schemes (K1, K2, K3)
- Personal accident - Overseas Travel Insurance (K1, K2, K3)
- Group Health Cover – Special Products (K1, K2, K3)
- Key terms in Health policies (K1, K2)
- Diagnostic Related Groups (DRG) – Determination of DRGs – Benefits of DRGs. (K1, K2, K3)

### **Unit IV: Underwriting**

- Health Insurance Underwriting - Need for underwriting (K1, K2, K3)
- Principles and tools of underwriting in Health insurance (K1, K2, K3)
- The underwriting process (K1, K2, K3)
- Group health insurance (K1, K2, K3)
- Underwriting of Overseas Travel Insurance (K1, K2, K3)
- Underwriting of Personal Accident Insurance (K1, K2, K3)

### **Unit V: Health Insurance Claims**

- Claims Management (K1, K2, K3)
- Management of Health Insurance Claims (K1, K2, K3)
- Claim process - Cashless settlement process (K1, K2, K3, K4)
- Documentation in Health Insurance Claims (K1, K2, K3)
- Role of Third Party Administrators (TPA) (K1, K2, K3)
- Claims management Personal Accident (K1, K2, K3, K4)

### **Text Books**

1. Insurance Institute of India, IC 32, Health Insurance, 2015.
2. Insurance Institute of India, IC 27, Healthcare Insurance, 2016.

### **Reference Books**

1. T Mahendran, Health Insurance Sector in India, Abhijeet Publications, 2009.
2. Benjamin S. Warren, Health Insurance: It's Relation to the Public Health, BiblioBazaar, 2009.
3. Thomas K T, Sakthivel R, Health Insurance in India, LAP Lambert Academic Publishing, 2012.

**SEMESTER V**  
**UEHAD20 – ELECTIVE II B: E BANKING**

<b>Year:</b> III <b>Sem:</b> V	<b>Course Code:</b> UEHAD20	<b>Title of the Course:</b> E-Banking	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Objectives**

1. To familiarize the students with the fundamentals of E-banking such as ATM, Internet banking, ECS, EFT Tele banking, Electronic Cheques, Credit cards, Debit cards, MICR, etc.
2. To enable the students to understand the concept of online banking.
3. To understand the E-Banking services provided in India.
4. To understand the various problems related to security aspects in E-banking.
5. To make students aware of means to overcome security related aspects in E-banking.
6. To familiarize students with various banking correspondence related to E-banking.

**COURSE OUTCOMES (CO)**

1. Acquire conceptual knowledge of E-banking, describe its features and compare it with traditional banking.
2. Understand the need for computerization in banks and describe the advantages and disadvantages of online banking.
3. Introduce the need for security and apply those to overcome cybercrimes.
4. Familiarize the crypto system followed in E-banking.
5. Understand the E-Security solutions and the various software used as security in E-banking.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	L	L	H
CO2	H	H	M	L	L	H
CO3	H	H	M	L	L	H
CO4	H	H	M	L	L	H
CO5	H	H	M	L	L	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	M	M
CO2	H	M	M	H	L	M
CO3	H	M	M	M	M	M
CO4	H	M	M	H	L	M
CO5	H	M	M	M	L	M

**(Low - L, Medium - M, High - H)**

## **Syllabus**

### **Unit I: Introduction**

- Electronic Banking: Traditional Banking Vs E-Banking (K1, K2, K3)
- Facets of E-Banking (K1, K2, K3)
- E-Banking transactions - Truncated cheque and Electronic cheque (K1, K2, K3)
- Models for E-banking - Complete centralized solution - Features CCS - Cluster approach (K1, K2, K3)
- Hi tech Bank with in Bank Advances of E-Banking (K1, K2, K3)
- Constraints in E-Banking (K1, K2, K3)

### **Unit II: Online Banking**

- Online Banking - Introduction - Concept and meaning (K1, K2, K3)
- The electronic delivery channels - Need for computerization (K1, K2, K3)
- Automatic Teller Machine (ATM) at home –Electronic Fund Transfer (EFT) uses(K1, K2, K3)
- Computerization in clearing houses (K1, K2, K3)
- Tele banking on home computers (K1, K2, K3)
- Electronic Money Transfer uses of EMT (K1, K2, K3)

### **Unit III: E Banking in India**

- Updating Bank saving accounts –Computer bank branches (K1, K2, K3)
- Financial Transaction Terminals (FTT) (K1, K2, K3)
- E-Cheque - Magnetic Ink Character Recognition (MICR) and Cheques (K1, K2, K3)
- E-Banking in India – Procedure – Programmes - Components (K1, K2, K3)
- How to go on net for Online Banking (K1, K2, K3)
- Advantages - Limitations (K1, K2, K3)

### **Unit IV: Security I**

- E-Banking Security – Introduction - Need for security (K1, K2, K3)
- Security concepts - Privacy –Survey - Findings on security attack - Cybercrimes (K1, K2, K3)
- Reasons for Privacy Tampering Encryption –Meaning - The encryption process (K1, K2, K3)
- Cryptogram – Cryptanalyst - Cryptography - Types of Cipher systems – Code systems (K1, K2, K3)
- Cryptography – Cipher – Decipher – Jumbling - Asymmetric (K1, K2, K3)
- Crypto system - Data Encryption Standard (DES) (K1, K2, K3)

### **Unit V: Security II**

- E-Builder solutions Digital certificate - Digital Signature & Electronic Signature(K1, K2, K3)
- E-Security solutions — solutions providers – E-locking technique – E-lockingservices - Netscape security solutions (K1, K2, K3)
- Pry Zone – E - software security - Internet Transactions - Transaction security(K1, K2, K3)
- PKI Sierras - Internet solutions –security devices (K1, K2, K3)
- Public Key Infrastructure (PKI) - Firewalls Secure Ledger (FSL) (K1, K2, K3)
- Secure Electronic Transaction (SET) (K1, K2, K3)

**Text Books**

1. C.S. Rayudu, E-Business, Himalaya Publishing House. 2015
2. IIBF, Bank Financial Management, Paperback, 2018.

**Reference Books**

1. Peter Rose, Sylvia Hudgins Bank Management and Financial Services Paperback, 1Jul 2017.
2. N S Toor, Arundeeep Toor, Skylark Publication's Bank Financial Management Guide For Caiib Q&A By N. S.Toor & Arundeeep Toor (9th Edition) Paperback, 2018.
3. Bhushan Dewan, E-Commerce, S Chand, 2001.

**Practical II E-banking**

1. Commenting on the correctness of documents like Cheque.
2. Responding to stimulated exercises on Customer/ Bank Employee Complaints.
3. Format of Letter of Credit.
4. Examining the working Mechanisms of ATMs and ETAs.
5. Working Knowledge of Telebanking
6. Knowledge of working Mechanisms of Encryption and E-Security.
7. Learning Internet Transactions Firewalls.

**SEMESTER V**  
**UGHAA521 – NON MAJOR ELECTIVE I: MANAGEMENT**  
**INFORMATIONSYSTEMS**

<b>Year:</b> III <b>Sem:</b> V	<b>Course Code:</b> UGHAA521	<b>Title of the Course:</b> Management Information Systems	<b>Course Type:</b> Theory	<b>Course Category:</b> Non Major Elective I	<b>H/W</b> 3	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To enable and understand the basic concepts of management information systems.
2. To analyze operational and tactical information systems in functional areas of business.
3. To develop skills in planning and development with the management information system.
4. To acquire skills to organize management information systems.
5. To learn and understand the concept of Hospital Information System.

**COURSE OUTCOMES (CO)**

1. Identify strategic uses of information systems in management.
2. Evaluate operational and tactical information systems in functional areas of business including marketing, finance and human resource.
3. Enhance skills in planning, analyzing and designing information systems.
4. Realize the roles and responsibility of information system professionals to control issues related to information theft.
5. Gain Knowledge in various Hospital Management software used for prescribing medicines, laboratory reports and logistics and inventory management.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	L	H
CO2	H	M	M	M	M	H
CO3	L	L	L	L	L	H
CO4	H	H	L	M	M	H
CO5	M	M	M	M	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	M	H	H
CO2	H	L	H	H	H	H
CO3	H	L	M	L	H	H
CO4	H	L	M	M	H	H
CO5	H	L	M	M	H	H

(Low - L, Medium - M, High - H)

## **Syllabus**

### **Unit I: Introduction to Information Systems and application in Functional Business Areas**

- A Manager's view of Information Systems (K1, K2, K3)
- An Introduction to concepts of system and Organizations (K1, K2, K3)
- Strategic Uses of Information Technology (K1, K2, K3)
- Business Process in Engineering (K1, K2, K3)
- Information Technology (K1, K2, K3)
- Information Technology and Business Process (K1, K2, K3)

### **Unit II: Applications of Information Systems**

- Applications to Operational Information systems to Business -  
Operation marketing information system (K1, K2, K3)
- Operational human resource information system (K1, K2, K3)
- Tactical and Strategic Information systems to Business (K1, K2, K3)
- Tactical accounting and financial information system (K1, K2, K3)
- Tactical marketing information system (K1, K2, K3)
- Tactical human resource information system (K1, K2, K3)

### **Unit III: Planning and Development of Information Systems**

- Information systems Planning (K1, K2, K3)
- Critical Success Factors (K1, K2, K3)
- Business System Planning (K1, K2, K3)
- System development life cycle (K1, K2, K3)
- System Analysis. (K1, K2, K3)
- Evaluating alternative design (K1, K2, K3)

### **Unit IV: Organization of Information systems**

- Introduction - Centralized/ De-Centralized/ Distributed Data Processing (K1, K2, K3)
- Allocation of Responsibilities in Distributed Data Processing (K1, K2, K3)
- Effective Organization of Information Processing Activities (K1, K2, K3)
- Roles & Responsibilities of Information Systems Professionals (K1, K2, K3)
- Career paths and Management of Data Processing (K1, K2, K3)
- The Organization and Management of End-User Computing (K1, K2, K3)

### **Unit V: Hospital Information systems (HIS)**

- Introduction to HIS- Definition - Need of HIS- Functional areas of HIS
- Utilization of HIS - Structure of HIS - Importance of HIS (K1, K2, K3)
- Managing information in hospitals, Functional areas in a hospital, structuring of HIS, users and access control - Development and implementation (K1, K2, K3)
- Hospital Management Software (HMS) - Application of MIS - Hospital Information Systems (HIS) or Hospital Information Technology (HIT) – Telemedicine (K1, K2, K3)
- Laboratory Information System (LIS)
- Health information management - Logistic and Supply chain
- Data analytics - Electronic Health - E-governance (K1, K2, K3)

**Textbooks**

1. Robert Schulthesis, Mary Sumner, Management Information Systems: The Manager's view, Tata McGraw Hill, 2006.
2. Haag, Cummings and McCubbrey, Management Information Systems for the Information Age, Tata McGraw Hill, 6<sup>th</sup> Edition, 2005.

**Reference Books**

1. Gordon Davis, Management Information Systems: Conceptual Foundations, Structure and Development, Tata McGraw Hill, 2000.
2. James A, O'Brien, Management Information Systems, Tata McGraw Hill, 6<sup>th</sup> Edition 2004.
3. S.A Kelkar, Hospital Information Systems: A Concise Study, Prentice Hall India Learning Private Limited, 2010.

## SEMESTER V

### USHAE520 - SKILL BASED ELECTIVE V: PRACTICAL: ACCOUNTING PACKAGES

<b>Year:</b> III <b>Sem:</b> V	<b>Course Code:</b> USHAE520	<b>Title of the Course:</b> Accounting Packages	<b>Course Type:</b> Practical	<b>Course Category:</b> Skill Based Elective V	<b>H / W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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#### Objectives

1. To introduce the students to the Basic of Accounts and the usage of Tally for accounting purpose.
2. To acquaint students with the accounting concept, tools and techniques influencing business organization will be liable for preparation of financial statements in the modern technological era.
3. To enable the students to record the business transactions and manage the accounts information for an organization using the popular Tally Business Accounting Software.
4. To enable the students to explore to and acquire skills in respect of most sophisticated computerized accounting procedures and practices so as to help them serve better the vast accounting needs of every commercial organization.
5. To enable the students ready with required skill for employability in the job market.

#### COURSE OUTCOMES (CO)

1. Gain knowledge in various accounting packages and the basics of Tally ERP 9.0
2. Be trained in creating company, enter accounting vouchers and to print profit and loss and Balance Sheet.
3. Prepare inventory and stock items for an organisation and print the stock summary report.
4. Understand how to create and maintain cost categories, cost centres of a product for easy processing of sales and purchase inventories.
5. Analyse the financial statements using ratio analysis and interpreting the results thereof.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	L	L	M
CO2	H	M	H	L	L	M
CO3	H	M	H	L	L	M
CO4	H	M	H	L	H	M
CO5	H	M	H	L	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	L
CO2	H	M	H	M	M	L
CO3	H	M	H	H	H	L
CO4	H	M	H	M	H	L
CO5	H	M	H	M	H	M

(Low - L, Medium - M, High - H)

## Syllabus

### Unit I: Introduction

Introduction to Accounting Software Packages : Marg – Zip books – Profit Books – Money Manager Ex – Quick Books – Zoho Books – Vyapar – MProfit – Marg ERP – Tally (K1)

### Unit II: Profit & Loss and Balance Sheet

Journal, ledger accounts – Trial Balance – Trading and Profit and Loss account – Profit and Loss account – Balance Sheet - Display Balance Sheet – Profit and Loss Account – Display trial balance (K5)

### Unit III: Inventory and Stock

Fundamentals of Inventory – Stock Groups – Stock categories – Godowns /Locations –Units of Measure Stock items (K5)

### Unit IV: Cost Categories

Cost Categories – Cost Centers – Inventory Master Creation: Stock groups – Entering Vouchers; Voucher types – How to enter Voucher – Different Types of Accounting Vouchers (Payments / Receipt, Journal, Sales and Purchase) (K5)

### Unit V: Introduction to Ratio Analysis

Ratio Analysis (K5)

### Lab Exercises

1. Trading and profit and loss account of a company
2. Balance Sheet of the Company
3. Cost category and cost center
4. Inventory and stock

### Textbooks

1. Namrata Agarwal, Tally 9, Dreamtech Press, 2<sup>nd</sup> Edition, 2013.
2. A.K.Nadhani, K.K.Nadhani, Implementing Tally 9, BPB Publications, 2<sup>nd</sup> Edition, 2007.

### Reference Books

1. Shraddha Singh, Navneet Mehra, Tally Power of Simplicity, V&S Publishers, 2015.
2. www.tally9book.com

**SEMESTER VI**  
**UCHAP20 - PUBLIC HEALTH AND COMMUNITY**

<b>Year:</b> III <b>Sem:</b> VI	<b>Course Code:</b> UCHAP20	<b>Title of the Course:</b> Public Health and Community	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 8	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand the history and antiquity of medicine.
2. To understand the concepts and definition of health and disease.
3. To understand the basic definitions and uses of Epidemiology.
4. To understand and differentiate communicable and non-communicable diseases.
5. To explore the health status, information and statistics in India.

**COURSE OUTCOMES (CO)**

1. Understand the history of medicine, dawn of scientific medicine and healthcare revolution.
2. Analyze the principles of health management and planning cycle and various health delivery systems.
3. Understand the uses of Epidemiology and concepts of screening for disease.
4. Realize and differentiate communicable and non-communicable diseases and conceptualize various National Health Planning in India and its impact.
5. Understand the importance of nutrition and health, environment and health in health status.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	M	L
CO2	H	M	L	H	M	L
CO3	H	M	L	H	M	L
CO4	M	M	L	H	M	L
CO5	H	M	L	H	M	L

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	M	M	M	M
CO3	H	H	M	M	M	M
CO4	H	H	M	M	M	M
CO5	H	M	M	M	M	M

**(Low L, Medium – M, High H)**

## **Syllabus**

### **Unit I: History of Medicine Overview**

- Medicine in antiquity (K1, K2, K3)
- Scientific approach (K1, K2, K3)
- Modern medicine (K1, K2, K3)
- Healthcare revolution (K1, K2, K3)
- Concept of health and health diseases (K1, K2, K3)
- Man and medicine (K1, K2, K3)

### **Unit II: Concepts of Health and Disease**

- Definition on health Determinants of Health (K1, K2, K3)
- Dimensions of Health (K1, K2, K3)
- Concept of Disease Concepts of Prevention (K1, K2, K3)
- Health Management and Planning Principles of Health Management and Planning cycle (K1, K2, K3)
- Healthcare of the community (K1, K2, K3)
- Health Delivery System (K1, K2, K3)

### **Unit III: Principles of Epidemiology**

- Definitions and basic measurement of epidemiology (K1, K2, K3)
- Epidemiologic methods (K1, K2, K3)
- Descriptive epidemiology (K1, K2, K3)
- Uses of epidemiology (K1, K2, K3)
- Screening for Disease (K1, K2, K3)
- Sensitivity and specificity (K1, K2, K3)

### **Unit IV: Disease: Concept, Cause and Control**

- Communicable diseases (K1, K2, K3)
- Non-communicable diseases - Control of non-communicable diseases (K1, K2, K3)
- National health planning in India, NHP (K1, K2, K3)
- Health programmes in India (K1, K2, K3)
- Reproductive and child health programme – Immunization Leprosy & TB (K1, K2, K3)
- HIV/AIDS programmes (K1, K2, K3)

### **Unit V: Health Status and Statistics in India and its Determinants**

- Nutrition and health (K1, K2, K3)
- Social science and medicine (K1, K2, K3)
- Environment and health (K1, K2, K3)
- Health information and statistics (K1, K2, K3)
- Mental health service (K1, K2, K3)
- Alcohol and its dependence (K1, K2, K3)

**Textbooks**

1. Park K, Park's Textbook of Preventive and Social Medicine, Banarsidas Bhanot, Jabalpur, India, 24<sup>th</sup> Edition, 2017.
2. Virginia Berridge, Public Health: A Very Short Introduction, Paperback, 2016.

**Reference Books**

1. Rajendra Pratap Gupta, Health Care Reforms in India: Making up for the Lost Decades, Hardcover, 2016.
2. Sharma Suresh, Nursing Research and Statistics, Paperback, 2018.
3. Mary Jane Schneider, Introduction to Public Health, 5<sup>th</sup> Edition, Paperback, 2017.

**SEMESTER VI**  
**UCHAQ20 - MATERIALS AND EQUIPMENT MANAGEMENT**

<b>Year:</b> III <b>Sem:</b> VI	<b>Course Code:</b> UCHAQ20	<b>Title of the Course:</b> Materials and Equipment Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 8	<b>Credits</b> 4	<b>Marks</b> 100
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**Objectives**

1. To understand the structure and overall functioning of the materials management.
2. To identify, differentiate and analyze the functions of materials management departments.
3. To recognize, evaluate and design the inventory control system for economical functioning of the hospital.
4. To categorize, plan and implement audits of inventory and materials system.
5. To develop, organize and implement the materials management system in the hospital.

**COURSE OUTCOMES (CO)**

1. Understand the need and importance of materials management in the hospital.
2. Develop and manage a purchase system for the hospital.
3. Plan and implement equipment purchase and develop audit and maintenance systems for hospital equipment.
4. Understand, interrelate various aspects of receiving and inspection and stores in materials management.
5. Recognize the importance of value and inventory management in materials management and select the appropriate methods for sustainable economic functioning.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	L	M	M
CO2	H	M	H	L	M	M
CO3	H	M	H	L	M	M
CO4	H	M	H	L	M	M
CO5	H	M	H	L	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	M	L	M
CO2	H	M	M	M	L	M
CO3	H	M	M	M	L	M
CO4	H	M	M	M	L	M
CO5	H	M	M	M	L	M

(Low - L, Medium - M, High - H)

## **Syllabus**

### **Unit I: Materials Management**

Introduction Definition and Function (K1,K2,K3)  
Goals and Objectives of Materials Management (K1,K2,K3)  
Materials Cycle (K1,K2,K3)  
Functions of Materials Manager (K1,K2,K3)  
Problems and Issues in Hospitals (K1,K2,K3)  
Information Systems for Materials Management (K1,K2,K3)

### **Unit II: Purchasing**

Objectives and Elements of Purchasing (K1,K2,K3)  
Purchasing System (K1,K2,K3)  
Purchasing Cycle (K1,K2,K3)  
Purchase Procedures Legal and Ethical Aspects (K1,K2,K3)  
Conditions of Contract (K1,K2,K3)  
Financial Rules - Arbitration (K1,K2,K3)

### **Unit III: Equipment Purchase and Maintenance**

Planning of Equipment (K1,K2,K3)  
Selection of Equipment (K1,K2,K3)  
Import of Equipment (K1,K2,K3)  
Equipment Utilization and Operation (K1,K2,K3)  
Equipment Repair and Maintenance (K1,K2,K3)  
Equipment Audit (K1,K2,K3)

### **Unit IV: Inspection, Storage and Distribution of Materials**

Planning - Consideration of Stores (K1,K2,K3)  
Inspection of Materials (K1,K2,K3)  
Verification of Materials (K1,K2,K3)  
Storage of Materials (K1,K2,K3)  
Distribution of Materials (K1,K2,K3)  
Condemnation and Disposal (K1,K2,K3)

### **Unit V: Scientific Inventory Management**

Codification and Standardization (K1,K2,K3)  
Value Analysis (K1,K2,K3)  
Inventory Control - Lead Time - Safety Stock and Reorder level (K1,K2,K3)  
Economic Order Quantity (EOQ) (K1,K2,K3)  
Selective Controls (K1,K2,K3)  
Case Studies on Inventory Control (K1,K2,K3, K4)

**Textbooks**

1. Shaki Gupta and Sunil Kant, Hospital Stores Management: An Integrated Approach, Jaypee Publications, New Delhi, India, 2004.
2. WHO, Maintenance and Repair of Laboratory, Diagnostic, Imaging and Hospital Equipment (WHO, Geneva), 2014.

**Reference Books**

1. Donald J. Bowersox and David J. Closs, Logistical Management, Tata McGrawHill, 2<sup>nd</sup> Edition, 2013.
2. David Simchi, Levi, Designing and Managing Supply Chain, Tata McGraw Hill, New Delhi, 3<sup>rd</sup> Edition, 2008.
3. Ajay Kaul, Hospitality Logistics Management, Hardcover, 2012.

**SEMESTER VI**  
**UCHAR20 - INTERNSHIP (2 MONTHS)**

<b>Year:</b> III <b>Sem:</b> VI	<b>Course Code:</b> UCHAR20	<b>Title of the Course:</b> Internship	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> -	<b>Credits</b> 8	<b>Marks</b> 100
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**Objectives**

1. To explore alternatives prior to graduation.
2. To integrate theory and practice.
3. To assess the interests and abilities in the field of management and hospital administration.
4. To develop work habits and attitudes necessary for work environment.
5. To build a record of work experience.

**COURSE OUTCOMES (CO)**

1. Identify work and its function in the economy
2. Develop communication, interpersonal and other critical skills for employability.
3. Realize the importance of professionalism in the workplace.
4. Gain ethical experience in organizational culture.
5. Ability to identify the diverse needs and global issues for sustainable growth.

CO	PO					
	1	2	3	4	5	6
CO1	L	H	M	L	H	M
CO2	L	H	M	L	H	M
CO3	L	H	M	L	H	M
CO4	L	H	M	L	H	M
CO5	L	H	M	L	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	H	H
CO2	H	M	M	M	H	H
CO3	H	M	M	M	H	H
CO4	H	M	M	H	H	H
CO5	H	M	H	M	H	H

**(Low - L, Medium - M, High - H)**

**Syllabus**

Each student shall be required to prepare the report on the basis of training undergone by her in a hospital. The report should demonstrate the capability of the students in studying the hospital and its services and activities in totality.

## Evaluation Pattern

- Each student should undergo the training separately.
- The mode of evaluating the student will consist of two parts. One on the basis of report writing and the other will be through Viva Voce.
- The valuation of the report writing will be by the internal examiner while for the oral examination an external examiner will be called for.
- 60 marks will be awarded for report writing and 20 marks for overall review and 20 marks for oral examination.
- Training will be for a period of 3 months which will be during the last semester of the course.
- Each student should find a reputed hospital to carry out her investigation with the approval of the department.
- After completing her training, the student should get an Attendance Certificate from the hospital.

The following are the components for report writing

Content	50 Marks
Layout	10 Marks
Overall Performance Review	CA – 60 Marks
Viva Voce	Semester 40 Marks
Oral Presentation	20 Marks
Question and Answer	20 Marks

**SEMESTER VI**  
**UGHAB620 - NON MAJOR ELECTIVE II: PRACTICALS: ADVANCED EXCEL**

<b>Year:</b> III <b>Sem:</b> VI	<b>Course Code:</b> UGHAB620	<b>Title of the Course:</b> Advanced Excel	<b>Course Type:</b> Practical	<b>Course Category:</b> Non Major Elective	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 100
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**Objectives**

1. To introduce the students to the basic of Microsoft Excel.
2. To acquaint students with spreadsheet concept, functions, formula; graphing tools and tables.
3. To enable the students to use a spreadsheet to track data and automatically see sums averages and totals.
4. To enable the students to explore and acquire skills in respect of most sophisticated computerized data analysis and documentation procedures and practices so as to help them serve better in an organization.
5. To enable the students ready with required skill for employability in the job market.

**COURSE OUTCOMES (CO)**

1. Gain knowledge in basics and advanced Microsoft Excel.
2. Be trained in creating worksheet, enter data set and can perform all arithmetic operations using formulas.
3. Prepare and can calculate the pay roll of employees in an organization.
4. Understand how to create and extract pivot table from the data set.
5. Analyze the data sets using various graphic tools and functions.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	L	L	M
CO2	H	H	M	L	L	M
CO3	H	H	M	L	L	M
CO4	H	H	M	L	L	M
CO5	M	H	M	L	L	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	H	M	L
CO2	H	L	M	H	M	L
CO3	H	L	M	H	H	L
CO4	H	L	M	H	H	L
CO5	H	L	M	H	H	L

(Low-L, Medium – M, High - H)

## **Syllabus**

### **Unit I: Introduction to Microsoft Excel**

Entering and Revising Data - Moving Data within a Workbook - Finding and Replacing Data - Correcting and Expanding Upon Worksheet Data - Defining a Table - Naming Groups of Data - Creating Formulas to Calculate Values - Finding and Correcting Errors in Calculations (K5)

### **Unit II : Formatting and Filters**

Formatting Cells- Defining Styles - Applying Workbook Themes and Table Styles - Adding Images to Worksheets - Limiting Data That Appears on Your Screen - Manipulating List Data - Defining Valid Sets of Values for Ranges of Cells (K5)

### **Unit III: Creating Dynamic Lists by Using PivotTables**

Sorting Data Lists-- Looking Up Information in a Data List - Analyzing Data Dynamically by Using Pivot Tables - Filtering, Showing, and Hiding PivotTable Data Editing PivotTables - Formatting PivotTables -Creating PivotTables from External Data (K5)

### **Unit IV: Analyzing Alternative Data Sets**

Defining an Alternative Data Set -Defining Multiple Alternative Data Sets - Varying Your Data to Get a Desired Result by Using Goal Seek - Finding Optimal Solutions by Using Solver - Analyzing Data by Using Descriptive Statistics - Consolidating Multiple Sets of Data into a Single Workbook - Grouping Multiple Sets of Data (K5)

### **Unit V: Creating Charts and Graphics 235**

Creating Chart - Customizing the Appearance of Charts - Finding Trends in Your Data - Adding Graphics to Spreadsheet - Creating Dynamic Charts by Using Pivot Charts - Creating Diagrams by Using Smart Art (K5)

### **Text Books**

1. Curtis D. Frye, Step by Step Microsoft Excel 2007, Microsoft Press, 2012.
2. John Walkenbach, Microsoft Excel 2016 Bible, John Wiley & Sons, 2015.

### **Reference books**

1. Paul McFedries, Excel 2016 Formulas and Functions, Pearson Publications, 2016.
2. [www.coursera.org](http://www.coursera.org)

## Practical List

1. Create a Worksheet with entering 10 Patient's data of a hospital with necessary formatting and sorting.
2. Create a worksheet and perform various arithmetic operations.
3. Find out total hours worked in a week by the employees in a company using arithmetic operator and fill the details using auto fill operation.
4. Calculate the total salary of all sales representative after adding the commission of 2% for each sale.
5. Create a mark list for 5 students in five subjects, and calculate the total average, minimum and maximum mark in each subject and results as pass or fail. Insert chart for input values
6. Create a sales and profit report for the first quarter and calculate the 10% Bonus, which is 10% of the Profit. .
7. Create a Pivot table and extract the medicine imported from a data set in a year by a company and insert pivot chart
8. Create an eligibility list for the second round of interview among the candidates those who scored above 60% marks in their first round.

**SEMESTER VI**  
**USHAF620 - SKILL BASED ELECTIVE VI: SOCIAL**  
**ENTREPRENEURSHIP**

<b>Year:</b> III <b>Sem:</b> VI	<b>Course Code:</b> USHAF620	<b>Title of the Course:</b> Social Entrepreneurship	<b>Course Type:</b> Theory	<b>Course Category:</b> Skill Based Elective VI	<b>H/ W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
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**Objectives**

1. To understand the difference between social entrepreneurship with other entrepreneurial and social work.
2. To learn various types of social enterprise.
3. To understand the concept of sustainable development.
4. To identify the opportunities of social entrepreneurship.
5. To develop the business model for social entrepreneurship.

**COURSE OUTCOMES (CO)**

1. Understand the theory of social entrepreneurship, and distinguish social entrepreneurship from other entrepreneurial and social work.
2. Be able to identify the different forms of social enterprise including nonprofit proprietorship, trust and section 25 companies.
3. Identify an unsatisfactory social equilibrium, and actively pursue a solution to create a more just, fair, and sustainable model.
4. Learn the opportunities of social entrepreneurship by understanding the concept of startups, incubation center, venture capital and CSR fund.
5. Be able to develop social entrepreneurship by understanding the success story of various social entrepreneurs like Aravind Eye Hospital.

CO	PO					
	1	2	3	4	5	6
CO1	H	L	M	L	L	H
CO2	H	M	M	L	M	H
CO3	L	M	M	M	M	H
CO4	M	M	L	M	H	L
CO5	M	M	M	L	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	H
CO2	H	M	M	H	H	H
CO3	H	M	M	H	H	H
CO4	H	M	M	H	H	H
CO5	H	H	M	H	H	H

(Low - L, Medium - M, High - H)

## **Syllabus**

### **Unit I: Social Entrepreneurship**

- Introduction of Social entrepreneur (K1, K2, K3)
- Difference Between social entrepreneurship and social entrepreneurship (K1, K2, K3)
- Need for social entrepreneurship (K1, K2, and K3)
- Factors impacting transformation into social entrepreneur (K1, K2, K3)
- The characteristics of social entrepreneurs (K1, K2, K3)
- The four distinctions of social entrepreneurship (K1, K2, K3)

### **Unit II: Forms of Social Enterprises**

- Profit and nonprofit Proprietorships (K1, K2, K3)
- Partnership Company (K1, K2, K3)
- Nongovernmental organization (K1, K2, K3)
- The Limited liability Company (K1, K2, K3)
- Section 25 Companies (K1, K2, and K3)
- Factors governing the selection of Suitable form of ownership Business Organization (K1, K2, and K3)

### **Unit III: Sustainable Development**

- Concept of Sustainable Development (K1, K2, K3)
- Goals of sustainable development (K1, K2, K3)
- Environmental costs and its economic value (K1, K2, K3)
- The Political Challenge and development Issues in India (K1, K2, K3)
- The Millennium Ecosystem Assessment (K1, K2, K3)
- Findings of Millennium Ecosystem Assessment (K1, K2, K3)

### **Unit IV: Opportunities for Social Entrepreneurs**

- Methods of sensing opportunities and fields of opportunities (K1, K2, K3)
- Steps to ensure a successful start (K1, K2, and K3)
- Startups and incubation (K1, K2, K3)
- Accessing venture capital (K1, K2, K3)
- CSR funds (K1, K2, and K3)
- Types of CSR (K1, K2, K3)

### **Unit V: Successful Social Entrepreneurship Initiatives**

- Factors affecting success of social entrepreneurship (K1, K2, K3)
- Business model of Aravind Eye Care System (K1, K2, K3)
- Example of Successful Indian social entrepreneurs (K1, K2, K3)
- Example of Successful foreign social entrepreneurs (K1, K2, K3)
- Creating Business ideas (K1, K2, K3, K4)
- Creating Business Design (K1, K2, K3, K4)
- Exposure visit to Hope House, MBKG

### **Textbooks**

1. Jayshree Suresh, Entrepreneurial Development, Margham Publication, 4<sup>th</sup> Edition, 2012.
2. Robert, Michael, Dean A. Shepherd, Entrepreneurship, Tata McGraw Hill, 6<sup>th</sup> Edition, 2006.

**Reference Books**

1. S. S. Khanka, Entrepreneurial Development, Sultan Chand & Sons, Latest Edition, 2006.
2. Dinanath Kaushik, Studies in Indian Entrepreneurship, New Delhi, Cyber Tech Publications, 2013.
3. Gopalkrishnan, The Entrepreneur's Choice: Cases on Family Business in India, Routledge Taylor & Francis Group, 2014.

**AUXILIUM COLLEGE (Autonomous)**  
(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)  
**Gandhi Nagar, Vellore – 632006**

**Department of Botany**

The Department of Botany offers Allied and Optional Allied Course in Botany to the students of Zoology and Chemistry Department. It also offers interdisciplinary course as Skill Based Elective and Non-Major Elective to I UG and III UG of all the disciplines.

**On completion of the UG Programme, students will be able to:**

**PO1:**Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:**Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:**Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:**Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.

**PO5:**Emulate positive social values and exercise leadership qualities and teamwork.

**PO6:**Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

**Programme Specific Outcomes (PSO)**

**PSO1:**Understand the basics of Botany

**PSO2:**Gain knowledge of the diversity of the Plant kingdom

**PSO3:**Utilize the knowledge to understand the metabolism of Plants

**PSO4:**Apply the knowledge to develop a sustainable environment

**PSO5:**Acquire skills for self-employment as Agripreneurs

**PSO6:**Affirm the opportunities to become an entrepreneur

### Structure of the course

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year I Sem	UBBTA20	Optional Allied Botany-I	Theory	Allied	4	4	40+60=100
I Year II Sem	UBBTB20	Optional Allied Botany-II	Theory	Allied	4	4	40+60=100
I Year I and II Sem	UBBTC20	Optional Allied Botany Practical	Practical	Allied	2	2	40+60=100
II Year III Sem	UABTA20	Allied Botany-I	Theory	Allied	4	4	40+60=100
II Year IV Sem	UABTB20	Allied Botany-II	Theory	Allied	4	4	40+60=100
II Year III and IV Sem	UABTC20	Allied Botany Practical	Practical	Allied	2	2	40+60=100
I Year I / II Sem	USBTA120 / USBTA220	Herbal therapy and Cosmetology	Theory	Skill based elective	2	2	40+60=100
I Year I / II Sem	USBTB121 / USBTB221	Horticulture	Theory	Skill based elective	2	2	40+60=100
III Year V / VI Sem	UGBTA520 / UGBTA620	Edible Mushroom Cultivation	Theory	Non- Major Elective	3	2	40+60=100
II Years IV Sem	UNEVS20	Environmental Studies	Theory	General Paper	2	2	40+60=100

### Pattern of Question Paper for Semester

#### Theory/NME- Total Marks 100

Section A (Answer ALL) -  $10 \times 2 = 20$

Section B (either OR) -  $5 \times 7 = 35$

Section C (3 out of 5) -  $3 \times 15 = 45$

#### Practical - Total Marks 60

**Practical:** 45 Marks

**Record:** 10 Marks

**Viva:** 5 Marks

#### SBE - Total Marks 60

Section A (Answer all)  $10 \times 2 = 20$

Section B (4 out of 6)  $4 \times 5 = 20$

Section C (2 out of 3)  $2 \times 10 = 20$

PSO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	H	H	H	H	M	H
PSO2	H	H	H	H	M	H
PSO3	H	H	H	H	H	H
PSO4	H	H	H	H	M	M
PSO5	H	H	H	H	H	H
PSO6	H	H	H	H	H	H

**H-High(3), M-Moderate(2), L-Low(1)**

## SEMESTER-I& III – PAPER-1

### UBBTA20/UABTA20– OPTIONAL ALLIED BOTANY-I/ALLIED BOTANY-I

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year I Sem	UBBTA20	Optional Allied Botany-I	Theory	Allied	4	4	40+60=100
II Year III Sem	UABTA20	Allied Botany-I	Theory	Allied	4	4	40+60=100

#### Course Outcomes (CO):

On completion of the course, the students will be able to,

1. Outline the general characters, life cycle and economic importance of Algae and Fungi.
2. Distinguish the general characters of Bacteria and Virus
3. Understand the general characters and life cycle of Bryophyta, Pteridophyta and Gymnosperms.
4. Upgrade the knowledge in Cell biology and Genetics
5. Identify the pathogens and the applications of Plants in agriculture.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	H
CO4	H	H	M	H	M	M
CO5	H	H	M	H	H	H

**H-High(3), M-Moderate(2), L-Low(1)**

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	M	M	H	M	H
CO4	H	H	M	H	M	H
CO5	H	H	M	H	M	H

**H-High(3), M-Moderate(2), L-Low(1)**

#### Unit I: Algae and Fungi:

(12 hours)

1.1 General characters of Algae. (K2)

1.2 Structure, reproduction and life cycle of *Nostoc* and *Sargassum*. (K1, K3)

- 1.3 Economic importance of Algae. (K4)
- 1.4 General characters of Fungi. (K2)
- 1.5 Structure, reproduction and life cycle of *Yeast and Agaricus*. (K1, K2)
- 1.6 Economic importance of Fungi. (K3)

**Unit II: Bacteria and Virus: (12 hours)**

- 2.1 General characters of Bacteria (K2)
- 2.2 Structure and reproduction of *E.coli*. (K3)
- 2.3 Economic importance of Bacteria. (K4)
- 2.4 General characters of Viruses. (K2)
- 2.5 Structure of TMV and Bacteriophage. (K2,K3)
- 2.6 Structure of COVID-19. (K3)

**Unit III: Bryophyta, Pteridophyta and Gymnosperms: (12 hours)**

- 3.1 General characters of Bryophyta. (K1, K2)
- 3.2 Structure and life cycle of *Funaria*. (K2, K3)
- 3.3 General characters of Pteridophyta. (K1, K2)
- 3.4 Structure and life cycle of *Lycopodium*. (K2, K3)
- 3.5 General characters of Gymnosperms. (K1, K2)
- 3.6 Structure and life cycle of *Cycas*. (K3, K4)

**Unit IV: Cell Biology and Genetics: (12 hours)**

- 4.1 Ultra structure of Prokaryotic and Plant Eukaryotic cell. (K2, K3)
- 4.2 Cell organelles- Ultra structure and functions of Chloroplast, Mitochondria and Nucleus. (K2,K3)
- 4.3 Cell division- Mitosis and Meiosis (K3)
- 4.4 Genetics-Mendelism-Monohybrid and Dihybrid cross. (K1,K4)
- 4.5 Back cross, Law of dominance, Law of segregation. (K1,K3)
- 4.6 Incomplete dominance, Law of independent assortment. (K1,K2)

**Unit V: Ecology, Crop Management and Applied Botany: (12 hours)**

- 5.1 Ecosystem - structure and functions, Food chain and Food web. (K2, K3)
- 5.2 Ecological Pyramid, Adaptation of Plants- Hydrophytes, Xerophytes. (K1,K2)
- 5.3 Symptoms, causative organism and control measures of Tobacco Mosaic disease. (K3)
- 5.4 Symptoms, causative organism and control measures of Citrus canker. (K2, K3)
- 5.5 Symptoms, causative organism and control measures of Tikka disease of groundnut. (K3)
- 5.6 Biopesticides – BT, Biofertilizers in Agriculture (Azolla and BGA), Mycorrhiza. (K3)

**Text Books:**

1. Kumaresan .V - Algae and Bryophytes, Saras Publications, Nagercoil, Kaniyakumari. 1997
2. Pandey B.P. - College Botany - Volume I, S.Chand and company pvt.Ltd., Ramnagar, Newdelhi. 2015
3. Arumugam.N, Kumaresan . V. - Plant Ecology and Phytogeography, Saras Publication, 2005.

**Reference Books:**

1. Vashishta B.R, Sinha A.K, Singh V.P. - Fungi, S.Chand and company pvt.Ltd., Ramnagar, Newdelhi.2005
2. Vashishta, B.R, Sinha, A. K and Adarsh Kuma - Botany for degree students -Bryophyta, S. Chand & Company LTD, Ram Nagar, New Delhi. 2005
3. Vashishta, P.C, Sinha,A.K and Anil Kumar, - Botany for degree students- Pteridophyta, S. Chand & Company LTD. Ram Nagar, New Delhi.(Revised edition, 2010).
4. Vashishta, P.C, Sinha,A.K and Anil Kumar - Botany for degree students Gymnosperms, S. Chand & Company LTD. Ram Nagar, New Delhi.(Revised edition, 2014),

**Open Educational Resources (OER):**

1. <https://youtu.be/c2adzEjYUmA>
2. [https://youtu.be/VIS\\_4G3Ysyk](https://youtu.be/VIS_4G3Ysyk)
3. [https://youtu.be/VVuYGkk\\_I8s](https://youtu.be/VVuYGkk_I8s)
4. <https://youtu.be/FmBZGx8fkp0>
5. <https://youtu.be/URUJD5NEXC8>
6. [https://youtu.be/2lqhJNgn\\_Wg](https://youtu.be/2lqhJNgn_Wg)

**SEMESTER-II& IV – PAPER-2**  
**UBBTB20 /UABTB20- OPTIONAL ALLIED BOTANY-II /ALLIED BOTANY-II**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year II Sem	UBBTB20	Optional Allied Botany-II	Theory	Allied	4	4	40+60=100
II Year IV Sem	UABTB20	Allied Botany-II	Theory	Allied	4	4	40+60=100

**Course Outcomes (CO):**

On completion of the course, the students will be able to

1. Classify Angiosperms and identify the family with the characters .
2. Identify and analyse the histology of Plants.
3. Gain knowledge on Embryology of Plants.
4. Understand the key process of Plant Physiology.
5. Integrate the knowledge of Horticulture in growing Plants.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

**H-High(3), M-Moderate(2), L-Low(1)**

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	M	H
CO5	H	M	H	H	H	H

**Unit I: Taxonomy:**

**(12 hours)**

- 1.1 Bentham and Hooker's system of classification, Nomenclature. (K2, K3)
- 1.2 Study of characters and economic importance of the family Caesalpiniaceae. (K1, K2)
- 1.3 Study of characters and economic importance of the family Rubiaceae. (K2, K3)
- 1.4 Study of characters and economic importance of the family Asclepiadaceae. (K2, K4)
- 1.5 Study of characters and economic importance of the family Amaranthaceae. (K2, K4)
- 1.6 Study of characters and economic importance of the family Liliaceae. (K1, K3)

**Unit II: Plant Anatomy:****(12 hours)**

- 2.1 Tissues- Meristematic and Permanent tissue. (K1, K2)
- 2.2 Primary structure of Dicot stem. (K1, K3)
- 2.3 Primary structure of Monocot stem. (K2, K3)
- 2.4 Primary structure of Dicot root and Monocot root. (K1,K3)
- 2.5 Primary structure of Dicot leaf. (K1,K3)
- 2.6 Primary structure of Monocot leaf. (K3)

**Unit III: Embryology:****(12 hours)**

- 3.1 Structure of mature Anther. (K2,K3)
- 3.2 Structure of Ovule. (K2,K4)
- 3.3 Types of Ovules. (K3)
- 3.4 Structure of Embryo sac. (K3)
- 3.5 Structure of Pollen grain. (K3)
- 3.6 Structure of Dicot embryo, Parthenocarpy. (K1,K3)

**Unit IV: Plant Physiology:****(12 hours)**

- 4.1 Absorption of Water. (K1,K2)
- 4.2 Transpiration. (K3,K4)
- 4.3 Photosynthesis - Light reaction, Calvin cycle. (K1,K3)
- 4.4 Respiration - Glycolysis, Fermentation, Krebs's Cycle. (K2,K3)
- 4.5 Electron transport system. (K1,K3)
- 4.6 Growth hormones - Auxins, Gibberellins and application. (K1, K3)

**Unit V: Plant propagation methods:****(12 hours)**

- 5.1 Tissue Culture-*Invitro* Culture method. (K1,K2)
- 5.2 Plant tissue culture and its applications. (K1,K3)
- 5.3 Vegetative Propagation. (K2, K3)
- 5.4 Horticulture methods – Cutting – Stem Layering-ground layering and air layering. (K2,K3)
- 5.5 Grafting- Cleft, Bark grafting. (K2,K3)
- 5.6 Terrace garden, Kitchen garden. (K3)

**Text Books:**

1. Pandey, B.P -Taxonomy of Angiosperms for University students,(Revised) S. Chand & Company LTD. Ram Nagar, New Delhi, 2009.
2. Pandey B.P. - College Botany - Volume II, S.Chand and company pvt.Ltd.,Ramnagar, Newdelhi. 2015

**Reference Books:**

- 1.Pandey, B.P. - Embryology of Angiosperms. S. Chand & Company Ltd., New Delhi, 1995.
2. Pandey, S.N. and Sinha, B.K. - Plant Physiology. IV Edition, Vikas Publishing company, Noida, UP, 2009
- 3.Verma, P.S. and Agarwal, V.K. - Cell biology, Genetics, Molecular Biology, Evolution and Ecology. S.Chand& Company Ltd. New Delhi, 2004
4. Dubey R.C - A textbook of Biotechnology, S.Chand and company pvt. Ltd., Ramnagar, New Delhi, 2015
- 5.Manibushan Rao. K - Text book of Horticulture. McMillan publication. Co., New York.1991

**Open Educational Resources (OER):**

1. [https://youtu.be/TTIGRcd\\_ju0](https://youtu.be/TTIGRcd_ju0)
2. <https://youtu.be/f2dvh0YNDwM>
3. <https://youtu.be/C8VHyezOJD4>
4. <https://youtu.be/dV9QcGs58l0>
5. <https://youtu.be/NqgeeAlp9zA>

## SEMESTER I & II

### UBBTC20/ UABTC20- OPTIONAL ALLIED BOTANY PRACTICAL /ALLIED BOTANY PRACTICAL

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year I and II Sem	UBBTC20	Optional Allied Botany Practical	Practical	Allied	2	2	40+60=100
II Year III and IV Sem	UABTC20	Allied Botany Practical	Practical	Allied	2	2	40+60=100

#### Course Outcomes (CO):

On completion of the course, the students will be able to,

1. Identify and describe the plants in technical terms belonging to the families prescribed in the theory syllabus.
2. Distinguish and analyse the microscopic and macroscopic study of Cryptogams.
3. Examine the internal features of Dicot and Monocot- root, stem and leaf.
4. Interpret the Physiology experiments.
5. Illustrate the horticultural practices- cutting, layering and grafting.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

**H-High(3), M-Moderate(2), L-Low(1)**

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	M	H
CO5	H	M	H	H	H	H

#### 1.Taxonomy:

1.1 Describe the plants in technical terms belonging to the following families  
Caesalpiniaceae, Rubiaceae, Asclepiadaceae, Amaranthaceae and Liliaceae

## **2. Anatomy:**

- 2.1 Sectioning of Dicot and Monocot stem
- 2.2 Sectioning of Dicot and Monocot root
- 2.3 Sectioning of Dicot and Monocot leaf

## **3. Demonstration of Physiology experiments:**

- 3.1 Potato osmoscope
- 3.2 Ganong's potometer
- 3.3 Ganong's light screen experiment
- 3.4 Test tube and funnel experiment
- 3.5 Ganong's respiroscope

## **4. Observation of microscopic and macroscopic materials/photomicrographs:**

- 4.1 Algae, Fungi, Bryophyta, Pteridophyta and Gymnosperms
- 4.2 Embryology
- 4.3 Ecology
- 4.4 Cytology
- 4.5 Biotechnology
- 4.6 Horticulture.

## **Reference Books:**

- 1. Gamble, J.S.- The Flora of Presidency of Madras. Vol. I, II and III. Bishen Singh and Mahendra Pal Singh, Dehra Dun. 1919-1925.
- 2. Dr. Ashok M. Bendrea and Dr. Ashok Kumar – A text book of Practical Botany –I,II ,Rastogi Publications, New Delhi, 2009-2010.

## SEMESTER-I & II – SKILL BASED ELECTIVE

### USBTA120/ USBTA220– HERBAL THERAPY AND COSMETOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year I / II Sem	USBTA120 USBTA220	Herbal therapy and Cosmetology	Theory	Skill based elective	2	2	40+60=100

#### Course Outcomes (CO):

On completion of the course, the students will be able to,

1. Acquire knowledge in the basics of medicinal plants.
2. Get an insight into the therapeutic values of Indian system of medicine.
3. Identify the herbs and formulate herbal medicines for skin care.
4. Identify the herbs and formulate herbal medicines for hair care.
5. Evaluate the importance of herbs used in herbal cosmetics.

#### Unit I: Herbs:

(6hours)

- 1.1 Herbs – definition, division, distribution. (K2, K3)
- 1.2 Elementary knowledge of herbs. (K1)
- 1.3 Importance of Medicinal plants. (K3)
- 1.4 Role of medicinal plants in human health care. (K3)
- 1.5 Plants in folk religion – *Aegle marmelos*, *Ficus benghalensis*. (K2)
- 1.6 *Curcuma domestica* and *Sesamum indicum*. (K2,K3)

#### Unit II: Indian system of medicines:

(6hours)

- 2.1 Indian system of medicines –AYUSH - Ayurveda, Unani (K2, K3)
- 2.2 Siddha and Homeopathy (K1,K3)
- 2.3 Therapeutic values of Naturopathy (K4)
- 2.4 Traditional knowledge and utility of some medicinal plants in Tamil Nadu -*Solanum trilobatum*, *Cardiospermumhalicacabum* (K3)
- 2.5 *Vitex negundo*, *Adathoda vasica* (K2,K3)
- 2.6 *Azadirachta indica* and *Eclipta alba* (K1,K3)

#### Unit III: Skin care:

(6 hours)

- 3.1 Herbal care for facial skin ( K1, K2)
- 3.2 Formulation of face pack for dry (K2)
- 3.3 Formulation of face pack for oily skin (K2)
- 3.4 Formulation of face pack for normal skin (K3)
- 3.5 Herbal remedy for skin disorders - pimple, acne ( K3)
- 3.6 Herbal remedy for skin disorders - boiles, black heads and tans (K3, K4)

**Unit IV: Hair care:****(6 hours)**

- 4.1 Herbal care for hair (K2, K3)
- 4.2 Formulation of hair oil (K3)
- 4.3 Formulation of hair tonics (K3)
- 4.4 Herbal remedy for dandruff (K1,K4)
- 4.5 Herbal remedy for Premature greying (K3)
- 4.6 Herbal remedy for hairloss (K1,K2)

**Unit V: Herbal Cosmetics:****(6 hours)**

- 5.1 Herbal cosmetics – Meaning, advantage and disadvantage (K1, K3)
- 5.2 Preparation of Herbal shampoo (K3)
- 5.3 Herbal tooth paste (K3)
- 5.4 Herbal soap (K2,K3)
- 5.5 Role of herbs in skin care - Tulasi and Aloe vera (K2, K3)
- 5.6 Role of herbs in hair care –Henna and Coconut (K2)

**Text Books:**

1. Kumar, N.C. - An Introduction to Medical Botany, Emkay Publications, NewDelhi. 1993
2. Kapoor L.D - Hand book of Ayurvedic medicinal plants, CRC press Anes books, New Delhi, 2005

**Reference Books:**

1. Sivarajan, V.V and Balasubramaniyan, I - Ayurvedic Drugs and their Plant Sources. Oxford and IBH, New Delhi, 1994.
2. Ambaster - Wealth of India. CSIR Publications, New Delhi, 1996.
3. Herbal Cosmetics - H.Pande, Asia Pacific Business press, New Delhi.

**Open Educational Resources (OER):**

1. <https://youtu.be/DeLjnFTDjFc>
2. <https://youtu.be/p5zb17r0f3U>
3. <https://youtu.be/arVcJITMAAtQ>
4. <https://youtu.be/c2d0UFRjlpw>
5. <https://youtu.be/eJmAY2OWrs4>

**SEMESTER-I & II-SKILL BASED ELECTIVE****USBTB121/ USBTB221– HORTICULTURE**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
I Year I / II Sem	USBTB121 USBTB221	Horticulture	Theory	Skill based elective	2	2	40+60=100

**Course Outcomes (CO):**

On completion of the course, the students will be able to,

1. Apply the principles of the cultivation of economically important horticultural crops.
2. Analyze the different methods of plant propagation in horticultural crops.
3. Evaluate the importance of floriculture in indoor gardening.
4. Plan and execute the different types of garden layouts and design.
5. Develop the skill for vegetable and fruit processing, its preservation and preparation of value added products.

**Unit I: Introduction to Horticulture:****(6hours)**

- 1.1 Importance and scope of Horticulture (K2)
- 1.2 Divisions and requirements of horticulture(K1, K2)
- 1.3 Soil types (K2)
- 1.4 Irrigation and nutrition (K3, K4)
- 1.5 Cultivation of economically important plant - Rose (K3)
- 1.6 Cultivation of economically important plant – Mango (K3)

**Unit II: Plant propagation:****(6hours)**

- 2.1 Methods of plant propagation (K2, K3)
- 2.2 Cutting- stem, root, leaf and leaf bud(K1,K3)
- 2.3 Layering - Simple, air, tip and mound (K1,K3)
- 2.4 Grafting - cleft and bark(K3)
- 2.5 Budding - chip and patch (K3)
- 2.6 Role of plant growth regulator in horticulture. (K2,K3)

**Unit III: Indoor gardening:****(6 hours)**

- 3.1 Potted plants and hanging basket (K1, K2)
- 3.2 Hydroponics (K1, K2)
- 3.3 Bonsai -Training, watering and pruning (K2)
- 3.4 Flower arrangement (K2,K3)
- 3.5 Cut flowers ( K3)
- 3.6 Flower decoration -displays, bouquets and wreaths (K3, K4)

**Unit IV: Outdoor gardening:****(6 hours)**

- 4.1 Landscaping (K2, K3)
- 4.2 Rockery and arches (K2,K3)
- 4.3 Terrace gardening (K3)
- 4.4 Kitchen gardening - plan and principles (K1,K4)
- 4.5 Classification of vegetables and fruits (K1,K3)
- 4.6 Layout for a model college garden.(K1,K2)

**Unit V: Fruits and vegetable preservation:****(6 hours)**

- 5.1 Preparation of Jam, jelly (K1, K3)
- 5.2 Preparation of squash, sauce (K2, K3)
- 5.3 Preparation of pickle, ketchup (K2)
- 5.4 Use of preservatives – chemicals, sugar (K1,K3)
- 5.5 Brim for fruits (K3)
- 5.6 Vegetable canning, bottling and levelling (K1,K2)

**Text Books:**

1. Manibushan Rao. K. - Text book of horticulture. McMillan publication. Co., New York, 1991
2. Sheela V.L - Horticulture. MJP Publishers, 1959

**Reference Books:**

- 1.Kumar. N - Introduction to Horticulture. Rajalakshmi publication Nagercoil,1986
- 2.SubbhaRoa, N.S - Biofertilizers in Agriculture and Forestry. India Book House Limited. 1997
- 3.Trivedy . P.P - Home gardening. ECA Publication, New Delhi, 1987
- 4.Arora, J. S. - Introductory Ornamental Horticulture. Kalyani Publishers, New Delhi, 1992
- 5.Rao, K. M. - Text Book of Horticulture. Macmillan India Ltd., New Delhi, 2000

**Open Educational Resources (OER):**

1. <https://youtu.be/cVzO00HDLLA>
2. <https://youtu.be/5vem9fyWuss>
3. <https://youtu.be/NqqeeAlp9zA>
4. [https://youtu.be/seA\\_h3FKKEE8](https://youtu.be/seA_h3FKKEE8)
5. <https://youtu.be/dwpNe5xiN2I>

## SEMESTER-V & VI – NON-MAJOR ELECTIVE

### UGBTA520/ UGBTA620– EDIBLE MUSHROOM CULTIVATION

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
III Year V / VI Sem	UGBTA520 UGBTA620	Edible Mushroom Cultivation	Theory	Non- Major Elective	3	2	40+60=100

#### Course Outcomes (CO):

On completion of the course, the students will be able to,

1. Plan the cultivation of mushroom for self employment activity
2. Identify the medicinal and nutritional value of mushroom
3. Evaluate the cultivation of Oyster mushroom
4. Develop the technical skills for both cultivation and preservation of mushroom
5. Establish a commercial mushroom production Unit.

#### Unit I: Introduction to Mushroom:

(9hours)

- 1.1 Biology of edible mushroom (K2, K3)
- 1.2 *Agaricus* sp.(K1, K3)
- 1.3 *Calocybe* sp. (K3)
- 1.4 *Volvariella* sp. (K3)
- 1.5 *Pleurotus* sp. (K1, K2)
- 1.6 Scope of edible mushroom cultivation in India. (K2,K3)

#### Unit II: Medicinal and nutritional value of Mushroom:

(9hours)

- 2.1 Nutrient Profile of Mushroom- Protein, aminoacids, (K2, K3)
- 2.2 Calorific values, carbohydrates, fats, vitamins & minerals. (K1,K3)
- 2.3 Medicinal properties (K4)
- 2.4 Disease cured and prevented by the consumption of edible mushroom (K3)
- 2.5 Poisonous mushrooms(K2,K3)
- 2.6 Types of edible mushroom available in India (K3)

#### Unit III: Cultivation technology:

(9 hours)

- 3.1 Infrastructure, substrates, polythene bag, vessels, inoculation loop, low cost stove, culture rack, mushroom Unit, water sprayer, tray ( K1, K2)
- 3.2 Preparation of spawn (K1, K2)
- 3.3 Substrate preparation- Steam pasteurization, Hot water treatment (K2)
- 3.4 Mushroom bed preparation, Spawning of substrate (K2,K3)
- 3.5 Crop management- Incubation and fruit body induction, Harvesting (K3)
- 3.6 Factors influencing mushroom cultivation (K3)

**Unit IV: Preservation and value added mushroom products: (9 hours)**

- 4.1 Short term storage- Refrigeration (K2, K3)
- 4.2 Long term storage - Freezing, dry Freezing, drying, canning (K2,K3)
- 4.3 Food preparations - soup powder, pickles, chips (K3)
- 4.4 Mushroom recipes - cutlets , samosa, curry, manchurian(K1,K4)
- 4.5 Beverages (K1,K3)
- 4.6 Dietary Supplements (K1,K2)

**Unit V: Establishment of mushroom Unit: (9 hours)**

- 5.1 Plans and procedure (K1, K3)
- 5.2 Role of TIIC and DIC in promoting edible mushroom cultivation (K2, K3)
- 5.3 Research centers- National level and regional level (K2)
- 5.4 Cost benefit ratio- Marketing in India and abroad (K1,K3)
- 5.5 Export value (K2, K3)
- 5.6 Economics of a small scale model (K1,K2)

**Text Books:**

1. Marimuthu, T. - Oyster Mushroom. Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore, 1991.
2. Pathak, V.N. and Yadav, N. - Mushroom Production and Processing Technology. Agrobios, Jodhpur, 1998.

**Reference Books:**

1. Kaul, T.N. - Introduction to mushroom science, Oxford & IBH Co., Pvt. Ltd., New Delhi, 1999.
2. Bahl, N. - Handbook on mushrooms. Oxford & IBH Publishing Co., Pvt. Ltd., 2000.
3. Philip G. Miles, Shu-Ting Chang -Mushroom biology, World Scientific, 1997.

**Open Educational Resources (OER):**

1. <https://youtu.be/TYu3AnuMJlg>
2. <https://youtu.be/BNtANzcc9yg>
3. <https://youtu.be/8xIVVRHNeXA>
4. <https://youtu.be/0sc0Tnfaytg>

## SEMESTER-IV

II Year- B.A / B.Sc. / B.Com / B.B.A / BCA

### UNEVS20– ENVIRONMENTAL STUDIES

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/ W	Credits	Marks
II Years IV Sem	UNEVS20	Environmental Studies	Theory	General Paper	2	2	40+60=100

#### COURSE OUTCOMES (CO):

On completion of the course, the students will be able to,

1. Gain knowledge on multidisciplinary nature of environmental studies
2. Understand the Ecosystem, its structure and function
3. Understand the conservation of biodiversity
4. Gain knowledge on Environmental pollution, causes and its effects
5. Apply the laws in prevention of environment.

#### UNIT I: Multidisciplinary nature of environmental studies: (6 hours)

- 1.1 Definition, scope and importance (K2, K3)
- 1.2 Need for public awareness (K1, K3)
- 1.3 Natural resources: Renewable and non-renewable resources (K3, K4)
- 1.4 Forest Resources: Use and over-exploitation, deforestation (K3, K4)
- 1.5 Water Resources: Use and over-utilisation of surface and ground water (K1, K2)
- 1.6 Mineral Resources: Use and exploitation, environmental effects of extracting and Food resources (K2,K3)

#### UNIT II: Ecosystem: (6 hours)

- 2.1 Concept of an ecosystem (K2, K3)
- 2.2 Structure and functions of an ecosystem (K1, K3)
- 2.3 Energy flow in the ecosystem-Water cycle and carbon cycle (K4)
- 2.4 Food chain, food web and ecological pyramids (K3)
- 2.5 Structure and functions of forest and grassland ecosystem (K2,K3)
- 2.6 Structure and functions of desert and aquatic ecosystem (K1,K3)

#### UNIT III: Biodiversity and its Conservation: (6 hours)

- 3.1 Definition: Genetic, Species, Ecosystem Diversity ( K1, K2)
- 3.2 Biogeographic classification of India (K1, K2)
- 3.3 Value of biodiversity: consumptive, productive use, social, ethical, aesthetic (K2, K4)
- 3.4 Hot spots of biodiversity, Endangered and endemic species of India (K2,K3)
- 3.5 Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts( K3, K4)
- 3.6 Conservation of biodiversity: in-situ and ex-situ (K3, K4)

#### UNIT IV: Environmental pollution: (6 hours)

- 4.1 Definition, causes, effects and control measures of air, water, soil and noise pollution (K2, K3)
- 4.2 Solid waste management: causes, effects and control measures of urban and industrial

waste (K2,K3)

4.3 Climate change, global warming, (K3)

4.4 Acid rain, ozone layer depletion (K3)

4.5 Disaster management: floods, earthquakes, cyclones, landslides (K1,K3)

4.6 Rainwater harvesting (K1,K2)

**UNIT V: Human Population and Environment:**

**(6 hours)**

5.1 Environmental acts- Environment Protection Act (1986), (K1, K3)

5.2 Air (Prevention and Control of Pollution Act 1981), Water (Prevention and Control of Pollution Act 1976 (K2, K3)

5.3 Wildlife Protection Act (1972), Forest Conservation Act (1980) (K2)

5.4 Population explosion – family welfare program (K1,K3)

5.5 Infectious diseases and Water related diseases (K2, K3)

5.6 Role of information technology in environmental conservation. (K1,K2)

**TEXT BOOKS:**

1. Dr. V. Balu – Environmental Studies. 2004.

2. N. Arumugam – Concepts of Ecology, 2014.

**REFERENCE BOOKS:**

1. Verma and Agarwal – Environmental Biology, 2015.

2. Anubha Kaushik & Kaushik .C .P(2008)-Perspectives in Environmental studies (3rd Edition )New age International publishers.

3. Environmental studies, Edition: Periyar EVR college, Trichy, Jazym Publications,Trichy, 2004.

**OPEN EDUCATIONAL RESOURCES (OER):**

7. <https://youtu.be/PwmSa09C16E>

8. <https://youtu.be/brF0RWJyx9w>

9. [https://youtu.be/76K\\_5SrYyM4](https://youtu.be/76K_5SrYyM4)

10. <https://youtu.be/PqxMzKLYrZ4>

**PATTERN OF QUESTION PAPER**

**CONTINUOUS ASSESSEMENT EXAMINATION**

**(Units I, II & III)**

**Time: 1 Hour**

**Maximum Marks: 25**

**Section - A (10 × 1 = 10 Marks)**

Answer ALL questions

(At least THREE questions from each Unit)

**Section - B (5 × 2 = 10 Marks)**

Answer any FIVE questions out of 8

(At least TWO questions from each Unit)

**Section - C (1 × 5 = 5 Marks)**

Answer any ONE question out of 3

(One questions from each Unit)

**SEMESTER EXAMINATION**  
**(Complete Syllabus)**

**Time: 2 Hour**

**Maximum Marks: 60**

**Section - A ( $30 \times 1 = 30$  Marks)**

Answer ALL questions

(SIX questions from each Unit)

**Section - B ( $5 \times 2 = 10$  Marks)**

Answer any FIVE questions out of 8

(At least ONE question from each Unit)

**Section - C ( $4 \times 5 = 20$  Marks)**

Answer any FOUR question out of 6

(At least ONE question from each Unit)

# ECONOMICS

## SEMESTER I

### UCCOB20 - BUSINESS ECONOMICS I

Year	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
I	UCCOB20	Business Economics –I	Theory	Core	5	4	40+60

#### Course Objective:

1. To familiarize the students with the basic concepts of micro economics.
2. To Make students understand the demand analysis in business applications.
3. To familiarize the students with the protection and cost structure under different stages of production.
4. To understand the pricing and output decisions under various market structure.
5. To help students understand and apply the various decision tools to understand the market

#### Course Outcome (CO):

On the successful of completion of the course, students will be able

1. To understand the concepts of demand, nature and cost of production and its relationship to business operations.
2. To apply demand analysis to relevant economic issues
3. To analyse the causes and consequences of different market conditions
4. To integrate the concept of price and output decisions of firms under various market structure.
5. To apply marginal analysis to the firm under different market conditions.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	M	M	H	H
2	H	H	H	M	H	H
3	H	H	H	H	H	H
4	H	H	H	M	M	H
5	H	H	H	H	H	H

Low – L, Medium – M, High - H

#### COURSE SYLLABUS

##### Unit I: Nature and scope of Economics

15 Hours

1. Introduction & Definition of Business Economics.
2. Nature and Scope of Business Economics.

3. Relationship with other disciplines Micro & Macro.
4. Concepts applied in Business Economics.
5. Role and responsibilities of Business Economics.
6. Objectives of Business Economics

**Unit II: Consumer Behaviour & Indifferent Curve Analysis**

**15 Hours**

1. Meaning of Utility.
2. Law of Diminishing & Marginal Utility.
3. Law of Equity- Marginal Utility.
4. Indifference Curve Analysis.
5. Indifferent Schedule.
6. Indifference Curve & Indifference Map.

**Unit III: Demand Analysis**

**15 Hours**

1. Meaning of Demand, Law of Demand.
2. Individual demand and Market demand.
3. Reasons for the downward sloping of the demand curve.
4. Types of Elasticity of Demand curve.
5. Measurement of Elasticity of demand.
6. Demand forecasting.

**Unit IV: Factors of Production**

**15 Hours**

1. Meaning of different factors of production.
2. Production Possibility Curve.
3. Law of Returns to Scale.
4. Diminishing Returns to Scale.
5. Law of variable Proportions.
6. Internal and External economics and diseconomies.

**Unit V: Cost Revenue and Supply**

**15 Hours**

1. Concept of Cost of Production.
2. Different Cost of Concept – Nominal & Real cost, Implicit and explicit cost, opportunity cost, Short- run & Long run cost, Variable cost and fixed cost, Total cost, Marginal cost, Marginal cost, Average cost.
3. Theory of cost & Break even Analysis – Profit Maximization and Sales Maximization.
4. Meaning of Supply: Functions of Supply and Classifications.
5. Cost – Output relationship.
6. Cost Control & Cost Reduction.

**TEXT BOOKS**

1. Sankaran S- Business Economics – Margham Publications, Chennai , 2016
2. H.L. Ahuja – Business Economics – S. Chand & Company Ltd., New Delhi.

**Reference Books:**

1. Varshney R.L &Maheshwary K.L -Managerial Economics - S Chand & Co Ltd  
New Delhi – 2008
2. Sundaram K.P.M &Sundaram E,N – Business Economics - S Chand & Co Ltd  
New Delhi – 2016
3. Jhingan M.L – Principles of Economics – Vrinda Publications (P) Ltd – 2015

**Web resources:**

1. National association for Business Economics
2. Prime academy
3. Harvard Extension school
4. Indian School of Business and Finance, New Delhi
5. Harvard Business school online
6. Online Master of science course in Business economics
7. The American institute of Business and Economics (AIBEE)

**Assessment Tools**

1. Lecture (Chalk & Talk – LCD)
2. Blended classroom – E – Content videos
3. Problem solving group discussion
4. Assignments
5. Class set
6. Quiz – seminar
7. Project

## SEMESTER II

### UCCOD20 - BUSINESS ECONOMICS II

Year	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
I	UCCOD20	Business Economics –II	Theory	Core	5	5	40+60

#### Course Objective:

1. To understand the functioning to the economy at the macro level.
2. To understand how the economy is regulated through monetary and fiscal policies.
3. To study the important indicators of the economy and their significance.
4. To classify different concepts of national income and its computation.
5. To obtain in depth knowledge about inflation and trade cycles

#### Course Outcome (CO's): On the successful completion of the course,

1. To explain the concept of macro economics
2. Understands the circular flow of income and expenditure.
3. Analyse the various pricing policies and its implementation in different business situations.
4. Analysis the causes and effects of changes in real GNP, NNP, etc.,
5. To integrate the role of fiscal and monetary policies in regulating economy.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	M	H	H	H	M	H
2	H	M	H	H	M	H
3	H	H	M	H	H	H
4	H	H	H	H	M	H
5	H	H	H	H	H	H

Low – L, Medium – M, High – H

#### Course Syllabus

##### Unit I: Market Structure

- 1.1 Meaning and types of Market Structure (K1, K2, K3, K4)
- 1.2 Perfect Competition: Features – Price and Output Determination (K1, K2, K3, K4)
- 1.3 Monopoly: Features – Price and Output Determination (K1, K2, K3, K4)
- 1.4 Price Discrimination (K1, K2, K3, K4)
- 1.5 Monopolistic Competition: Price and Output Determination (K1, K2, K3, K4)
- 1.6 Oligopoly and Duopoly market (K1, K2)

## **Unit II: Pricing Policy**

- 2.1 Meaning and Objectives of Pricing Policies (K1, K2, K3, K4, K5)
- 2.2 Meaning Determining Pricing Policies(K1, K2, K3, K4, K5)
- 2.3 Different Pricing Methods(K1, K2, K3, K4, K5)
- 2.4 Specific Pricing Problems(K1, K2, K3, K4, K5)
- 2.5 Export Prices(K1, K2, K3, K4, K5)
- 2.6 Public Pricing(K1, K2, K3, K4, K5)

## **Unit III: Factor Pricing**

- 3.1 Ricardian Theory of Rent – Quasi Rent (K1, K2, K3, K4, K5)
- 3.2 Marginal Productivity theory of Wage – Modern theory of Wage(K1, K2, K3, K4, K5)
- 3.3 Liquidity theory of Interest – Modern theory of Interest (K1, K2, K3, K4, K5)
- 3.4 Innovation theory of Profit (K1, K2, K3, K4, K5)
- 3.5 Risk theory of Profit(K1, K2, K3, K4, K5)
- 3.6 Uncertainty theory of Profit (K1, K2, K3, K4, K5)

## **Unit IV: National Income**

- 4.1 Different concepts of National Income(K1, K2, K3, K4, K5)
- 4.2 Gross National Product (GNP) & Net National Product (NNP)(K1, K2, K3, K4, K5)
- 4.3 National Income at factor cost(K1, K2, K3, K4, K5)
- 4.4 Personal Income – Disposable Income(K1, K2, K3, K4, K5)
- 4.5 Measurement of National Income(K1, K2, K3, K4, K5)
- 4.6 Difficulties of National Income (K1, K2, K3, K4, K5)

## **Unit V: Inflation and Trade cycles**

- 5.1 Meaning of Inflation (k1, k2)
- 5.2 Causes of Inflation – Types of Inflation(K1, K2, K3, K4, K5)
- 5.3 Inflationary Gap(K1, K2, K3, K4, K5)
- 5.4 Philips Curve(K1, K2, K3, K4, K5)
- 5.5 Meaning of trade cycles(K1, K2, K3, K4, K5)
- 5.6 Characteristics of trade cycles.(K1, K2, K3, K4, K5)

### **Text Books:**

- 1. Sankaran S. Business Economics – Margham Publications Chennai – 2016
- 2. H L Ahuja - Business Economics – S Chand & Co Ltd New Delhi – 2016

### **Reference Books:**

- 1. Varshney R.L &Maheshwary K.L -Managerial Economics - S Chand & Co Ltd New Delhi – 2008
- 2. Sundaram K.P.M &Sundaram E,N – Business Economics - S Chand & Co Ltd New Delhi – 2016
- 3. Jhingan M.L – Principles of Economics – Vrinda Publications (P) Ltd – 2015

**Web resources:**

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2. Prime academy
3. Harvard Extension school
4. Indian School of Business and Finance, New Delhi
5. Harvard Business school online
6. Online Master of science course in Business economics
7. The American institute of Business and Economics (AIBEE)

**Assessment Tools**

1. Lecture (Chalk & Talk – LCD)
2. Blended classroom – E – Content videos
3. Problem solving group discussion
4. Assignments
5. Class set
6. Quiz – seminar
7. Project

**SEMESTER III**  
**UAIED20 – ALLIED III: INDIAN ECONOMIC DEVELOPMENT POLICY**

<b>Year / Sem</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course type</b>	<b>Course Category</b>	<b>No. of Hours</b>	<b>Credits</b>	<b>Marks</b>
II/III	UAIED20	<b>Allied: III-Indian Economic Development Policy</b>	Theory	Allied	5	5	40+60

**Course Objective:**

1. To understand the several parameters of development of the nation.
2. To introduce the students on the basic understanding and role of planning and various economic policies of the government.
3. To interpret the importance of Agriculture and Industrial Production.
4. Understanding the impact of climate change on agriculture and its related impact on food security.
5. Helps students to understand the role and importance of agricultural sector vis-à-vis public and private enterprises in the economic development of India. It also provides the students a basic idea about the service and unorganized sectors of the economy.

**Course Outcome (CO):**

On the successful completion of the course, students will be able to

1. Students can be aware about the process of national development and requirement for it.
2. Students will be able to better appreciate and understand the role and process of planning and how monetary and fiscal policies affect the economy.
3. Students clearly understand the role of Agriculture and Industrialization in the development of Indian Economy.
4. Against this background, students will clearly understand two major issues – food security and climate change – that has come up with changes in economic regimes at the domestic and global level.
5. Students will be able to appreciate the relative importance of industrial sector, service sector and the unorganized sector in the Indian economy.

### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	H	H	H	M
2	H	M	H	H	M	M
3	H	H	M	H	H	H
4	H	H	H	H	M	H
5	H	H	H	H	H	H

(Low – L, Medium – M, High –H)

### Course Syllabus

#### Unit I: Growth and Development

(15 Hours)

- 1.1 Difference between Growth and Development (K1, K2, K3)
- 1.2 Characteristics of Underdeveloped Economy (K1, K2, K3, K4)
- 1.3 Factors determining Economic Development (K1, K2, K3, K4)
- 1.4 Obstacles to Economic Development (K1, K2, K3, K4)
- 1.5 Human Development Index (K1, K2, K3, K4)
- 1.6 Gender Development Index (K1, K2, K3, K4)

#### Unit II: Planning in India

(15 Hours)

- 2.1 Origin and Development of Planning (K1, K2, K3)
- 2.2 Types of Planning – Planning in India (K1, K2, K3)
- 2.3 History of Planning in India (K2, K3)
- 2.4 Objectives of Planning & Different Planning periods (K2, K3, K4)
- 2.5 Achievements and Failures of Planning (K1, K2, K3)
- 2.6 NITI Aayog (K2, K3, K4)

#### Unit III: Agriculture

(15 Hours)

- 3.1 Role of Agriculture in Indian Economy (K1, K2, K3)
- 3.2 Land Reforms (K2, K3)
- 3.3 Green Revolution (K2, K3, K4)
- 3.4 Agricultural Credit – Causes of Low productivity in Indian Agriculture (K2, K3, K4)
- 3.5 Agricultural Price Policy. (K2, K3, K4)
- 3.6 Food Security Act (K2, K3, K4)

#### Unit IV: Industry in India

(15 Hours)

- 4.1 Role of Industry in Indian Economy (K1, K2, K3)
- 4.2 Industrial Policy Resolution 1948, 1956 (K1, K2, K3, K4)
- 4.3 Industrial Policy Resolution 1991 (K3, K4)

- 4.4 Industrial Sickness (K3, K4)
- 4.5 Industrial Dispute (K2, K3, K4)
- 4.6 Trade Unions in India (K3, K4)

### **Unit V: Economic Reforms in India**

**(15 Hours)**

- 5.1 Liberalisation, Privatisation, Globalisation (LPG). (K1, K2, K3, K4)
- 5.2 Disinvestment Policy (K1, K2, K3)
- 5.3 Public Sector (K3, K4)
- 5.4 Private Sectors (K2, K3, K4)
- 5.5 Globalisation and its Impact on Indian Economy. (K3, K4, K5)
- 5.6 Foreign Direct Investment in India (FDP) (K3, K4)

#### **Text Books:**

1. Sankaran S. -Indian Economy – Margham Publications, Chennai, 2018.
2. R. Cauvery, N. Kruparani – Monetary Economics – S. Chand & Company Limited, New Delhi, 2016. Reference Books 1.GauravDatt and AshwaniMahajan – Indian Economy – S. Chand Company, New Delhi, 2013.
3. Indian Economy: For Civil Services Examinations, McGraw Hill Education. 3. Economic Survey, Government of India. 4. Misra S. K. and Puri V.K.(2018): Indian Economy, Himalaya Publishing House, New Delhi.

#### **Web Resources:**

1. <http://exampariksha.com/study-material-notes/economics-study-materials-notes/>
2. <http://www.jagranjosh.com/general-knowledge/indian-economy-a-complete-studymaterial-1464929494-1>
3. <https://sol.du.ac.in/mod/book/view.php?id=1735&chapterid=1695>
4. <http://www.toppr.com>business-studies>
5. <http://IMS.indianeconomy.net>glossary>

#### **Assessment Tools**

1. Lecture (Chalk and Talk – LCD)
2. Flipped Learning – E-Content, Videos
3. Group Discussion – Seminar
4. Assignments – Report writing
5. Peer Learning
6. Class test
7. MCQ's
8. Group discussion
9. Project
10. Self – Study Papers

## SEMESTER IV

### UAITA20 - INTERNATIONAL TRADE

Year/Semester	Course Code	Title of the Course	Course Type	Course category	No. of Hours	Credits	Marks
II/ IV	UAITA20	International Trade	Theory	Allied	5	5	40+60

#### Course Objective:

1. Basic and broad knowledge in international business environment, strategies, and management. Ability to apply concepts, principles, and theories to simple business situations.
2. Global perspective: Awareness of the different thinking and viewpoints of diverse cultures.
3. Awareness of the global business environment and its impacts on businesses.
4. Practical Application: Use of tools in real world scenarios.
5. To imbibe the knowledge on various aspects of International Organizations.

#### Course Outcome (CO):

On the successful completion of the course, students will be able to

1. Explain the concepts in international business with respect to foreign trade/international business.
2. Apply the current business phenomenon and to evaluate the global business environment in terms of economic, social, and legal aspects.
3. Analyse the principle of international business and strategies adopted by firms to expand globally.
4. Integrate concept in international business concepts with functioning of global trade.
5. Cognise about International Organizations such as IBRD, IMF and WTO.

#### COs Consistency with POs

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	H	M	H	M	H
2	H	H	M	H	H	M
3	H	H	H	H	M	H
4	H	M	M	H	M	H
5	H	H	H	H	H	H

(Low – L, Medium – M, High – H)

## **Course Syllabus**

### **Unit I: Foreign Trade**

- 1.1 Difference between Internal and External Trade or (Inter-regional versus International Trade)(K1, K2)
- 1.2 Importance of International Trade(K1, K2, K3)
- 1.3 Theories of International trade(K1, K2, K3, K4, K5)
- 1.4 Adam Smith – Ricardo(K1, K2, K3, K4, K5)
- 1.5 Haberler's theory of International Trade(K1, K2, K3, K4, K5)
- 1.6 Heckscher – Ohlin Theory(K1, K2, K3, K4, K5)

### **Unit II: Terms of Trade and Balance of Payments**

- 2.1 Different concept of Terms of trade: (Net Barter Terms of Trade-Gross Barter Trade-Income Terms of Trade)(K1, K2, K3, K4, K5)
- 2.2 Balance of Payments (BOP): Meaning – structure
- 2.3 Balance of Payments and Balance of Trade(K1, K2, K3)
- 2.4 Disequilibrium in BOP and Balance of Trade(K1, K2, K3, K4, K5)
- 2.5 Causes of disequilibrium in BOP(K1, K2, K3)
- 2.6 Measures for correcting disequilibrium(K1, K2, K3, K4)

### **Unit III: Free Trade and Protection**

- 3.1 Free Trade: Introduction to Free Trade(K1, K2, K3)
- 3.2 Case for Free Trade(K1, K2, K3)
- 3.3 Case against Free Trade(K1, K2, K3)
- 3.4 Gain of Free Trade(K1, K2, K3)
- 3.5 Introduction to protection, meaning(K1, K2, K3)
- 3.6 Arguments for and against Protection(K1, K2)

### **Unit IV: Tariff**

- 4.1 Tariff: Meaning and Types – Effects of Tariff(K1, K2)
- 4.2 Quotas: Meaning and types(K1, K2)
- 4.3 Effect of Quotas on Import –Export Management(K1, K2, K3, K4)
- 4.4 Non- Tariff: Quantitative restriction(K1, K2, K3)
- 4.5 Voluntary Export Restraints- Export procedure and Documents(K1, K2)
- 4.6 Export Finance (K1, K2, K3, K4)

### **Unit V: International Organisation**

- 5.1 IBRD (World Banks): Introduction, history, functions(K1, K2, K3)
- 5.2 IBRD Financial model and services(K1, K2, K3)
- 5.3 IMF: Introduction, history, functions, member countries, leadership(K1, K2, K3)
- 5.4 IMF: Uses, Impact, Criticism(K1, K2, K3)
- 5.5 WTO: Introduction, history, functions, Organization structure(K1, K2, K3)
- 5.6 WTO: Decision making, agreements, criticism(K1, K2, K3)

## **Textbooks**

1. Dr. Radha V International Economics- Prasanna Publications, Chennai- 2016
2. Sankaran – Foreign Exchange and Financing of Foreign Trade – Margham Publication, 2017

## **Reference Books**

1. Charles W L Hill and Arun Kumar Jain- International Business: Competing in the Global Marketplace- McGraw Hill, 2007.
2. Justin Paul – International Business, 2<sup>nd</sup> Edition – Prentice Hall of India, 2007.
3. Francis Cherumilam– International Business, 5<sup>th</sup> Edition –Prentice Hall, India 2010.
4. C.JeevanandamM. Victir Louis Anthuvan – International Economics – Sultan Chand and Sons, New Delhi, 2006.

## **Web Resources:**

1. [http://www.textbooksfree.org/Economics\\_Appendix\\_A\\_International%20Trade.htm](http://www.textbooksfree.org/Economics_Appendix_A_International%20Trade.htm).
2. [https://www.youtube.com/results?search\\_query=haberler%E2%80%99s+theory+of+international+trade](https://www.youtube.com/results?search_query=haberler%E2%80%99s+theory+of+international+trade)
3. [https://www.youtube.com/results?search\\_query=ricardo+and+heckscher-ohlin+theory+in+international+trade+](https://www.youtube.com/results?search_query=ricardo+and+heckscher-ohlin+theory+in+international+trade+)
4. [https://www.youtube.com/results?search\\_query=balance+of+payment+theories+in+international+trade](https://www.youtube.com/results?search_query=balance+of+payment+theories+in+international+trade)
5. [https://www.youtube.com/results?search\\_query=foreign+exchange+rate+theories+in+international+trade](https://www.youtube.com/results?search_query=foreign+exchange+rate+theories+in+international+trade)

## **Assessment Tools**

1. Lecture(Chalk and Talk- LCD)
2. Flipped learning – E-content, videos
3. Group discussion- Seminar
4. Assignments – Report Writing
5. Peer Learning
6. Class test
7. MCQ's
8. Group discussion
9. Project
10. Self - Study papers

**SEMESTER – V & VI**  
**UGECA520 - NON- MAJOR ELECTIVE - WOMEN ENTREPRENEURSHIP**

Year/ Semester	Course Code	Title of the course	Course type	Course Category	No. of. Hours	Credits	Marks
V/VI	UGECA520	Women Entrepreneurship	Theory	NME	3	2	40+60

**Course Objectives:**

1. To provide an insight into the various functional aspects of starting and managing own business.
2. To develop entrepreneurial skills of the women students.
3. To identify the role of various financial and promotional institutions in women entrepreneurial development.
4. To know about the roles of government schemes and institutional support for women entrepreneurs.
5. To highlight the different identifications and guidelines for the project.

**Course Learning Outcomes:**

On the successful completion of the course, students will be able to

1. Identify the functions and challenges of an women entrepreneurship.
2. Explain the various theories of women entrepreneurship.
3. Design and develop business plans and projects.
4. Illustrate the sources of financing a business.
5. Utilize management techniques and design a project.

**COs consistency with POs**

CO	PO1	PO2	PO3	PO4	PO5	PO6
	<b>1</b>	H	H	M	H	H
<b>2</b>	H	H	M	H	H	M
<b>3</b>	H	M	H	M	H	M
<b>4</b>	H	M	H	M	M	H
<b>5</b>	H	H	H	H	H	M

(Low– L, Medium– M, High–H)

**Course Syllabus**

**Unit I: Introduction**

**(9 Hours)**

- 1.1 Women Entrepreneurship: Meaning and Definition
- 1.2 Characteristics of entrepreneurs

- 1.3 Types of Women Entrepreneurship
- 1.4 Functions of Women Entrepreneurship
- 1.5 Evolution of Women Entrepreneurship in India
- 1.6 Role of Women Entrepreneurship

**Unit II: Opportunities and Challenges**

**(9 Hours)**

- 2.1 Women Entrepreneurs
- 2.2 Opportunities for an entrepreneurial career
- 2.3 Challenges faced by Women Entrepreneurship
- 2.4 Measures to improve Women Entrepreneurship
- 2.5 Factors influencing the Women Entrepreneurship
- 2.6 Entrepreneurial motivation concept

**Unit III: Role of financial Institutions**

**(9 Hours)**

- 3.1 SIDBI, DIC, CEDOK, RUDSETI: Objectives and Functions
- 3.2 SFC, EDIL,: Objectives and Functions
- 3.3 Long-term and short-term financing
- 3.4 Women Empowerment and Entrepreneurial Programmes
- 3.5 Women Empowerment through Entrepreneurial Programmes
- 3.6 Success Stories

**Unit IV: Government Schemes and Institutional Support**

**(9 Hours)**

- 4.1 Bharatiya Mahila Bank, Annapurna Scheme
- 4.2 Stree Shakti, Orient Mahila Vikas Yojana Scheme
- 4.3 Dena Shakti Scheme, Udyogini Scheme
- 4.4 Cent Kalyani Scheme
- 4.5 Mahila Udyam Nithi Scheme
- 4.6 Mudra yojana Scheme for Women etc.,

**Unit V: Project Identification and Formulation**

**(9 Hours)**

- 5.1 Meaning of Project
- 5.2 Project Identification, Project Selection
- 5.3 Project Formulation (Steps)
- 5.4 Significance, Contents
- 5.5 Planning Commission's Guidelines for formulating a project report
- 5.6 Specimen of a project report

**Suggested Readings:**

- 1. Deepak M. Walolar: Women Entrepreneurs, Himalaya Publishing House, New Delhi.
- 2. Mridula Velagapudi, Women Entrepreneurship.
- 3. C.B Gupta and N.P. Srinivasan: Entrepreneurial Development in India, Sultan Chand and Sons, New Delhi

**Web Resources:**

1. <https://www.startupindia.gov.in/content/sih/en/government-schemes/web.html>
2. <https://www.womenentrepreneursindia.com/>
3. <https://inc4.com/entrepreneurship/indian-women-entrepreneurs/>
4. <https://www.womensweb.in/2015/03/30-incredible-indian-women-entrepreneurs/>
5. <https://cwe.org.in/>
6. [https://www.youtube.com/watch?v=ksiONVgJF\\_Y](https://www.youtube.com/watch?v=ksiONVgJF_Y)
7. <https://www.neusourcestartup.com/startupindia/women-entrepreneurship-platform>
8. [https://www.youtube.com/results?search\\_query=http%3A%2F%2Fyoutube%2FtNwdWTUQJqc%3Flis%3Dt%3D](https://www.youtube.com/results?search_query=http%3A%2F%2Fyoutube%2FtNwdWTUQJqc%3Flis%3Dt%3D)
9. [https://www.youtube.com/watch?=Xy7\\_J9qQvJw](https://www.youtube.com/watch?=Xy7_J9qQvJw)
10. <https://www.thebalancesmb.com/online-resources-for-women-2951858>
11. <https://www.graphicssprings.com/blog/view/30-top-online-resources-for-female-entrepreneurs>.

**Assessment Tools:**

1. Lecture (Chalk and Talk – LCD)
2. Flipped Learning – E Content, Videos
3. Group Discussion – Seminar
4. Assignments – Report Writing
5. Field – Practical Study
6. Class test
7. MCQs
8. Group discussions
9. Project
10. Self – Study Papers

## SEMESTER I & II

### USECA121 - SKILL BASED ELECTIVE: STATISTICS FOR ECONOMICS

<b>Year: I Sem: I &amp; II</b>	<b>Course Code</b> USECA121	<b>Title of the Course</b> Statistics for Economics	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b>	<b>Credits</b>	<b>Marks</b> <b>100</b> 40+60
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#### Unit I

- 1.1 **Introduction:** Definitions, Functions, and Importance of Statistics
- 1.2 Sources of data
- 1.3 Methods of collecting data: primary and secondary data
- 1.4 Census and Sampling: Methods of sampling
- 1.5 Classification and Tabulation of data
- 1.6 Presentation of statistical data: Diagrams and Graphs.

#### Unit II

- 2.1 **Measures of Central Tendency**
- 2.2 Properties, Merits and Demerits
- 2.3 Mean, Median
- 2.4 Geometric Mean
- 2.5 Harmonic Mean
- 2.6 Mode

#### Unit III

- 3.1 **Measures of Dispersion:** Meaning
- 3.2 Range
- 3.3 Quartile Deviation, Mean Deviation
- 3.4 Standard Deviation
- 3.5 Variance, Coefficient of variation
- 3.6 Lorenz Curve – Merits and Demerits.

#### Unit IV

- 4.1 **Correlation and Regression-** Meaning
- 4.2 Types of Correlation
- 4.3 Measurement: Karl Pearson Co-efficient of Correlation
- 4.4 Spearman's Rank correlation
- 4.5 Differences between Correlation and Regression
- 4.6 Regression equations.

## Unit V

- 5.1 **Analysis of Time Series and Index Number** – Meaning of Time Series
- 5.2 Components of Time Series
- 5.3 Index Number: Meaning, Problems in the Construction of Index Numbers
- 5.4 Methods of construction of Index Number
- 5.5 Laspeyre's Method
- 5.6 Paasche's method and Fisher's Index number.

### Reference Books:

1. S.P. Gupta, Elementary Statistical Methods –Sultan Chand & Sons, New Delhi, 2010
2. S. P. Gupta, Statistical Methods –Sultan Chand New Delhi, 2001.
4. S.P. Gupta, Elementary Statistical Methods, Sultan Chand & Sons, New Delhi.
6. S.C. Gupta, Fundamentals of Statistics, Himalaya Publishing House, New Delhi.
5. R.S.N. Pillai & Bagavathi, Statistics –S. Chand, New Delhi, 2006.
6. S.C Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi.
7. P.R. Vital, Business Mathematics and Statistics.
8. K. Chandra Sekhar, Business of Statistics.
9. K. Pazhani, Statistics, J.P. Publications, Nagercoil, 2004.
10. Clarke, G.M., & Cooke, D. A Basic course in Statistics (5<sup>th</sup> ed.). Arnold.

### Web Resources:

1. [Economy \(India\) Statistics - StatisticsTimes.com](http://StatisticsTimes.com)
2. [Economics And Statistics,Ministry Of Agriculture,Government Of India \(dacnet.nic.in\)](http://dacnet.nic.in)
3. [Statistical Hand Book - 2019 \(tn.gov.in\)](http://tn.gov.in)

### Teaching Methodology

1. Chalk and talk
2. Video lecture
3. E- content

### Assessment Tools

1. Reports
2. Assignments
3. MCQ's
4. Projects

**FOUNDATION COURSE FOR B. A. / B. Sc. / B. Com. / B. B. A. / B. C. A.**

**SEMESTER I**

**UENGA20 - GENERAL ENGLISH- I**

<b>Year:</b> <b>I</b>	<b>Code:</b> UENGA20	<b>Title:</b> General English I	<b>Course Type:</b> Theory	<b>Course Category:</b> Language	<b>H/W:</b> <b>6</b>	<b>Credits:</b> <b>3</b>	<b>Marks:</b> <b>100</b>
<b>Sem:</b> <b>I</b>							

**COURSE OUTCOMES (COs):**

CO1: Recognize the elements of English language at the levels of vocabulary, spelling, grammar and pronunciation

CO2: Rephrase ideas into sentences in both speech and writing with accuracy, clarity and fluency

CO 3: Use the LSRW (listening, speaking, reading & writing) skills in English language with ease in academic and real-life situations.

CO4: Explain one's ideas and opinions on any given subject, clearly and effectively

CO5: Discern (figure out) effective ways of communication with etiquette

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	<b>H</b>	M	M	M	M	M
<b>CO2</b>	H	<b>H</b>	M	M	M	M
<b>CO3</b>	H	H	<b>H</b>	H	M	M
<b>CO4</b>	H	H	M	<b>H</b>	M	M
<b>CO5</b>	H	H	M	M	<b>M</b>	M

**H - High – (3), M - Moderate (3), L - Low (1)**

**Unit 1**

**(18 Hours)**

- |  |        |
|--|--------|
| 1.1. Poetry - The Piper  | K3     |
| 1.2. Fairy Tale –The Ugly Duckling   | K2     |
| 1.3. Short Story - Panchatantra Tales- Book III- Crows<br>and the Owls- 1. How the Birds Picked a King | K2     |
| 1.4. How the Rabbit Fooled the Elephant  | K2     |
| 1.5. From Raymond Murphy's Essential English Grammar.<br>Grammar Units 1-11                            | K1, K2 |
| 1.6. Composition - Jumbled Sentences<br>- Writing Skills   | K3     |

<b>Unit 2</b>	<b>(18 Hours)</b>
2.1. Poetry - The Donkey	K3
2.2. Poetry - The Kitten and Falling Leaves	K3
2.3. Fairy Tale - The Country Mouse and the Town Mouse	K2
2.4. Short Story - The Gift of the Magi	K2
2.5. Grammar Units 12-22	K1, K2
2.6. Composition - Writing Advertisement - Writing Skills	K3

<b>Unit 3</b>	<b>(18 Hours)</b>
3.1. Poetry-The Owl and the Pussy Cat	K3
3.2. Fairy Tale -The Leap-Frog	K2
3.3. Short Story- Arabian Nights The Seven Voyages – Third Voyage	K3
3.4. Of Sindbad the Sailor - Fourth Voyage	K3
3.5. Grammar Units 23-33	K1, K2
3.6. Composition - Precise Writing - Writing Skills	K3

<b>Unit 4</b>	<b>(18 Hours)</b>
4.1. Poetry -The Brook	K4
4.2. Fairy Tale -Rumpelstiltskin	K2
4.3. The Elves and the Shoemaker	K2
4.4. Short Story -The Golden Deer	K2
4.5. Grammar Units 34-44	K1,K2
4.6. Composition – Letter Writing- Informal Letter –Writing Skills	K3

<b>Unit 5 – Fiction- The Tales From Shakespeare</b>	<b>(18 Hours)</b>
5.1. The Tempest	K4
5.2. The Winter’s Tale	K4
5.3. The Merchant of Venice	K4
5.4. King Lear	K 4
5.5. Othello	K4
5.6. Grammar Units 45-57	K1, K2
Composition- Story Writing-own imagination	K4

### **Text Books**

1. *Darts: A Voyage of Learning English* by the Department of English, Auxilium College, Vellore. Bloomsbury Publications: New Delhi, 2017.
2. Murphy, Raymond. *Essential English Grammar*, Cambridge University Press. Ed. 2. New Delhi.
  - a. 2017

### **Reference Books**

Charles & Mary Lamb, *Tales from Shakespeare*, New Delhi, 2018.

### **OER (Open educational resources):**

1. <https://open.umn.edu/opentextbooks>
2. <https://www.saylor.org/>
3. <https://textbooks.opensuny.org/browse-by-subject/>
4. [www.bloomsbury.com](http://www.bloomsbury.com)

**SEMESTER II**  
**UENGB20 - GENERAL ENGLISH –II**

<b>Year: I</b> <b>Sem II</b>	<b>Course Code:</b> UENGB20	<b>Title of the Course:</b> General English II	<b>Course Type:</b> Theory	<b>Course Category:</b> Language	<b>H/W:</b> 6	<b>Credits:</b> 3	<b>Marks:</b> 100
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**COURSE OUTCOMES (COs):**

CO1: Relate with the time-tested values of Indian culture and assimilate communicative skills through the reading of texts by Indian English writers

CO2: Outline the values and ideas from the prescribed texts in self-made sentences with accuracy, clarity and fluency

CO 3: Use the LSRW (listening, speaking, reading & writing) skills in English language with ease in academic and real-life situations.

CO4: Explain one's ideas and opinions on any given subject, clearly and effectively

CO5: Figure out effective ways to make a point and describe one's standpoint

	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>CO1</b>	H	H	M	M	M	M
<b>CO2</b>	H	H	M	M	M	M
<b>CO3</b>	H	H	H	M	M	M
<b>CO4</b>	H	H	H	H	M	M
<b>CO5</b>	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

**Unit 1**

**( 18 Hours)**

1.1. Poetry-Where the Mind is without Fear	K3
1.2. Prose - Science and Religion	K4
1.3. Short Story -The Tree Speaks	K3
1.4. Autobiography - Shyness My Shield	K3
1.5. Grammar Units 58-70	K2, K3
1.6 Composition: Email Writing – Writing Skills	K3

**Unit 2** ( 18 Hours)

2.1. Poetry - Peace	K3
2.2. Prose - Dynamic Life	K4
2.3. Short Story - Father and Son	K3
2.4. Autobiography - Wings of Fire	K3
2.5. Grammar Units 71-82	K2, K3
2.6. Composition: Dialogue Writing –Writing Skills	K4

**Unit 3** (18 Hours)

3.1. Poetry- Freedom	K3
3.2. Prose - The India of My Dreams	K4
3.3. Short Story – Sparrows	K2
3.4. Biography - Bankim Chandra Chattopadhyaya	K4
3.5. Grammar Units 83-95	K2, K3
3.6. Composition: Report Writing – Writing Skills	K3

**Unit 4** (18 Hours)

4.1. Poetry - A Scratch	K3
4.2. Prose - How Economic Growth Has Become Anti-Life	K4
4.3. Short Story - Eight Rupees	K2
4.4. Biography – The Saint of the Gutters	K3
4.5. Grammar Units 96-107	K2, K3
4.6. Composition - Preparing Posters	K3

**Unit 5** (18 Hours)

5.1. Poetry- On Killing a Tree	K3
5.2. Prose- Future of Our Past: Towards a Critique of Globalization and Culture Industry	K4
5.3. Short Story-The Guest	K2
5.4. Biography- Daring to Dream	K3
5.5. Grammar Units 108-114	K2, K3
5.6. Composition: Formal Letter Writing -Writing Skills	K2, K3

### **Text Books**

1. *Darts: A Voyage of Learning English* by the Department of English, Auxilium College, Vellore. a. Bloomsbury, New Delhi, 2017.
2. Murphy, Raymond. *Essential English Grammar*, Cambridge University Press. Ed. 2. New a. Delhi. 2017.

### **Reference Books**

1. Hall, Donald and Sven Birkerts. *Writing Well*. New York: Harper Collins Publishers, 1991.
2. Kahn, John Ellison (Ed.) *Reader's Digest: How to Write and Speak Better*. New York: Reader's Digest, 1993.

### **OER (Open educational resources):**

1. [www.bloomsbury.com](http://www.bloomsbury.com)
2. Open Textbook Library
3. Saylor.org
4. <https://textbooks.opensuny.org/browse-by-subject/>

## SEMESTER III

### UENGC20 - GENERAL ENGLISH -III

<b>Year: II</b> <b>Sem-III</b>	<b>Course Code:</b> UENGC20	<b>Title :</b> General English-Paper III	<b>Course Type:</b> Theory	<b>Course Category:</b> Language	<b>H/W:</b> <b>5</b>	<b>Credits:</b> <b>3</b>	<b>Marks : 100</b>
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#### Course Outcomes (CO):

1. Evolve newer ways to approach language-learning goals.
2. Enable students to be aware of the contemporary social issues of national and global importance.
3. Improve speaking ability both in terms of fluency and comprehensibility.
4. Paraphrase the online sources effectively and accurately.
5. Develop comprehensive abilities as to read, write and speak.

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	<b>H</b>	H	H	H	M	M
<b>CO2</b>	H	<b>H</b>	H	H	M	M
<b>CO3</b>	H	H	<b>H</b>	H	H	M
<b>CO4</b>	H	H	H	<b>H</b>	H	M
<b>CO5</b>	H	H	H	H	<b>H</b>	H

**H - High – (3), M - Moderate (3), L - Low (1)**

#### Unit 1

**(18 Hours)**

- |   |        |
|---|--------|
| 1.1. Life and Liberty                                   | K3 K3  |
| 1.2. Dignity and Security                               | K2, K3 |
| 1.3. Grammar Units 1 – 6 (Intermediate English Grammar) |        |
| 1.4. Grammar Units 7 – 12                               | K2, K3 |
| 1.5. Skill Development: News Reading - Reading Skills   | K2     |
| 1.6. Composition: Prose Comprehension - Writing Skills  | K4     |

#### Unit 2

**(18 Hours)**

- |   |        |
|---|--------|
| 2.1. Children's Rights                                    | K3     |
| 2.2. Living on the Edge                                   | K3     |
| 2.3. Grammar Units 13 - 20 (Intermediate English Grammar) | K2, K3 |
| 2.4. Grammar Units 21 -25                                 | K2, K3 |
| 2.5. Skill development: Vocabulary (Analogies) -Writing   | K5     |

## Skills

2.6. Composition: Expansion of an Idea - Writing Skills K5

### Unit 3

(18 Hours)

- 3.1. Science and Technology can shape our Future K3  
3.2. Make peace, Not War K3  
3.3. Grammar Units 26-31 (Intermediate English Grammar) K2, K3  
3.4. Grammar Units 32-38 K2, K3  
3.5. Skill development: Listening TED Talks- Listening Skills K3  
3.6. Composition: Writing Instructions – Writing Skills K3

### Unit 4

(18 Hours)

- 4.1. Defenders of Peace K3  
4.2. Grammar Units 39-42 K2, K3  
4.3. Grammar Units 43-47 K2, K3  
4.4. Grammar Units 48-51 K2, K3  
4.5. Skill development: Group discussion - Speaking Skills K5  
4.6. Composition: Correction of sentences - Writing Skills K4

### Unit 5

(18Hours)

- 5.1 Violence and Non-Violence K3  
5.2. Grammar Units 52 –56 K2, K3  
5.3. Grammar Units 57-62 K2, K3  
5.4. Grammar Units 63-67 K2, K3,  
5.5. Composition: Check List-Writing Skills K4  
5.6. Skill development: Writing minutes –Writing Skills K4

### Text Books

1. Malini Seshadri & Helen Thimmayya, *A Window to your World*. Orient Black Swan, Hyderabad. 2018.
2. Murphy, Raymond. *Intermediate English Grammar*, Cambridge University Press. Ed. 2. 1994.

### **Reference Books**

1. Millward, Celia. *Handbook for Writers, 2<sup>nd</sup> Edition*. New York: Holt, Rinehart & Winston, 1980.
2. Rao, M. S. *Soft Skills - Enhancing Employability: Connecting Campus with Corporate I*. K International Publishing House: New Delhi. 2011.
3. Reid, Ian. *The Short Story: The Critical Idiom Series*. London: Methuen & Co, 1986.
4. Saxena, Sunil. *Headline Writing*. New Delhi: Sage Publications, 2006.
5. Scott, Bill. *The Skills of Communicating*. Mumbai: Jaico Publishing House, June 1995.

### **OER (Open educational resources):**

1. [www.bloomsbury.com](http://www.bloomsbury.com)
2. Open Textbook Library
3. Saylor.org <https://textbooks.opensuny.org/browse-by-subject/>

**SEMESTER IV**  
**UENGD20 - GENERAL ENGLISH – IV**

<b>Year: II</b> <b>Sem –IV</b>	<b>Course Code:</b> UENGD20	<b>Title of the Course:</b> General English –IV	<b>Course Type:</b> Theory	<b>Course Category</b> Language	<b>H/W</b> <b>6</b>	<b>Credits:</b> <b>3</b>	<b>Marks:</b> <b>100</b>
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**Course Outcomes (CO):**

1. Relate with real life situations by reading the literary text from the past.
2. Respect and protect the differences among nations and practice positive social values.
3. Instill the ability to analyze texts critically and practice writing through assignments.
4. Develop knowledge about the system of Governance and its regulations.
5. Create a sense of belonging towards the community and nation.

	<b>PSO 1</b>	<b>PSO2</b>	<b>PSO 3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>CO1</b>	H	H	H	<b>M</b>	<b>M</b>	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	<b>H</b>	H	H	H	H	<b>M</b>
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

**Unit 1**

**(18 Hours)**

- |   |        |
|---|--------|
| 1.1. Women’s Rights   | K3 K3  |
| 1.2. Rights of the elderly  |        |
| 1.3. Grammar Units 68 – 75  | K2, K3 |
| 1.4. Grammar Units 76 – 82  | K2, K3 |
| 1.5. Skill development: Listening comprehension and answering     | K3     |
| - Listening Skills  |        |
| 1.6. Composition: Essay writing on current Topics –Writing Skills | K5     |

**Unit 2**

**(18 Hours)**

- |                               |        |
|-------------------------------|--------|
| 2.1. Being Wise, not wasteful | K3     |
| 2.2. Grammar Units 83 – 86    | K2, K3 |
| 2.3. Grammar Units 87 – 91    | K2, K3 |

2.4. Grammar Units 92 – 96	K2, K3
2.5. Skill development: Interview skills -Speaking Skills	K4
2.6. Composition: Curriculum Vitae and Job application - Writing Skills	K4

**Unit 3 (18 Hours)**

3.1. The Role of the Government	K3
3.2. Strengthening the Roots	K3
3.3. Grammar Units 97 – 100	K2, K3
3.4. Grammar Units 101 – 107	K2, K3
3.5. Skill Development: Telephone Conversations - Speaking Skills	K3
3.6. Composition: Note making - Writing Skills	K5

**Unit 4 (18 Hours)**

4.1. Religious Harmony	K3
4.2. Grammar Units 108-112	K2, K3
4.3. Grammar Units 113-115	K2, K3
4.4. Grammar Units 116-119	K2, K3
4.5. Skill development: Interpretation of Graphs (Pie Chart, Flow chart) - Writing Skills	K5
4.6. Composition: Writing Recommendations - Writing Skills	K4

**Unit 5 (18 Hours)**

5.1. Peace + Balance = Harmony	K3
5.2. Grammar Units 120-125	K2, K3
5.3. Grammar Units 126-130	K2, K3
5.4. Grammar Units 131-136	K2, K3
5.5. Skill Development: Conducting Mock Interview -Speaking Skills	K3
5.6. Composition: Writing Book Review - Writing Skills	K5

**Text Books**

1. Malini Seshadri & Helen Thimmayya. *A Window to your World*. Orient Black Swan. Hyderabad 2018.
2. Murphy, Raymond. *Intermediate English Grammar*, Cambridge University Press. Ed. 2. New Delhi. 2014.

### **Reference Books**

1. Millward, Celia. *Handbook for Writers, 2<sup>nd</sup> Edition*. New York: Holt, Rinehart & Winston, 1980.
2. Rao, M. S. *Soft Skills - Enhancing Employability: Connecting Campus with Corporate*. I. K International Publishing House: New Delhi. 2011.
3. Reid, Ian. *The Short Story: The Critical Idiom Series*. London: Methuen & Co, 1986.
4. Saxena, Sunil. *Headline Writing*. New Delhi: Sage Publications, 2006.
5. Scott, Bill. *The Skills of Communicating*. Mumbai: Jaico Publishing House, June 1995.

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  2. Open Textbook Library
  3. Saylor.org
  4. <https://textbooks.opensuny.org/browse-by-subject/>
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## ULTAA20 - GENERAL TAMIL – I

தமிழ் முதல் தாள்

Year : I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: I	ULTAA20	General Tamil – I	Theory	Foundation	6	3	40 + 60 =100

### PROGRAMME OUTCOMES (PO)

- PO1:** Attain knowledge and understand the principles and concepts in the respective discipline.
- PO2:** Acquire and apply analytical, critical and creative thinking, and problem-solving skills
- PO3:** Effectively communicate general and discipline-specific information, ideas and opinions.
- PO4:** Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society.
- PO5:** Emulate positive social values and exercise leadership qualities and team work.
- PO6:** Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

### COURSE OBJECTIVES

- மாணவர்களை மனித உரிமை சிந்தனையாளர்களாக உருவாக்குதல்.
- இலக்கியத்தின் வாயிலாக சமுதாய விழிப்புணர்வை ஏற்படுத்துதல்.
- புத்திலக்கியங்களைக் கற்பிப்பதன் வாயிலாக சமுதாய முன்னேற்றத்திற்கு வழிவகுத்தல்.
- தாய்மொழி வழியாக கவிதை எழுதுவதற்கான பயிற்சி அளித்தல்.
- வாழ்க்கை வரலாறு வழி பல்வேறு ஆளுமைகளை உணர்தல்.
- இலக்கண கல்வியின் பயனால் பிழையின்றி வாசிக்கும், எழுதும் திறனை வளர்த்தெடுத்தல்.

### COURSE OUTCOMES (CO)

- நவீன தமிழ் இலக்கியத்தின் வாயிலாக மனித உரிமைச் சார்ந்த கருத்துக்களை மதிப்பிடுதல்.
- வாழ்க்கை வரலாற்றின் வழி சான்றோர்களின் வாழ்வியல் விழுமியங்களை ஊக்குவித்தல்.
- அயலகத் தமிழர் கவிதைகளைப் பகுத்தாராய்தல்.

4. தமிழ்மொழியைப் பிழையின்றி பேசவும், எழுதவும் கற்பித்தல்.
5. பொது அறிவுத் திறனை வளர்த்து வேலை வாய்ப்பினை பெற வழி வகுத்தல்.

### CO/PO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	M	M	M
CO2	H	M	H	M	L	M
CO3	M	H	M	L	M	M
CO4	H	M	H	L	M	L
CO5	M	H	M	H	H	L

(Low – L, Medium – M, High – H)

### Course Syllabus

#### அலகு 1

(18 மணி நேரம்)

#### கவிதைகள்

1.1 கவிமணி தேசிய விநாயகம்பிள்ளை - தொழிலாளியின் முறையீடு (K1, K2, K3)

நாமக்கல் கவிஞர் - தியாக புத்தி (K1, K2, K3)

பாரதியார் - விடுதலை சிட்டுக்குருவி (K1, K2, K3)

பாரதிதாசன் - அறம் செய்க (K1, K2, K3)

முடியரசன் - மனத்தூய்மை (K1, K2, K3)

சுரதா - நெய்தல் நீர் (K1, K2, K3)

1.2 உரைநடை - வணக்கம் வகுப்பறையே!

முனைவர்சகோ. அ. ஆரோக்கியஜெயசீலி 1. உடலினை உறுதி செய் (K3, K4)

2. பலமும் வளமும் (K3, K4)

1.3 இலக்கிய வரலாறு - இருபதாம் நூற்றாண்டு மரபுக் கவிஞர்கள் (K3, K4)

1.4 வாழ்க்கை வரலாறு - மாயூரம் வேதநாயகம் பிள்ளை (K2, K3)

1.5 சிறுகதை - திறந்த ஜன்னல் - புதுமைப்பித்தன் (K2, K3)

1.6 இலக்கணம் - அகர வரிசைப்படுத்துதல் (K1, K2, K3)

பொது அறிவு - மொழிக் குடும்பம் (K1, K2, K3)

## அலகு - 2

(18 மணி நேரம்)

### கவிதைகள்

2.1 கண்ணதாசன்- புதியதோர் உலகு செய்வோம் (K1, K2, K3)

பட்டுக்கோட்டை கல்யாணசுந்தரம் - உயர்வும் தாழ்வும் (K1, K2, K3)

கவிக்கோ அப்துல் ரகுமான் - நான் யார்? (K1, K2, K3)

நா.காமராசன் - குழந்தை (K1, K2, K3)

இன்குலாப் - ஒரு சிலை உயிர்ப்பில்லாது (K1, K2, K3)

மு.மேத்தா - இரவல் முகங்கள் (K1, K2, K3)

2.2 உரைநடை- வணக்கம் வகுப்பறையே!

முனைவர் சகோ. அ. ஆரோக்கியஜெயசீலி 3. வளருமா தமிழ்? (K3, K4)

4. கற்றது மறவாமை (K3, K4)

2.3 இலக்கிய வரலாறு - இருபதாம் நூற்றாண்டு புதுக்கவிஞர்கள் (K3, K4)

2.4 வாழ்க்கை வரலாறு - அன்னை செசிரா (K2, K3)

2.5 சிறுகதை - செய்த கணக்கு - சி. சு. செல்லப்பா (K2, K3)

2.6 இலக்கணம் - ஒரு பொருள் குறித்த பலசொற்கள் (K1, K2, K3)

பொது அறிவு - சிறப்புப் பெயர்கள் (K1, K2, K3)

## அலகு 3

(18 மணி நேரம்)

### கவிதைகள்

3.1 சிற்பி - நள்ளிரவுத் தொலைப்பேசி (K1, K2, K3)

வைரமுத்து - எதிர்காலம் (K1, K2, K3)

அழ. வள்ளியப்பா - பறவை வரம் (K1, K2, K3)

அறிவுமதி - காதல் 10 (K1, K2, , K3)

பாலை நிலவன் - விவசாயம் செய்வது எப்படி? (K1, K2, K3)

தரிசன பிரியன் - திரு. குரல் (K1, K2, K3)

3.2 உரைநடை - வணக்கம் வகுப்பறையே!

முனைவர் சகோ. அ. ஆரோக்கியஜெயசீலி 5. முகம் பார்த்து (K3, K4)

6. ஒவ்வொரு படியாய் (K3, K4)

3.3 இலக்கிய வரலாறு - சிறுகதை இலக்கியம் (K3, K4)

3.4 வாழ்க்கை வரலாறு - கா. மு. ஷெரிப் (K2, K3)

3.5 சிறுகதை - பால் வடியும் முகம் - ஜெயகாந்தன் (K2, K3)

3.6 இலக்கணம் - சொற்பிழைகளைக் களைதல் (K1, K2, K3)

பொது அறிவு - முக்கிய நாட்கள் (K1, K2, K3)

**அலகு 4**

(18 மணி நேரம்)

**கவிதைகள்**

4.1 தமிழ்ச்சி தங்கப் பாண்டியன் - எஞ்சோட்டுப்பெண் (K1, K2, K3)

இளம்பிறை - ஆடாதோர் உண்டோ? (K1, K2, K3)

லிவிங் ஸ்மைல் வித்யா - மரணம் மட்டுமா மரணம் (K1, K2, K3)

கா.தமிழ் வேங்கை - ஞெகிழி (K1, K2, K3)

மரகதமணி - எனது இயற்கை (K1, K2, K3)

சக்தி ஜோதி - மகள், சமையலறை உலகிலிருந்து (K1, K2, K3)

4.2 உரைநடை - வணக்கம் வகுப்பறையே!

முனைவர் சகோ. அ. ஆரோக்கியஜெயசீலி 7. நின்னே போல் உள்ளன (K3, K4)

8. நம் அனைவருக்குமான இல்லம் (K3, K4)

9. கண் இமைக்காமல் (K3, K4)

4.3 இலக்கிய வரலாறு - நவீன இலக்கியத்தில் பெண் படைப்பாளிகள் (K3, K4)

4.4 வாழ்க்கை வரலாறு - மூவலூர் இராமாமிர்தம் அம்மையார் (K2, K3)

4.5 சிறுகதை - உயர்த்திய விரல் - சூடாமணி (K2, K3)

4.6 இலக்கணம் - ஒலி வேற்றுமை (K1, K2, K3)

பொது அறிவு - சாதனை மகளிர் (K1, K2, K3)

**அலகு - 5**

(18 மணி நேரம்)

**அயலகத் தமிழர் கவிதைகள்**

5.1 சர்மிளா ஸெய்யித் - 1. ஓய்விலிருந்து திரும்பியிருக்கிறேன் (K1, K2, K3)

2. கடலும் ஒரு காட்சியும் (K1, K2, K3)

முல்லை அமுதன் - இன்று என்னை (K1, K2, K3)

நித்ய ஜெய ஜோதி - விடியல் (K1, K2, K3)

5.2 உரைநடை - வணக்கம் வகுப்பறையே!

முனைவர் சகோ. அ. ஆரோக்கியஜெயசீலி 10. நவீன அடிமைத்தனம் (K3, K4)

11. நல்லது நாட்டுக (K3, K4)

5.3 இலக்கிய வரலாறு - அயலகத் தமிழர் வரலாறு (K3, K4)

5.4 வாழ்க்கை வரலாறு - தனிநாயக அடிகளார் (K2, K3)

5.5 சிறுகதை - மூன்று குருட்டு எலி - அ. முத்துலிங்கம் (K2, K3)

## 5.6 இலக்கணம் - பிறமொழிச் சொற்கள் (K1, K2, K3)

பொதுஅறிவு - நடப்பு நிகழ்வுகள் (K1, K2, K3)

### INTERNAL COMPONENT (K5, K6)

கற்பித்தல் முறை:

- வகுப்பறைக் கற்பித்தல்
- ஒப்படைப்பு
- குழு விவாதம்
- கலந்துரையாடல்
- கணினி விளக்கக்காட்சி
- எழுத்துக்களை எழுதவும் உச்சரிக்கவும் பயிற்சி அளித்தல்.
- செய்முறைபயிற்சி – ஆடல், பாடல், நாடகம், படைப்பாற்றல்.

பாடநூல்:

1. ஆசிரியர் குழு : தமிழ்த்துறை, அக்சிலியம் கல்லூரி, வேலூர் – 6, பொதுத்தமிழ், இளநிலைப் பட்ட படிப்பு, முதல் பருவம், அடிப்படை பாடம், 2020 – 2025, ஜேம்ஸ் ஆர்ட்ஸ் கிராப்ட்ஸ் - சிவகாசி.

பரிந்துரை நூல்கள்:

1. முனைவர் தமிழண்ணல், தமிழ் இலக்கிய வரலாறு, முல்லைப் பதிப்பகம், சென்னை, 2000
2. முனைவர் ஜெயம், தமிழ் இலக்கிய வரலாறு, நியூ செஞ்சுரி புக் ஹவுஸ், வேலூர், 2004

வலையொளி இணைப்புகள்:

1. <https://youtu.be/vW52mh56yxo> (தொழிலாளிகள் முறையீடு)
2. <https://youtu.be/h-MmEkpmqiM> (உணவே மருந்து)
3. <https://youtu.be/QoLWMWjobFE> (இலக்கிய வரலாறு)

## ULTAB20 - GENERAL TAMIL – II

தமிழ் இரண்டாம் தாள்

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	ULTAB20	General Tamil – II	Theory	Foundation	6	3	40 + 60=100

### COURSE OBJECTIVES

1. பல்வேறு சமய இலக்கியங்களைக் கற்பித்தல்.
2. பக்தி இலக்கியத்தின் வழி சமத்துவம் மற்றும் சகோதரத்துவ உணர்வை மேம்படுத்தல்.
3. அறத்தையும் ஆன்மீகத்தையும் வளர்க்க ஊக்குவித்தல்.
4. சமயநெறிகள் மூலம் மனதைப் பண்படுத்த செய்தல்.
5. சமயத்தின் வழியே பண்பாட்டினை உணரவும், பாதுகாக்கவும் செய்தல்.
6. தல வரலாறுகளை அறிய செய்தல்.

### COURSE OUTCOMES (CO)

1. பக்தி இலக்கியங்கள் வாயிலாக மதநல்லிணக்க உணர்வை வளர்த்தல்.
2. சமய நல்லிணக்க பண்பை வளர்த்தல்.
3. தலவரலாறுகள் மூலம் தமிழகக் கோவில்கள், சிற்பங்கள், கலைகள், கல்வெட்டுகள் போன்றவற்றின் சிறப்பை உணர்ந்து பண்பாட்டைப் பேணச்செய்தல்.
4. சிறுகதைகளின் வழி மனிதநேய மாண்பை பின்பற்றி வாழ ஊக்குவித்தல்
5. மாணவர்களிடையே பொதுஅறிவு சிந்தனைகளை வலுப்படுத்தல்.

### PO/ CO MAPPING

PO/ CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	M	M	M
CO2	M	H	M	H	M	M
CO3	H	M	H	M	L	H
CO4	M	H	M	H	M	L
CO5	M	H	H	M	L	L

(Low – L, Medium – M, High – H)

## Course Syllabus

அலகு – 1

(18மணி நேரம்)

செய்யுள்

1.தேவாரம்

1.1 திருவண்ணாமலை - திருஞானசம்பந்தர் (பாடல் எண்கள்: 1, 2) (K1, K2)

திருமறைக்காடு - திருநாவுக்கரசர் (பாடல் எண்கள்: 1, 5) (K1, K2)

திருமுதுகுன்றப்பதிகம் - சுந்தரர் (பாடல் எண்கள்: 2, 3) (K1, K2)

அச்சோப் பதிகம் - மாணிக்கவாசகர் (பாடல் எண்கள் : 7,8) (K1, K2)

அற்புதத் திருவந்தாதி - காரைக்காலம்மையார் (பாடல் எண்கள் : 2, 8) (K1, K2)

1.2 சிறுகதை - அந்தராத்மாவின் ஆட்டம் - ம. காமுத்துரை (K2, K3)

1.3 தலவரலாறு - தஞ்சைப் பெரிய கோவில் (K2, K3)

1.4 இலக்கிய வரலாறு - சைவ இலக்கியங்கள் (K3, K4)

1.5 உரைநடை - வீர வழிபாடு - கி. வ. ஜகந்நாதன் (K3, K4)

1.6 இலக்கணம்/ - இலக்கணச் சொல்வகைகள் (K1, K2, K3)

பொது அறிவு இந்தியா அடிப்படைத் தகவல்கள் (K1, K2, K3)

அலகு – 2

(18 மணி நேரம்)

செய்யுள்

2. நாலாயிரத் திவ்வியப் பிரபந்தம்

2.1 பெரியாழ்வார் திருமொழி - பெரியாழ்வார் திருமொழி (பாடல் எண்கள்: 18, 21) (K1, K2)

திருவிருத்தம் - நம்மாழ்வார் (பாடல் எண்கள்: 21, 23) (K1, K2)

திருப்பாவை - ஆண்டாள் (பாடல் எண்கள் : 1, 2) ) (K1, K2)

தாயுமானவர் - தாயுமான சுவாமிகள் பாடல்கள்

(பாடல் எண்கள் : 16, 17, 30) ) (K1, K2)

சிலப்பதிகாரம் - அடைக்கலக்காதை (வரிகள் 1 - 50) ) (K1, K2, K3)

2.2 சிறுகதை - பொற்கொடியின் சிறகுகள், அழகிய பெரியவன் (K2, K3)

2.3 தல வரலாறு - புனித பெரியநாயகி அன்னை, , (K2K3)

2.4 இலக்கிய வரலாறு - வைணவ இலக்கியங்கள் (K3, K4)

2.5 உரைநடை - நாட்டுப்புறச் சிறுதெய்வங்கள், (K3, K4)

2.6 இலக்கணம் / - இலக்கியச் சொல்வகைகள், (K1, K2, K3)

பொது அறிவு இந்திய அரசியலமைப்பின் முகப்புரை (பகுதி - 1) (K1, K2, K3)

**அலகு - 3****(18 மணி நேரம்)****செய்யுள்**

- 3.1 சீறாப்புராணம் - ஒட்டகைப் பேசிய படலம் - உமறுப்புலவர் (K1, K2, K3)  
தேம்பாவணி - மகவருள் படலம் - வீரமாமுனிவர் (K1, K2, K3)
- 3.2 சிறுகதை - தன்மானம் (K2, K3)
- 3.3 தலவரலாறு - அஜ்மீர் தர்கா (K2, K3)
- 3.4 இலக்கிய வரலாறு - இஸ்லாமிய இலக்கியங்கள் (K3, K4)
- 3.5 உரைநடை - அன்பின் வழியது உயிர்நிலை- துரைமூர்த்தி (K3, K4)
- 3.6 இலக்கணம் / - மூவிடப்பெயர்கள் (K1, K2, K3)  
பொது அறிவு - இந்திய அரசியலமைப்பின் முகப்புரை(பகுதி - 2) (K1, K2, K3)

**அலகு - 4****(18 மணி நேரம்)****செய்யுள்**

- 4.1 மணிமேகலை - பளிக்கறை புக்க காதை, (K1, K2, K3)  
கம்பராமாயணம்- நகர்நீங்குப் படலம் - அயோத்தியா காண்டம் (K1, K2, K3)
- 4.2 சிறுகதை - சுப்புத்தாய் - தமிழ்ச்செல்வன் (K2, K3)
- 4.3 தலவரலாறு - அமிர்தசரஸ் பொற்கோவில் (K2, K3)
- 4.4 இலக்கிய வரலாறு - கிறித்தவ இலக்கியங்கள் (K3, K4)
- 4.5 உரைநடை - தமிழும் சாக்கியமும் - ரா. பி. சேதுப்பிள்ளை (K3, K4)
- 4.6 இலக்கணம் / -வல்லினம் மிகும் இடங்கள், (K1, K2, K3)  
பொது அறிவு - உலக சமயங்கள். (K1, K2, K3)

**அலகு - 5****(18 மணி நேரம்)****செய்யுள்**

- 5.1 வள்ளலார் பாடல்கள் - திருவருட்பா (பாடல் எண்கள் : 18, 25) (K1, K2)
- 5.2 சிறுகதை - ஜென்ம பூமி, ஆண்டாள் பிரியதர்ஷினி (K3, K4)
- 5.3 தலவரலாறு - பிற தல வரலாறுகள் (பொது) (K2, K3, K4)
- 5.4 இலக்கிய வரலாறு - ஐஞ்சிறு காப்பியம், ஐம்பெரும் காப்பியம் (K3, K4)
- 5.5 உரைநடை - ஆன்மிக அடிப்படையிலிருந்து அன்றாட வாழ்வுக்கு -  
எம்.எஸ்.உதயமூர்த்தி (K3, K4)
- 5.6 இலக்கணம்/ - வல்லினம் மிகா இடங்கள் (K1, K2, K3)  
பொது அறிவு - நடப்பு நிகழ்வுகள் (K1, K2, K3)

## INTERNAL COMPONENT (K5, K6)

### கற்பித்தல் முறை :

- வகுப்பறைக் கற்பித்தல்
- ஒப்படைப்பு
- குழு விவாதம்
- கலந்துரையாடல்
- கணினி விளக்கக் காட்சி
- எழுத்துக்களை எழுதவும் உச்சரிக்கவும் பயிற்சி அளித்தல்.

செய்முறைபயிற்சி – ஆடல், பாடல், நாடகம், படைப்பாற்றல்

### பாடநூல் :

1. ஆசிரியர் குழு: தமிழ்த்துறை, அக்சிலியம் கல்லூரி, வேலூர் – 6, பொதுத்தமிழ், இளநிலைப் பட்ட படிப்பு, இரண்டாம் பருவம், அடிப்படை பாடம், 2020 – 2025, ஜேம்ஸ் ஆர்ட்ஸ் கிராப்ட்ஸ், சிவகாசி.

### பரிந்துரை நூல்கள் :

1. முனைவர் வெங்கடராமன், பன்னிரு திருமுறைகள், மணிவாசகர் பதிப்பகம், 2000
2. முனைவர் மு.வரதராசன், தமிழ் இலக்கிய வரலாறு, பாரி நிலையம், 2004

### வலையொளி இணைப்புகள் :

1. <https://youtu.be/MXmxidSueBk> (சமணமும் பௌத்தமும்)
2. <https://youtu.be/QdclEaWueCM> (சிலப்பதிகாரம்)
3. <https://youtu.be/8HCH1c31xBY> (மணிமேகலை)
4. [https://youtu.be/9jKeWaSCQ\\_I](https://youtu.be/9jKeWaSCQ_I) (சைவம்)
5. <https://youtu.be/GfmQSxsHLNY> (ஆண்டாள் திருப்பாவை)

## ULTAC20 - GENERAL TAMIL – III

தமிழ் மூன்றாம் தாள்

Year: II Sem: III	Course Code: ULTAC20	Title of the Course: General Tamil – III	Course Type: Theory	Course Category: Foundation	H/W 6	Credits 3	Marks 40 + 60=100
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### COURSE OBJECTIVES

இலக்கியங்களின் வாயிலாக தனி மனித ஒழுக்கத்தை வளர்த்தல்.

1. சமூக இடர்ப்பாடுகளை அகற்றி அறிவை மேம்படுத்திக் கொள்ள வழிவகைச் செய்தல்
2. இலக்கியங்களை ஊன்றிக் கற்பதால் மொழித்திறனை பெறச் செய்தல்.
3. அற இலக்கியங்கள் வாயிலாக அறநெறியாளராக வாழ வழிவகுத்தல்
4. வாழ்வியல் சிந்தனைகளை உணரவைத்தல்.
5. மொழிப்பயிற்சிக்குத் தேவையான இலக்கணங்களைக் கற்பித்தல்.

### COURSE OUTCOMES (CO)

1. சங்க இலக்கியங்களை அறிமுகப்படுத்தி, அதன் விழுமியங்களில் வாழ ஊக்குவித்தல்.
2. பழந்தமிழரின் மரபை அறியச்செய்தல்.
3. சங்க இலக்கியங்கள் வழி தலைமைப்பண்பை வளர்த்தல்.
4. தன் வரலாற்று இலக்கியங்கள் வாயிலாக நம்பிக்கை பெற ஊக்குவித்தல்.
5. இலக்கணப் பிழையின்றி எழுதக் கற்பித்தல்.

### CO/PO MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	M	H	M	M	L	M
CLO2	H	M	H	H	M	L
CLO3	M	H	M	M	L	M
CLO4	H	M	H	H	M	L
CLO5	M	H	H	M	L	M

(Low – L, Medium – M, High – H)

## Course Syllabus

### அலகு 1

(18 மணிநேரம்)

#### செய்யுள்

- 1.1 நற்றிணை - பாலைத்திணை (பாடல் எண் : 110) (K1, K2)  
குறுந்தொகை - நெய்தல் திணை (பாடல் எண் : 397) (K1, K2)  
குறிஞ்சித்திணை (பாடல் எண் : 143) (K1, K2)  
ஐங்குறுநூறு - மருதத்திணை (பாடல் எண்கள் : 2, 8) (K1, K2)  
அகநானூறு - பாலைத்திணை (பாடல் எண் : 173) (K1, K2)  
கலித்தொகை- முல்லைக்கலி (பாடல் எண் : 110) (K1, K2)
- 1.2 உரைநடை- கலித்தொகை காட்டும் பண்பாடு – பேரா. ம. திருமலை (K3, K4)
- 1.3 இலக்கிய வரலாறு- சங்ககாலம் – சங்ககால சிறப்பியல்புகள் (K3, K4)
- 1.4 தன்வரலாறு - முள் – முத்துமீனாள் (K3, K4)
- 1.5 இலக்கணம் - தொல்காப்பியம் அறிமுகம் (K1, K2, K3)
- 1.6 பொதுஅறிவு - TNPSC – மாதிரி வினாக்கள் - சங்க இலக்கியம் (K1, K2, K3)

### அலகு 2

(18 மணிநேரம்)

#### செய்யுள்

- 2.1 புறநானூறு - பாடாண்திணை (பாடல் எண்கள் : 35, 163) (K1, K2)  
பதிற்றுப்பத்து - ஆறாம் பத்து (பாடல் எண் : 57) (K1, K2)  
திருக்குறள் - அன்புடைமை (8), இனியவை கூறல் (10) வெகுளாமை (31),  
ஊக்கமுடைமை (60) நட்பாராய்தல் (80) (K1, K2)
- 2.2 இலக்கிய வரலாறு - எட்டுத்தொகை (K3, K4)
- 2.3 உரைநடை - மனிதனும் அழகும் – திரு.வி.கலியாணசுந்தரனார் (K3, K4)
- 2.4 தன்வரலாறு (தொடர்ச்சி) - முள் – முத்துமீனாள் (K3, K4)
- 2.5 இலக்கணம் - அகப்பொருள் (K1, K2, K3)
- 2.6 பொதுஅறிவு - TNPSC மாதிரி வினாக்கள் - சங்க இலக்கியம் (K1, K2, K3)

### அலகு 3

(18 மணிநேரம்)

#### செய்யுள்

- 3.1 நாலடியார் - பொறையுடைமை (பாடல் எண்கள் : 72,75,76) (K1, K2)  
நான்மணிக்கடிகை - பாடல் எண்கள் : 4,17,46 (K1, K2)  
இனியவை நாற்பது - பாடல் எண்கள் : 12,16,30 (K1, K2)  
பழமொழி - பாடல் எண்கள்: 40,126,111(K1, K2)

- 3.2 இலக்கிய வரலாறு - பத்துப்பாட்டு (K3, K4)  
 3.3 உரைநடை - ஒப்புரவு - டாக்டர் கா. மீனாட்சி சுந்தரம் (K3, K4)  
 3.4 குறுநாவல் - கிடை - கி. ராஜ நாராயணன் (K3, K4)  
 3.5. இலக்கணம் - ஐந்திணைகள் அறிமுகம்(K3, K4)  
 3.6 பொதுஅறிவு - TNPSC மாதிரி வினாக்கள் - அற இலக்கியம் (K1, K2, K3)

#### அலகு 4

(18 மணிநேரம்)

#### செய்யுள்

- 4.1 இன்னா நாற்பது - பாடல் எண்கள் : 23,27,32 (K1, K2)  
 ஆசாரக்கோவை - பாடல் எண்கள் : 16,18,50 (K1, K2)  
 ஏலாதி - பாடல் எண்கள் : 7, 9, 13 (K1, K2)  
 4.2 இலக்கிய வரலாறு - பதினெண் கீழ்க்கணக்கு நூல்கள் (K3, K4)  
 4.3 உரைநடை - விழிகள் உள்முகமாக - முனைவர் அப்துல் காதர்(K3, K4)  
 4.4 குறுநாவல் - கிடை - கி. ராஜ நாராயணன்(K3, K4)  
 4.5 இலக்கணம் - புறப்பொருள் விளக்கம் (K1, K2, K3)  
 4.6 பொதுஅறிவு - TNPSC மாதிரி வினாக்கள் - அற இலக்கியம்(K1, K2, K3)

#### அலகு 5

(18 மணிநேரம்)

#### செய்யுள்

- 5.1 நானாற்பது - பாடல் எண்கள் : 13,17,19(K1, K2)  
 திரிகடுகம் - பாடல் எண்கள் : 6,12, 20 (K1, K2)  
 5.2 இலக்கிய வரலாறு - பதினெண் கீழ்க்கணக்கு நூல்கள் (K3, K4)  
 5.3 உரைநடை - தொலைக்காட்சி கலாச்சாரம்- க. அ. பஞ்சாங்கம்(K3, K4)  
 5.4 குறுநாவல் - கிடை - கி. ராஜ நாராயணன்(K3, K4)  
 5.5 இலக்கணம் - தொடர்ப்பிழை (K1, K2, K3)  
 5.6 பொது அறிவு - TNPSC மாதிரி வினாக்கள் - இலக்கணம் (K1, K2, K3)

### INTERNAL COMPONENT (K5, K6)

#### கற்பித்தல் முறை :

- வகுப்பறைக் கற்பித்தல்
- ஒப்படைப்பு
- குழுவிவாதம்
- கலந்துரையாடல்
- கணினி விளக்கக் காட்சி

- எழுத்துக்களை எழுதவும் உச்சரிக்கவும் பயிற்சி அளித்தல்.
- செய்முறை பயிற்சி – ஆடல், பாடல், நாடகம், படைப்பாற்றல்.

**பாடநூல் :**

1. ஆசிரியர் குழு தமிழ்த்துறை, அக்சிலியம் கல்லூரி, பொதுத்தமிழ், இளநிலைப் பட்ட படிப்பு, முதல் பருவம், அடிப்படை பாடம், 2020 – 2025, ஜேம்ஸ் ஆர்ட்ஸ் கிராப்ட்ஸ், சிவகாசி.

**பரிந்துரை நூல்கள் :**

1. முனைவர் கு.வெ. பாலசுப்ரமணியன், பதினெண்கீழ்க்கணக்கு நூல்கள், கழக வெளியீடு, 1999
2. முனைவர் மு.வரதராசன், தமிழ் இலக்கிய வரலாறு, பாரி நிலையம், 2004

**வலையொளி இணைப்புகள்**

1. <https://youtu.be/ZUIEa-C20co> (தொல்காப்பியம்)
2. <https://youtu.be/XAtXz0FG4YA> (குறுந்தொகை)
3. <https://youtu.be/cwiScEdKk50> (பத்துப்பாட்டு)
4. <https://youtu.be/ZBLAiWcjWGQ> (திருக்குறள்)
5. <https://youtu.be/3Zh6aokRDyw> (கிடை)

## ULTAD20 - GENERAL TAMIL – IV

### தமிழ் நான்காம் தாள்

Year : II Sem: IV	Course Code: ULTAD20	Title of the Course: General Tamil – IV	Course Type: Theory	Course Category: Foundation	H/W	Credits	Marks 40 + 60 =100
					6	3	

### COURSE OBJECTIVES

1. மொழித்திறன்களின் முதன்மைத்துவத்தை உணர வைத்தல்
2. படைப்பாற்றலினால் சமுதாயத்தை சீர்த்தூக்கிப் பார்க்கும் சிந்தனை மிக்கவர்களாக மாற்றுதல்
3. மொழித்திறன்களில் ஆளுமை பெறுவதோடு, படைப்பாற்றல் திறன்களைப் பெற வழி செய்தல்
4. தமிழர் தம் பழக்கவழக்கங்களை மீட்டுருவாக்கம் செய்ய வழி வகுத்தல்
5. தகவல் தொடர்புப் பயன்பாட்டில் விழிப்புணர்வை பெற ஊக்குவித்தல்
6. நாடகக்கலையை ஊக்குவிக்க பயிற்சி அளித்தல்

### COURSE OUTCOMES (CO)

1. கேட்டல், எழுதுதல், பேசுதல், வாசித்தல் (LSWR) முதலிய மொழித்திறன்களை வளர்த்தல்
2. படைப்பாக்க இலக்கியங்களை உருவாக்க உதவுதல்
3. வேலைவாய்ப்புக் குறித்த வாய்ப்புகளை அறிமுகப்படுத்துதல்
4. இலக்கிய வரலாறு வழி தமிழர்களின் வாழ்வியலை அடையாளப் படுத்துதல்
5. நவீன தகவல் தொடர்பு பயன்பாட்டை ஊக்குவித்தல்

### CO/PO MAPPING

CO/PO	PO1	PO 2	PO 3	PO 4	PO 5	PO6
CO1	H	H	M	L	M	M
CO2	M	H	H	M	H	L
CO3	H	M	M	L	M	M
CO4	M	H	H	M	L	L
CO5	H	M	M	M	M	M

(Low – L, Medium – M, High – H)

## Course Syllabus

### அலகு - 1

18 மணிநேரம்

#### வாசிப்புக்கலை

- 1.1 உரைநடை - வாசிப்பியல் பன்முகப்பார்வை (K1,K2,K3)
- 1.2 இலக்கிய வரலாறு - தமிழர்ப் பண்பாடு: அன்றாட வாழ்க்கை முறை (K2,K3,K4)
- 1.3 வாழ்க்கை வரலாறு - சி. பா. ஆதித்தனார் (K2,K3)
- 1.4 படைப்பாக்கம் - கவிதை (K1,K2,K3)
- 1.5 பயிற்சி- கதை, குறுநாவல் - கல் மரம் (K1,K2,K3,K4)
- 1.6 பொது அறிவு- செய்தித்தாள் (K1,K2,K3)

### அலகு - 2

18 மணிநேரம்

#### பேச்சுக்கலை

- 1.1 உரைநடை - பேச்சுத்திறன் அடிப்படைகள், உரையாடல், குழு உரையாடல், நேர்க்காணல் (K1,K2,K3)
- 1.2 இலக்கிய வரலாறு - உணவு, வழிபாடு, தெய்வங்கள் (K2,K3,K4)
- 1.3 வாழ்க்கை வரலாறு - பா. ஜீவானந்தம் (K2,K3)
- 1.4 படைப்பாக்கம் - கடிதம் (K1,K2,K3)
- 1.5 பயிற்சி - கட்டுரை (K1,K2,K3)
- 1.6 பொது அறிவு - தொலைக்காட்சி (K1,K2,K3)

### அலகு - 3

18 மணிநேரம்

#### எழுத்துக்கலை

- 1.1 உரைநடை - நாட்டுப்புறவியல் (K1,K2,K3)
- 1.2 இலக்கிய வரலாறு - உடை, திருமணம் (K2,K3,K4)
- 1.3 வாழ்க்கை வரலாறு - பம்மல் சம்பந்த முதலியார் (K2,K3)
- 1.4 படைப்பாக்கம் - நகைச்சுவைத் துணுக்குகள் (K1,K2,K3)
- 1.5 பயிற்சி - பேட்டிக் காணல் (K2,K3,K4)
- 1.6 பொது அறிவு - கணினி (K1,K2,K3)

## தகவல் தொடர்புக்கலை

- 1.1 உரைநடை - மக்கள் தகவல்தொடர்பியல் நவீன தகவல் தொடர்பு சாதனங்கள் (K1,K2,K3)
- 1.2 இலக்கிய வரலாறு - விளையாட்டும் பொழுதுபோக்கும் (K3,K4)
- 1.3 வாழ்க்கை வரலாறு - ஏ.பி.ஜே. அப்துல் கலாம் (K2,K3)
- 1.4 படைப்பாக்கம் - விளம்பரங்கள் (K1,K2,K3)
- 1.5 பயிற்சி - தலையங்கம் (K1,K2,K3)
- 1.6 பொது அறிவு - இதழ்கள் (K1,K2,K3)

## நடிப்புக் கலை

- 1.1 உரைநடை - மொழிபெயர்ப்பியலின் தோற்றமும் வளர்ச்சியும் (K2,K4)
  - 1.2 இலக்கிய வரலாறு - விழாக்கள், வழிபாடு (K3,K4)
  - 1.3 வாழ்க்கை வரலாறு - கே.பி. சுந்தராமப்பாள் (K2,K3)
  - 1.4 படைப்பாக்கம் - கலைச் சொல்லாக்கம் (K2,K3,K4)
  - 1.5 பயிற்சி - பழமொழிகள் (K1,K2,K3)
  - 1.6 பொது அறிவு - நாடகம் (K1,K2,K3)
- Internal Component - (k5,k6)

## கற்பித்தல் முறை :

- வகுப்பறை கற்பித்தல்
- ஒப்படைப்பு
- குழு விவாதம்
- கலந்துரையாடல்
- வலையொளி
- செய்முறைப் பயிற்சி - நடித்தல், படைப்பாற்றல், வாசிப்புப் பயிற்சி

## பாடநூல் :

பொதுத் தமிழ், இளநிலைப் பட்டப்படிப்பு, நான்காம் பருவம், அடிப்படைப்பாடம், தமிழ்த்துறை, அக்சிலியம் கல்லூரி, வேலூர் - 6, ஜேம்ஸ் ஆர்ட்ஸ் கிராப்ட்ஸ், சிவகாசி, 2020-2025

**பரிந்துரை நூல்கள் :**

1. இரா. பாலசுப்பிரமணியம், தமிழர் நாட்டு விளையாட்டுகள், உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, 1980
2. முனைவர் அ. விநாயகமூர்த்தி, விளம்பரக்கலை, பாலமுருகன் பதிப்பகம், 1989
3. அ. தட்சிணாமூர்த்தி, தமிழர் நாகரிகமும் பண்பாடும், யாழ் வெளியீடு, சென்னை, 1999
4. பரிதிமாற் கலைஞர், நாடகக்கலை, உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை, 2004
5. முனைவர் மு.சுதந்திர முத்து, படைப்புக்கலை, அறிவுப் பதிப்பகம், 2008

**வலையொளி இணைப்புகள்**

1. <https://youtu.be/IO7PI2lcLEA> (இதழ்)
2. <https://youtu.be/Pks00LBsGJU> (ஊடகம்)
3. <https://youtu.be/-oUmlDvHvQg> (நாடகம்)
4. <https://youtu.be/v3zh2Xr3jNs> (நாட்டுப்புறவியல்)

**SEMESTER V**  
**NON MAJOR ELECTIVE**  
**UGTAA521 - ADIPADAI TAMIL**

தமிழல்லாத பிறமொழி மாணாக்கர்களுக்குரிய தமிழ் மொழிப் பாடம்

மூன்றாம் ஆண்டு – ஐந்தாம் பருவம்

Year: III Sem: V	Course Code	Title of the Course	Course Type	Course Category	H / W	Credits	Marks
	UGTAA521	Adipadai Tamil	UG	NME	3	2	40+60=100

**Course Objective**

1. மாணவிகளுக்குத் தமிழ் மொழியின் அடிப்படைகளைக் கற்பிப்பதன் மூலம் தமிழ் எழுதப் படிக்கக் கற்றுத்தரல்.
2. மாணவிகள் புதிய மொழியினைக் கற்றுக் கொள்வதால் தன்னம்பிக்கையோடு செயல்பட வழி வகுத்தல்.
3. தமிழ்மொழியின் சிறப்பினை பிறமொழி மாணவர்களுக்கு எடுத்துரைத்தல்.

**Course Outcomes**

1. தமிழ் எழுத்துகளின் அடிப்படைகளை மாணவிகளுக்கு அறிமுகப்படுத்தல்.
2. மெய்யெழுத்துகளையும் உயிர்மெய் எழுத்துகளையும் மாணவிகளுக்கு விளக்குதல்.
3. எண்களை மாணவிகளுக்கு அறிவுறுத்தல்.
4. மரம்,செடி,கொடி, காய் கனிகளின் பெயர்களை கற்பித்தல்.
5. வார, மாத பெயர்கள், முக்கிய விழாக்கள், புலவர்கள், நூல்களின் பெயர்களை எடுத்துரைத்தல்.

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	L	H	H	L
CO2	M	L	H	H	M	H
CO3	H	M	L	L	M	M
CO4	H	L	H	M	L	H
CO5	M	M	H	H	H	L

(Low – L, Medium – M, High – H)

அலகு - ஒன்று

9 மணிநேரம்

- 1.1 எழுத்து – ஓர் அறிமுகம்
- 1.2 உயிர் எழுத்துகள்
- 1.3 உயிர் எழுத்துகளின் வகைகள்

1.4 உயிர் எழுத்துகளில் இன எழுத்துகள்

1.5 உயிர் எழுத்துகளை அடிக்கோடிட்டு அடையாளம் கண்டறிதல்

1.6 பயிற்சிகள்

**அலகு - இரண்டு**

**9 மணிநேரம்**

2.1 மெய்யெழுத்துகளை அறிமுகப்படுத்துதல்

2.2 உயிர் மெய்யெழுத்துகளை அறிமுகப்படுத்துதல்

2.3 மெய்யெழுத்துகளின் வகைகள்

2.4 மெய்யெழுத்துகளில் இன எழுத்துகள்

2.5 மெய் மற்றும் உயிர்மெய் எழுத்துகளை அடிக்கோடிட்டு அடையாளம் கண்டறிதல்

2.6 பயிற்சிகள்

**அலகு - மூன்று**

**9 மணிநேரம்**

3.1 ஒன்று முதல் பத்து வரை எண்கள் அறிமுகம்

3.2 நூறு முதல் ஆயிரம் வரை எண்கள் அறிமுகம்

3.3 இலட்சம் முதல் கோடி வரை எண்களை அறிமுகப்படுத்துதல்

3.4 எண்களை எழுத்துகளால் எழுதிப் பழகுதல்

3.5 எண்களை பகுத்தறிந்து அடையாளம் காணல்

3.6 பயிற்சிகள்

**அலகு - நான்கு**

**9 மணிநேரம்**

4.1 மரங்களின் பெயர்கள்

4.2 செடி மற்றும் கொடிகளின் பெயர்கள்

4.3 காய்களின் பெயர்கள்

4.4 கனிகளின் பெயர்களை கற்பித்தல்

**அலகு - ஐந்து**

**9 மணிநேரம்**

5.1 வார நாட்கள்

5.2 தமிழ் மாதங்கள்

5.3 முக்கிய விழாக்கள்

5.4 புலவர்கள், நூல்கள் பெயர்களைக் கற்பித்தல்

**கற்பித்தல் முறை :**

● வகுப்பறை

● மனன முறை

- வாசிப்பு முறை
- கலந்தாய்வு முறை
- குழு உரையாடல்
- வலையொளி பதிவு
- ஒப்படைப்பு

பரிந்துரை நூல்கள் :

வரிசை எண்	ஆசிரியர்	தலைப்பு	பதிப்பகம்	ஆண்டு
1	கல்வி கோபால கிருஷ்ணன்	அரிச்சுவடி	நியூசெஞ்சூரி புக் ஹவுஸ் வேலூர்.	2009
3	ஆசிரியர்க் குழு	அரிச்சுவடி	லியோ பப்ளிஷர்ஸ் தி.நகர், சென்னை.	2020

வலையொளி இணைப்புகள் :

1. <https://www.youtube.com/watch?V=VRUZG>
2. <https://www.magicbox.co.in/Top-50-Tam...>
3. <https://www.magicbox.co.in/Top-100-Tam...>
4. <https://youtube.com/watch?V=nKLAKHABJBC&feature=share>

**SEMESTER VI**  
**NON MAJOR ELECTIVE**  
**UGTAA621 - ADIPADAI TAMIL**

தமிழல்லாத பிறமொழி மாணாக்கர்களுக்குரிய தமிழ் மொழிப் பாடம்

மூன்றாம் ஆண்டு – ஆறாம் பருவம்

Year: III Sem: VI	Course Code UGTAA621	Title of the Course Adipadai Tamil	Course Type UG	Course Category NME	H/W 3	Credits 2	Marks 40+60=100
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**Course Objective**

1. மாணவிகளுக்கு தமிழ் மொழிப்பாடத்தை அறிமுகப்படுத்துதல், மொழியறிவையும் திறனையும் வளப்படுத்துதல்.
2. தமிழ்மொழி குறித்த அடிப்படைகளை அறிதல், துறைச் சார்ந்த அடிப்படை சொற்களைத் தமிழில் அறிந்து கொள்ளும் ஈடுப்பாட்டை ஏற்படுத்துதல்.
3. தமிழ் மொழியின் எளிமையும் பெருமையும் குறித்த உணர்வுகளை ஏற்படுத்துவதோடு, எளிமையான பயிற்சிகளால், மாணவியரின் தமிழ்மொழியறிவில் ஆர்வத்தை தூண்டவும் துலங்கவும் செய்தல்.

**Course Outcomes**

1. ஐந்தாம் பருவ பாடத்திட்டத்தில் தமிழ் மொழி குறித்த அடிப்படைகளை எழுத்தால் அறிந்துக் கொண்ட மாணவியர்க்கு, சொற்களை அறியப் பயிற்றுவித்தல்.
2. சொற்களைக் கொண்டு தொடரமைத்து, எழுதக் கற்பித்தல். பயிற்றுவித்தலோடு மாணவிகள் தாங்களே சுயமாக எழுத, பேச ஊக்கப்படுத்துதல்.
3. கவிதை, சிறுகதைகளை சொல்லாகவும் தொடராகவும் படித்தறியச் செய்தல்.
4. வெவ்வேறு கவிதைகள், சிறுகதைகள், செய்தித்தாள்கள், புத்தகங்களைக் கொடுத்து வாசிக்கப் பழகுதல்.
5. தமிழ் மொழியை பேசப் பழகுதல் புரிந்துக்கொள்ளுதல்

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	L	H	M	L
CO2	H	M	L	H	M	L
CO3	H	M	L	L	M	H
CO4	M	M	H	L	M	H
CO5	L	M	H	M	H	L

(Low – L, Medium – M, High – H)

## அலகு - ஒன்று

9 மணிநேரம்

- 1.1 சொல் வகைகள் -ஓர் அறிமுகம்
- 1.2 இலக்கணச் சொல்வகைகள்
- 1.3 திசைச் சொற்கள்
- 1.4 வினா - விடை அமைத்து எழுதுதல்
- 1.5 சொல் வகைகளை இனம் கண்டறிதல்
- 1.6 பயிற்சிகள்

## அலகு - இரண்டு

9 மணிநேரம்

- 2.1 திணை வகைகள்
- 2.2 பால் பகுப்புகள்
- 2.3 எண் மற்றும் இட வகைகள்
- 2.4 திணை, பால், எண் சொற்களைக் கொண்டு தொடரமைத்தல்
- 2.5 திணைகளை இனம் கண்டு அறிதல்
- 2.6 பயிற்சிகள்

## அலகு - மூன்று

9 மணிநேரம்

- 3.1 பெண்கல்வி - பாரதிதாசன் கவிதை
- 3.2 அறிவுடைமை - சிறுகதை
- 3.3 வினா - விடை அமைத்து எழுதுதல்
- 3.4 வாசிப்புப் பயிற்சிகள்
- 3.5 எழுத்துப் பயிற்சிகள்
- 3.6 பயிற்சிகள் - சேர்த்து எழுதுதல், பிரித்து எழுதுதல், எதிர்ச்சொல் அறிதல்

## அலகு - நான்கு

9 மணிநேரம்

- 4.1 அந்தக்காலம் இந்தக்காலம் - உடுமலை நாராயண கவி
- 4.2 பெரியாரைத் துணை கொள் - சிறுகதை
- 4.3 வினா - விடை அமைத்து எழுதுதல்
- 4.4 வாசிப்புப் பயிற்சிகள்
- 4.5 எழுத்துப் பயிற்சிகள்
- 4.6 பயிற்சிகள் - சேர்த்து எழுதுதல், பிரித்து எழுதுதல், எதிர்ச்சொல் அறிதல்

5.1 அன்றாடப் பயன்பாட்டுச் சொற்கள்

5.2 மருத்துவம் சார்ந்த சொற்கள்

5.3 கணினி சார்ந்த சொற்கள்

5.4 கல்வி சார்ந்த சொற்கள்

5.5 அன்றாடப் பயன்பாட்டுச் சொற்களை இனம் கண்டறிதல்

5.6 பயிற்சிகள்

**கற்பித்தல் முறை:**

- வகுப்பறை
- ஒப்படைப்பு
- குழு விவாதம்
- விளக்க காட்சி முறை
- வலையொளி
- செய்முறை பயிற்சி - எளிய பயிற்சிகளால் எழுதப் பழகுதல்

**பரிந்துரை நூல்கள்:**

வரிசை எண்	ஆசிரியர்	தலைப்பு	பதிப்பகம்	ஆண்டு
1.	பேரா. கா. பட்டாபிராமன்	மொழிப்பயன்பாடு	நியூசெஞ்சுரி புக் ஹவுஸ் வேலூர்.	2000
2.	அ.கி. பரந்தாமன்	நல்ல தமிழ் எழுதவேண்டுமா?	பாரிநிலையம், சென்னை – 600 007	2018

**SEMESTER V**  
**NON MAJOR ELECTIVE**  
**UGATA521 – ADVANCED TAMIL**

Year: III Sem: V	Course Code UGATA521	Title of the Course Advanced Tamil	Course Type UG	Course Category NME	H /W 3	Credits 2	Marks 40+60=100
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**Course Learning Objectives**

1. தமிழ்மொழிக் குறித்து அறிமுகம் செய்தல்
2. அகரவரிசைப்படுத்தும் திறனை வளர்த்தல்
3. வாசிப்பு மற்றும் பேச்சுப் பயிற்சி அளித்தல்

**Course Outcomes**

1. மொழித்திறனை எடுத்துரைத்தல்
2. சொற்களை உருவாக்கக் கற்றுத்தரல்
3. இலக்கிய வாசிப்புப் பயிற்சிகளை ஊக்குவித்தல்
4. மொழியை எழுதவும் பேசவும் பயிற்சி வழங்குதல்
5. வாசிப்பு பயிற்சி வழங்குதல்

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	M	H	M	M
CO2	M	H	L	L	H	H
CO3	H	L	M	L	H	M
CO4	L	H	M	L	H	H
CO5	H	L	M	H	H	L

(Low – L, Medium – M, High – H)

**அலகு – 1**

**9 மணிநேரம்**

**கவிதைகள்**

- 1.1 நாமக்கல் கவிஞர் - தியாக புத்தி
- 1.2 பாரதிதாசன் - அறம் செய்க

- 1.3 இலக்கிய வரலாறு - இருபதாம் நூற்றாண்டு மரபுக்கவிஞர்கள்
- 1.4 வாழ்க்கை வரலாறு - மாயூரம் வேதநாயகம் பிள்ளை
- 1.5 சிறுகதை - திறந்த ஜன்னல் - புதுமைப்பித்தன்
- 1.6 இலக்கணம் - அகர வரிசைப்படுத்துதல்
- 1.7 பொதுஅறிவு - மொழிக்குடும்பம்

## அலகு - 2

9 மணிநேரம்

### கவிதைகள்

- 2.1 கண்ணதாசன் - புதியதோர் உலகு செய்வோம்
- 2.2 நா. காமராசன் - குழந்தை
- 2.3 உரைநடை - வணக்கம் வகுப்பறையே!

முனைவர் சகோ. அ. ஆரோக்கியஜெயசீலி- (1) உடலினை உறுதி செய்

(2) பலமும் வளமும்

- 2.4 வாழ்க்கை வரலாறு - அன்னை செசிரா
- 2.5 சிறுகதை - செய்த கணக்கு - சி.சு.செல்லப்பா
- 2.6 இலக்கணம் - ஒரு பொருள் குறித்த பல சொற்கள்
- 2.7 பொது அறிவு - சிறப்புப் பெயர்கள்

## அலகு - 3

9 மணிநேரம்

### கவிதைகள்

- 3.1 சிற்பி - நள்ளிரவுத் தொலைப்பேசி
- 3.2 தரிசனப்பிரியன் - திரு. குரல்
- 3.3 இலக்கியவரலாறு - இருபதாம் நூற்றாண்டு புதுக்கவிஞர்கள்
- 3.4 வாழ்க்கை வரலாறு - கா.மு. ஷெரீப்
- 3.5 சிறுகதை - பால்வடியும் முகம் - ஜெயகாந்தன்
- 3.6 இலக்கணம் - சொற்பிழைகளை களைதல்
- 3.7 பொது அறிவு - முக்கிய நாட்கள்

## அலகு - 4

9 மணிநேரம்

### கவிதைகள்

- 4.1 தமிழ்ச்சி தங்கப்பாண்டியன் - எஞ்சோட்டுப்பெண்
- 4.2 கா. தமிழ்வேங்கை - ஞெகிழி

4.3 இலக்கிய வரலாறு - சிறுகதை இலக்கியம்

4.4 உரைநடை - வணக்கம் வகுப்பறையே!

முனைவர் சகோ. அ. ஆரோக்கியஜெயசீலி- (3) வளருமா தமிழ்?

(4) கற்றது மறவாமை

4.5 வாழ்க்கை வரலாறு - மூவலூர் இராமாமிர்தம் அம்மையார்

4.6 சிறுகதை - உயர்த்திய விரல் - சூடாமணி

4.7 இலக்கணம் - ஒலி வேற்றுமை

4.8 பொது அறிவு - சாதனை மகளிர்

**அலகு - 5**

**9 மணிநேரம்**

**அயலகத் தமிழர் கவிதை**

5.1 சர்மிளா செய்யித் - கடலும் ஒரு காட்சியும்

5.2 இலக்கிய வரலாறு - நவீன இலக்கியத்தில் பெண் படைப்பாளிகள்

5.3 உரைநடை - வணக்கம் வகுப்பறையே!

முனைவர் சகோ. அ. ஆரோக்கியஜெயசீலி- (5) முகம் பார்த்து

5.4 வாழ்க்கை வரலாறு - தனிநாயக அடிகளார்

5.5 இலக்கணம் - பிறமொழிச் சொற்கள்

5.6 பொது அறிவு - நடப்பு நிகழ்வுகள்

**கற்பித்தல் முறை :**

- வகுப்பறை கற்பித்தல்
- ஒப்படைப்பு
- குழு விவாதம்
- கலந்துரையாடல்
- கணினி விளக்கக் காட்சி
- எழுத்துக்களை எழுதவும், உச்சரிக்கவும் பயிற்சி அளித்தல்
- செய்முறைப் பயிற்சி - ஆடல், பாடல், நாடகம், படைப்பாற்றல், வாசிப்புப் பயிற்சி, வினா விடை

**பாடநூல் :**

ஆசிரியர்	தலைப்பு	பதிப்பகம்	ஆண்டு
ஆசிரியர் குழு தமிழ்த்துறை, அக்சிலியம் கல்லூரி, வேலூர் - 6.	பொதுத் தமிழ், இளநிலைப் பட்டப்படிப்பு, ஐந்தாம் பருவம், அடிப்படைப்பாடம், 2021-2026	ஜேம்ஸ் ஆர்ட்ஸ் கிராப்ட்ஸ், சிவகாசி	2021-2026

பரிந்துரை நூல்கள் :

ஆசிரியர்	தலைப்பு	பதிப்பகம்	ஆண்டு
முனைவர் ஜெயம்	தமிழ் இலக்கிய வரலாறு	நியு செஞ்சுரி புக் ஹவுஸ்	2000
முனைவர் மு. வரதராசன்	தமிழ் இலக்கிய வரலாறு	பாரி நிலையம்	2004

**SEMESTER VI**  
**NON MAJOR ELECTIVE**  
**UGATA621 – ADVANCED TAMIL**

**ஆறாம் பருவம்**

Year: III Sem: VI	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
	UGATA621	Advanced Tamil	UG	NME	3	2	40+60=100

**Course Learning Objectives**

1. தமிழ் இலக்கியங்களை அறிமுகம் செய்தல்
2. இலக்கண, இலக்கிய சொல் வகைகளை அறிமுகப்படுத்துதல்

**Course Outcomes**

1. இலக்கியவகைச் சொற்களை கையாளும் திறன் பெறுதல்
2. ஆன்மிக அறநெறி சிந்தனைகளை மேம்படுத்துதல்
3. தமிழ் இலக்கண வகைகளை அறிமுகம் செய்தல்
4. தமிழ் இலக்கிய வகைகளை அறிமுகம் படுத்துதல்
5. வேலைவாய்ப்பு பயிற்சி வழங்குதல்

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	M	H	M	M
CO2	M	H	L	L	H	H
CO3	H	L	M	L	H	M
CO4	L	H	M	L	H	H
CO5	H	L	M	H	H	L

(Low – L, Medium – M, High – H)

**அலகு – 1**

**9 மணிநேரம்**

**செய்யுள்**

**தேவாரம்**

1.1 திருவண்ணாமலை - திருஞான சம்பந்தர் (பாடல்: 1,2)

1.2 அற்புதத் திருவந்தாதி - காரைக்கால் அம்மையார் (பாடல்: 2,8)

- 1.3 இலக்கிய வரலாறு - சைவ இலக்கியம்
- 1.4 தல வரலாறு - தஞ்சைப் பெரியகோவில்
- 1.5 சிறுகதை - அந்தராத்மாவின் ஆட்டம் - ம. காமுத்துரை
- 1.6 இலக்கணம் - இலக்கண சொல் வகைகள்
- 1.7 பொதுஅறிவு - இந்தியா அடிப்படைத் தகவல்கள்

## அலகு - 2

9 மணிநேரம்

### செய்யுள்

#### நாலாயிரத் திவ்வியப் பிரபந்தம்

- 2.1 பெரியாழ்வார் திருமொழி - பெரியாழ்வார் (பாடல்: 18,21)
- 2.2 திருப்பாவை - ஆண்டாள் (பாடல்: 6)
- 2.3 உரைநடை - வீர வழிபாடு - கி.வா. ஜகந்நாதன்
- 2.4 தல வரலாறு - புனித பெரியநாயகி அன்னை
- 2.5 சிறுகதை - பொற்கொடியின் சிறகுகள் - அழகிய பெரியவன்
- 2.6 இலக்கணம் - இலக்கிய சொல் வகைகள்
- 2.7 பொதுஅறிவு - இந்திய அரசியலமைப்பின் முகப்புரை -பகுதி-1

## அலகு - 3

9 மணிநேரம்

### செய்யுள்

- 3.1 சிலப்பதிகாரம் - அடைக்கலக் காதை (வரிகள் : 1 - 50)
- 3.2 இலக்கிய வரலாறு - இஸ்லாமிய இலக்கியம்
- 3.3 தல வரலாறு - அஜ்மீர் தர்கா
- 3.4 சிறுகதை - தன்மானம் - சூரியகாந்தன்
- 3.5 இலக்கணம் - மூவிடப்பெயர்கள்
- 3.6 பொதுஅறிவு - இந்திய அரசியலமைப்பின் முகப்புரை -பகுதி-2

## அலகு - 4

9 மணிநேரம்

### செய்யுள்

- 4.1 தேம்பாவணி - மகவருள் படலம் (பாடல் : 1 - 10)
- 4.2 உரைநடை - தமிழும் சாக்கியமும் - ரா. பி. சேதுபிள்ளை

- 4.3 தல வரலாறு - அமிர்தசரஸ் பொற்கோவில்  
 4.4 சிறுகதை - சுப்புத்தாய் – தமிழ்ச் செல்வன்  
 4.5 இலக்கணம் - வல்லினம் மிகும் இடங்கள்  
 4.6 பொதுஅறிவு - உலக சமயங்கள்

**அலகு – 5**

**9 மணிநேரம்**

**செய்யுள்**

- 5.1 சீறாப்புராணம் - ஒட்டகைப் பேசிய படலம்  
 (பாடல்:1,2,3,13,14,16,18,19,20,22)  
 5.2 உரைநடை - அன்பின் வழியது உயிர்நிலை – துரைமூர்த்தி  
 5.3 இலக்கிய வரலாறு - கிறித்தவ இலக்கியம்  
 5.4 சிறுகதை - ஜென்மபூமி – ஆண்டாள் பிரியதர்ஷினி  
 5.5 இலக்கணம் - வல்லினம் மிகா இடங்கள்  
 5.6 பொதுஅறிவு - நடப்பு நிகழ்வுகள்

**கற்பித்தல் முறை :**

- வகுப்பறை கற்பித்தல்
- ஒப்படைப்பு
- குழு விவாதம்
- கலந்துரையாடல்
- கணினி விளக்கக் காட்சி
- எழுத்துக்களை எழுதவும், உச்சரிக்கவும் பயிற்சி அளித்தல்
- செய்முறைப் பயிற்சி – ஆடல், பாடல், நாடகம், படைப்பாற்றல், வாசிப்புப் பயிற்சி, வினா விடை

**பாடநூல் :**

ஆசிரியர்	தலைப்பு	பதிப்பகம்	ஆண்டு
ஆசிரியர் குழு தமிழ்த்துறை, அக்சிலியம் கல்லூரி, வேலூர் - 6	பொதுத் தமிழ், இளநிலைப் பட்டப்படிப்பு, ஆறாம் பருவம், அடிப்படைப்பாடம், 2021-2026	ஜேம்ஸ் ஆர்ட்ஸ் கிராப்ட்ஸ், சிவகாசி	2021- 2026

**பரிந்துரை நூல்கள் :**

ஆசிரியர்	தலைப்பு	பதிப்பகம்	ஆண்டு
முனைவர் ஜெயம்	தமிழ் இலக்கிய வரலாறு	நியு செஞ்சுரி புக் ஹவுஸ்	2000
முனைவர் மு. வரதராசன்	தமிழ் இலக்கிய வரலாறு	பாரி நிலையம்	2004

**பாடத்திட்ட ஒருங்கிணைப்புக் குழு :**

1. முனைவர் சகோ. அ. ஆரோக்கிய ஜெயசீலி (தேர்வாணையர் மற்றும் தமிழ்த்துறைத் தலைவர்)
2. முனைவர் நா. குமாரி
3. முனைவர் கோ. செந்தில் செல்வி
4. முனைவர் கே. பி. கனிமொழி
5. முனைவர் ஜ. பபீதா
6. முனைவர் வெ. ரா. மீனாட்சி
7. முனைவர் ஏ. கௌதமச்செல்வி
8. முனைவர் இரா. பிரித்தா
9. முனைவர் கோ. செண்பகவள்ளி
10. முனைவர் சு. தீபா

**AUXILIUM COLLEGE (AUTONOMOUS), VELLORE-6**  
**SYLLABUS AND REGULATIONS**  
**PART – I HINDI**  
**COMMON FOR ALL UG (BA/B.Sc./B. Com/BBA/BCA)**  
**Effective for the students admitted from the academic year 2020-2021**

**Structure of the course**  
**For UG students opting for the Foundation Course in Hindi – B.A./ B.Sc.**

Semester	Course Code	Title of the Course	Course Type	Course Category	Hours/ Week	Credits	Marks
I	ULHNA20	Hindi Paper- I	Theory	Language	6	3	40 + 60
II	ULHNB20	Hindi Paper- II	Theory	Language	6	3	40 + 60
III	ULHNC20	Hindi Paper- III	Theory	Language	6	3	40 + 60
IV	ULHND20	Hindi Paper- IV	Theory	Language	6	3	40 + 60

**For UG students opting for the Foundation Course in Hindi**  
**(B.Com./ B.B.A/B.C.A)**

Semester	Course Code	Title of the Course	Course Type	Course Category	Hours/ Week	Credits	Marks
I	ULHNA20	Hindi Paper- I	Theory	Language	6	3	40 + 60
II	ULHNB20	Hindi Paper- II	Theory	Language	6	3	40 + 60

**PROGRAMME OUTCOME (UG)**

- PO1: Attain knowledge and understand the principles and concepts in the respective discipline
- PO2: Acquire and apply analytical, critical and creative thinking and problem-solving skills
- PO3: Effectively communicate general and discipline-specific information ideas and opinions
- PO4: Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society
- PO5: Emulate positive social values and exercise leadership qualities and teamwork
- PO6: Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the need of the society

**SEMESTER I**  
**ULHNA20 - HINDI PAPER- I**  
**(PROSE, APPLIED GRAMMAR AND FUNCTIONAL HINDI)**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I/I	ULHNA20	Hindi Paper- I	Theory	Language	6	3	40+60=100

**COURSE OBJECTIVES**

1. To appreciate Hindi Language and Literature
2. To know the origin and development of different literary forms
3. To know the rules of Hindi grammar and its applications
4. To develop effective communication skills
5. To develop skills of translation and business correspondence
6. To develop an in-depth knowledge of human life and to imbibe moral values through the writings of great authors.

**COURSE OUTCOMES (CO)**

On completion of the course, the students will be able to

1. Explain the origin and development of Hindi Prose and appreciate Hindi Language.
2. Apply the rules of Hindi grammar and communicate effectively.
3. Acquire comprehensive skills related to letter writing and use them in their personal and professional life proficiently.
4. Use business and administrative terminology accurately.
5. Translate English passages to Hindi efficiently and equip with a job - oriented skill.

**CO/PO MAPPING**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	M	H	M
CO2	H	M	H	L	L	M
CO3	M	H	H	L	H	H
CO4	M	M	H	M	L	M
CO5	H	M	M	L	M	H

H – High (3)

M- Moderate (2)

L- Low (1)

## **SYLLABUS AND BOOKS PRESCRIBED**

### **UNIT I**

**(18 Hours)**

- 1.1 Introduction to Hindi Grammar: Verb (kriya), Akarmak kriya and Sakarmak kriya, Vidhi roop (K1, K2)
- 1.2 Prose: Introduction to Hindi literature - Adhunik kal, Origin and development of Hindi prose, Literary forms (K1)
- 1.3 Prose: Mitrata (Nibandh) - Acharya Ramchandra Shukla (K1, K2, K3, K4)
- 1.4 Letter writing: Letter to Family members/Friends (K2, K3)
- 1.5 Technical Terminology: Words from English to Hindi and Hindi to English (K1)
- 1.6 Translation: 2 passages - English to Hindi (K2, K3)

### **UNIT II**

**(18 Hours)**

- 2.1 Prose: Lobh (Vicharathmak nibandh) - Mahaveer Prasad Dwivedi (K1, K2, K3, K4)
- 2.2 Prose: Bharat Ek Hai (Sanskritik)- Ramdhaari Singh Dinakar (K1, K2, K3, K4)
- 2.3 Applied Grammar: Tense (Kaal) - Vartaman kaal, Bhoot kaal, Bhavishyat kaal- Types (K2, K3)
- 2.4 Business Correspondence: Placing orders, Letter of complaint (K2, K3)
- 2.5 Technical Terminology: Phrases from English to Hindi and Hindi to English (K1)
- 2.6 Translation- 2 passages- English to Hindi (K2, K3)

### **UNIT III**

**(18 Hours)**

- 3.1 Prose: Krantikari Ki Katha (Vyangyathmak Nibandh) - Harishankar Parsayee (K1, K2, K3, K4)
- 3.2 Prose: Do Kalakar (Ekanki) - Bhagavathi Charan Varma (K1, K2, K3, K4)
- 3.3 Applied Grammar: Noun (Sangya), Pronoun (Sarvanam), Gender (Ling), Number (Vachan) (K2)
- 3.4 Business Correspondence: Letter for job, Banking Letters (K2, K3)
- 3.5 Technical Terminology: Phrases from English to Hindi and Hindi to English (K1)
- 3.6 Translation: 2 passages- English to Hindi (K2, K3)

### **UNIT IV**

**(18 Hours)**

- 4.1 Prose: Rahi (Nayi kahani) - Subdrakumari Chauhan (K1, K2, K3, K4)
- 4.2 Introduction to Official Correspondence: Types (K1)
- 4.3 Official correspondence: Circular (Paripatr), Office Order (Karyalay adesh) (Definitions and context of usage only) (K1, K2)
- 4.4 Technical Terminology: Words from English to Hindi and Hindi to English (K1)
- 4.5 Applied Grammar: Voice (Vachya) – Active voice, Passive Voice (K2, K3)
- 4.6 Translation: 2 passages - English to Hindi (K2, K3)

## UNIT V

(18 Hours)

- 5.1 Prose: Bhakthin (Rekha Chithr) - Mahadevi Varma (K1, K2, K3, K4)
- 5.2 Applied Grammar: Causal Verb (Preranarthak kriya), Auxillary Verb (Sahayak kriya) (K1, K2)
- 5.3 Applied Grammar: Sentence Correction (Shudh Kijiye) (K2, K3)
- 5.4 Official correspondence: Reminder (Anusmarak), Demi Official Letter (Ardh sarkari patra) (Definitions and context of usage only) (K1)
- 5.5 Technical Terminology: Words from English to Hindi and Hindi to English(K1)
- 5.6 Translation: 2 passages - English to Hindi (K2, K3)

### TEXT BOOK

1. Gadya Nikash- Ed. Dr. Shaik Abdul Wahab, Sanrachna Prakashan, Allahabad, 2018

### BOOKS FOR REFERENCE

1. Srikrishna Pandey - Samanya Hindi Vyakaran Tatha Rachna, Lokmangal Prakashan, Delhi -93, 2014.
2. Shastri & Apte - Hindi Vyakaran, D.B.H Prachar Sabha, Chennai, 1998.
3. Karyalaya Alekhan Aur Tippan- Karnatak Mahila Hindi Seva Samidhi, Bangalore, 1991.
4. Anuvad Abhyas –Part III, D.B. Hindi Prachar Sabha, Chennai-17
5. Dr. Dwarika Prasad Saxsena- Hindi Ke Pratinidhi Nibandhkar, Vinod Pustak Mandir, 15A, Mahatma Gandhi Marg, Illahabad-2 2001

### OER

1. <https://www.youtube.com/watch?v=14ttL-A04tw>
2. <https://www.youtube.com/watch?v=3T27u2B9Qp8>
3. [https://www.youtube.com/watch?v=a3y5MQ\\_g49I](https://www.youtube.com/watch?v=a3y5MQ_g49I)

**QUESTION PAPER PATTERN  
PART- I HINDI  
SEMESTER I  
ULHNA20- HINDI PAPER –I  
(PROSE, APPLIED GRAMMAR AND FUNCTIONAL HINDI)**

**Time: 3 Hrs**

**Max: 100 marks**

**SECTION A (10x2=20 marks)**

**Answer all Questions**

- Q. No 1 – 4 from Prose  
Q. No 5 – 9 from Applied Grammar (Ling, Vachan, Causal Verbs, Active & Passive Voice, Sentence Correction)  
Q. No 10 from Official Correspondence

**SECTION B (5x7=35 marks)**

**Answer three annotations (Either or)**

- Q. 11a. or 11b. }  
Q. 12a. or 12b. } Annotations from Prose  
Q. 13a. or 13b. }

- Q. 14a. or 14b. }  
Q. 15a. or 15b. } Letters (Personal, Business, Employment and Banking)

**SECTION C (3x15=45 marks)**

**Answer any three questions.**

- Q.16. Essay from Prose  
Q.17. Essay from Prose  
Q.18. Essay from Prose  
Q.19. Technical words (7 from English to Hindi out of 9 and 7 from Hindi to English out of 9)  
and  
Technical Phrases (8 phrases from English to Hindi and Hindi to English out of 10)  
Q.20. Translation passage from English to Hind

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**PART – I HINDI**  
**COMMON FOR ALL UG (BA/B.Sc./B. Com/BBA/BCA)**

**SEMESTER II**  
**ULHNB20 - HINDI PAPER-II**  
**(POETRY, HINDI E-LEARNING AND FUNCTIONAL HINDI)**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I/II	ULHNB20	Hindi Paper- II	Theory	Language	6	3	40+60

**COURSE OBJECTIVES**

1. To appreciate Modern Hindi Poetry
2. To enhance critical thinking, imagination, self and social awareness through the study of poetry.
3. To develop effective communication skills
4. To develop job- oriented skills (Translation)
5. To develop an in-depth knowledge of human life and to imbibe moral values through the writings of great authors

**COURSE OUTCOMES (CO)**

On completion of the course, the students will be able to

1. Explain the cultural traditions, moral values and social issues of life in a better way through the study of Poetry.
2. Communicate effectively in Hindi in their day to day life.
3. Acquire the skills of a good Translator
4. Utilize Hindi E-resources.
5. Acquire and apply critical, analytical and creative thinking

**CO/PO MAPPING**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	M	L	H	M
CO2	M	M	H	L	H	H
CO3	H	M	M	M	M	H
CO4	M	M	H	L	M	H
CO5	H	H	M	M	H	M

H – High (3)

M- Moderate (2)

L- Low (1)

## **SYLLABUS AND BOOKS PRESCRIBED**

### **UNIT I**

**(18Hours)**

- 1.1 Introduction to Modern Hindi Poetry: Origin and development (K1)
- 1.2 Modern Hindi Poetry: Kaisa ho apna sansar - Mythilisharan Gupta (K1, K2, K3, K4)
- 1.3 Modern Hindi Poetry: Kiran- Jayashankar Prasad (K1, K2, K3, K4)
- 1.4 Principles of Translation: Translation meaning and its definition (K1)
- 1.5 Usage of Hindi in Computer: Introduction to Computer and Hindi (K1)
- 1.6 Dialogue writing: Preparation of conversations according to given contexts  
Do mitron ke beech, Do Yaatriyon ke beech (K2, K3)

### **UNIT II**

**(18Hours)**

- 2.1 Modern Poetry: Sukh-Dukh - Sumithranandan Panth (K1, K2, K3, K4)
- 2.2 Modern Poetry: Murjhaya Phool - Mahadevi Varma (K1, K2, K3, K4)
- 2.3 Principles of Translation: Qualities of a good Translator (K1)
- 2.4 Usage of Hindi in Computer: Introduction to Computer and Hindi - Names of Hindi E-journals, Softwares and Fonts (K1)
- 2.5 Dialogue writing: Preparation of conversations according to given contexts  
Pitha aur Puthr ke beech, Adhyapak aur Vidyarthi ke beech (K2, K3)
- 2.6 Translation Practice: 2 passages - Hindi to English (K2, K3)

### **UNIT III**

**(18Hours)**

- 3.1 Modern Poetry: Bhikshuk - Suryakaanth Tripathi Nirala (K1, K2, K3, K4)
- 3.2 Modern Poetry: Mera Jeevan - Subhadra Kumari Chouhan (K1, K2, K3, K4)
- 3.3 Principles of Translation: Types of Translation (K1, K2)
- 3.4 Usage of Hindi in Computer: Computer Terminology (English to Hindi) (K1)
- 3.5 Dialogue writing: Preparation of conversations according to given contexts  
Dukandar aur Vidyarthi ke beech, Dukandar aur grahak ke beech (K2, K3)
- 3.6 Translation Practice: 2 passages - Hindi to English (K2, K3)

### **UNIT IV**

**(18Hours)**

- 5.1. Modern Poetry: Madhushala – Harivansh Rai Bacchan (K1, K2, K3, K4)
- 5.2. Modern Poetry: Nadi ke Dweep- Sachidanand Hiranand Vatsyayan Agney (K1, K2, K3, K4)
- 5.3. Principles of Translation: Translation – An Art, Science or Technique (K1, K2)
- 5.4. Usage of Hindi in Computer: History of Internet and changing scenario  
Computer and Hindi - Challenges and Opportunities (K1)
- 5.5. Dialogue writing: Preparation of conversations according to given contexts  
Doctor aur rogi ke beech, Telephone par (K2, K3)
- 5.6. Translation Practice: 2 passages - Hindi to English (K2, K3)

## **UNIT V**

**(18Hours)**

- 5.1 Modern Poetry: Toota Pahiya - Dharmaveer Bharathi (K1, K2, K3, K4)
- 5.2 Modern Poetry: Aaj ka Manav- Jagadeeshchandra Jeeth (K1, K2, K3, K4)
- 5.3 Principles of Translation: Role of translation in the development of Hindi (K2, K3)
- 5.4 Usage of Hindi in Computer: Learning Computerised Hindi Language - Unicode Hindi typing – Practice (K1, K2, K3)
- 5.5 Dialogue writing: Preparation of conversations according to given contexts Bank mein, Ghar mein (K2, K3)
- 5.6 Translation Practice: 2 passages - Hindi to English (K2, K3)

## **TEXT BOOK**

1. Collection of Poems by the Department of Hindi, Auxilium College, Vellore- 6

## **BOOKS FOR REFERENCE**

1. Anuvad Abhyas – Part IV, D.B.Hindi Prachar Sabha, Chennai, 1998.
2. Anuvad Vigyan - Dr. Bholanath Tiwari, Sabdakar Publication, 1987.
3. Anuvad evam Sanchar – Dr. Puranchand Tandon, Rajpal & Sons, Kashmiri Gate, Delhi- 6, 2014.
4. Bolchal ki Hindi - Dr. Susheela Gupta, Lokbharathi Prakashan, Allahabad, 2013.
5. Hindi Ke Aadhunik Prathinidhi Kavi - Dwarika Prasad Saxena, Vinod Putak Mandir, Agra, 2001.
6. Computer Ek Parichay- Ed. Santhosh Chaubey, Madhya Pradesh Hindi Granth Academy, 2015.
7. Computer Ke Bhashik Anuprayog- Vijay Kumar Malhotara, Vani Prakashan, New Delhi, 1998.

## **OER**

1. <https://www.youtube.com/watch?v=y6kXGDhdLXk>
2. <https://www.youtube.com/watch?v=oJpLxOtiGp4>
3. <https://www.youtube.com/watch?v=IUOtjs-UIags>
4. <https://www.youtube.com/watch?v=YipqpxwAefU>

**QUESTION PAPER PATTERN**  
**PART I – HINDI**  
**SEMESTER II**  
**ULHNB20 HINDI PAPER –II**  
**(POETRY, HINDI E- LEARNING AND FUNCTIONAL HINDI)**

**Time: 3 Hrs**

**Max: 100 marks**

**SECTION A (10x2=20 marks)**

**Answer all Questions**

- Q. No 1 – 4            from Poetry  
Q. No 5 – 8            from Translation Theory  
Q.No 9 – 10          from Usage of Hindi in Computer

**SECTION B (5x7=35 marks)**

**Answer three annotations (Either or)**

- Q. 11a. or 11b.    }  
Q. 12a. or 12b.    } Annotations from Modern Poetry  
Q. 13a. or 13b.    }

- Q. 14a. or 14b.    }  
Q. 15a. or 15b.    } Dialogue Writing

**SECTION C (3x15=45 marks)**

**Answer any three questions**

- Q.16. Essay from Poetry  
Q.17. Essay from Poetry  
Q.18. Essay from Usage of Hindi in Computer  
Q.19. Essay from Translation Theory  
Q.20. Translation from Hindi to English

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**PART – I HINDI  
COMMON FOR UG (BA/B.Sc.)**

**SEMESTER III - PAPER III  
ULHNC20 - HINDI PAPER- III  
(ANCIENT AND MEDIEVAL POETRY, NOVEL AND APPLIED GRAMMAR)**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II/III	ULHNC20	Hindi Paper- III	Theory	Language	6	3	40+60

**COURSE OBJECTIVES**

1. To appreciate the ancient and medieval Hindi poetry.
2. To enhance critical thinking, imagination, self and social awareness through the study of novels and poetry.
3. To understand the culture of our nation and to facilitate national integration.
4. To enhance effective communication skills.
5. To create an awareness of the distinct features of each era of ancient Hindi literature.

**COURSE OUTCOMES (CO)**

On completion of the course, the students will be able to

1. Evaluate different forms of literature.
2. Cultivate the habit of critical and creative thinking.
3. Communicate effectively in Hindi in day to day life.
4. Explain the social background, the trends, the famous poets and their works during the first three periods of the history of Hindi literature.
5. Acquire positive social values through the study of novels.

**CO/PO MAPPING**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	H	L	H	M
CO2	M	H	H	M	H	M
CO3	H	M	H	L	M	H
CO4	H	H	M	M	H	M
CO5	H	H	M	M	H	H

H – High (3)

M- Moderate (2)

L- Low (1)

## **SYLLABUS AND BOOKS PRESCRIBED**

### **UNIT I**

**(18Hours)**

- 1.1 Introduction to Ancient poetry: Bhakti kaal- Nirgun Bhakti: Gnanashrayi shakha and Premashrayi shakha- Sagun Bhakti: Krishna bhakti shakha and Ram bhakti shakha (K1, K2)
- 1.2 Poetry: Kabirdas ke Dohes - Introduction to Kabirdas and Gnanashrayi shakha (K1, K2, K3, K4)
- 1.3 General information about Aadi kaal: Social background, trends and famous poets and their works. (K1)
- 1.4 Literary Study on the representative poets: 1. Chand Bardai, 2. Vidyapati (K1, K2)
- 1.5 Muhavare Aur Lokoktiyan: Meanings only (1-30) (K1)
- 1.6 Applied grammar: Synonyms (Pariyayvachi shabd), Antonyms (Vilom shabd) (K1, K2)

### **UNIT II**

**(18Hours)**

- 2.1 Poetry: Soordas ke pad - Introduction to Vatsalya samrat Soordas and Krishna bhakti shakha (K1, K2, K3, K4)
- 2.2 Poetry: Meera Bai ke pad - Introduction to Meerabai and Krishna bhakti (K1, K2, K3, K4)
- 2.3 Literary Study on the representative poet: Amir Khusro (K1, K2)
- 2.4 Muhavare Aur Lokoktiyan: Meanings only (31-60) (K1)
- 2.5 Applied Grammar: Words with different meanings (Bhinn arth wale shabd), One word Substitution (Anek shabdon ke liye ek shabd) (K1, K2)
- 2.6 Novel: Introduction to Hindi Novel Literature - Literary study on Mamta Kaliya (K1)

### **UNIT III**

**(18Hours)**

- 3.1 Poetry: Tulsidas - Vinay Ke Pad – Introduction to Tulasidas and Ram bhakti shakha (K1, K2, K3, K4)
- 3.2 Novel: Daud by Mamta Kaliya (Non-detailed) (K1, K2, K3, K4)
- 3.3 Literary Study on the representative poet: Malik Mohammed Jayasi (K1, K2)
- 3.4 Poetics: General information on Alankar - Definitions and Examples of Anupras, Slesh, Yamak, Upma, Roopak, Uthpresha (K1, K2)
- 3.5 Muhavare Aur Lokoktiyan - Meanings only (61-90) (K1)
- 3.6 Applied Grammar: Synonyms (Pariyayvachi shabd), Antonyms (Vilom shabd) (K1, K2)

## **UNIT IV**

**(18Hours)**

- 4.1 Poetry: Rahim ke dohe (K1, K2, K3, K4)
- 4.2 Novel: Daud by Mamta Kaliya (K1, K2, K3, K4)
- 4.3 General information on Reethikaal - Literary Study on the representative poets:  
Keshav Das, Ghananand (K1, K2)
- 4.4 Poetics: General information on Chhand - Definition and Examples of Doha, Sorata, Chaupayee (K1, K2)
- 4.5 Muhavare Aur Lokoktiyan: Meanings only (91-120) (K1)
- 4.6 Applied grammar: Words with different meanings (Bhinn arth wale shabd), One word Substitution (Anek shabdon ke liye ek shabd) (K1, K2)

## **UNIT V**

**(18Hours)**

- 5.1 Poetry: Bihari Ke Dohe - Reetikaal - its trends and Introduction to Biharilal (K1, K2, K3, K4)
- 5.2 Poetry: Thiruvalluvar Ke Thirukkural - Introduction to Thirualluvar and Thirukkural (K1, K2, K3, K4)
- 5.3 Poetics: General information on Ras - Types of Ras (K1)
- 5.4 Poetics: Definition and Examples of Shringaar Ras, Veer Ras, Hasya Ras (K1, K2)
- 5.5 Muhavare Aur Lokoktiyan: Meanings only (121-150) (K1)
- 5.6 Applied Grammar: Spell Check (Shudh Roop) (K1)

## **TEXT BOOKS**

1. Collection of Poems by the Department of Hindi, Auxilium College, Vellore- 6
2. 'DAUD' - Mamta Kaliya, Vaani Prakashan, New Delhi, 2008

## **BOOKS FOR REFERENCE**

1. Hindi Sahitya Yug Aur Pravarthiyam- Dr. Shivakumar Sharma, Ashok Prakashan, Delhi- 6, 2001.
2. Hindi Ke Prachin Prathinidhi Kavi, Dwarika Prasad Saxena, Vinod Putak Mandir, Agra, 2001.
3. Hindi Rooprachana Part-2, Acharya Jayendra Trivedi, Lok Bharathi Prakashan, Illahabad-2, 2001.
4. Hindi Sahitya ka doosra Ithihas - Dr. Bachan Singh, Radhakrishna Prakashan, New Delhi, 2000
5. Kavyang (Kavye Ras, Alankar avem Chhand) - Dr. Krishnadev Jhaari, Parag Prakashan, 2010.

## **OER**

1. <https://www.youtube.com/watch?v=UhomK8okTKw>
2. <https://www.youtube.com/watch?v=OxzVwF6Anzw>
3. <https://www.youtube.com/watch?v=ydvLiPd01LE>

**QUESTION PAPER PATTERN**  
**PART I – HINDI**  
**SEMESTER – III**  
**ULHNC20- HINDI PAPER- III**  
**(ANCIENT AND MEDIEVAL POETRY, NOVEL AND APPLIED GRAMMAR)**

**Section A (10x2 = 20 marks)**

Short Answer Type Questions

Q. No. 1- 5 from Poetry

Q.No. 6- 10 from History of Hindi Literature

**Section B (5x7 = 35marks)**

**Answer three annotations (Either or)**

Q. 11a. or 11b. }  
Q. 12a. or 12b. } Annotations from Ancient Poetry  
Q. 13a. or 13b. }

Q. 14a. or 14b. Short Notes on Alankar, Ras, Chandh (any 2)

Q. 15a. or 15b. Meanings of 7 Idioms and Proverbs out of 9

**Section- C (3x15 = 45 marks)**

**Answer any three questions.**

Q.16 Essay from Poetry

Q.17 Essay from Poetry

Q.18 Short notes on 2 Authors out of 4

Q.19 Essay from Novel

Q.20 Applied Grammar

- a) Synonyms – 6 words
- b) Antonyms – 6 words
- c) One Word Substitution – 6 words
- d) Different Meaning – 6 words
- e) Spell Check (Shudh roop likiye) – 6 words

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**PART – I HINDI**  
**COMMON FOR UG (BA/B.Sc.)**

**SEMESTER IV**  
**ULHND20 - HINDI PAPER- IV**  
**(ONE ACT PLAY, SHORT STORY, HISTORY OF HINDI LITERATURE (MODERN PERIOD) AND GENERAL ESSAY)**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II/IV	ULHND20	Hindi Paper- IV	Theory	Language	6	3	40+60

**COURSE OBJECTIVES**

1. To understand and reflect on the social/cultural issues through the study of short stories and one-act plays.
2. To cultivate the habit of critical thinking and analysis through the study of literature.
3. To improve communication skills and fluency in Hindi.
4. To create an awareness of the distinct features of modern Hindi literature through the writings of great authors.

**COURSE OUTCOMES (CO)**

On completion of the course, the students will be able to

1. Explain the origin and development of modern Hindi literature and the life history and works of the famous representative writers.
2. Gain a deeper understanding of different societies, social issues and human experiences through the study of modern Hindi literature.
3. Enhance the creative writing skills.
4. Communicate effectively in Hindi in their day to day life.
5. Develop the skills to interpret and critically analyze the themes and messages in the selected plays and stories.

**CO/PO MAPPING**

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	L	H	M
CO2	H	M	M	M	H	M
CO3	M	H	M	L	M	H
CO4	H	M	H	L	M	H
CO5	M	H	M	M	H	M

H – High (3)

M- Moderate (2)

L- Low (1)

## **SYLLABUS AND BOOKS PRESCRIBED**

### **UNIT I**

**(18 Hours)**

- 1.1. Introduction to One act play: Origin and development (K1)
- 1.2. Principles of One Act Play: Plot, Character sketch, Conversation and Language style, Stage direction, Aim etc (K1, K2, K3)
- 1.3. One act play: Charumitra - Ramkumar Varma (K1, K2, K3, K4)
- 1.4. Literary study on the representative writer: Ramchandra Shukla (K1, K2)
- 1.5. Applied Grammar: Case - Endings (Karak) (K1, K2, K3)
- 1.6. General Essay: Favourite Poet/Favourite Book (K1, K2)

### **UNIT II**

**(18 Hours)**

- 2.1 Introduction to Short Story: Origin and development (K1)
- 2.2 Short story: Kafan – Premchand (Non-detailed) (K1, K2, K3, K4)
- 2.3 One act play: Das Hazar - Udayshankar Bhatt (K1, K2, K3, K4)
- 2.4 Introduction to Devanagari Lipi (K1, K2)
- 2.5 Literary study on the representative writer: Hazari Prasad Dwivedi (K1, K2)
- 2.6 General Essay: Literature and Society (K1, K2)

### **UNIT III**

**(18 Hours)**

- 3.1 One act play: Raksha Bandhan - Harikrishna Premi (K1, K2, K3, K4)
- 3.2 Short Story: Akeli – Mannu Bandari (Non-detailed) (K1, K2, K3, K4)
- 3.3 Literary study on the representative writer: Jainendra Kumar (K1, K2)
- 3.4 Devanagari Lipi – Features (K1, K2)
- 3.5 Applied Grammar: Usage of Case – Endings in Sentences (K2, K3)
- 3.6 General Essay: Environment Pollution (K1, K2)

### **UNIT IV**

**(18 Hours)**

- 4.1 One act play: Ek Din- Lakshmi Narayan Mishra (K1, K2, K3, K4)
- 4.2 Short story: Chief Ki Davat - Bheeshma Sahni (Non-detailed) (K1, K2, K3, K4)
- 4.3 Literary study on the representative writer: Krishna Sobthi (K1, K2)
- 4.4 Devanagari Lipi – Errors (Trutiyam) (K1, K2)
- 4.5 General Essay: Women Empowerment (K1, K2)
- 4.6 General Essay: Science and Life (K1, K2)

## **UNIT V**

**(18 Hours)**

- 5.1 Short story: Biradari Bahar - Rajendra Yadav (Non-detailed) (K1, K2, K3, K4)
- 5.2 Literary study on the representative writer: Mohan Rakesh (K1, K2)
- 5.3 Literary study on the representative writer: Vishnu Prabhakar (K1, K2)
- 5.4 Devanagari Lipi – Standard Form (Manak roop) (K2, K3)
- 5.5 Applied Grammar: Case- Endings and Pronoun (K2, K3)
- 5.6 General Essay: National Language Hindi (K1, K2)

## **TEXT BOOKS**

1. Gadya Nikash, Ed. Shaik Abdul Wahab, Sanrachna Prakashan, Allahabad, 2018.

## **BOOKS FOR REFERENCE**

1. Srikrishna Pandey - Samanya Hindi Vyakaran Tatha Rachna, Lokmangal Prakashan, Delhi -93, 2014.
2. Hindi Sahitya Yug Aur Pravarthiyam- Dr. Shivakumar Sharma, Ashok Prakashan, Delhi- 6, 2001.
3. Aadhunik Hindi Sahitya Ka Ithihas, Dr. Bacchan Sinh, Lokabharathi Prakashan, Allahabad, 2016.
4. Hindi Ke Prathinidhi Ekankikar, Dwarika Prasad Saxena, Vinod Putak Mandir, Agra, 2001.
5. Dr. Bolanath Tiwari – Hindi Bhasha Aur Nagari Lipi, Bharathi Prakashan, Allahabad, 1996.

## **OER**

1. <https://www.youtube.com/watch?v=OAJrlaefbNY>
2. <https://www.youtube.com/watch?v=bS-ro-FOwHo>
3. <https://www.youtube.com/watch?v=oT7Kx0hjK-4>

**QUESTION PAPER PATTERN**  
**PART I – HINDI**  
**SEMESTER – IV**  
**ULHND20- HINDI PAPER- IV**  
**(SHORT STORY, ONE ACT PLAY, HISTORY OF HINDI LITERATURE (MODERN PERIOD) AND GENERAL ESSAY)**

**Section – A (10x2 = 20 marks)**

Q.1- Q.3 (from One Act Play)

Q.4- Q.6 (from Short Story)

Q.7 – Q.10 (from Authors)

**Section – B (5x7= 35 marks)**

**Answer three annotations (Either or)**

Q. 11a. or 11b. }  
Q. 12a. or 12b. } Annotations from One Act Play  
Q. 13a. or 13b. }

Q. 14a. or 14b. Fill up with suitable Karak (Case - endings) (7 sentences)

Q. 15a. or 15b. Match the following: Author - Works (7)

**Section – C (3x15 = 45 marks)**

**Answer any three questions.**

Q.16. Essay from One Act Play

Q.17. Essay from Short Story

Q.18. Literary notes on 2 authors out of 4

Q.19. Essay from Devanagari Lipi

Q.20. General Essay (1 out of 3)

**SEMESTER - I**  
**ULFRA20 - FRENCH PAPER –I**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> ULFRA20	<b>Title of the Course:</b> <b>French Paper –I</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b>	<b>Credits</b> 3	<b>Marks</b> 100
<b>Sem: I</b>							

**COURSE OUTCOMES:**

**Course Outcomes**

<b>COs</b>	<b>Statements</b>	<b>Bloom's Level</b>
<b>CO1</b>	express self and participate in conversations on familiar topics	<b>L1</b>
<b>CO2</b>	communicate in contexts relevant to oneself, others, work place and place of study	<b>L1</b>
<b>CO3</b>	recognize and use culturally appropriate vocabulary, expressions and gestures when participating in everyday interactions	<b>L3</b>
<b>CO4</b>	Demonstrate knowledge of the grammatical structures of French	<b>L2</b>
<b>CO5</b>	Construct simple texts on familiar topics like family, city and personal interests	<b>L3</b>

**SYLLABUS :**

**UNIT I** : LUCILLE (4 LESSONS ) (PAGES 8-24)+WORK BOOK  
Dire son nom et demander le nom de quelqu'un ,compter  
Jusqu'a 19, nommer les objets de son sac, faire  
Connaissances avec des nouveaux copains ,fabriquerune  
Affiche pour presenter sabande de copains

**UNIT II** : XAVIER (4 LESSONS) (PAGES 26-34) + WORK BOOK  
Dire cequ'on aime et cequ'on deteste, poser des questions,  
Demander et donner une explication, nommer les jours de  
La semaine, organiser un sondage dans la classe

**UNIT III** : LISE ET LEA (4 LESSONS ) (PAGES 36-48) +  
WORK BOOK  
Demander et dire son age, decrire des personnes, decrire  
Des vetements, parler des ressemblances et des differences,  
ecrireunereponse et y repondre, creer un vetement original

**PRESCRIBED TEXT BOOK: ADOSPHERE 1 + CAHIER D'EXERCICES (EXERCICE  
WORK BOOK), Celine Himber et al., Hachette , Paris , 2011**

**BOOKS FOR STUDY: EDITO -A 1, Alcaraz Marion et al, Didier, Paris 2016**

**L'Atelier ,Cocton Marie-Noelle et al., Didier, Paris 2019**

**SEMESTER - II**  
**ULFRB20 - FRENCH PAPER –II**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> ULFRB20	<b>Title of the Course:</b> <b>French Paper –II</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>  100
<b>Sem:</b> <b>II</b>							

**Course Outcomes**

<b>COs</b>	<b>Statements</b>	<b>Bloom's Level</b>
<b>CO1</b>	Express oneself and provide personal details using simple connectors	<b>L1</b>
<b>CO2</b>	Comprehend and apply vocabulary related to family, transport, daily activities	<b>L3</b>
<b>CO3</b>	Communicate orally and in written form in limited social situations	<b>L2</b>
<b>CO4</b>	demonstrate knowledge of cultural differences	<b>L2</b>
<b>CO5</b>	apply basic grammatical structures to write simple texts	<b>L3</b>

**SYLLABUS:**

**UNIT I** : Loic( 4 lessons ) (PAGES 50-60) + WORK BOOK  
Echanger sur les sports qu'on pratique, dire pourquoi on fait du sport, poser des questions , presenter un sportif, Le verbe faire, les adjectifs possessifs, les articles Contractes.

**UNIT II** : Imane( 4 lessons) (PAGES (61-71) + WORK BOOK  
Chez + pronom tonique, les articles definis, indefinis, ou et Quand, quelques prepositions et adverbs, dire ou on habite, demander et indiquer un chemin, parler des lieux dans la Ville, parler de ses deplacements.

**UNIT III** : OSCAR ( 4 LESSONS) (PAGES (74-84)+ WORK BOOK  
Proposer , accepter une proposition, demander et dire de l' Heure, indiquer des horaires, parler des ses activites Quotidiennes, donner des instructions et des conseils, Le verbe venir, les verbes pronominaux, l'imperatif

**PRESCRIBED TEXT BOOK: ADOSPHERE 1+ CAHIER D'EXERCICES (EXERCICE WORK BOOK) , Celine Himber et al., Hachette , Paris , 2011**

**BOOKS FOR STUDY: EDITO -A 1, Alcaraz Marion et al, Didier, Paris 2016**

**L'Atelier ,Cocton Marie-Noelle et al., Didier, Paris 2019**

**SEMESTER - III**  
**ULFRC20 - FRENCH PAPER –III**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> ULFRC20	<b>Title of the Course:</b> <b>French Paper –III</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>  100
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**Course Outcomes**

<b>COs</b>	<b>Statements</b>	<b>Bloom's Level</b>
<b>CO1</b>	Express a wish and talk about vacations	<b>L1</b>
<b>CO2</b>	Comprehend and apply the prepositions of places and talk about transport	<b>L3</b>
<b>CO3</b>	Communicate in a polite manner and ask appropriate questions	<b>L2</b>
<b>CO4</b>	Demonstrate the ability to speak about favourite animals, friends, family	<b>L2</b>
<b>CO5</b>	apply the futur tense to talk about projects	<b>L3</b>

**SYLLABUS:**

- UNIT I** : ALICE ( 4 LESSONS) (PAGES 85-96)+WORK BOOK  
Le verbe aller, les prepositions devant les noms de Pays et des villes, les prepositions de lieux, Telephoner, parler de sa famille, parler des Caracteristiques d'un pays, parler des transports
- UNIT II** : SAMUEL ( 4 LESSONS) (PAGES 97-108)+WORK BOOK  
Faire des projets des vacances, exprimer un souhait  
Faire une demande polie, parler des animaux  
Preferes, poser des questions avec quel/quels, le Futur proche
- UNIT III** : ETIENNE ( 4 LESSONS ) (PAGES 14-23)+WORK BOOK  
Parler de sa nationalite, de ses origins, decrire ton Caractere et celui de tes copains, parler de ta vie au College et ton emploi du temps, poser des questions

**PRESCRIBED TEXT BOOK: ADOSPHERE I ( 2 MODULES )+ 1 MODULE OF BOOK 2, Celine Himber et al., Hachette , Paris , 2011**

**BOOKS FOR STUDY: EDITO -A 1, Alcaraz Marion et al, Didier, Paris 2016**

**L'Atelier ,Cocton Marie-Noelle et al., Didier, Paris 2019**

**SEMESTER - IV**  
**ULFRD20 - FRENCH PAPER –IV**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> ULFRD20	<b>Title of the Course:</b> <b>French Paper –IV</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b>	<b>Credits</b> 3	<b>Marks</b> 100
<b>Sem:</b> <b>IV</b>							

**Course Outcomes**

<b>COs</b>	<b>Statements</b>	<b>Bloom's Level</b>
<b>CO1</b>	Present our house and describe our ideal room	<b>L1</b>
<b>CO2</b>	<b>Narrate your passions and write a poem</b>	<b>L 2</b>
<b>CO3</b>	Ability to compose a menu and write a original recipe in French	<b>L2</b>
<b>CO4</b>	Describe the physical traits of a person	<b>L3</b>
<b>CO5</b>	Understand money matters and how to spend pocket money	<b>L1</b>

**SYLLABUS:**

**UNIT I** : Manon ( 4 lessons ) (pages 26-36)+ WORK BOOK  
Localiser dans l'espace, exprimer un desir, faire visiter ta Maison, decrire ta chamber, retrouver un objet perdu, ecire Un poeme, imaginer ta chamber ideale

**UNIT II** : ANTOINE ( 4 LESSONS) (PAGES 37-47)+ WORK BOOK  
Compter 70 a 100, faire des achats, parler de ton argent de poche, de tesdepenses, parler de ses passions, acheter un Cadeau pour un camarade, commencer une collection, organizer un vide grenier dans la classe

**UNIT III** : AKIKO ( 4LESSONS) (PAGES 49-59)+WORK BOOK  
Exprimerunequantite, parler de ton alimentation, faire des Recommendations, faire uneliste des courses ,organiser Un pique-nique, creerunerecetteoriginale, composer un Repas

**PRESCRIBED TEXT BOOK: ADOSPHERE 2, Celine Himber et al., Hachette , Paris , 2011**  
**BOOKS FOR STUDY: EDITO -A 1, Alcaraz Marion et al, Didier, Paris 2016**

**L'Atelier ,Cocton Marie-Noelle et al., Didier, Paris 2019**

**SEMESTER - I**  
**ULURA20 – URDU PAPER - I**  
**PROSE, GRAMMAR & LETTER WRITING**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> ULURA20	<b>Title of the Course:</b> Prose, Grammar & Letter Writing	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b>	<b>Credits</b> 3	<b>Marks</b> 100
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**Course Objectives**

1. To promote students' proficiency in the basics of Urdu.
2. To accelerate their zeal to cultivate Writing Skills.
3. To strengthen their reading and receptive skills.

**Course Learning Outcomes (CLO)**

1. Students will acquire the required academic efficiency
2. They will be learning the techniques of exemplary writing.
3. They will develop ability to foster fast reading of Texts.

**Unit – I**

1. Sair Pahlay Darwesh Ki – Meer Amman Dehalvi
2. Umeed Ki Khushi – Sir Syed
3. Letter To The Principal Seeking Leave

**Unit – II**

1. Mirza Ghalib Ke Akhlaq Wa Adat – Moulana hali
2. Zubaida Khatoon – Abdul Haleem Sharar
3. Zameer Auruskikhismien
4. Letter To The Manager Of A Firm Seeking Employment

**Unit – III**

1. Noor Jhan – Mohamed Hussain Azad
2. Sawere Jo Kal Ankh Meri Khuli – Patras Bukhari
3. Sifat Auruskikhimein
4. Letter To A Publisher Of Book Seller Placing Order For Books

**Unit – IV**

1. Khud Gharaz Dost – Duputi Nazeer Ahmed
2. Sir Syed Marhoom Aur Urdu Literature – Allama Shibli
3. Letter To The Father / Guardian Asking Money For Payment Of College Fees

**Unit – V**

1. Letter To A Friend Inviting Him To Your Sister's Marriage
2. Sifat Auruskikhim
3. Fe'l Auruskikhimein
4. Lawazim-E-Isim
5. Alamat-E-Fael "Nay" Aur Alamat-E-Mafo'ol "Ko" Kequaide

**Text Books**

1. BOOK PRESCRIBED: "ADAB-E-JAMEEL"

Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam.

**SEMESTER - II**  
**ULURB20 – URDU PAPER - II**  
**MANZOOMATH, GHAZALIATH & TRANSLATION**

<b>Year:</b> I	<b>Course Code:</b> ULURB20	<b>Title of the Course:</b> Manzoomath, Ghazaliath & Translation	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b>	<b>Credits</b> 3	<b>Marks</b> 100
<b>Sem:</b> II							

**Course Objectives**

1. To enhance students' creative thinking.
2. To trigger the literary skills dormant in them.
3. To train them to advance their Translation Skills.

**Course Learning Outcomes (CLO)**

1. Students will be able to expand the frontiers of their creative intellect.
2. Their fascination for Literature will get doubled or tripled.
3. The translation skills will help them professionally.

**Unit – I**

1. Nagma-E-Hasrath – Akbar Allahbadi
2. Meer Taqi Meer - Hasthiapnihabbab Ki Si Hai
3. Khaja Meer Dard - Tohmaten Chand ApneZimmz Dhar Chale

**Unit – II**

1. Qaumi Geeth – Allama Iqbal
2. Shaik Ibrahim Zauq - Layihayathaayeqaza Le Chali
3. Mirza Ghalib - Dil Hi To Hai Na Sang WaKhisht

**Unit – III**

1. Nisar Main Teri Galiyon Ke – Faiz Ahmed Faiz
2. Momin Khan Momin - Adam Mein Rehthe
3. Jigar Muradabade - Dil Gaya RonaqHayathGayi

**Unit – IV**

1. Wo Nabion Mein Rahmath Laqab Pane Wala - Masaddas Hali
2. Firaq - Sar Mein Soudabhinahin
3. Kawish Badri - Az Sare Nav Fikr Ka Aaghaaz Karna Chahiye
4. A General Passage Translation from English to Urdu

**Unit – V**

1. Taj Mahal – Sahirludhyanwi
2. Shakir Naithi - Shahid Maqsood Ek Din Rubaroo Ho Jayega
3. Parveen - Chalna Ka HosalaNaye
4. A General Passage Translation from English to Urdu

**Text Books**

BOOK PRESCRIBED: “ADAB-E-JAMEEL” Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam

**SEMESTER - III**  
**ULURC20 – URDU PAPER - III**  
**AFSANA, MAZMOON NAWESI & MUKALAMA NIGARI**

<b>Year:</b> <b>I</b>	<b>Course</b> <b>Code:</b> ULURC20	<b>Title of the Course:</b> Afsana, Mazmoon Nawesi & Mukalama Nigari	<b>Course</b> <b>Type:</b> Theory	<b>Course</b> <b>Category:</b> Core	<b>H/W</b>	<b>Credits</b> <b>3</b>	<b>Marks</b>  100
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**Course Objectives**

1. To arouse interest for Non-Detailed Texts.
2. To equip them with ample knowledge to pen their own articles.
3. To instill in them a flair for translation.

**Course Learning Outcomes (CLO)**

1. Students will care more for Non-Detailed Texts on par with Detailed Texts.
2. They will sharpen necessary skills to draft essays on varied themes.
3. They will succeed in their official routine with their ability to translate.

**Unit – I**

- 1.Kafan – Prem Chand
- 2.Jamun Ka Ped – Krishan Chander

**Unit – II**

- 1.Khush Naseeb – Ali Akbar Amburi
- 2.Dard Ka Ehsas – Ameerunnisa

**Unit – III**

- 1.Bhola – Rajender Singh Bedi
- 2.Naya Qanoon – Saadath Husain Manto

**Unit – IV**

- 1.Noor-O-Nar – Ali Abbas Hussani
- 2.Aakhr Paisa Bach Hi Gaya – B.S.Ramaiya

**Unit – V**

- 1.Guldasta-E-Mazameen-O-Inshapardazi By **Mohammed Arif Khan**
2. A General Passage For Translation From Urdu To English

**Text Books**

BOOK PRESCRIBED: “ADAB-E-JAMEEL” Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam.

**SEMESTER - IV**  
**ULURD20 – URDU PAPER - IV**  
**DRAMA, RUBAYIATH & HISTORY OF URDU LITERATURE**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> ULURD20	<b>Title of the Course:</b> Drama, Rubayiath & History Of Urdu Literature	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b>	<b>Credits</b> 3	<b>Marks</b> 100
<b>Sem:</b> <b>IV</b>							

**Course Objectives**

1. To promote students' knowledge of various literary genres like Drama.
2. To effectuate their caliber to pen poems of their own.
3. To motivate them to build lively conversations.

**Course Learning Outcomes (CLO)**

1. Students will learn to excel in the art of reading Plays.
2. They will hoan their faculty of imagination.
3. They will emerge as exponents of good conversation.

**Unit – I**

1. Darwazakholdo-Krishan Chander [First Quarter]
2. Agoosh-E- Lihad Mein Jab Ke Sona Hoga - Anees
3. Gulshan Mein Phiroou–Anees
4. Meer Taqi Meer

**Unit – II**

1. Darwazakholdo-Krishan Chander [Second Quarter]
2. GhafLatKihansihse Aah BharnaAcha –AkberAllahbadi
3. Har Ek Se Sun NayeFasana Ham Ne – Aker Allahbadi
4. Mirza Ghalib

**Unit – III**

1. Darwazakholdo-Krishan Chander [Third Quarter]
2. Gunche Teri Zindagi Pe DilHalth Hai -- Josh
3. Gunche Teri Zindagi Pe DilHalth Hai – Josh
4. Sir Syed Ahmed Khan

**Unit – IV**

1. Darwaza kholdo-Krishan Chander [Last Quarter]
2. Mufliis Hun Na Dowlath Hai Na Sermaya Hai --Amjad
3. Is Naam Ki Zindagi Mein KuchJaan To Ho – Amjad
4. Moulana Hali
5. Prem Chand

**Unit – V**

1. Roshan Nahi Karta JalaDethe Hain –Asghar Vellori
2. DhoondaThoKithabon Mein Sadaqath Na Mili –Asghar Vellori
3. AkberAllahbadi
4. Allama Iqbal
5. Krishan Chandar

**Text Books**

1. BOOK PRESCRIBED: “ADAB-E-JAMEEL” Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam.

**SEMESTER – I**  
**UCBAB20 – Business Mathematics and Statistics I**

<b>Year: I</b>	<b>Course Code:</b> UCBAB20	<b>Title of the Course:</b> Business Mathematics and Statistics - I	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce mathematical applications in business and management, thereby enhancing the logical thinking of the students with regard to problem solving.
2. To train the students to apply statistical techniques in business and management, thereby enhancing the decision making skills of the students.

**Course Outcomes (CO)**

The learners will be able to

**CO1:** Apply the concept of matrices in solving business problems.

**CO2:** Analyze and demonstrate differentiation skills in economics and business.

**CO3:** Apply graphical methods to interpret statistical data.

**CO4:** Apply the statistical techniques in business.

**CO5:** Solve a range of problems using the techniques covered.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	L
CO2	H	H	H	H	M	L
CO3	H	H	M	H	M	L
CO4	H	H	L	H	M	H
CO5	H	M	H	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	M	H
CO2	H	H	M	M	M	H
CO3	H	H	M	M	H	H
CO4	H	H	M	L	M	H
CO5	H	H	H	L	H	H

**(Low-L, Medium - M, High - H)**

## **Course Syllabus**

### **Unit I: Matrices**

**(15 hours)**

- 1.1. Definition, Types of matrices (K1, K2, K3, K4)
- 1.2 Matrix operations, Determinant of a matrix (K1, K2, K3, K4)
- 1.3 Singular and non-singular matrices (K1, K2, K3, K4)
- 1.4 Inverse of a matrix by co-factor method (K1, K2, K3, K4)
- 1.5 Rank of a matrix (K1, K2, K3, K4)
- 1.6 Solution of system of linear simultaneous equations using Cramer's rule (K1, K2, K3, K4)

### **Unit II: Differentiation**

**(15 hours)**

- 2.1 Differentiation (K1, K2, K3, K4)
- 2.2 Derivatives of standard functions  $x^n$ ,  $e^x$ ,  $\log x$ , constant ( without proof ) (K1, K2, K3, K4)
- 2.3 Rules of differentiation ( Addition, difference, product, quotient ) (K1, K2, K3, K4)
- 2.4 Chain rule, Successive differentiation (up to second derivative) (K1, K2, K3, K4)
- 2.5 Uses: Marginal Concepts, Elasticity of demand, Increasing and decreasing functions (K1, K2, K3, K4)
- 2.6 Maxima and minima, break - even point. (K1, K2, K3, K4)

### **Unit III: Classification and Graphical Representation**

**(15 hours)**

- 3.1 Introduction, meaning of classification, chief characteristics of classification, objects of classification rules of classification (K1, K2, K3, K4)
- 3.2 Frequency distribution, individual observations (K1, K2, K3, K4)
- 3.3 Discrete frequency distributions continuous frequency distribution (K1, K2, K3, K4)
- 3.4 Frequency distribution, graph of frequency distribution (K1, K2, K3, K4)
- 3.5 Histogram (K1, K2, K3, K4)
- 3.6 Frequency polygon, frequency curve. (K1, K2, K3, K4)

### **Unit IV: Measures of Central Tendency**

**(15 hours)**

- 4.1 Arithmetic mean (K1, K2, K3, K4)
- 4.2 Median (K1, K2, K3, K4)
- 4.3 Mode (K1, K2, K3, K4)
- 4.4 Empirical formulae, Combined and Weighted arithmetic mean (K1, K2, K3, K4)
- 4.5 Geometric mean (K1, K2, K3, K4)
- 4.6 Harmonic mean. (K1, K2, K3, K4)

### **Unit V: Measures of Dispersion and Skewness**

**(15 hours)**

- 5.1 Range (K1, K2, K3, K4)
- 5.2 Quartile deviation (K1, K2, K3, K4)
- 5.3 Mean deviation (K1, K2, K3, K4)

5.4 Standard deviation (K1, K2, K3, K4)

5.5 Karl Pearson's coefficient of skewness (K1, K2, K3, K4)

5.6 Bowley's coefficient of skewness. (K1, K2, K3, K4)

**Text Books:**

1. P. A. Navnitham - Business Mathematics and Statistics - Jai Publishers - Trichy 2007.
2. R. S. N. Pillai and Bagavathi - Statistics, 17<sup>th</sup> Edition, S. Chand and Company - New Delhi, 1984.

**Reference Books:**

1. Francis, Andy - Business mathematics and statistics. Cengage Learning EMEA, 2004.
2. Agarwal, B. M. - Business Mathematics & Statistics. Ane Books Pvt Ltd, 2009.
3. Asim Kumar Manna - Business Mathematics & Statistics. McGraw Hill Education (India) Pvt. Ltd., 2018.

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – II**  
**UCBAD20 - Business Mathematics and Statistics - II**

<b>Year: I</b> <b>SEM: II</b>	<b>Course Code:</b> UCBAD20	<b>Title of the Course:</b> Business Mathematics and Statistics - II	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce mathematical applications in business and management, thereby enhancing the logical thinking of the students with regard to problem solving.
2. To train the students to apply statistical techniques in business and management, thereby enhancing the decision making skills of the students.

**Course Outcomes (CO)**

The learners will be able to

- CO1:** Understand mathematical applications in finance.  
**CO2:** Demonstrate mathematical skills like integration required in economics and business.  
**CO3:** Comprehend critical thinking and problem solving skills in correlation and regression.  
**CO4:** Interpret numerical information that forms the basis of index numbers in business.  
**CO5:** Analyze the theoretical concepts, tools and methods of probability.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	L
CO2	H	H	H	H	M	L
CO3	H	H	M	H	M	L
CO4	H	H	L	H	M	H
CO5	H	M	H	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	M	H
CO2	H	H	M	M	M	H
CO3	H	H	M	M	H	H
CO4	H	H	M	L	M	H
CO5	H	H	H	L	H	H

**(Low - L, Medium - M, High - H)**

## Course Syllabus

### Unit I: Mathematics of Finance

(15 hours)

- 1.1 Mathematics of finance (K1, K2, K3, K4)
- 1.2 Simple and Compound interest (K1, K2, K3, K4)
- 1.3 Discount on bills (K1, K2, K3, K4)
- 1.4 Pay roll wages (K1, K2, K3, K4)
- 1.5 Commission (K1, K2, K3, K4)
- 1.6 Annuities (K1, K2, K3, K4)

### Unit II: Integration

(15 hours)

- 2.1 Integration, Indefinite integrals, Standard forms (K1, K2, K3, K4)
- 2.2 Integration of  $x^n$ ,  $\frac{1}{x}$ ,  $e^x$  (K1, K2, K3, K4)
- 2.3 Basic theorems on integration, Integration (K1, K2, K3, K4)
- 2.4 Integration by substitution ( $ax+b$ ,  $e^{ax+b}$ ,  $f'(x)/f(x)$ )(K1, K2, K3, K4)
- 2.5 Integration by partial fractions (K1, K2, K3, K4)
- 2.6 Integration by parts, Uses of Economics. (K1, K2, K3, K4)

### Unit III: Correlation and Regression

(15 hours)

- 3.1 Correlation (K1, K2, K3, K4)
- 3.2 Karl Pearson's coefficient of correlation (K1, K2, K3, K4)
- 3.3 Spearman's rank correlation (K1, K2, K3, K4)
- 3.4 Regression (K1, K2, K3, K4)
- 3.5 Simple regression equations (K1, K2, K3, K4)
- 3.6 Regression coefficients. (K1, K2, K3, K4)

### Unit IV: Index Numbers

(15 hours)

- 4.1 Various methods of construction of index numbers, Unweighted index numbers. (K1, K2, K3, K4)
- 4.2 Weighted index numbers, Quantity index numbers, Value index numbers (K1, K2, K3, K4)
- 4.3 Test of consistency of index numbers, Time reversal test, Factor reversal test (K1, K2, K3, K4)
- 4.4 Chain base and fixed base index numbers (K1, K2, K3, K4)
- 4.5 Base shifting, Consumer price index (K1, K2, K3, K4)
- 4.6 Aggregate method, Family budget method. (K1, K2, K3, K4)

### Unit V: Probability

(15 hours)

- 5.1 Permutation and Combination (K1, K2, K3, K4)
- 5.2 Trial, Event, Sample space (K1, K2, K3, K4)

- 5.3 Mutually exclusive events, Exhaustive events, Independent events (K1, K2, K3, K4)
- 5.4 Classical definition of probability, Axiomatic definition of probability (K1, K2, K3, K4)
- 5.5 Addition and multiplication theorems (without proof) (K1, K2, K3, K4)
- 5.6 Problems (K1, K2, K3, K4)

**Text Books:**

- 1. P. A. Navnitham - Business Mathematics and Statistics - Jai Publishers - Trichy 2007.
- 2. R. S. N. Pillai and Bagavathi - Statistics, 17<sup>th</sup> Edition, S. Chand and Company, New Delhi, 1984
- 3. P. R. Vittal - Business Mathematics, 1<sup>st</sup> Edition - Margham Publications, Chennai, 1995.

**Reference Books:**

- 1. Francis, Andy - Business mathematics and statistics. Cengage Learning EMEA, 2004.
- 2. Agarwal, B. M. - Business Mathematics & Statistics. Ane Books Pvt. Ltd., 2009.
- 3. Asim Kumar Manna - Business Mathematics & Statistics. McGraw Hill Education (India) Pvt. Ltd., 2018.

**e-Resources:**

- 1. <https://nptel.ac.in>
- 2. [www.coursera.org](http://www.coursera.org)
- 3. <https://swayam.gov.in>

**SEMESTER – III**  
**UCBAG20 – Operations Research I**

<b>Year: II</b> <b>SEM: III</b>	<b>Course Code:</b> UCBAG20	<b>Title of the Course:</b> <b>Operations Research I</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 6	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the use of quantitative methods and techniques for effective decision making
2. To provide a detailed knowledge about mathematical, transportation and assignment models.
3. To analyse any real life system with limited constraints and depict it in a model form.
4. To examine the aspects of business and marketing with respect to operations research.

**Course Outcomes (CO)**

The learners will be able to

**CO1:** Understand and solve linear programming problems.

**CO2:** Identify and develop the operational research models such as graphical and simplex method.

**CO3:** Comprehend advanced linear programming problems using Big M method.

**CO4:** Construct and solve transportation models and assignment models.

**CO5:** Analyze and evaluate assignment models.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	L
CO2	H	M	H	M	L	H
CO3	H	M	H	H	H	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	M	H
CO2	H	H	M	M	M	H
CO3	H	H	M	M	H	H
CO4	H	H	M	L	M	H
CO5	H	H	H	L	H	H

**(Low-L, Medium - M, High - H)**

## **Course Syllabus**

### **Unit I: Introduction and Mathematical Formulation (18 hours)**

- 1.1 Operations research: Definition (K1, K2, K3, K4)
- 1.2 Scope, Characteristics (K1, K2, K3, K4)
- 1.3 Models of operations research: Iconic (K1, K2, K3, K4)
- 1.4 Analogue, Symbolic model (K1, K2, K3, K4)
- 1.5 Linear programming (K1, K2, K3, K4)
- 1.6 Formulation. (K1, K2, K3, K4)

### **Unit II: Linear Programming (18 hours)**

- 2.1 Linear Programming: Graphical method (problems: part I) (K1, K2, K3, K4)
- 2.2 Graphical method (problems: part II) (K1, K2, K3, K4)
- 2.3 Graphical method (problems: part III) (K1, K2, K3, K4)
- 2.4 Regular simplex Method (problems: part I) (K1, K2, K3, K4)
- 2.5 Regular simplex Method (problems: part II) (K1, K2, K3, K4)
- 2.6 Regular simplex Method (problems: part III) (K1, K2, K3, K4)

### **Unit III: Linear Programming (18 hours)**

- 3.1 Linear programming: Big 'M' method (problems part I) (K1, K2, K3, K4)
- 3.2 Big 'M' method (problems part II) (K1, K2, K3, K4)
- 3.3 Big 'M' method (problems part III) (K1, K2, K3, K4)
- 3.4 Duality (problems part I) (K1, K2, K3, K4)
- 3.5 Duality (problems part II) (K1, K2, K3, K4)
- 3.6 Duality (problems part III) (K1, K2, K3, K4)

### **Unit IV: Transportation Model (18 hours)**

- 4.1 Transportation Problem (K1, K2, K3, K4)
- 4.2 Initial basic feasible solution using North West Corner rule(K1, K2, K3, K4)
- 4.3 Initial basic feasible solution using least cost method and Vogel's approximation method (K1, K2, K3, K4)
- 4.4 Degeneracy, Unbalanced Transportation problem (K1, K2, K3, K4)
- 4.5 Maximization problem(K1, K2, K3, K4)
- 4.6 Test of Optimality using MODI method (K1, K2, K3, K4)

### **Unit V: Assignment Model (18 hours)**

- 5.1 Assignment problems (K1, K2, K3, K4)
- 5.2 Minimal assignment problems (K1, K2, K3, K4)
- 5.3 Unbalanced Assignment problems (K1, K2, K3, K4)

5.4 Restricted Assignment problems (K1, K2, K3, K4)

5.5 Maximization problem in Assignment (K1, K2, K3, K4)

5.6 Maximization problems in Assignment Problems (K1, K2, K3, K4)

**Text Books:**

1. Premkumar Gupta and Hira D. S. - Introduction to Operations Research, 1<sup>st</sup> Edition – S.Chand Company Ltd., 1998.
2. Vittal P. R - Introduction to Operations Research, 1<sup>st</sup> Edition - Margham Publishers – 1999.

**Reference Books:**

1. Kalavathy. S - Operations Research, 2<sup>nd</sup> Edition - Vikas Publishing Ltd., 2002.
2. K. Pandian, C. Kayalvizhi - Applied Operations Research for Management, 2<sup>nd</sup> Edition, Thirumalaa Publications, 2004.

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – IV**  
**UCBAI20 – Operations Research II**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: IV</b>	UCBAI20	Operations Research - II	Theory	Core	6	6	100

**Course Objectives**

1. To improve problem solving skills of students and make them to use the skills in daily life problems
2. To improve knowledge in Sequencing Problems, Queuing theory and Network Analysis.

**Course Outcomes (CO)**

The learners will be able to

**CO1:** Utilize the concepts of Operation research in real life experiments and plan the Sequencing of jobs through machines.

**CO2:** Evaluate the critical path and project duration in CPM.

**CO3:** Compute the Probability of meeting the scheduled dates in PERT and compare CPM and PERT.

**CO4:** Acquire the solutions for Game of two players in Game theory.

**CO5:** Analyze the queuing theory for single channel problems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	L
CO2	H	M	H	M	L	H
CO3	H	M	H	H	H	L
CO4	H	H	H	H	M	L
CO5	H	H	H	H	M	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	M	H
CO2	H	H	M	M	M	H
CO3	H	H	M	M	H	H
CO4	H	H	M	L	M	H
CO5	H	H	H	L	H	H

**(Low-L, Medium - M, High - H)**

## **Course Syllabus**

### **Unit I: Sequencing Problems (18 hours)**

- 1.1 Introduction – Definition of Sequencing (K1, K2)
- 1.2 Basic steps – Job assigning through machines (K1, K2)
- 1.3 Processing n jobs through two machines (K1, K2, K3, K4)
- 1.4 Processing n jobs through three machines (K1, K2, K3, K4)
- 1.5 Processing two jobs through m machines (K1, K2, K3, K4)
- 1.6 Processing n jobs through m machines (K1, K2, K3, K4)

### **Unit II: Network Analysis: CPM Computations (18 hours)**

- 2.1 Introduction – Network diagram representation (K1, K2)
- 2.2 Rules for constructing the network (K1, K2)
- 2.3 Numbering the events – Different time Calculation (K1, K2, K3, K4)
- 2.4 CPM representation in Tabular form (K1, K2, K3, K4)
- 2.5 Total, Independent and free float Calculations (K1, K2, K3, K4)
- 2.6 Calculation of CPM and Project duration (K1, K2, K3, K4)

### **Unit III: Network Analysis: PERT Computations (18 hours)**

- 3.1 Network diagram representation (K1, K2)
- 3.2 Basic Steps in PERT (K1, K2)
- 3.3 Difference between PERT and CPM (K1, K2, K3, K4)
- 3.4 Calculation of Critical path and Project duration (K1, K2, K3, K4)
- 3.5 Probability of meeting the scheduled dates (K1, K2, K3, K4)
- 3.6 Calculation of project duration for the scheduled dates (K1, K2, K3, K4)

### **Unit IV: Game Theory (18 hours)**

- 4.1 Introduction characteristic of Games- Definition (K1, K2)
- 4.2 Meaning for Saddle points (K1, K2)
- 4.3 Game without Saddle points (K1, K2, K3, K4)
- 4.4 Games without Saddle points – Mixed Strategy
- 4.5 Basic Steps -Dominance property (K1, K2)
- 4.6 Games problems using Dominance property (K1, K2, K3, K4)

### **Unit V: Queuing Theory (18 hours)**

- 5.1 Introduction - Meaning – Queuing theory (K1, K2)
- 5.2 Various types of Queuing Model (K1, K2)
- 5.3 Single channel Queuing theory (infinite capacity only) (K1, K2, K3, K4)
- 5.4 Different formulae (without derivation) - Concepts
- 5.5 Calculation of Single Channel systems (K1, K2, K3, K4)
- 5.6 Problems solving using Queuing theory (K1, K2, K3, K4)

**Text Books:**

1. Kalavathy. S - Operations Research, 2<sup>nd</sup> Edition - Vikas Publishing Ltd., 2002.
2. Vittal P.R. - Introduction to Operations Research, 1<sup>st</sup> Edition - Margham Publishers – 1999.

**Reference Books:**

1. Premkumar Gupta and Hira D.S. - Introduction to Operations Research, 1<sup>st</sup> Edition – S.Chand Company Ltd., 1998.
2. K. Pandian, C.Kayalvizhi - Applied Operations Research for Management, 2<sup>nd</sup> Edition, Thirumalaa Publications, 2004

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

## SEMESTER – I/II

### UVEDA20 – CHRISTIAN DOCTRINE

Year:I Sem: I/II	Course Code UVEDA22	Title of the Course Christian Doctrine	Course Type Theory	Course Category	H/W 1	Credits -	Marks -
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#### Course Objectives:

1. To make the students understand the sacred liturgy as encountering Christ at various moments.
2. To introduce to the students the signs and symbols of the liturgy in order to make them participate with greater enthusiasm.
3. To develop in the students the desire to know about the importance of the seven sacraments and their significance in their life.
4. To impart to the students the knowledge about the liturgical year and its impact in Christian life.

#### Course Learning Outcomes:

1. Able to make the students value all forms of liturgy as a means to grow in their spiritual life.
2. Active participation through the signs and symbols present in the liturgy
3. Able to perceive the significance of the Sacraments received at various moments of life
4. Imbibe the knowledge about the celebration of solemnities of Our Lord's feasts, Marian feasts and feast of the apostles and saints occurring each liturgical year.

#### Unit I: Liturgy

- 1.1 Introduction – The celebration of the Christian mysteries through liturgy
- 1.2 Liturgy in the life of the Church and the individual
- 1.3 Origin of the liturgy – Essence of every liturgy – The seven sacraments of the church – sacraments of initiation, healing, communion and mission.
- 1.4 Effect of sacraments – signs and symbols of liturgy – music in the liturgy
- 1.5 Celebration of liturgical year – Impact of Sunday liturgy – liturgy of the hours

( Refer YouCat: Q.No. 166 to 192)

#### Unit II: Sacraments of initiation: Baptism & Confirmation

- 2.1 Introduction – Meaning of Baptism – Administration of Baptism
- 2.2 Requirement for baptism – adherence of the church to infant baptism
- 2.3 Baptism, the way to Salvation – Significance of Baptism – effect of Baptism
- 2.4 Confirmation – Scripture based on Confirmation – Significance of Confirmation
- 2.5 Requirement and administration of confirmation.

( Refer YouCat: Q.No. 193 to 207)

#### Unit III: Sacrament of initiation: Holy Eucharist

- 3.1 Holy Eucharist – Institution of the Holy Eucharist – Importance of the Holy Eucharist

- 3.2 Various names of the Holy Eucharist – Essential parts of the Holy mass
- 3.3 Structure of the Holy mass – Celebration of the Holy Eucharist
- 3.4 The significance of Holy Eucharist in the Church – Tabernacle – the reverence and worship due to the Lord present in the tabernacle
- 3.5 Participation of the faithful in the Holy Eucharist – Preparation of the faithful to the Holy Eucharist – Effect of Holy Eucharist in one's life.  
(Refer YouCat: Q.No. 208 to 223)

#### **Unit IV: Sacraments of Healing: Confession**

- 4.1 Introduction – Names that indicate the sacrament of confession
- 4.2 Need for the Sacrament of reconciliation – institution of the sacrament of penance
- 4.3 Preparation for the sacrament of confession - penance
- 4.4 Essential elements of confession – Significance of examination of conscience and confession of sins
- 4.5 Authority of priest over the remission of sins – positive effects of confession  
(Refer YouCat: Q.No. 224 to 239)

#### **Unit V: Sacrament of healing: Anointing of the sick**

- 5.1 Interpretation of sickness in Old Testament – Jesus' compassion towards sick
- 5.2 Church's Mission to take care of the sick
- 5.3 Significance of Sacrament of anointing of the sick
- 5.4 Administration of the anointing of the sick – effects of the anointing of the sick
- 5.5 Viaticum – the meaning and its significance  
(Refer YouCat: Q.No. 240 to 247)

#### **Books for study:**

Michael J. Miller -YouCat – Youth Catechism of the Catholic Church with a foreword by Pope Benedict XVI, Asian Trading Corporation, Bengaluru, India (2010)

#### **Books for reference:**

Catechism of the Catholic Church –published by Theological Publications in India, New Delhi (1994)

Cyril de Souza, SDB and Thomas Kalathuveetil, SDB, Introducing the Catechism of the Catholic Church, Kristu Jyoti Publications, Bangalore (1994)

Compendium: Catechism of the Catholic Church – Vaigarai Publishing house, Dindigul, South India (2006).

Laravoire, Louis Morrow, Our Catholic Faith – Revised Edition for India, Sisters of Mary Immaculate, Krishnagar, West Bengal (2002).

Morissette Herve, C.S.C., Listen to the River, Youth Catechesis in Parables on the mysteries of Faith, The Holy Cross Fathers, Bangalore (1990)

Michael J. Walsh, Commentary on the Catechism of the Catholic church, St. Pauls' Publications, Bandra, Mumbai (1996)

## SEMESTER – III/IV

### UVEDA20 – CHRISTIAN DOCTRINE

<b>Year: II</b> <b>Sem:</b> III/IV	<b>Course Code</b> UVEDA22	<b>Title of the Course</b> Christian Doctrine	<b>Course Type</b> Theory	<b>Course Category</b>	<b>H/W</b> 1	<b>Credits</b> -	<b>Marks</b> -
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#### Course Objectives:

1. To make the students understand the element of Faith in the Trinitarian God as the basic necessity for Christian living.
2. To introduce to the students the creeds that we profess in the Holy Eucharistic celebration and difference between the apostles creed and the Nicene creed
3. To develop in the students the desire to know about the existence of the Holy Spirit from the beginning of the Church and in each one's life to guide us in the right path.
4. To impart to the students the vitality of the one Holy Catholic Church and their participation and contribution towards it for its sanctity.
5. To teach the students the Ten Commandments, its implications and its demands for Christian living.

#### Course Learning Outcomes:

1. Able to make the students value the Catholic Faith received at Baptism and to deepen it.
2. Knowing the different Creeds and profess them meaningfully acknowledging their faith in the Triune God and the teachings of the Catholic Church.
3. Able to perceive the significance of the role of the Holy Spirit, the who sanctifies us, guides us and lead us Sacraments received at various moments of life
4. Imbibe the knowledge about the Ten Commandments with its implications and demands that enable to lead a life worthy of our Christian Call.

#### Unit I: Christian Profession of Faith

- 1.1 The meaning of Faith in one's life – Expression of faith in Creed – Faith in the Trinitarian God.
- 1.2 The Apostle's Creed – The Nicene Creed
- 1.3 The belief in one God – God as truth – God as love
- 1.4 God as one, in three persons – The Trinitarian God – God as Father - Jesus, the second person of the Trinity – Holy Spirit, the third person of the Trinity
- 1.5 The World-creation of God – the theory of evolution of science - Science and spirituality.**  
**(Refer YouCat: Q.No. 25 to 48)**

#### Unit II: Faith in God, the Father, Son and Holy Spirit (Trinity)

- 2.1 Belief in One God - God as Father, Creator
- 2.2 Belief in Jesus Christ, the Only Begotten Son of God - the Christ Jesus, true God and true man
- 2.3 Death and Resurrection of Jesus - Ascension

- 2.4 Belief in the Holy Spirit - Pentecost – the outpouring of the Holy Spirit on the disciples
- 2.5 Holy Spirit in the life of the Church – Holy Spirit in my life – Each individual as the temple of the Holy Spirit  
**(Refer YouCat: Q.No. 37,71-79, 113-120)**

### **Unit III: The Holy Catholic Church**

- 3.1 Church with Christ as Head – God’s presence in the Church
- 3.2 The task of the Church – The church being the people of God
- 3.3 The Church as the Body of Christ, Bride of Christ and Temple of the Holy Spirit
- 3.4 The Church being Holy, Catholic and Apostolic Church – Relation between Jews and the Church
- 3.5 Lay Vocation – Pope, the Leader of the Church – Responsibility of Pope - Infallibility of Pope  
**(Refer YouCat: Q.No. 121-143 )**

### **Unit IV: Ten Commandments (1 – 3)**

- 4.1 Introduction – Scriptural Background of the Ten commandments – Significance of the Ten Commandments
- 4.2 The First Commandment – Worship due to God – the meaning of the First Commandment - Do’s and Don’ts of the First Commandment
- 4.3 Images and Statues in the Catholic Church – its purpose and significance
- 4.4 The Second Commandment – its meaning and implications – the sign of the cross – the significance of the name given at baptism
- 4.5 The Third Commandment – Jesus’ dealing with Sabbath day – Sunday as the Lord’s day  
**(Refer YouCat: Q.No. 348-366 )**

### **Unit V: Ten Commandments (4– 5)**

- 5.1 The Fourth Commandment – Family in God’s plan of Creation – irreplaceability of families - role of families in the Church
- 5.2 The respect due to Parents – the respect due to Children – Living the Christian Faith as a family
- 5.3 God’s precedence over family – Respect to authorities in family and in state
- 5.4 The fifth commandment – the importance of preserving one’s life and that of others – the reason for church to oppose capital punishment
- 5.5 Abortion – Sin against the 5<sup>th</sup> Commandment – Right to life and human dignity
- 5.6 Protection of physical and spiritual integrity of human being – Importance to one’s health – drugs as self-destruction – Donation of organs – Christian’s duty toward the dying  
**( Refer YouCat: Q.No. 367-399 )**

**Books for study:**

Michael J. Miller -YouCat – Youth Catechism of the Catholic Church with a foreword by Pope Benedict XVI, Asian Trading Corporation, Bengaluru, India (2010)

**Books for reference:**

Catechism of the Catholic Church –published by Theological Publications in India, New Delhi (1994)

Cyril de Souza, SDB and Thomas Kalathuveetil, SDB, Introducing the Catechism of the Catholic Church, Kristu Jyoti Publications, Bangalore (1994)

Compendium: Catechism of the Catholic Church – Vaigarai Publishing house, Dindigul, South India (2006).

Laravoire, Louis Morrow, Our Catholic Faith – Revised Edition for India, Sisters of Mary Immaculate, Krishnagar, West Bengal (2002).

Morissette Herve, C.S.C., Listen to the River, Youth Catechesis in Parables on the mysteries of Faith, The Holy Cross Fathers, Bangalore (1990)

Michael J. Walsh, Commentary on the Catechism of the Catholic church, St. Pauls' Publications, Bandra, Mumbai (1996)

## SEMESTER – V/VI

### UVEDA20 – CHRISTIAN DOCTRINE

Year:III Sem: V/VI	Course Code UVEDA22	Title of the Course Christian Doctrine	Course Type Theory	Course Category	H/W 1	Credits -	Marks -
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#### Course Objectives:

1. To make the students understand marriage as sacrament and the nature of Christian marriage
2. To instill in the students the essential elements of Christian marriage and the challenges of married life
3. To inculcate to the students the sacredness of sexuality and the sexual ethics in marriage
4. To impart to the students the pastoral and practical tips for successful married life and the ways to handle conflicts in married life.
5. To teach the students the canonical and pastoral implications of marriage and annulment procedures.

#### Course Learning Outcomes:

1. Able to make the students understand the nature of the Christian marriage as Sacrament
2. Know the essential elements of Christian marriage according to the teachings of the Catholic Church and the challenges of the married life
3. Able to perceive the sacredness of sexuality in marriage and get to know about the natural family planning.
4. Imbibe the knowledge about the canonical and pastoral implications of marriage and annulment procedures.

#### Unit I:

- 1.1 What is marriage – scriptural understanding of marriage – marriage as sacrament
- 1.2 Marriage as covenant – is Christian marriage a covenant or contract?
- 1.3 Nature of Christian marriage – purpose and properties of marriage
- 1.4 Essential elements of marriage – Conjugal love – commitment that last forever
- 1.5 Marriages in India according to various religions – Salient features of married life in India – challenges of married life in India.

#### Unit II:

- 2.1 What makes a marriage into existence – what is consent – nature and object of consent
- 2.2 Defects of consent – Diriment impediments of Marriage – Canonical form of marriage.
- 2.3 Marriage and family – the plan of God for marriage and the family
- 2.4 The role of the Christian family – pastoral care of the family in difficult cases
- 2.5 Family in personal life and society – family life in Tamil culture

### **Unit III:**

- 3.1 Sexuality and Christian marriage – a vocation to unity through sex
- 3.2 Sex in marriage – the sacrament of sexuality
- 3.3 Reproductive dimension of sex - The reproductive system of male and female
- 3.4 Natural family planning – Artificial means of Birth control – Sterilization
- 3.5 Abortion – Sexual ethics – Lust – sexual life – Chastity and sex education.

### **Unit IV:**

- 4.1 Pastoral and practical tips for a successful marriage life
- 4.2 How to handle the conflicts in married life gracefully – stages of conflicts and managing the conflicts with Christian values of forgiveness and love
- 4.3 The family that prays together stays together – benefits of couple prayer
- 4.4 Stories about couples who pray together – Life examples of faithful and committed love
- 4.5 A special intimacy – conjugal harmony and happiness.

### **Unit V:**

- 5.1 Canonical and pastoral implications of marriage
- 5.2 Canonical separation – Annulment procedures
- 5.3 Annulment and divorce – dispensations
- 5.4 Favour of faith cases – about marriage tribunal
- 5.5 Practical questions regarding marriage.

### **Books for Study and Reference:**

**John Paul II**, Apostolic Exhortation, *Familiaris consortio*, 22 November 1981, St Paul's Publication, 1982, pp. 20-26; 28-88; 108-125.

**Francis I**, Post Synodal Apostolic Exhortation, *Amorislaetitia*, 19 March 2016, Carmel International Publishing House, Kerala, India, 2016.

**Grugni Antony**, *Preparing for Marriage: A Comprehensive and Practical guide for a Happy Married Life*, St Paul's Publication, Mumbai, 2013, pp. 17-23; 45-72.

**Greg – Lisa Popcak**, *Just Married – A guide to Surviving and Thriving in the early years of Marriage*, St Paul's Publication, Mumbai, 2014, pp. 59;87 -102; 103-119.

**Gene O'Brien – Judith O'Brien**, *Couples Praying – A Special Intimacy*, St Paul's Publication, Mumbai, 2008, pp.13-56.

**Albina Cruz (ed)**. *jpUkz tho;tpy; kfpo;r;rp-jpUkz jahhpg;G gapw;rp VL Family Commission Publication, Tiruchy, pp. 34- 41; 72-82.*

**Appathurai S.**, *Marriage is Forever*, St Paul's Publication, Mumbai, 2012, pp. 17-41; 65-66.

**Suresh Jagadish A.**, *Recent Doctrine and Jurisprudence on bonumfidei*, Urbaniana University, Rome, pp. 82-85.

**Pazhayampallil Thomas**, *Pastoral Guide – Moral – Canonical – Liturgical A Text Book*, KristuJyoti Publications, Bangalore, 1997, pp. 665-681; pp.696-707.

**Podimattam Felix**, *The Ethics of Sex – A Reinterpretation*, Media House, Delhi, 2007, 117-120.

**TNBC.** -, *dpa ,y; ywk; - jpUkz jahhpg; G gapw; rp>* TNBC Publication, Tiruchy, 2012, pp.50-72; 82-84.

**Greg – Lisa Popcak**, *Just Married – A guide to Surviving and Thriving in the early years of Marriage*, St Paul's Publication, Mumbai, 2014, pp. 195-197.

**Cajetan D. Menezes, Judy & Willie Mendonsa and Dr.(Mrs.) Kiran S.Coelho**, *Creative Love*, Snehalaya Family Service Centre, Mumbai (2006)

**Xavier Edayodil, SDB**, *Education to Family life for Catholic Youth – Kristu Jyoti Publications*, Bangalore (2011)

**AUXILIUM COLLEGE (Autonomous)**

**Gandhi Nagar, Vellore – 632 006.**

**SKILL BASE ELECTIVE – NCC**

**Programme Objective**

To develop character, Comradeship, Discipline, Secular Outlook, Spirit of Adventure, Sportsmanship, Ideals of Selfless service among the youth of the country

To Create a Human Resource of organized, Trained and motivated youth

To provide leadership in all walks of life and always be available for the service of the Nation

To provide a suitable environment and to motivate the youth to take up a career in the Armed Forces.

**Programme Outcome**

- ☐ PO1: Make NCC as an Important Part of the Society.
- ☐ PO2: Teach Positive Thinking and Attitude to the Youths
- ☐ PO3: Mold the Youth of the Entire Country into United, Secular And Disciplined Citizens of The Nation.
- ☐ PO4: Provide An Ideal Platform for The Youth To Showcase Their Potential In Nation Building.
- ☐ PO5: Instill Spirit of Secularism and United India by Organizing National Integration Camps All Over the Country.
- ☐ PO6: Reach Out to The Youths of Friendly Foreign Countries Through Youth Exchange Programs (YEP).

## SEMESTER I

### USNCA120 - ORGANISATIONAL TRAINING

#### Course Objective

- 1.The main object of this course is to acquaint the cadets to expand the scope of National Cadet Corps training and reach out ultimate goal of unity.
- 2.To know the origin and the conceptualization of NCC
3. To know the command and learning objective of Drill
4. To develop the in-depth knowledge on physical and mental hygiene
5. To know the preventive measures of contagious disease
6. To have an in-depth knowledge on adventure training.

#### Course Outcomes

1. Reach out to Maximum Youth through its organizational Structure
2. Gain knowledge on the organizational structure of National Cadet Corps and their training
3. Understand the problems and prospects of training in various fields
4. Increase the self-confidence , self-awareness and self-perception
5. Instills adventurous spirit and develops courage to face the challenges

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	M	H	M
CO2	M	H	L	L	L	M
CO3	H	H	L	H	H	H
CO4	M	H	H	L	H	H
CO5	M	L	M	H	H	H

H – High(3)      M – Moderate (2)      L- Low (1)

## **UNIT I(NCC Organization)**

Aims and objectives of NCC - Cardinal points of NCC-Organization of NCC – Structure – NCC staff – Training in NCC and the NCC song – incentives to cadets – incentives by the Central Government and State Government – Duties , Responsibilities and conduct by NCC cadets – NCC camps: Reece, selection of camp site, camp hygiene , camp appointments

## **UNIT II (Foot Drill Basics)**

Aims and objectives of learning the drill commands and its importance- General word of commands - Attentions-Stand at ease-Turning and inclining at the Halt – Sizing, Forming up in Three Ranks, Numbering and close order march and Dressing – Saluting at the Halt, Getting on Parade, Falling out and Dismissing- Arms Drill – Ceremonial Drill

## **UNIT III (Physical and Mental Hygiene)**

Structure and Functioning of the Human body – introduction – Skeletal and Muscular system – Classification - Personal Hygiene – introduction – important Component of Food hygiene – Sanitation – Sources of Refuse – Disposal of waste Products – Physical and Mental Hygiene

## **UNIT IV (First-Aid)**

Infectious and Contagious Diseases – Introduction – Classification – Preventive Measures - First aid in Common Medical Emergencies – injuries to internal organs – Reasoning and treatment – Burns and Scalds – Snake, Scorpion and Dog Bite – Foreign Bodies – Asphyxia – First aid in case of Electric Shocks – Insensibility or Unconsciousness – Artificial Respiration – First aid for different type of fractures.

## **UNIT V (Adventure Training)**

Introduction – Para Sailing – Parasailing Gear – Types – Safety Tips – Slithering – General information – Equipment – uses and techniques – Rock climbing – Cycling and Trekking – Trekking Gear and Tips – Safety Measures.

## **(Practical - Drill Movements)**

### **Text book:**

Study material will be provided

**Book for Reference:**

1) Pamphlets issued by the Ministry of Defense

2) DG NCC training directive.

## SEMESTER II

### USNCB220 - NATIONAL INTEGRATION AND TRAINING

#### Course Objective

1. The main objective of the course is to become a main source of National integration by making National Cadet Corps as one of the greatest cohesive force of our Nation irrespective of any caste, creed, religion or region.
2. To know about the necessity of National Integration and unity
3. To have an indepth knowledge on constitutions of India.
4. To know about the organization and working of National Disaster Management Authority
5. To develop skill related to civil defence services
6. To develop skill on Foot drill

#### Course Outcome

On completion of the course, the cadets will be able to

1. Understand the relevance of National Cadet Corps in National integration
2. Understand the importance of the fundamental rights and duties of constitution of India
3. Gain knowledge of the various types of Natural Disasters and take measures to minimize losses of all types
4. Understand its vast trained resource in Civil Defence .
5. Gain knowledge on foot drill.

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	M	H
CO2	M	H	L	L	L	M
CO3	H	H	L	H	H	H
CO4	M	H	H	L	H	H
CO5	M	L	M	H	H	H

H – High(3)    M – Moderate (2)    L- Low (1)

## **UNIT I (National Integration)**

Introduction – Importance – Necessity of National Integration – factors affecting National Integration – Measures - Relevance of NCC in National integration – slogans of National integration – images – Role of NCC in Nation Building – NCC and National Integration

## **UNIT II (Constitutions of India)**

Introduction – Preamble – fundamental rights and duties – Directive Principles of State policy – National Flag, National Emblem, National Anthem and National Song

Unity in Diversity – Introduction – Fundamental of unity in diversity - Heritage of India – Festivals of India – Freedom struggle and Nationalist Movement in India – End of rule of East India Company – Nationalist Movements in India

## **UNIT III (Disaster Management)**

Disaster Management – introduction – National Disaster Management Authority – Organisation of NDMA – Structure – National Disaster Response Force – Types of Disasters – Classification – Essential services and their Maintenance – Role of NCC cadets in Maintaining Essential Services – Traffic Control during Natural Disasters under police supervision – Assistance during Natural Disasters – Effects - Do's and Don'ts for NCC cadets performing disaster Management duties .

## **UNIT IV(Civil Defence )**

Civil defence – Introduction – Civil defence organisation – Civil Defence services and their duties. Fire fighting – Introduction – Causes and Prevention of Fire – Mode of Spread – Fire fighting extinguisher – Fire fighting Parties – Fire fighting Equipments

## **UNIT V (Foot Drill II)**

Marching-length of pace and time in marching in quick time and halt-slow march and halt-side pace-pace forward and to the rear-Turning on the march and wheeling-saluting on the march-Marching time-forward march and halt in quick march-Changing step-Strength of Samman guard – Guard of Honour.

**(Practical – Arms Drill )**

**Text book:**

Study material will be provided

**Book for Reference:**

- 1) Pamphlets issued by the Ministry of Defence
- 2) DG NCC training directive.

## **SEMESTER III**

### **USNCC320 - DEFENSIVE MECHANISM**

#### **Course Objective**

1. The main object of this course is to acquaint the cadets be aware of defensive Mechanism and the role of Cadets in maintaining essential trainings
2. To have a complete knowledge on basics of weapon training used by NCC cadets
- 3.To learn various skills on yogasanas
- 4.To know the art of using the field effectively and weapon
- 5.To learn the medication and administration by the nurses
- 6.To develop the skill related to obstacles.

#### **Course Outcome**

On completion of this course the cadets will be able to

1. Understand the different types of weapons and develop the quality of immediate and implicit obedience to orders
2. Gain knowledge on the functioning of a nurse, in one's own home, taking care of the establishment and reducing the intensity and the frequency of sickness to the barest minimum.
3. Demonstrate basic skills associated with yoga activities including strength, flexibility and muscular endurance.
4. Promote cardiovascular endurance, flexibility, muscular strength and endurance.
5. To develop the quality of immediate and implicit obedience to orders.

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	L	H	H	H
CO2	M	H	H	L	H	H
CO3	M	L	M	H	H	H
CO4	H	M	H	M	M	H
CO5	M	H	L	L	L	M

H – High(3)    M – Moderate (2)    L- Low (1)

### **UNIT I (Basics of Weapon Training)**

Characteristics of .22 Rifle – introduction - Stripping, Assembling, Cleaning and Sight Setting – Loading, Cocking and Unloading - Lying Position and Hold – Trigger Control and Firing a Shot – Range Procedure and Safety Precautions – Theory of Group and Snap Shooting – Short Range Firing (.22 Rifle), Aiming and alteration of sight - Characteristics of 7.62mm SLR and 5.56mm INSAS – Technical Data of infantry weapons

### **UNIT II (Yoga)**

Introduction – Definition – Purpose – Potential Benefits – Potential Problems - Types of Asana  
The concept of yoga – meaning and definition of Yoga- Scope of yoga – Aims and objective of yoga – Types of Yoga Asanas (Suryanamarkas (12ways) – VajaraAsanas)

### **UNIT III (Home Nursing)**

Home Nursing – Introduction – Qualities of a Good Nurse – The Roller Bandage and its application – Sick room: Preparation, Cleaning, Lighting and ventilation – Pulse, Respiration and Temperature taking and recording – Observation of the sick: signs and symptoms to be noted – Feeding a helpless patient – Medicines and their administration – Fever, infection, disinfection and specific infectious diseases – Operation: After care, Dressing of Wounds – Poisons and First Aid. Women health and sanitation.

#### **UNIT IV(Field Craft and Battle Craft)**

Introduction – Field Craft – Description of Ground – Indication of Ground – Observation and Concealment – Fundamental of Correct use of Cover - Judging distance - Introduction– Over estimation and under estimation - Indication and recognition of targets – Movements with and without Arms- Battle Craft – Field Signal – Section Formation – Fire and Movement- Section Battle Drill- Fire Control orders – Types and Conduct of Patrols

#### **UNIT V(Obstacle Training)**

Obstacle Training – Introduction – Obstacle Course – Straight balance, clear jump, Gate vault, Zig- zag balance, high wall, double ditch, right hand vault, left hand vault, ramp – Safety Measures – Benefits.

#### **(Practical – Obstacle Training)**

##### **Text book:**

Study material will be provided

##### **Book for Reference:**

- 1) Pamphlets issued by the Ministry of Defence
- 2) DG NCC training directive.

**SEMESTER IV**  
**USNCD420 - ELEMENTS OF TRAINING SKILLS**

**Course Objective**

1. The main object of this course is to appraise Cadets about various elements of training skills & enhancing the same through application of life skills.
2. To learn various types of communication
3. To have an in-depth knowledge on art of getting thing done through others.
4. To develop the skill of influencing the others
5. To learn the skill of identification among the universe
6. To learn the interview skill.

**Course Outcome**

1. Build self-confidence, self-esteem and also enable the cadets to adapt to situations and people.
2. Learn from their own experience, perceptions, insight, stories, books, parents, teachers, religion, media, culture etc.
3. Establish an agreed set of team guidelines.
4. Work in groups and teams that help alotof tolerance and time to come to conclusions and make decisions.
5. Do tasks alone and accomplish a shared task or goal together.

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	L	H	H
CO2	M	L	M	H	H	H
CO3	H	M	H	M	M	H
CO4	M	H	L	L	L	M
CO5	M	L	M	H	H	M

H – High(3)      M – Moderate (2)      L- Low (1)

## **UNIT I (Communication Skill)**

Communication skills – introduction – understanding basics of Communication – different ways of Communication – Components of Effective Communication – Common barriers to effective Communication – types – Measures

Decision making and Problem solving – Practicing decision making and Problem solving – coping with stress and emotions – stress management techniques – understanding emotions and feelings

## **Unit II (Leadership Skill)**

Leadership Traits – introduction – Types – important Leadership Traits – Indicators of Good Leadership – Development of the indicators of Good Leadership – Leadership and Motivation – Factors – Case studies – Moral values and Character Traits – Honour Code Concept - Leadership case studies.

## **Unit III (Motivational Skill)**

Motivation - discipline and duty of a good citizen – leadership Traits – Personality / Character Development – Types of Leadership – Values/ Code of Ethics – Perception – Communication Including Inter-Personal – Effect of Leadership with Historical Examples – Customs of Services – Importance of Group / Team Work

## **UNIT IV (Personality Development skill)**

Personality Development – introduction – Life skill vs other skill – concept of Life skill – use of core skills in daily life – Factors influencing Personality – Self awareness

Empathy – introduction – Empathy , Sympathy and Altruism – importance of Empathizing with others – Critical and Creative thinking – Characteristics of the creative person

## **UNITV: (Interview Skill)**

Change your Mindset – introduction – how to change your mindset – Time Management – Essentials – Time wasters – Principles – Social skills , Etiquettes and Manners – Types – how to

improve your social skills – Importance of Group/ team work - Types and characteristics of Groups – interview skills – Career counseling and counselor – Need and its importance.

**(Practical – Posture and Weapon Training)**

**Text book:**

Study material will be provided

**Book for Reference:**

- 1) Pamphlets issued by the Ministry of Defense
- 2) DG NCC training directive.

## SEMESTER V

### UGNCA520 - TECHNIQUES AND SERVICE ACTIVITIES

#### Course Objective

1. The main object of this course is to acquaint Cadets with Map Reading techniques conventional signs, bearings, uses of Service Protractor and the civic Responsibility
2. To learn the various techniques on Map
3. To learn the function of communication used in war field
4. To develop various skill related to community development programmes
5. To have an insight knowledge on various laws and Acts
6. To know the social security schemes.

#### Course Outcome

##### On completion of this course, the Cadets will be able to

1. Gain knowledge on various types of Maps and its uses by finding out their own position from map to ground and ground to map
2. Understand the quality of communication and makes people respect the view point of others.
3. To find solution to complex problems
4. Understand the implications of NGOs and their contribution to the society
5. Develop new research parks in Rural and Development Sectors

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	L	H	H	H
CO2	M	H	H	L	H	H
CO3	M	L	M	H	H	H
CO4	H	M	H	M	M	H
CO5	M	H	L	L	L	M

H – High(3)      M – Moderate (2)      L- Low (1)

## **UNIT I (Map Reading Techniques)**

Introduction to Map - Conventional signs – Scales and grid systems- Methods of Expressing a Scale – Topographical Forms – Technical Terms – Relief, Contour and Gradients - Cardinal points and Types of North – Magnetic Variation - Types of Bearing and uses of Service Protector – Prismatic Compass – Types - Setting a map – Finding own position- Map to Ground and Ground to Map – Night March.

## **UNIT II (Communication)**

Communication – Introduction – Importance – Methods of Communication – Types of Communications – Advantages and Disadvantages – Communication Media – RS ANPRC-25 – Characteristic of Walkie Talkie – Line Communication – Functions – Latest trends and Developments – Advantages and Disadvantages – Types of Satellites

## **UNIT III (Social Service Activities)**

Basic of social service – introduction – Methods – Types - weaker sections in the society and their needs – Classes of Society – Needs of the weaker sections – Contribution of NCC cadets – Rural Development Programmes – its need – objectives – Important Rural Development Programmes - NGOs and their role and contribution – List of Top ten NGO's in India- Community Development activities

Social evils – drug abuse – family planning – corruption – counter terrorism – eradication of illiteracy – Aids awareness programme – cancer awareness programme.

## **UNIT IV (Law and Acts)**

Right to Information Act – introduction – Right to information Act 2005 – Scope – Important Provisions of the Act

Right to Education Act – Definition – Highlights of RTE Act

Protection of Children and POSCO Act – Definition – Punishment under the Act – Methods for Reporting and Recording -

## **UNIT V( Civil Responsibilities )**

Civic Responsibilities – introduction – importance – characteristics of responsible citizen – Swatchh Bharat Abhiyan – Contribution of youth towards social welfare – Role of NCC – Social Security schemes – Types – Benefits – New social Security schemes of Government – Governments New Development initiatives – Aadhar, Digital India , BHIM Act, Make in India , Start up India, Skill India , Mudra Bank

### **(Practical – Map Reading)**

#### **Text book:**

Study material will be provided

#### **Book for Reference:**

- 1) Pamphlets issued by the Ministry of Defense
- 2) DG NCC training directive.

## SEMESTER VI

### UGNCB620 - SPECIALIZED SUBJECT IN ARMY

#### Course Objective

1. The main object of the course is to familiarize with the outline organization of infantry battalion and its salient features and to acquaint Cadets with the task and roles of Combat Support Arms and Services
2. To know the importance of the Past and renowned Generals
3. To know the commands of the Armed Forces
4. To know the essential of Environment and Ecology
5. To know the traffic duty during the disaster
6. To learn in detail the counter terrorism and poster training.

#### Course Outcome

On completion of this course, the Cadets will be able to

1. Prepare them to join in Armed Forces
2. Understand the importance of Military History and the biography of Field Marshals
3. To develop consciousness among common people to control all pollution
4. To Develop the Personality of Cadets, build their physique and understand the cadets correct postures
5. Develop the personality of cadets and make them to be more self-reliant

CO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	L	H	H	H
CO2	M	H	H	L	H	H
CO3	M	L	M	H	H	H
CO4	H	M	H	M	M	H
CO5	M	H	L	L	L	M

H – High(3)      M – Moderate (2)      L- Low (1)

## **UNIT I(Military History)**

Introduction – Importance/ necessity of Studying Military History - Biography of Field Marshal K.M. CARIAPPA , Field Marshal SAM MANEKSHA and renowned Generals - Indian Army War Heroes PVC – Study of Battles of Indo- Pak War1965,1971 and Kargil 1999 – PVC Awardees.

## **UNIT II (Armed Forces)**

Basic organization of Armed Forces – Basic organization of Army – Task and role of fighting Arms, Supporting Arms – Commands of Army, Navy and Air Force – Supporting Services of Army - Task and role of Fighting Arms , supporting Arms and Services – Badges and Ranks – Honours and Awards - concept of Combined Defence services

## **UNIT III (Environment and Ecology)**

Natural Resources – Introduction – Basic information and its Types –Conservation and Management of Natural Resources – Need – Methods – Water Conservation and Rain water Harvesting – Practices for water conservation – Rain water Harvesting – Types – Waste Management – Type of Waste – Disposal and Management of Waste – Energy Conservation – Reason for increase in energy conservation – Measures.

## **UNIT IV(Disaster Management - II)**

Introduction – Traffic Control during Disaster under Police Supervision - Disaster Management during Flood/Cyclone - Disaster Management during Earth Quake - Setting up Relief Camp during Disaster Management - Assistance in Removal of Debris - Collection and Distribution of Aid Material - Message Services.

## **UNIT V (Counter Terrorism)**

Counter Terrorism – Introduction – Terrorism and Terrorist methods – History of Terrorism in India – Types – Funding – Types of Terrorist Act – Counter Terrorism measures.

Posture Training – Aims and Principles – Analysis – Causes – Balanced alignment and Exercise – Balanced Diet – Correct Standing and Exercises – Correct walking and Exercises.

**(Practical- Self Defence )**

**Text book:**

Study material will be provided

**Book for Reference:**

- 1) Pamphlets issued by the Ministry of Defense
- 2) DG NCC training directive.

**UGHIB520/UGHIB620 -Non-Major Elective: History of Indian Constitution  
SEMESTER V/VI**

<b>Year:</b> III	<b>Course Code:</b> UGHIB520/ UGHIB620	<b>Title of the Course:</b> History of Indian Constitution	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100 40+60
<b>Sem:</b> V/VI							

**Course Objectives:**

1. To help the students to understand the know the Basics of Indian Constitution and its Governance
2. To help the students to assimilate the powers and functions of the President, Vice-Prime Minister, Prime Minister and Central Council of Ministers.
3. To enable the students to know the functions of the Judiciary

**Course Learning Outcomes (CLOS):**

**After completion of the course the student will able to :**

1. Gain Knowledge on the growth of Legislatures during the British Period
2. Acquire Knowledge on the Nature & the special features of the Indian Constitution
3. Enhance Knowledge on the Rights and Duties of the Indian Constitution in the Present Situation
4. Understand the Legal Structure of Indian Political System and became the Agents of Social Change
5. Analyze the functions of the Indian Judiciary System and become the Agents of Social Change

CO/PO	1	2	3	4	5	6
CO1	H	M	M	L	M	M
CO2	M	H	H	M	M	H
CO3	M	M	H	L	H	H
CO4	H	M	H	M	L	M
CO5	M	M	H	L	L	H

**(Low -L, Medium -M, High-H)**

CO/PSO	1	2	3	4	5	6
CO1	L	L	M	H	H	M
CO2	M	L	M	M	H	L
CO3	L	M	H	L	H	H
CO4	L	L	H	M	H	H
CO5	M	L	M	H	H	H

**(Low -L, Medium -M, High-H)**

## **Unit I:**

Historical background- Growth of Legislatures from 1773 to 1892- Minto-Morely Reforms- Mont ford reform 1919- Government of India Act 1935.

1.1.Historical Background-Growth of Legislatures from 1773 to 1892; Regulating Act of 1773- Pitt's India Act of 1784

1.2.Charter Act of 1793-Charter Act of 1813-Charter Act of 1833-Charter Act of 1853

1.3.Government of India Act of 1858-Indian Council Act of 1861-Indian Council Act of 1

1.4.Minto-Morley Reforms of 1909-Montague Chelmsford Reforms of 1919

1.5.Government of India Act of 1935.

## **Unit II:**

India Independence Act of 1947- Salient features of the Constitution- National Symbols.

2.1.Indian Independence Act of 1947-Salient features of Indian Constitution

2.2.Constituent Assembly-Preamble-

2.3.Type of the Constitution

2.4.Fundamental Rights-Fundamental Duties

2.5.National Symbols of India.

## **Unit III:**

Union Government- President- Prime Minister and the Council of Ministers- Parliament- Functions – Legislation- Ordinary Bills- Money Bills- Financial Bills

3.1.President: Powers and Functions of the President-Emergency Powers

3.2.Prime Ministers-Powers and Functions.

3.3.Council of Ministers-Ministers and their portfolios-Parliament.

3.4.Lok Sabha -Rajya Sabha-Powers and Functions of the Parliament

3.5.Legislation-Procedure for Passing a Bills-Ordinary Bills-Money Bills-Financial Bills.

## **Unit IV:**

State Government- Governor –Chief Minister- Council of Ministers- Special Category Status states of India

- 4.1 Governor-Powers and Functions of the Governor
- 4.2. Chief Minister and the Council of Ministers
- 4.3. Ministers and their Portfolios
- 4.4. State Legislative Assembly –Legislative Council
- 4.5. Special Status to States of India

**.Unit V:**

Judiciary- Supreme Court- High Courts- Judicial Review- Amendments of the Constitution .

- 5.5. Supreme Court-Its Function-Judicial Review
- 5.2. State Judiciary: High Court
- 5.3. Subordinate Courts-Amendments of the Constitution
- 5.4. Procedure for the Amendment of the Constitution
- 5.5. Simple Majority of Parliament-Special Majority of the Parliament

**Books for Study and Reference:**

1. A.C.Kapur- Constitutional History of India- S.Chand & Co. Pvt.Ltd, New Delhi-1976
2. N.Jayapalan- History of India, Vol III- Atlantic Publishers and distributors, New Delhi-2001
3. Dr. J.Kasthuri- Modern Governments- Ennes Publications, Udumalpet- 2006
4. M.H.Syed- Indian Constitution-Angolan Publications Pvt Ltd., New Delhi-2006
5. M.V.Pylee- An Introduction to the constitution of India- Vikas Publications House Pvt Ltd, 2007
6. Dr. G. Venkatesan- Contemporary India- V.C. Publications, Rajapalayam -2010
7. R.S.Chaurasia- History of Modern India-Atlantic Publishers and distributors, New Delhi-2011
8. Bipin Chandra- History of Modern India- Orient Black-swan, New Delhi-2015
9. S.Chan-Modern Indian History- S.Chand & Co. Pvt.Ltd, New Delhi-2015

**SEMESTER – III**  
**UACAA20 – Mathematical Foundations**

<b>Year : II</b> <b>SEM :III</b>	<b>Course Code :</b> UACAA20	<b>Title Of The Course :</b> Mathematical Foundations	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 6	<b>MARKS</b> 100
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**Course Objectives**

1. To provide basic mathematical concepts required for computer applications.
2. To introduce the notion of relations and functions
3. To learn simple methods in algebra

**Course Outcomes (CO)**

The learners will be able to

**CO1:** Understand the concepts of Mathematical logic and compute operators on Symbolic logic.

**CO2:** Acquire knowledge about relations and functions.

**CO3:** Assess real life simple problems with permutation, combination and probability.

**CO4:** Know about matrices and their types.

**CO5:** Differentiate standard trigonometric functions.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	M	L	H	H
<b>CO2</b>	H	H	H	M	L	H
<b>CO3</b>	M	L	H	H	H	H
<b>CO4</b>	M	L	H	H	H	H
<b>CO5</b>	H	H	M	H	H	L

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	M	L	H	H
<b>CO2</b>	H	H	H	M	L	H
<b>CO3</b>	M	L	H	H	H	H
<b>CO4</b>	M	L	H	H	H	H
<b>CO5</b>	H	H	M	H	H	L

**(Low-L, Medium - M, High - H)**

## Course Syllabus

### Unit I: Symbolic logic (18 hours)

- 1.1 Symbolic logic (K1, K2, K3)
- 1.2 Logical operator (K1, K2, K3)
- 1.3 Conditional and bi-conditional operators (K1, K2, K3)
- 1.4 Converse, Inverse, Contra positive (K1, K2, K3)
- 1.5 Tautology and Contradiction (K1, K2, K3, K4)
- 1.6 Algebra of Propositions (K1, K2, K3, K4)

### Unit II: Relations and Functions (18 hours)

- 2.1 Relation (K1, K2, K3)
- 2.2 Equivalence relation (K1, K2, K3)
- 2.3 Partition, Partial order relation (K1, K2, K3, K4)
- 2.4 Functions, Inverse (K1, K2, K3, K4)
- 2.5 Composition of functions (K1, K2, K3)
- 2.6 Properties of functions (K1, K2, K3, K4)

### Unit III: Algebra (18 hours)

- 3.1 Probability (K1, K2, K3)
- 3.2 Probability (simple problems) (K1, K2, K3, K4)
- 3.3 Permutations (K1, K2, K3, K4)
- 3.4 combinations (K1, K2, K3, K4)
- 3.5 Combinatorial arguments (K1, K2, K3, K4)
- 3.6 Boolean algebra (K1, K2, K3)

### Unit IV: Matrices (18 hours)

- 4.1 Types of matrices (K1, K2, K3)
- 4.2 Matrix operations, Symmetric and skew symmetric, Hermitian and skew-Hermitian (K1, K2, K3)
- 4.3 Orthogonal and Unitary (K1, K2, K3, K4)
- 4.4 Rank of a matrix (K1, K2, K3, K4)
- 4.5 Solution of system of linear equations using matrices (K1, K2, K3, K4)
- 4.6 Cramer's rule (K1, K2, K3)

### Unit V: Differential calculus (18 hours)

- 5.1 Differentiation of standard function  $x^n$  (K1, K2, K3)
- 5.2 Differentiation of standard function  $e^x$  (K1, K2, K3)
- 5.3 Differentiation of standard function  $\log x$  (K1, K2, K3)
- 5.4 Differentiation of standard functions  $\sin x$ ,  $\cos x$ ,  $\tan x$  (K1, K2, K3)
- 5.5 Chain Rule (K1, K2, K3)
- 5.6 Successive differentiation (up to second derivative) (K1, K2, K3)

**Text Books:**

1. P.R.Vittal-Mathematical Foundations-Margham Publications, Chennai, 2<sup>nd</sup> Edition – 2003.
2. P.A.Navanitham-Business Statistics-jai publishers, Trichy-21.

**Reference Books:**

1. P.R. Vittal - Allied Mathematics – Margham Publications - Third Edition, 2002
2. M.K.Venkataraman - Engineering Mathematics, Volumes I and II - The National Publication Co.,  
Madras, 1992 and 1993

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – IV**  
**UACAB20 – Statistical Methods**

<b>Year: II</b>	<b>Course Code: UACAB20</b>	<b>Title of the Course: Statistical Methods</b>	<b>Course Type: Theory</b>	<b>Course Category: Core</b>	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To enrich the knowledge of students on statistical methods which play a major role in computer applications
2. To demonstrate sampling techniques and to employ statistical methods of analysis to make inference

**Course Outcomes (CO)**

The learners will be able to

- CO1: Analyse the statistical data using measures of central tendency and graphs.  
 CO2: Provide an overall description of a set of data using measures of dispersion.  
 CO3: Apply the concept of regression and correlation in business problems.  
 CO4: Make decisions using hypothesis testing.  
 CO5: Apply the Chi-square test for independence as well as goodness of fit.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	H
CO2	H	H	M	L	H	H
CO3	M	L	H	H	H	H
CO4	M	H	H	H	H	L
CO5	H	H	H	M	L	H

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	H	H
CO2	H	H	M	L	H	H
CO3	M	L	H	H	H	H
CO4	M	H	H	H	H	L
CO5	H	H	H	M	L	H

**(Low- L, Medium - M, High - H)**

## **Course Syllabus**

### **Unit 1: Introduction of Statistics and Measurements of Central Tendency (18 hours)**

- 1.1 Definition of Statistics, Classification and Tabulation (K1, K2)
- 1.2 Graphical representation of numerical data (K1, K2, K3)
- 1.3 Formation of frequency distribution ( K1, K2, K3)
- 1.4 Mean and its types (K1, K2, K3, K4)
- 1.5 Median and its types( K1, K2, K3, K4)
- 1.6 Mode and its types ( K1, K2, K3, K4)

### **Unit II: Measures of Dispersion (18 hours)**

- 2.1 Basic definition of Measures of Dispersion (K1, K2)
- 2.2 Sums on range (K1, K2)
- 2.3 Sums on quartile deviation (K1, K2, K3)
- 2.4 Sums on Mean deviation about mean and median (K1, K2, K3, K4)
- 2.5 Sums on Standard deviation (K1, K2, K3, K4)
- 2.6 Sums on coefficient of Variation (K1, K2, K3, K4)

### **Unit III: Correlation and Regression (18 hours)**

- 3.1 Definitions of Correlation and its types (K1, K2)
- 3.2 Karl Pearson's Co-efficient of correlation (K1, K2, K3, K4)
- 3.3 Bivariate Correlation (K1, K2, K3, K4)
- 3.4 Spearman Rank Correlation (K1, K2, K3, K4)
- 3.5 Regression equations (K1, K2, K3, K4)
- 3.6 Regression Co-efficient (K1, K2, K3, K4)

### **Unit IV: Tests of Hypothesis (18 hours)**

- 4.1 Basic definition of hypothesis (K1, K2)
- 4.2 Test for single and difference between means (K1, K2, K3, K4)
- 4.3 Test for single standard deviation and difference standard deviation (K1, K2, K3, K4)
- 4.4 Test for small correlation coefficient (K1, K2, K3, K4)
- 4.5 Small samples-Test for single and difference between means (K1, K2, K3, K4)
- 4.6 Paired t-test (K1, K2, K3, K4)

### **Unit V: Chi-Square Test and Goodness of Fit (18 hours)**

- 5.1 Definitions of Chi-Square test (K1, K2)
- 5.2 Properties (K1, K2)
- 5.3 Sums on Chi-Square test (K1, K2, K3, K4)
- 5.4 Goodness of Fit (K1, K2, K3, K4)
- 5.5 Contingency table (K1, K2, K3, K4)
- 5.6 Test for Independence of Attributes (K1, K2)

**Text Book:**

1. P. R. Vittal and V. Malini - Statistical and Numerical Methods, 1<sup>st</sup> Edition - Margham Publications, 2002.

**Reference Books:**

1. P. R. Vittal-Mathematical Statistics, 1<sup>st</sup> Edition-Margham Publications, 2002.
2. S. C. Gupta and V. K. Kappor - Fundamentals of Mathematical Statistics, 3<sup>rd</sup> Edition, Sultan Chand and Sons, 2004.
3. P. Kandasamy and K. Thilagavathy - Calculus of Finite Differences and Numerical Analysis, 1<sup>st</sup> Edition - Margam Publications, 2003.

**e-Resources:**

1. <https://nptel.ac.in>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – I**  
**UBMAA20 – Allied Mathematics I**

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code :</b> UBMAA20	<b>Title Of The Course :</b> Allied Mathematics I	<b>Course Type :</b> Theory	<b>Course Category :</b> Allied	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the basic concepts of matrices
2. To improve problem solving skills in Trigonometry
3. To introduce various methods to solve equations
4. To introduce differential and integral calculus

**Course Outcomes (CO)**

The learners will be able to

**CO1:** Understand the basic concepts of matrices

**CO2:** Apply the theory of equations and find roots using Newton’s and Horner's method.

**CO3:** Acquire problem solving skills in trigonometry.

**CO4:** Compute radius of curvature, centre of curvature, evolutes and involutes.

**CO5:** Apply the techniques of integral calculus.

CO	PSO					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
<b>CO1</b>	H	H	H	H	H	L
<b>CO2</b>	H	H	H	H	M	L
<b>CO3</b>	H	H	H	H	L	L
<b>CO4</b>	H	H	H	H	H	L
<b>CO5</b>	H	H	H	H	L	L

CO	PO					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
<b>CO1</b>	H	H	H	H	H	L
<b>CO2</b>	H	H	H	H	M	L
<b>CO3</b>	H	H	H	H	L	L
<b>CO4</b>	H	H	H	H	H	L
<b>CO5</b>	H	H	H	H	L	L

**(L-Low, M-Moderate, H-High)**

## Course Syllabus

### Unit I: Matrices

(18 hours)

- 1.1 Symmetric, Skew symmetric, Hermitian, Skew Hermitian (K1, K2, K3, K4)
- 1.2 Orthogonal, Unitary matrices (K1, K2, K3, K4)
- 1.3 Eigen values and Eigen vectors (K1, K2, K3, K4)
- 1.4 Cayley-Hamilton Theorem (without proof) (K1, K2, K3, K4)
- 1.5 Verification and computation of inverse (K1, K2, K3, K4)
- 1.6 Diagonalisation of a matrix (K1, K2, K3, K4)

### Unit II: Theory of Equations

(18 hours)

- 2.1 Polynomial equations (K1, K2, K3, K4)
- 2.2 Irrational roots – Complex roots (K1, K2, K3, K4)
- 2.3 Reciprocal equations (K1, K2, K3, K4)
- 2.4 Descarte's Rule of signs (K1, K2, K3, K4)
- 2.5 Approximation of roots of polynomial equation by Newton's method (K1, K2, K3, K4)
- 2.6 Horner's methods (K1, K2, K3, K4)

### Unit III: Trigonometry

(18 hours)

- 3.1 Expansions of  $\sin n\theta$ ,  $\cos n\theta$ ,  $\tan n\theta$  (K1, K2, K3, K4)
- 3.2 Expansions of  $\sin n\theta$ ,  $\cos n\theta$ ,  $\tan n\theta$  (continued) (K1, K2, K3, K4)
- 3.3 Expansion of  $\sin^n \theta$ ,  $\cos^n \theta$  (K1, K2, K3, K4)
- 3.4 Expansions of  $\sin \theta$ ,  $\cos \theta$ ,  $\tan \theta$  in terms of  $\theta$  (K1, K2, K3, K4)
- 3.5 Expansions of  $\sin \theta$ ,  $\cos \theta$ ,  $\tan \theta$  in terms of  $\theta$  (continued) (K1, K2, K3, K4)
- 3.6 Logarithm of a complex number (K1, K2, K3, K4)

### Unit IV: Differential Calculus

(18 hours)

- 4.1 Curvature (K1, K2, K3, K4)
- 4.2 Radius of curvature in Cartesian Coordinates (K1, K2, K3, K4)
- 4.3 Polar Coordinates, (K1, K2, K3, K4)
- 4.4 p-r equations (K1, K2, K3, K4)
- 4.5 Evolutes (K1, K2, K3, K4)
- 4.6 Involute (K1, K2, K3, K4)

### Unit V: Integral Calculus

(18 hours)

- 5.1 Integration by parts (K1, K2, K3, K4)
- 5.2 Bernoulli's formula (K1, K2, K3, K4)
- 5.3 Reduction formulae  $\sin^n x$  (K1, K2, K3, K4)
- 5.4 Reduction formulae  $\cos^n x$  (K1, K2, K3, K4)
- 5.5 Reduction formulae  $\tan^n x$ ,  $\operatorname{cosec}^n x$  (K1, K2, K3, K4)
- 5.6 Reduction formulae  $\sec^n x$ ,  $\cot^n x$  (K1, K2, K3, K4)

**Text Book:**

1. S. Narayanan and others – Ancillary Mathematics – Volumes I, II, III and IV-S.Viswanathan Printers and Publishers Private Limited, 2007

**Reference Books:**

1. T.K.Manikavachogam Pillay and others – Algebra – Volume II – S. Viswanathan Printers and Publishers Private Limited, 2006
2. T.K.Manikavachogam Pillay and others – Differential Calculus - S.Viswanathan Printers and Publishers Private Limited – Volume I, 2007
3. T.K.Manikavachagom Pillay and others – Integral Calculus - S.Viswanathan Printers and Publishers Private Limited - Volume II, 2007
4. P.R. Vittal - Allied Mathematics – Margham Publications - Third Edition, 2002

**e-Resources:**

1. <https://nptel.ac.in/>
2. [www.coursera.org](http://www.coursera.org)
3. <https://swayam.gov.in>

**SEMESTER – II**  
**UBMAB20 – Allied Mathematics II**

<b>Year : I SEM :II</b>	<b>Course Code : UBMAB20</b>	<b>Title Of The Course : Allied Mathematics: II</b>	<b>Course Type : Theory</b>	<b>Course Category : Allied</b>	<b>H/W 6</b>	<b>CREDITS 5</b>	<b>MARKS 100</b>
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**Course Objectives**

1. To introduce concepts of vector calculus
2. To teach methods of solving partial differential equations
3. To introduce Laplace transforms and Fourier Series

**Course Outcomes (CO)**

The learners will be able to

- CO1.** Understand the use of vector calculus in science and engineering.  
**CO2.** Understand the applications of Green’s, Gauss divergence and Stoke’s Theorems.  
**CO3.** Find the complete, singular and general integral of partial differential equations.  
**CO4.** Understand the basic concepts of Laplace Transforms.  
**CO5.** Determine the nature of the Fourier series and find its coefficients

CO	PSO					
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
<b>CO1</b>	H	H	H	H	H	L
<b>CO2</b>	H	H	H	H	H	L
<b>CO3</b>	H	H	H	H	M	L
<b>CO4</b>	H	H	H	H	M	L
<b>CO5</b>	H	H	H	H	H	L

CO	PO					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
<b>CO1</b>	H	H	H	H	H	L
<b>CO2</b>	H	H	H	H	M	L
<b>CO3</b>	H	H	H	H	L	L
<b>CO4</b>	H	H	H	H	H	L
<b>CO5</b>	H	H	H	H	L	L

**(L-Low (1), M-Moderate (2), H-High (3))**

## Course Syllabus

### Unit I: Differentiation of vectors

(18 hours)

- 1.1 Scalar and vector point functions (K1, K2, K3, K4)
- 1.2 Differentiation of vectors (K1, K2, K3, K4)
- 1.3 Differential operators (K1, K2, K3, K4)
- 1.4 Directional derivatives (K1, K2, K3, K4)
- 1.5 Gradient (K1, K2, K3, K4)
- 1.6 Divergence and Curl (K1, K2, K3, K4)

### Unit II: Integration of vectors

(18 hours)

- 2.1 Line Integral (K1, K2, K3, K4)
- 2.2 Surface Integral (K1, K2, K3, K4)
- 2.3 Volume Integral (K1, K2, K3, K4)
- 2.4 Green's theorem statement and application (K1, K2, K3, K4)
- 2.5 Gauss's theorem statement and application (K1, K2, K3, K4)
- 2.6 Stoke's theorem statement and application (K1, K2, K3, K4)

### Unit III: Partial Differential Equations

(18 hours)

- 3.1 Formation of Partial Differential equations by eliminating arbitrary constants (K1, K2, K3, K4)
- 3.2 Formation of Partial Differential equations by eliminating arbitrary functions (K1, K2, K3, K4)
- 3.3 Solutions of standard types of first order differential equations –  $f(p,q) = 0$  (K1, K2, K3, K4)
- 3.4 Solution of  $f(x,p,q) = 0$ ;  $f(y,p,q) = 0$ ;  $f(z,p,q) = 0$  (K1, K2, K3, K4)
- 3.5 Solution of  $f_1(x,p) = f_2(y,q)$  (K1, K2, K3, K4)
- 3.6 Solution of  $z = px+qy+f(p,q)$  (K1, K2, K3, K4)

### Unit IV: Laplace Transformations

(18 hours)

- 4.1 Definition of Laplace transforms (K1, K2, K3, K4)
- 4.2 Laplace transforms of standard functions (K1, K2, K3, K4)
- 4.3 Laplace transforms – problems (K1, K2, K3, K4)
- 4.4 Laplace transforms – problems (continued) (K1, K2, K3, K4)
- 4.5 Inverse Laplace Transforms (K1, K2, K3, K4)
- 4.6 Solving ordinary differential equations of second order with constant coefficients using Laplace transforms (K1, K2, K3, K4)

### Unit V: Fourier Series

(18 hours)

- 5.1 Definition of Fourier series (K1, K2, K3, K4)
- 5.2 Fourier series –Problems (K1, K2, K3, K4)
- 5.3 Finding Fourier coefficients for a given periodic function with period  $2\pi$  (K1, K2, K3, K4)

- 5.4 Odd functions (K1, K2, K3, K4)
- 5.5 Even function (K1, K2, K3, K4)
- 5.6 Half range series.(K1, K2, K3, K4)

**Text Book:**

- 1. S.Narayanan and others – Ancillary Mathematics – Volumes I, II, III and IV, S.Viswanathan Printers and Publishers Private Limited, 2007.

**Reference Books:**

- 1. P.R. Vittal - Allied Mathematics – Margham Publications - Third Edition, 2002
- 1. T.K.Manikavachagom Pillay and others – Ancillary Mathematics Volume I and Volume II - S.Viswanathan Printers and Publishers Private Limited, 2004
- 2. P.Kandasamy and K.Thilagavathi - Allied Mathematics Volume I and Volume II - S.Chand and Co, New Delhi, 2004.

**e-Resources:**

- 1. <https://nptel.ac.in/>
- 2. [www.coursera.org](http://www.coursera.org)
- 3. <https://swayam.gov.in>

**SEMESTER - I**  
**ULURA20 – URDU PAPER - I**  
**PROSE, GRAMMAR & LETTER WRITING**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> ULURA20	<b>Title of the Course:</b> Prose, Grammar & Letter Writing	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b>	<b>Credits</b> 3	<b>Marks</b> 100
<b>Sem:</b> <b>I</b>							

**Course Objectives**

1. To promote students' proficiency in the basics of Urdu.
2. To accelerate their zeal to cultivate Writing Skills.
3. To strengthen their reading and receptive skills.

**Course Learning Outcomes (CLO)**

1. Students will acquire the required academic efficiency
2. They will be learning the techniques of exemplary writing.
3. They will develop ability to foster fast reading of Texts.

**Unit – I**

1. Sair Pahlay Darwesh Ki – Meer Amman Dehalvi
2. Umeed Ki Khushi – Sir Syed
3. Letter To The Principal Seeking Leave

**Unit – II**

1. Mirza Ghalib Ke Akhlaq Wa Adat – Moulana hali
2. Zubaida Khatoon – Abdul Haleem Sharar
3. Zameer Auruskikhismien
4. Letter To The Manager Of A Firm Seeking Employment

**Unit – III**

1. Noor Jhan – Mohamed Hussain Azad
2. Sawere Jo Kal Ankh Meri Khuli – Patras Bukhari
3. Sifat Auruskikhimein
4. Letter To A Publisher Of Book Seller Placing Order For Books

**Unit – IV**

1. Khud Gharaz Dost – Duputi Nazeer Ahmed
2. Sir Syed Marhoom Aur Urdu Literature – Allama Shibli
3. Letter To The Father / Guardian Asking Money For Payment Of College Fees

**Unit – V**

1. Letter To A Friend Inviting Him To Your Sister's Marriage
2. Sifat Auruskikhim
3. Fe'l Auruskikhimein
4. Lawazim-E-Isim
5. Alamat-E-Fael "Nay" Aur Alamat-E-Mafo'ol "Ko" Kequaide

**Text Books**

1. BOOK PRESCRIBED: "ADAB-E-JAMEEL"

Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam.

**SEMESTER - II**  
**ULURB20 – URDU PAPER - II**  
**MANZOOMATH, GHAZALIATH & TRANSLATION**

<b>Year:</b> <b>I</b>	<b>Course</b> <b>Code:</b>	<b>Title of the Course:</b>	<b>Course</b> <b>Type:</b>	<b>Course</b> <b>Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem:</b> <b>II</b>	ULURB20	Manzoomath, Ghazaliath & Translation	Theory	Core		3	100

**Course Objectives**

1. To enhance students' creative thinking.
2. To trigger the literary skills dormant in them.
3. To train them to advance their Translation Skills.

**Course Learning Outcomes (CLO)**

1. Students will be able to expand the frontiers of their creative intellect.
2. Their fascination for Literature will get doubled or tripled.
3. The translation skills will help them professionally.

**Unit – I**

1. Nagma-E-Hasrath – Akbar Allahbadi
2. Meer Taqi Meer - Hasthiapnihabbab Ki Si Hai
3. Khaja Meer Dard - Tohmaten Chand Apne Zimmz Dhar Chale

**Unit – II**

1. Qaumi Geeth – Allama Iqbal
2. Shaik Ibrahim Zauq - Layihayathaayeqaza Le Chali
3. Mirza Ghalib - Dil Hi To Hai Na Sang WaKhisht

**Unit – III**

1. Nisar Main Teri Galiyon Ke – Faiz Ahmed Faiz
2. Momin Khan Momin - Adam Mein Rehthe
3. Jigar Muradabade - Dil Gaya Ronaq Hayath Gayi

**Unit – IV**

1. Wo Nabion Mein Rahmath Laqab Pane Wala - Masaddas Hali
2. Firaq - Sar Mein Soudabhinahin
3. Kawish Badri - Az Sare Nav Fikr Ka Aaghaaz Karna Chahiye
4. A General Passage Translation from English to Urdu

**Unit – V**

1. Taj Mahal – Sahirludhyanwi
2. Shakir Naithi - Shahid Maqsood Ek Din Rubaroo Ho Jayega
3. Parveen - Chalna Ka Hosala Naye
4. A General Passage Translation from English to Urdu

**Text Books**

BOOK PRESCRIBED: “ADAB-E-JAMEEL” Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam

**SEMESTER - III**  
**ULURC20 – URDU PAPER - III**  
**AFSANA, MAZMOON NAWESI & MUKALAMA NIGARI**

<b>Year:</b> <b>I</b>	<b>Course</b> <b>Code:</b> ULURC20	<b>Title of the Course:</b> Afsana, Mazmoon Nawesi & Mukalama Nigari	<b>Course</b> <b>Type:</b> Theory	<b>Course</b> <b>Category:</b> Core	<b>H/W</b>	<b>Credits</b> <b>3</b>	<b>Marks</b>  100
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**Course Objectives**

1. To arouse interest for Non-Detailed Texts.
2. To equip them with ample knowledge to pen their own articles.
3. To instill in them a flair for translation.

**Course Learning Outcomes (CLO)**

1. Students will care more for Non-Detailed Texts on par with Detailed Texts.
2. They will sharpen necessary skills to draft essays on varied themes.
3. They will succeed in their official routine with their ability to translate.

**Unit – I**

- 1.Kafan – Prem Chand
- 2.Jamun Ka Ped – Krishan Chander

**Unit – II**

- 1.Khush Naseeb – Ali Akbar Amburi
- 2.Dard Ka Ehsas – Ameerunnisa

**Unit – III**

- 1.Bhola – Rajender Singh Bedi
- 2.Naya Qanoon – Saadath Husain Manto

**Unit – IV**

- 1.Noor-O-Nar – Ali Abbas Hussani
- 2.Aakhr Paisa Bach Hi Gaya – B.S.Ramaiya

**Unit – V**

- 1.Guldasta-E-Mazameen-O-Inshapardazi By **Mohammed Arif Khan**
2. A General Passage For Translation From Urdu To English

**Text Books**

BOOK PRESCRIBED: “ADAB-E-JAMEEL” Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam.

**SEMESTER - IV**  
**ULURD20 – URDU PAPER - IV**  
**DRAMA, RUBAYIATH & HISTORY OF URDU LITERATURE**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> ULURD20	<b>Title of the Course:</b> Drama, Rubayiath & History Of Urdu Literature	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b>	<b>Credits</b> 3	<b>Marks</b> 100
<b>Sem:</b> <b>IV</b>							

**Course Objectives**

1. To promote students' knowledge of various literary genres like Drama.
2. To effectuate their caliber to pen poems of their own.
3. To motivate them to build lively conversations.

**Course Learning Outcomes (CLO)**

1. Students will learn to excel in the art of reading Plays.
2. They will hoan their faculty of imagination.
3. They will emerge as exponents of good conversation.

**Unit – I**

1. Darwazakholdo-Krishan Chander [First Quarter]
2. Agoosh-E- Lihad Mein Jab Ke Sona Hoga - Anees
3. Gulshan Mein Phiroou–Anees
4. Meer Taqi Meer

**Unit – II**

1. Darwazakholdo-Krishan Chander [Second Quarter]
2. GhafLatKihansihse Aah BharnaAcha –AkberAllahbadi
3. Har Ek Se Sun NayeFasana Ham Ne – Aker Allahbadi
4. Mirza Ghalib

**Unit – III**

1. Darwazakholdo-Krishan Chander [Third Quarter]
2. Gunche Teri Zindagi Pe DilHalth Hai -- Josh
3. Gunche Teri Zindagi Pe DilHalth Hai – Josh
4. Sir Syed Ahmed Khan

**Unit – IV**

1. Darwaza kholdo-Krishan Chander [Last Quarter]
2. Mufliis Hun Na Dowlath Hai Na Sermaya Hai --Amjad
3. Is Naam Ki Zindagi Mein KuchJaan To Ho – Amjad
4. Moulana Hali
5. Prem Chand

**Unit – V**

1. Roshan Nahi Karta JalaDethe Hain –Asghar Vellori
2. DhoondaThoKithabon Mein Sadaqath Na Mili –Asghar Vellori
3. AkberAllahbadi
4. Allama Iqbal
5. Krishan Chandar

**Text Books**

1. BOOK PRESCRIBED: “ADAB-E-JAMEEL” Published by Dept. of Urdu, C. Abdul Hakeem College, Melvisharam.

## SEMESTER – I/II

### UVEDA20 – VALUE EDUCATION

Year:I Sem: I/II	Course Code UVEDA22	Title of the Course Value Education	Course Type Theory	Course Category	H/W 1	Credits -	Marks -
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#### Course Objectives:

1. To understand good manners and etiquette
2. To identify their goals in life
3. Able to differentiate between love and infatuation

#### Course Outcomes

1. To develop good manners and learn to respect others.
2. To improve self-esteem and to set goals.
3. To enhance their emotional intelligence and to know about their importance.
4. To identify true friendship and differentiate between love and infatuation.
5. To acquire knowledge on counseling.

#### Course Syllabus

##### Unit I: Good Manners, Etiquette and Self Esteem

- 1.1 Introduction – Good Manners.
- 1.2 Respecting others – In Public Places, at Public Functions.
- 1.3 Cell Phone Etiquette
- 1.4 Self-Image and Self Esteem.
- 1.5 Basic Patterns of Self Esteem.
- 1.6 Impact of Self Esteem.

##### Unit II: Self Esteem and Goal Setting

- 2.1 Steps to improve Self Esteem.
- 2.2 Introduction to Goal Setting.
- 2.3 Seven Deadly Mistakes in Goal Setting.
- 2.4 Helpful Guidelines for Goal Setting.
- 2.5 The Three Steps for Setting Goals.
- 2.6 Steps to achieve Goals

##### Unit III: Emotional Intelligence

- 3.1 Introduction to Emotional Intelligence – The way to act and re-act.
- 3.2 Vital importance of EI.
- 3.3 Personal Competencies

- 3.4 Social Competencies.
- 3.5 Important Clarification on EQ and IQ.
- 3.6 Handling negative emotions.

#### **Unit IV: Friendships and Love**

- 4.1 Introduction – Friendships and Adolescence.
- 4.2 Dangerous Friendships – Right Friendships.
- 4.3 Characteristics of True Friendships.
- 4.4 Rules for Friendship
- 4.5 Introduction to Love and Infatuation – Understanding ‘Falling in Love’.
- 4.6 Infatuation vs Love

#### **Unit V: Infatuation and Counseling**

- 5.1 Dealing with Infatuation.
- 5.2 Dealing with attraction – Pursuing an attraction.
- 5.3 Counseling – Aims of counseling.
- 5.4 Types of counseling – Necessity of Counseling
- 5.5 Different Issues helped by Counselors.
- 5.6 Common concerns of Students –Counseling as a Help

#### **Books for study:**

Contribution from Team of Experts and edited by M.A. Joe Antony, SJ, Young and Happy: Values for life, Auxilium Publications, Vellore (2013)

#### **Books for reference:**

George Elizabeth FMA, Sebastian Elizabeth, FMA and Annie Lolia, FMA, Youthrill : A youth resource book for FMA Youth Animators, Volume 1, Youth Pastoral Sector, FMA India (2011)

Adukanil Mathew, SDB Runway to Success: A guide to success in studies, career and life, Arumbu Publications, Kilpauk, Chennai (2005)

Maurus J., Make the most of your Time, Better yourself Books, Bandra, Mumbai (1992)

Shinn George, The Miracle of Motivation: The Action Guide to Happiness and Success, Better yourself Books, Bandra, Mumbai (1985)

Furey J.Robert, Your are Good Enough: overcoming Feelings of inadequacy, Better yourself Books, Bandra, Mumbai (2002)

Youth Ministry – 2, Reconciliation, The way to the Father, DBYA Publications, New Delhi (1996)

Varkey C.P. SJ, Are you a winner or a loser?: Psychology for the young and the old, Better yourself Books, Bandra, Mumbai (2006)

Kopmeyer M.R., Here’s Help, Universal Book Stall, New Delhi (1992)

## SEMESTER – III/IV

### UVEDA20 – VALUE EDUCATION

Year: II Sem: III/IV	Course Code UVEDA22	Title of the Course Value Education	Course Type Theory	Course Category	H/W 1	Credits -	Marks -
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#### Course Objectives:

1. To identify and apply the strategies to solve conflicts.
2. To understand the sources of stress and management.
3. To develop leadership and time management skills.
4. To understand the social responsibility that benefits the society.
5. To understand the human impact on nature and to protect the ecosystem.

#### Course Outcomes:

1. Understand the reasons of conflict and how to respond to conflicts.
2. Acquire the knowledge of Media and its safe usage.
3. Develop the ability to handle stress in various situations.
4. Understand the importance of managing time for a successful career.
5. Develop various leadership skills to work together and achieve goals.
6. Gaining knowledge about social responsibility and to fulfill the civic duties to benefit the society.
7. Analyse the environmental influences on our day to day living and to care for the environment.

#### Unit I: Conflict Management

- 1.1 Introduction - Reasons for Conflict
- 1.2 Nature of Conflicts
- 1.3 Conflict Management – Conflict Management Styles
- 1.4 Responses to Conflict Situations
- 1.5 Conflict Resolution Strategies

#### Unit II: Stress and Media Management

- 2.1 Meaning of Stress– Symptoms of Stress
- 2.2 Hidden Causes of Stress
- 2.3 Steps to manage Stress
- 2.4 Introduction – Media in India
- 2.5 Understanding Mass Media - Managing Media

#### Unit III: Leadership and Time Management

- 3.1 Introduction to Leadership
- 3.2 Traits of Good Leaders

- 3.3 Creating Personal Leadership Plans
- 3.4 Introduction to Time Management
- 3.5 Five steps to successful Time Management

#### **Unit IV: Social Responsibility**

- 4.1 Components of Justice - Five types of Justice
- 4.2 Issues connected to Social Justice – In the world – In India
- 4.3 Social Analysis - Agents of Social Transformation
- 4.4 Strategies to be adopted for Social Justice
- 4.5 Social Justice as an Inter Religious Project

#### **Unit V: Caring for Nature**

- 5.1 Introduction
- 5.2 Ecological Crisis
- 5.3 Caring for Environment
- 5.4 Experience Nature
- 5.5 Steps to care for nature – as Individuals, as groups

#### **Books for study:**

Contribution from Team of Experts and edited by M.A. Joe Antony, SJ, Young and Happy: Values for life, Auxilium Publications, Vellore (2013)

#### **Books for reference:**

George Elizabeth, FMA, Sebastian Elizabeth, FMA and Annie Lolia, FMA, Youthrill : A youth resource book for FMA Youth Animators, Volume 1, Youth Pastoral Sector, FMA India (2011)

Adukanil Mathew, SDB Runway to Success: A guide to success in studies, career and life, Arumbu Publications, Kilpauk, Chennai (2005)

Maurus J., Make the most of your Time, Better yourself Books, Bandra, Mumbai (1992)

Shinn George, The Miracle of Motivation: The Action Guide to Happiness and Success, Better yourself Books, Bandra, Mumbai (1985)

Youth Ministry – 2, Reconciliation, The way to the Father, DBYA Publications, New Delhi (1996)

Varkey C.P. SJ, Are you a winner or a loser?: Psychology for the young and the old, Better yourself Books, Bandra, Mumbai (2006)

Koikara Felix, Heal the World: Sessions on Justice and Peace, Better Yourself Books, Bandra, Mumbai (2002)

All rights for all: sessions for Human Rights Education, Margaret Mathai, FMA & Felix Koikara, SDB, Better Yourself Books, Bandra, Mumbai (2008)

## SEMESTER – V/VI

### UVEDA20 – VALUE EDUCATION

Year:III Sem: V/VI	Course Code UVEDA22	Title of the Course Value Education	Course Type Theory	Course Category	H/W 1	Credits -	Marks -
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#### Course Objective

1. To impart the knowledge of sexuality and awareness of its Pros and Cons.
2. To give the students the understanding of marriage, family life and its challenges.
3. To create awareness of women's' health and its importance.
4. To familiarize women about their rights and to know their responsibilities.
5. To enhance the students to experience quality happiness and the essence of spirituality.

#### Course Outcome

1. To get a clear idea about sexuality
2. To understand about the importance of marriage and family life.
3. To become conscious about their health and to practice healthy habits.
4. To be aware about the rights and responsibilities of women.
5. To know the beauty of happiness and to taste the love of God and practice inter- religious harmony.

#### Unit I

- 1.1 Introduction of Sexuality – Difference of male and female hormones
- 1.2 Sexual Organs – Reproductive system
- 1.3 Child birth – Sexual activity
- 1.4 Introduction to Marriage – Types of Marriages
- 1.5 Need for successful marriage
- 1.6 Tips for marriage to be successful

#### Unit II

- 2.1 Reasons for failure in marriages
- 2.2 Increase in divorce rates – Dowry
- 2.3 Introduction to families – Major functions of families
- 2.4 Kinds of families – Family stages and tasks
- 2.5 Bringing up children
- 2.6 Effective parenting – Family planning

#### Unit III

- 3.1 Introduction –Health problems during adolescence
- 3.2 Healthy habits of teenagers – Health tips
- 3.3 Signs and Symptoms of anemia in teens
- 3.4 Premenstrual Syndrome
- 3.5 Uterine Fibroids
- 3.6 Breast cancer – Cervical cancer

## **Unit IV**

- 4.1 Introduction – The constitution of India
- 4.2 Legal provisions
- 4.3 Special initiatives for women
- 4.4 Women in India today
- 4.5 Marriage – child marriage – dowry – divorce – inheritance
- 4.6 Responsibility of educated women in India

## **Unit V**

- 5.1 Introduction to happiness – Beauty of happiness
- 5.2 Reason for importance of happiness
- 5.3 Causes for real happiness – Major factors contribute to happiness
- 5.4 Introduction to Religion – Inter-religious dialogue
- 5.5 Forms of dialogue
- 5.6 Reflection – means of nurturing Inter-religious harmony

### **Books for study:**

Contribution from Team of Experts and edited by M.A. Joe Antony, SJ, Young and Happy: Values for life, Auxilium Publications, Vellore (2013)

### **Books for reference:**

Smalley, Cary, The joy of Committed Love: A Handbook for wives, Better yourself Books, Bandra, Mumbai(2003)

Fisher, Cart Kathleen and Hart N. Thomas, Early Years of Marriage: Foundations for a life together, Bettter Yourself Books, Bandra, Mumbai(1999)

George, Elizabeth,FMA, Sebastian Elizabeth, FMA and Annie Lolia, FMA, Youthrill : A youth resource book for FMA Youth Animators, Volume 1, Youth Pastoral Sector, FMA India (2011)

Adukanil, Mathew, SDB Runway to Success: A guide to success in studies, career and life, Arumbu Publications, Kilpauk, Chennai (2005)

Shinn, George, The Miracle of Motivation: The Action Guide to Happiness and Success, Better yourself Books, Bandra, Mumbai (1985)

Varkey C.P. SJ, Are you a winner or a loser?: Psychology for the young and the old, Better yourself Books, Bandra, Mumbai(2006)

Koikara Felix, Heal the World: Sessions on Justice and Peace, Better Yourself Books, Bandra, Mumbai (2002)

Margaret Mathai, FMA & Felix Koikra, SDB. All rights for all: sessions for Human Rights Education, Better Yourself Books, Bandra, Mumbai (2008)

## ENGLISH FOR COMMUNICATION

<b>Year</b> 2020- 2021 <b>SEM: I</b>	<b>Course Code:</b> USENA120	<b>Title</b> ENGLISH FOR COMMUNICATION	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 2	<b>CREDITS</b> 2	<b>MARKS</b> 60
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### Course Outcomes

CO1. Have the knowledge about the elements of effective communication skills.

CO2. Understand the concepts of impactful writing.

CO3. Implement the strategies for effective speech communication.

CO4. Acquire knowledge on employment communication.

CO5. Apply communicative skills for conversational and academic purposes.

CO/PO	1	2	3	4	5	6
<b>CO1</b>	H	H	M	M	M	M
<b>CO2</b>	H	H	H	M	M	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

### Unit I: Introduction – Learning

#### Sub Units:

#### 1.1

Introduction to countries and nationalities

Question forms (pronunciation)

Asking for and giving personal Information (Writing- Completing a form) (Employability)

#### 1.2

Asking about people (Review)

Talking about jobs (Employability)

Present Simple

#### 1.3

Reading: Adverbs of frequency

Making Appointments (Skill Development)

Collocations

#### 1.4

Past Simple (Statements)

Reading: a life changes (because & so)  
Responding to information (Skill Development)

### 1.5

Life Events Years  
Past Simple: Questions  
Translation from Tamil to English (Skill Development)

### 1.6

Reading (Infinitive of Purpose)  
Talking about news (Employability)  
Letter Writing (Formal and Informal) (Skill Development)

## UNIT II: Basics of English

Unit	Cognitive Level	No. of. Hours
2	K2, K4	6

### Sub Units:

#### 2.1

At the station (pronunciation: Word Stress)  
Present Continuous  
Reading: (Transport)

#### 2.2

Offering and asking for help  
Directions and Locations (describing a route)  
Date and Time Usage

#### 2.3

Past continuous  
Reading: What were you doing?  
Giving directions  
The World Pronunciation: Word Stress

#### 2.4

Going to  
Reading: (Punctuation in number)  
Expressing doubt (Review: Lessons 25-28)

#### 2.5

Describing People (1) Modifiers  
Adjectives and adverbs  
Correction of Sentences

#### 2.6

Describing People (2) Reading: What do you like?

## Unit III: Phrase Building I

Unit	Cognitive Level	No. of. Hours
3	K1, K3	6

## **Sub Units**

### **3.1**

TV Programmes (Skill Development)

Present perfect (Ever and Never)

### **3.2**

Reading and Writing: Newspaper stories Pronunciation: The Letter (Skill Development)

Expressing thoughts Review: Lessons 33-36

Writing about Places (skill Development)

### **3.3**

Health Problems Possessive adjectives

Present perfect and past simple (talking about accidents)

### **3.4**

Advice for travelers

At the doctor's (Review: Lesson 37-40)

Cooking (Verbs and Adjectives)

### **3.5**

Quantity expression a recipe

Shops Pronunciation: Silent Letters

Comparatives and superlatives

### **3.6**

Reading and Writing: Shopping not as ... As

In a clothes shop Review: lessons 45-48

## **Unit IV: Phrase Building II**

Unit	Cognitive Level	No. of. Hours
4	K2, K4	6

## **Sub Units:**

### **4.1**

Money (pay, lend, and borrow)

Future with will

Reading and Writing: Predictions Pronunciations: Sentence Stress

### **4.2**

Money Problems

Review: lesson 49-52

Activities Likes and Dislikes

First Conditional (Pronunciation)

### **4.3**

Reading and Writing: activity holidays

Future time clauses

Booking a hotel Room (Review: lesson 53-56)

### **4.4**

In the Office

Obligation

Reading Writing: a journey to work Time Expression

### **4.5**

Greeting a Visitor (Review: 57-60)

In the home (Subject /Object Questions)

Model Verbs: Should/ Shouldn't

#### **4.6**

Reading and Writing: jobs in the home (Expressing Opinions)

Describing Faults (Review: Lessons: 61-64) (Skill Development)

Writing Report and Writing CV (Skill Development)

### **Unit V: Structural Conversation**

Unit	Cognitive Level	No. of. Hours
5	K3, K4	6

#### **Sub Units**

##### **5.1**

Material Word Building

Passives

Reading: A New Year Festival

##### **5.2**

**Responding to information (Review: lesson: 65-68) (Skill Development)**

Computers

Relatives Clauses

##### **5.3**

Reading: Internet dating

Asking what things are called (Review lessons 69-72)

Phrasal Verbs

##### **5.4**

Present Perfect: For and Since

Pronunciation: Vowel Sounds

Telephoning (Review: lessons 73-76) (Skill Development)

##### **5.5**

Reading and Writing: a description of a life (Skill Development)

Telephonic (Review: lessons 73-76)

Feelings, -ed vs -ing adjectives,

##### **5.6**

Would (Second conditional)

Reading and Writing winning: a win on lottery (Pronunciation: Syllabus)

Writing Thank – you note (Review: Lesson 77-80) (Skill Development)

### **PRESCRIBED TEXT:**

Tom, Hutchinson. English for Life Pre- intermediate Workbook with Key: Oxford University

Press, 2007. Print

**BOOKS FOR REFERENCE:**

Taylor, Grant. English Conversation Practice. Tata Mcgraw Hill.2001

Shemesh, Ruth and Waller, Sheila. Teaching English Spellings, A Practical Guide. Cambridge. 2000.

Raymond Murphy, Essential English Grammar: A Self-Study Reference and Practice Book for Elementary Students of English with Answers: Cambridge University Press.

Good will's Common Mistakes in English – Sam Phillips (Active Grammar Level 1, 2, 3)  
(English vocabulary in use –Stuart Redman).

## CONVERSATIONAL ENGLISH

<b>Year</b> 2020- 2021 <b>SEM:</b> <b>II</b>	<b>Course</b> <b>Code:</b> USENA220	<b>Title</b> <b>CONVERSATIONAL</b> <b>ENGLISH</b>	<b>Course</b> <b>Type:</b> Theory	<b>Course</b> <b>Category:</b> Elective	<b>H/W</b> <b>2</b>	<b>CREDITS</b> <b>2</b>	<b>MARKS</b> <b>60</b>
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### Course Outcomes

CO1. Have the knowledge about the elements of effective communication skills.

CO2. Understand the concepts of impactful writing.

CO3. Implement the strategies for effective speech communication.

CO4. Acquire knowledge on employment communication.

CO5. Apply communicative skills for conversational and academic purposes.

<b>CO/PSO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

<b>CO/PO</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	H

### Course Syllabus

<b>Unit</b>	<b>Cognitive Level</b>	<b>No. of. Hours</b>
<b>1</b>	<b>K1, K2</b>	<b>6</b>

## **Unit I**

### **Sub Units:**

#### **1.1**

Idiom and Fixed Expression

Prepositions: Place

#### **1.2**

Adverb: frequency and degree,

Time and sequence

#### **1.3**

Addition and Contrast

Similarities

#### **1.4**

Difference and conditions

Reasons

#### **1.5**

Purpose and results

The Physical world

#### **1.6**

Weather

Using the land

## **UNIT II**

<b>Unit</b>	<b>Cognitive Level</b>	<b>No. of. Hours</b>
<b>2</b>	<b>K2, K4</b>	<b>6</b>

### **Sub Units:**

#### **2.1**

Animals and insects

Countries nationalities and language

#### **2.2**

The body and what it does

Describing people's appearance

#### **2.3**

Describing Character

Human feelings and actions

#### **2.4**

Family and friends

Ages and stages

Daily Routine

**2.5**

Homes and buildings

Around the home 1

Around the home 2

**2.6**

Everyday Problems

Money, Health: illness and disease

Health: injuries

**Unit III**

<b>Unit</b>	<b>Cognitive Level</b>	<b>No. of. Hours</b>
<b>3</b>	<b>K1, K3</b>	<b>6</b>

**Sub Units**

**3.1**

Clothes

Shops and shopping

Food

Cooking and restaurants

**3.2**

Town and country

On the road

Transport

**3.3**

Work: duties

Conditions and pay

Jobs

**3.4**

The Career ladder, in the office and in the factory

Business and Finance

Sales and marketing

**3.5**

Hobbies

Sports1: games people and places

**3.6**

Cinema and theatre

Music art and Literature

**Unit IV**

<b>Unit</b>	<b>Cognitive Level</b>	<b>No. of. Hours</b>
<b>4</b>	<b>K2, K4</b>	<b>6</b>

**Sub Units:****4.1**

Newspapers

Television

On the phone

**4.2**

Computers

Education: School

Education: university

**4.3**

Law and order

Crime

Politics

**4.4**

Bureaucracy

War and Peace

**4.5**

Pollution and the environment

Air Travel

**4.6**

A Sightseeing holiday

On the beach and in the country

**Unit V**

Unit	Cognitive Level	No. of. Hours
5	K3, K4	6

**Sub Units****5.1**

Time

Numbers

Distance and dimension

**5.2**

Shapes

Colours and Patterns

**5.3**

Partitives

The senses

**5.4**

Notices and Warnings

Vague languages

**5.5**

American English

Formal and informal English

## 5.6

Abbreviations and abbreviated words

### **PRESCRIBED TEXT:**

Stuart Redman. English Vocabulary in use Pre-intermediate & intermediate: Cambridge University Press, 1997. print

### **BOOKS FOR REFERENCE:**

Taylor, Grant. English Conversation Practice. Tata Mcgraw Hill.2001

Shemesh, Ruth and Waller, Sheila. Teaching English Spellings, A Practical Guide. Cambridge. 2000.

Raymond Murphy, Essential English Grammar: A Self-Study Reference and Practice Book for Elementary Students of English with Answers: Cambridge University Press.

Good will's Common Mistakes in English – Sam Phillips (Active Grammar Level 1, 2, 3)  
(English vocabulary in use –Stuart Redman.

## AUXILIUM COLLEGE (Autonomous)

(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)

**Gandhi Nagar, Vellore - 632006**

<b>Year: II SEM: III</b>	<b>Course Code :USEN C320</b>	<b>Title Of The Course: English for Competitive Exams</b>	<b>Course Type :Theory/ Practical</b>	<b>Course Category : Skill Based Elective I</b>	<b>H/W 2</b>	<b>CREDITS 2</b>	<b>MARKS 60</b>
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### Course Outcomes

The Learners will be able to

<b>CO No.</b>	<b>Course Outcome</b>
CO1	Recall basic rules of grammar
CO2	Enhance the students vocabulary and communication skill
CO3	Speak and write fluently inEnglish
CO4	Enhance different verbal and reasoning ability
CO5	Enrich student knowledge on general awareness and current affairs

<b>CO/PSO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	M	M	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

<b>CO/PO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	M	M	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	M

**Unit I: Grammar**

**K Level (1 – 4)**

**(Hours 7)**

- 1.1 Elements of Grammar
- 1.2 Parts of speech
- 1.3 Kinds of sentences
- 1.4 Articles
- 1.5 Spotting the errors
- 1.6 Rearranging sentences

**Unit II: Vocabulary**

**K Level (1 – 4)**

**(Hours 7)**

- 2.1 Introduction to Vocabulary
- 2.2 Antonyms
- 2.3 Synonyms
- 2.4 Acronyms
- 2.5 Homophones
- 2.6 Homonyms

**Unit III: Spellings****K Level (1 – 4)****(Hours 7)**

- 3.1 Introduction to the importance of correct spelling
- 3.2 Jumbled words
- 3.3 One Word Substitutions
- 3.4 Misspelt words
- 3.5 Introduction to creating new words
- 3.6 Creating new words

**Unit IV: Reasoning****K Level (1 – 4)****(Hours 8)**

- 4.1 Verbal Reasoning
- 4.2 Comprehension and composition
- 4.3 Letter writing
- 4.4 Paragraph Writing
- 4.5. Cloze Test
- 4.6 Idioms and Phrases

**Unit V: General knowledge****K Level (1 – 4)****(Hours 7)**

- 5.1 Introduction to the importance of General Knowledge
- 5.2 General Intelligence and Reasoning
- 5.3 Current Affairs and recent developments
- 5.4 Static GK
- 5.5 General Awareness
- 5.6 Abbreviations

**Books for Study:**

R. Gopalan V. Rajagopalan Roopkumar Balasingh, General English for Competitive Examinations. Vijay Nicole Imprints pvt. Ltd ( Chennai) 2010.

R.P. Bhatnagar. *English for Competitive Examinations* 3<sup>rd</sup> Edition. India: MacMillan. 2009.

Bhatnagar R.P & Rajul Bhargava. *English for Competitive Examinations*. Special

Edition. Macmillan Publishers, 2007.

Maison M.Margaret . *Examine Your English*. Orient Blackswan Private Limited,  
Hyderabad, 1964.

### **Books for Reference**

Murphy, Raymond. *Essential English Grammar*. Cambridge University Press, 2003.

B.G.Tandon &Tandon,Loveena. *English Grammar and Composition*. Anne Books, 2007.

A.J. Thompson &A.V.Martinet. *A Practical English Grammar*. OUP, 1980.

T.L.H. Pearse, Smith. *The English Errors of Indian Students*. OUP, 1968.

# **Department of Psychology (UG)**

## **SYLLABUS AND REGULATIONS**

**Under**

### **OUTCOME BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



### **AUXILIUM COLLEGE (Autonomous)**

**(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)**

**Gandhi Nagar, Vellore-632 006**

**AUXILIUM COLLEGE (Autonomous)**

**(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)**

**Gandhi Nagar, Vellore-632 006**

**Department of Psychology (UG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighbouring districts.

**B) NAME OF THE PROGRAMME: B.Sc. Psychology**

**Vision:**

The course intends to enable students in developing skills and competencies needed for meeting the challenges and needs of the real world effectively and prepare them to be lifelong learners who will be socially responsible to navigate the complexities of a rapidly changing society.

**C) ELIGIBILITY CRITERIA OF THE PROGRAMME**

A candidate who has qualified in Higher Secondary Examination conducted by Government of Tamil Nadu or an examination accepted as equivalent thereto by the Syndicate, preferably with Biology as one of the subjects is eligible for seeking admission to the B.Sc. Psychology course.

<u>Sem</u>	<u>Part</u>	<u>Paper Code</u>	<u>Title of the Paper</u>	<u>Hour s/ Wee k</u>	<u>Exam</u>		<u>Credits</u>	<u>Marks</u>
					<u>Th</u>	<u>Pr</u>		
I	I	<u>ULTAA20</u>	<u>Tamil Paper – I</u>	<u>6</u>	<u>3</u>	<u>=</u>	<u>3</u>	<u>40+60</u>
	II	<u>UENGA20</u>	<u>English Paper – I</u>	<u>6</u>	<u>3</u>	<u>=</u>	<u>3</u>	<u>40+60</u>
	III	<u>UCPYA20</u>	<u>General Psychology – I</u>	<u>5</u>	<u>3</u>	<u>=</u>	<u>5</u>	<u>40+60</u>
	III	<u>UCPYB20</u>	<u>Biological Psychology – I</u>	<u>5</u>	<u>3</u>	<u>=</u>	<u>4</u>	<u>40+60</u>
	III	<u>UAPMA20</u>	<u>Allied – I: Principles of Management</u>	<u>5</u>	<u>3</u>	<u>=</u>	<u>4</u>	<u>40+60</u>
	IV	<u>=</u>	<u>Skill-based Elective – I</u>	<u>2</u>	<u>2</u>	<u>=</u>	<u>2</u>	<u>40+60</u>
	IV	<u>UVEDA15</u>	<u>Value Education</u>	<u>1</u>	<u>=</u>	<u>=</u>	<u>=</u>	<u>=</u>
<b><u>Total</u></b>							<b><u>21</u></b>	<b><u>600</u></b>
II	I	<u>ULTAB20</u>	<u>Tamil Paper – II</u>	<u>6</u>	<u>3</u>	<u>=</u>	<u>3</u>	<u>40+60</u>
	II	<u>UENGB20</u>	<u>English Paper – II</u>	<u>6</u>	<u>3</u>	<u>=</u>	<u>3</u>	<u>40+60</u>
	III	<u>UCPYC20</u>	<u>General Psychology – II</u>	<u>5</u>	<u>3</u>	<u>=</u>	<u>5</u>	<u>40+60</u>
	III	<u>UCPYD20</u>	<u>Biological Psychology – II</u>	<u>5</u>	<u>3</u>	<u>=</u>	<u>4</u>	<u>40+60</u>
	III	<u>UAOBA20</u>	<u>Allied – II: Organizational Behaviour</u>	<u>5</u>	<u>3</u>	<u>=</u>	<u>4</u>	<u>40+60</u>
	IV	<u>=</u>	<u>Skill-based Elective – I</u>	<u>2</u>	<u>2</u>	<u>=</u>	<u>2</u>	<u>40+60</u>
	IV	<u>UVEDA15</u>	<u>Value Education</u>	<u>1</u>	<u>=</u>	<u>=</u>	<u>=</u>	<u>=</u>
<b><u>Total</u></b>							<b><u>21</u></b>	<b><u>600</u></b>

## **E) PROGRAMME OUTCOMES (PO)**

**PO1:**Attain knowledge and understand the principles and concepts in the respective discipline.

**PO2:**Acquire and apply analytical, critical and creative thinking, and problem-solving skills

**PO3:**Effectively communicate general and discipline-specific information, ideas and opinions.

**PO4:**Appreciate biodiversity and enhance eco-consciousness for sustainable development of the society

**PO5:**Emulate positive social values and exercise leadership qualities and team work.

**PO6:**Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

## F) PROGRAMME S OUTCOMES (PSO)

### PSO1: Disciplinary knowledge

- i. Define major concepts in psychology and explain the theoretical perspectives of the fields in Psychology.
- ii. Capability of demonstrating comprehensive knowledge of Psychology and understanding of one or more disciplines which form a part of the undergraduate programme of study.

### PSO2: Problem solving

Ability to handle various life situations confidently and competently.

### PSO3: Self-directed learning

Ability to work independently and do in-depth study of various concepts of Psychology.  
Learn independently through self-reflection and evaluation of one's strengths and weaknesses

### PSO4: Employability Skills

Ability to gain employment and be successful in their chosen occupation which benefits the recipients, the workforce, the community and themselves.

### PSO5: Research-related skills

- i. Capability for inquiring about appropriate questions relating to the concepts in various fields of Psychology.
- ii. To know about the advances in various branches of Psychology

### PSO6: Communication skills

- i. Developing an understanding of the growing discipline of psychology and developing necessary skills to be effective in her communicative skills.
- ii. Use effective and fluent written, oral and visual communication to convey ideas and concept

PSO	PO						AVERAGE
	PO1	PO2	PO3	PO4	PO5	PO6	
PSO1	3	3	3	3	3	3	3
PSO2	3	3	3	3	3	3	3
PSO3	3	3	3	2	3	3	2.833
PSO4	3	3	3	3	3	3	3
PSO5	3	2	2	2	3	3	2.5
PSO6	3	3	3	3	3	3	3
Average mean score of mapping							= 17.3/6

**STRONGLY CORRELATED -3, MODERATELY CORRELATED – 2, WEAKLY  
CORRELATED -1**

**SEMESTER – I**  
**GENERAL PSYCHOLOGY - I**

<u>Year/ Sem</u>	<u>Course Code</u>	<u>Title of the Course</u>	<u>Course Type</u>	<u>Course Category</u>	<u>H/W</u>	<u>Credits</u>	<u>Marks 100</u>
I/I	UCPYA20	General psychology - I	Theory	Core	5	5	40+60=100

**OBJECTIVE:** To introduce students to the basic concepts of the field of psychology with an emphasis on applications of psychology in everyday life.

**COURSE OUTCOMES (CO):**

On completion of the course, the students will be able to:

- Understand the origin of psychology as science and acquire knowledge of the various scientific methods used in psychology to understand human behaviour
- Define the concepts and explain sensation, perception and attention
- Demonstrate the structural features of Consciousness
- Explain the role of Learning, and compare the various theories of learning
- To understand the fundamental processes of Memory

CO/PSO	PSO					
	1	2	3	4	5	6
CO 1	H	M	H	M	H	M
CO 2	H	M	M	M	H	M
CO 3	H	H	H	M	M	M
CO 4	H	M	H	M	H	H
CO 5	H	M	H	M	M	M

**Low-L, Medium-M, High-H**

CO/PO	PO					
	1	2	3	4	5	6
CO 1	M	M	H	H	H	M
CO 2	M	H	M	H	H	M
CO 3	L	H	H	M	M	M
CO 4	L	H	H	M	H	H
CO 5	L	M	H	M	M	M

**UNIT I:****[18 Hours]**

- 1.1 Psychology - Definition – Goals (K1,K2)
- 1.2 Pseudo psychology(K1,K2,K3)
- 1.3 The History of Psychology – Schools - Modern Perspectives – Psychology in India(K1,K2,K3,K4)
- 1.4 Psychology: The Science – Methods: Introspection – Observation – Survey – Experiment Case Study – Correlation Research(K1,K2,K3,K4)
- 1.5 Scope of Psychology - Branches of basic Psychology (K1,K2,K3,K4)
- 1.6 Branches of applied Psychology(K1,K2,K3)

**UNIT II:****[18 Hours]**

- 2.1 Sensation: Meaning – Psychophysics -Thresholds – Weber’s Law – Adaptation (K1,K2,K3,K4)
- 2.2 Basic sensation: Vision – Hearing – Touch and other Skin senses – Olfaction- Gustation (K1,K2,K3,K4)
- 2.3 Kinesthetic sense – Vestibular sense (K1,K2,K3,K4)
- 2.4 Perception: Meaning– Organizing principles of perception –Constancies-Pattern perception, Distance perception- Errors in Perception - Illusion – Types; Hallucinations – Types(K1,K2,K3,K4)
- 2.5 Extra Sensory Perception. - Factors that influence perception – Depth perception (K2,K3,K4)
- 2.6 Attention: Meaning – Types – Determinants(K2,K3,K4)

**UNIT III:****[18Hours]**

- 3.1 Consciousness - States of Consciousness: Consciousness – Definition –Types(K1,K2,K3)
- 3.2 Natural State of Consciousness: Biological Rhythms – Circadian Rhythms(K1,K2,K3,K4)
- 3.3 Waking States of Consciousness – Sleep – Functions – Stages –(K1,K2,K3,K4)
- 3.4 Sleep Disorders – Dream – Theories. (K2,K3,K4)
- 3.5 Altered States of Consciousness: meaning – Hypnosis – Use of Drugs – Meditation (K1,K2,K3,K4)
- 3.6 Other Altered States. Sensory deprivation: Near death Experience- Lucid dreaming(K1,K2,K3,K4)

**UNIT IV:****[18 Hours]**

- 4.1 Learning: Definition – Nature(K1,K2,K3,K4)
- 4.2 Association Learning: Classical Conditioning – Basic Principles(K1,K2,K3,K4)
- 4.3 Operant Conditioning – Basic Principles – Reinforcement – Types (K2,K3)
- 4.4 Punishment – Types(K2,K3,K4)
- 4.5 Schedules of Reinforcement – Shaping – Learned Helplessness; Similarities and Differences between Classical Conditioning and Operant Conditioning(K1,K2,K3,K4)
- 4.6 Social and Cognitive Learning: Latent Learning – Insight Learning – Observational Learning(K1,K2,K3,K4)

**UNIT V:****[18 Hours]**

5.1 Memory: Definition (K1,K2)

5.2 Memory Process: Encoding – Storage – Retrieval (K1,K2,K3)

5.3 The information processing model – Sensory memory – Short term memory – Long term memory(K1,K2,K3,K4)

5.4 Forgetting: Meaning – Forgetting curve- Causes – Memory(K1,K2,K3,K4)

5.5 Theories of forgetting (K1,K2,K3,K4)

5.6 Brain – Improving memory(K1,K2,K3)

**TEXTBOOK:**

1. Cicarelli, K. S., Meyer, E. G. & Misra, G. (2008). *General psychology*. New Delhi, India: Pearson India Education Services Pvt Ltd.

**REFERENCE BOOK:**

1. Baron, R. A. (2010). *Psychology* (5th ed.). New Delhi, India: Pearson India Education Services Pvt. Ltd

## SEMESTER – I

### UCPYB20 - BIOLOGICAL PSYCHOLOGY - I

<u>Year/ Sem</u>	<u>Course Code</u>	<u>Title of the Course</u>	<u>Course Type</u>	<u>Course Category</u>	<u>H/W</u>	<u>Credits</u>	<u>Marks 100</u>
I/I	UCPYB20	Biological Psychology - I	Theory	Core	5	5	40+60=100

#### OBJECTIVES:

- To explore the biological basis of experience and behaviour.
- To develop an understanding of the influence of behaviour, cognition, and the environment on bodily system.
- To develop an appreciation of the neurobiological basis of psychological function and dysfunction.

#### COURSE OUTCOMES (CO)

On completion of the course, the students will be able to:

- Comprehend human biology and its influence on human behaviour
- Outline the Foundations of behaviour and brain activity
- Demonstrate the structure and functions of the Neurons
- Explain the role of Neurotransmitter
- Demonstrate and summaries the structure and functions of the developement of the central nervous system
- To understand the influence of various Hormones on behaviour

CO/PSO	PSO					
	1	2	3	4	5	6
CO 1	H	H	H	M	H	H
CO 2	H	H	H	M	H	H
CO 3	H	H	H	M	M	H
CO 4	H	H	H	M	H	H
CO 5	H	H	H	M	M	H

CO/PO	PO					
	1	2	3	4	5	6
CO 1	H	M	H	M	H	M
CO 2	H	M	M	M	H	M
CO 3	H	H	H	M	M	M
CO 4	H	M	H	M	H	H
CO 5	H	M	H	M	M	M

**UNIT I:****[18 Hours]**

- 1.1 Foundations of behaviour - Introduction: meaning of biological psychology(K1,K2,K3)
- 1.2 Viewpoints to explore Biology of Behaviour- Approaches that relate brain and behaviour(K1,K2,K3,K4)
- 1.3 Levels of analysis - Correlating brain anatomy with behaviour(K2,K3)
- 1.4 Recording brain activity (K2,K3,K4)
- 1.5 Effects of brain damage(K2,K3)
- 1.6 Effects of brain stimulation (K1,K2,K3)

**UNIT II:****[18 Hours]**

- 2.1 Neurons- features of the Nervous System: An overview(K1,K2,K3,K4)
- 2.2 Meninges, Ventricular system and production of cerebrospinal fluid. (K1,K2,K3,K4)
- 2.3 Cells of the Nervous System: Neurons, Supporting cells(K2,K3,K4)
- 2.4 The blood-brain barrier (K1,K2,K3)
- 2.5 Neural Communication: An overview, Measuring electrical potentials of axons(K1,K2,K3)
- 2.6 The Membrane Potential: Balance of two forces, The Action Potential, Conduction of the action potential(K1,K2,K3,K4)

**UNIT III:****[18 Hours]**

- 3.1 Communication between Neurons: Structure of synapses(K1,K2,K3,K4)
- 3.2 Neurotransmitter: meaning- types(K1,K2,K3)
- 3.3 Release of the Neurotransmitter: Activation of receptors(K1,K2,K3)
- 3.4 Postsynaptic potentials- Termination of postsynaptic potentials(K1,K2,K3,K4)

**UNIT IV:****[18 Hours]**

- 4.1 Nervous System: Development of the central nervous system(K1,K2,K3,K4)
- 4.2 Brain: The forebrain, The hind brain, midbrain & forebrain(K1,K2,K3)
- 4.3 Division of Nervous System: Central Nervous System, The Peripheral Nervous System(K1,K2,K3,K4)
- 4.4 Division of Nervous System: Spinal nerves, Cranial nerves(K2,K3)
- 4.5 The Autonomic Nervous system – Sympathetic (K2,K3)
- 4.6 The Autonomic Nervous System Parasympathetic(K2,K3)

**UNIT V:****[18 Hours]**

- 5.1 Hormonal actions- General principles of hormonal actions(K1,K2,K3,K4)
- 5.2 Hormonal action on cellular mechanisms- Hormonal influence on growth and activity(K2,K3)
- 5.3 Feedback control mechanisms in regulating secretion of hormones(K2,K3)
- 5.4 Endocrine glands and its specific hormones: Pituitary- Pineal- Thyroid- Parathyroid(K1,K2,K3,K4)
- 5.5 Pancreas- Adrenal- Gonads(K2,K3)

**TEXT BOOKS:**

1. Carlson, N.R. (2007). *Foundations of physiological psychology* (6th ed.). New Delhi, India: Pearson India Education Services Pvt Ltd.
2. Kalat, J.W. (2011). *Biopsychology*. Delhi, India: Cengage Learning India Private Limited.

**REFERENCES:**

1. Pinel, J. (2007). *Biopsychology* (6th ed.). New Delhi, India: Pearson India Education Services Pvt Ltd.
2. Purves, D., Brannon, E., Huettel, S.A., Labar, K.S., Platt, M.L., & Woldorff, G.M. (2008). *Principles of cognitive neurosciences*. Sunderland, MA: Sinauer Associates, Inc. Publishers.

## SEMESTER – I

### UAPMA20 – ALLIED I: PRINCIPLES OF MANAGEMENT

<u>Year/ Sem</u>	<u>Course Code</u>	<u>Title of the Course</u>	<u>Course Type</u>	<u>Course Category</u>	<u>H/W</u>	<u>Credits</u>	<u>Marks 100</u>
I/I	UAPMA20	Principles of management	Theory	Allied	5	5	40+60=100

#### OBJECTIVE:

To provide employment opportunities to people, To provide a safe working environment with strict safety measures for its employees to work without fear and anxiety

#### COURSE OUTCOMES(CO):

On completion of the course, the students will be able to:

- 1) Identify and apply appropriate management techniques for managing business
- 2) Have a conceptual knowledge about the planning and decision making.
- 3) Apply the concept of organising for the effective functioning of a management.
- 4) Evaluate leadership style to anticipate the consequences of each leadership style.
- 5) Demonstrate the techniques for controlling and coordination.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	M	H	M
CO2	H	L	M	H	M	L
CO3	H	M	H	L	L	M
CO4	H	M	M	H	M	M
CO5	M	M	H	H	L	H

CO/PO	PO					
	1	2	3	4	5	6
CO1	M	H	M	H	H	H
CO2	L	M	M	H	H	L
CO3	H	M	M	L	M	L
CO4	H	M	H	M	L	L
CO5	M	H	H	L	H	H

## **UNIT-I**

- 1.1 Management -importance-definition(K1,K2,K3,K4)
- 1.2 Nature-scope-process(K1,K2,K3,K4)
- 1.3 Role & functions-levels-management(K1,K2,K3,K4)
- 1.4 As a science-management(K1,K2,K3)
- 1.5 As a profession-contribution of henry fayol & f.w.taylor in management(K1,K2,K3,K4)

## **UNIT-II**

- 2.1 Planning-nature-importance-types(K1,K2,K3,K4)
- 2.2 Steps in planning-objectives-policies(K1,K2,K3,K4)
- 2.3 Procedures-and methods(K1,K2,K3,K4)
- 2.4 Decision-process of decision making-types of decision(K1,K2,K3,K4)

## **UNIT-III**

- 3.1 Organizing (K1,K2)
- 3.2 Types of organizing structure(K1,K2,K3,K4)
- 3.3 Span of control(K1,K2,K3)
- 3.4 Departmentation(K1,K2,K3)
- 3.5 Informal organization(K1,K2,K3)

## **UNIT-IV**

- 4.1 Authority- delegation - decentralization (K1,K2,K3,K4)
- 4.2 Difference between authority - staffing (K1,K2,K3)
- 4.3 Sources of recruitment (K1,K2,K3)
- 4.4 Selection process - training - directing (K1,K2,K3)
- 4.5 Nature and purpose of directing (K1,K2,K3)
- 4.6 Motivation (Maslow's need hierarchy theory only)(K1,K2,K3,K4)

## **UNIT-V**

- 5.1 Introduction(K1,K2)
- 5.2 meaning of coordination(K1,K2,K3,K4)
- 5.3 Definition of coordination by different authors(K1,K2,K3,K4)
- 5.4 Need/Importance of coordination (K1,K2,K3,K4)
- 5.5 Types of coordination(K1,K2,K3,K4)
- 5.6 Techniques of coordination(K1,K2,K3,K4)
- 5.7 Coordination & cooperation(K1,K2,K3,K4)

## SEMESTER – II

### UCPYC20 - GENERAL PSYCHOLOGY – II

<u>Year/ Sem</u>	<u>Course Code</u>	<u>Title of the Course</u>	<u>Course Type</u>	<u>Course Category</u>	<u>H/W</u>	<u>Credits</u>	<u>Marks 100</u>
I/II	UCPYC20	General Psychology - II	Theory	Core	5	5	40+60=100

**OBJECTIVE:** Provide an overview of the basic concepts in psychology to help in better communication and enhance adjustment in life and work.

#### **COURSE OUTCOMES (CO):**

On completion of the course, the students will be able to:

- Understand the basic aspects of cognition and behaviour
- Demonstrate the process of motivation and frustration
- Explain the underlying principles of physiological basis of emotion and stress
- Elaborate on the attributes of creativity and Intelligence
- Compare and contrast the various approaches of personality

CO/PSO	PSO					
	1	2	3	4	5	6
CO 1	H	H	H	M	H	H
CO 2	H	H	H	M	H	H
CO 3	H	M	H	M	M	H
CO 4	H	H	H	M	H	H
CO 5	H	H	M	M	M	H

#### **Low-L, Medium-M, High-H**

CO/PO	PO					
	1	2	3	4	5	6
CO 1	L	H	H	H	M	H
CO 2	M	H	H	M	L	M
CO 3	L	M	H	H	H	M
CO 4	H	M	H	H	M	H
CO 5	H	H	M	H	H	M

**UNIT I:****[18 Hours]**

- 1.1 Cognition: Meaning – Cognitive Psychology(K1,K2,K3)
- 1.2 Types of cognition: – Mental Imagery – Concept, Problem solving- Steps(K1,K2,K3,K4)
- 1.3 Barriers to Effective problem solving(K2,K3)
- 1.4 Strategies of problem solving: Algorithms, Heuristic, Decision making – Step(K1,K2,K3,K4)
- 1.5 Reasoning – Inductive and Deductive reasoning(K2,K3)
- 1.6 Language: Nature - Main Components of Language – Phonemes- Morphemes  
Syntax - Semantics – Pragmatics(K1,K2,K3,K4)

**UNIT II:****[18 Hours]**

- 2.1 Motivation: Definition – Needs – Biological Needs – Social Needs - Psychological Needs (K1,K2,K3,K4)
- 2.2 Theories of Motivation: Instincts – Drive-reduction theory – Arousal – Incentive (K2,K3,K4)
- 2.3 Opponent-Process – Cognitive theories – Social cognitive theory – Need theories(K2,K3,K4)
- 2.4 Classification of Motives: Physiological motives – Psychological motives(K2,K3,K4)
- 2.5 Conflict: Meaning- Types(K1,K2,K3)
- 2.6 Frustration: Meaning- Causes(K2,K3,K4)

**UNIT III:****[18 Hours]**

- 3.1 Emotion: Meaning – Basic emotions- Components (K1,K2,K3)
- 3.2 Physiology of emotion - Expression of emotion(K2,K3)
- 3.3 Theories of Emotions(K2,K3,K4)
- 3.4 Stress: Definition – Four variations - Stressors – Effects (K1,K2,K3,K4)
- 3.5 General Adaptation Syndrome – Individual differences - Coping mechanism.(K1,K2,K3,K4)

**UNIT IV:****[18 Hours]**

- 4.1 Intelligence: Definition - Concept of IQ (K1,K2,K3)
- 4.2 Individual differences in Intelligence –Mental retardation(K2,K3,K4)
- 4.3 Mentally gifted – Assessment of Intelligence(K2,K3,K4)
- 4.4 Emotional Intelligence: Meaning ,Characteristics(K1,K2,K3)
- 4.5 Creativity: Definition- Nature – Steps - Characteristics of creative people(K1,K2,K3,K4)
- 4.6 Creativity tests(K2,K3)

**UNIT V:****[18 Hours]**

- 5.1 Personality: Definition - Theories – Psychoanalytic(K1,K2,K3,K4)
- 5.2 Neo Freudian: Jung –Adler - Karen Horney – Erikson (K2,K3,K4)
- 5.3 Behavioristic view – Social Cognitive view (K2,K3,K4)
- 5.4 Humanism and Personality: Roger’s theory – Maslow’s theory (K1,K2,K3,K4)
- 5.5 Trait Theories Psychology – Allport – Cattell - The Big Five Factors(K2,K3,K4)
- 5.6 Assessment of Personality, Uses of Personality tests(K1,K2,K3,K4)

**TEXTBOOK:**

1. Cicarelli, K. S., Meyer, E. G. & Misra. (2008) General psychology. New Delhi, India: Dorling Kingsley (India) Private Limited

**REFERENCE BOOK:**

1. Baron, R. A. (2010) Psychology (5th ed.). New Delhi, India: Pearson India Education Services Pvt Ltd.

## SEMESTER – II

### UCPYD20 - BIOLOGICAL PSYCHOLOGY – II

<u>Year/ Sem</u>	<u>Course Code</u>	<u>Title of the Course</u>	<u>Course Type</u>	<u>Course Category</u>	<u>H/W</u>	<u>Credits</u>	<u>Marks 100</u>
I/ II	UCPYD20	Biological Psychology - II	Theory	Core	5	5	40+60=10 <u>0</u>

#### OBJECTIVES:

- To explore the biological basis of experience and behaviour.
- To develop an understanding of the influence of behaviour, cognition, and the environment on bodily system.
- To develop an appreciation of the neurobiological basis of psychological function and dysfunction.

#### COURSE OUTCOMES (CLO):

On completion of the course, the students will be able to:

- Explain the Circadian rhythms, sleep and dreaming patterns
- Demonstrate the brain development
- Understand the biological basis of thirst and hunger
- Elaborate biological basis of emotions
- Explain biological basis of Learning and memory

CO/PSO	PSO					
	1	2	3	4	5	6
CO 1	H	H	H	M	L	H
CO 2	H	H	H	M	H	H
CO 3	M	M	H	M	M	H
CO 4	M	H	H	M	H	H
CO 5	H	H	M	M	L	H

**Low-L, Medium-M, High-H**

CO/PO	PO					
	1	2	3	4	5	6
CO 1	L	H	M	L	M	H
CO 2	H	H	H	H	M	H
CO 3	L	H	M	H	M	L
CO 4	M	M	H	H	H	H
CO 5	M	M	H	H	H	H

**UNIT I:****[18 Hours]**

- 1.1 Rhythms of waking and sleeping: Endogenous cycles(K1,K2,K3)
- 1.2 Setting and resetting the biological clock- Mechanisms of the biological clock(K2,K3,K4)
- 1.3 Sleep and brain mechanisms: Sleep and other interruptions of consciousness, the onset of sleep and hypnagogic hallucinations(K1,K2,K3,K4)
- 1.4 Stages of sleep. Paradoxical or REM sleep, Brain mechanisms of wakefulness and arousal(K1,K2,K3,K4)
- 1.5 Brain functions in REM sleep- Functions of sleep(K1,K2,K3)
- 1.6 Dreaming: REM sleep and dreaming. Biological perspectives on dreaming(K1,K2,K3)

**UNIT II:****[18 Hours]**

- 2.1 Development of the brain- Maturation of the vertebrate brain(K1,K2,K3)
- 2.2 Growth and development of neurons (K1,K2,K3)
- 2.3 New neurons later in life- Path finding by axons(K1,K2,K3)
- 2.4 Determinants of neuronal survival(K2,K3)
- 2.5 Neural plasticity: Meaning- Plasticity after brain damage(K1,K2,K3)

**UNIT III:****[18 Hours]**

- 3.1 Thirst: Mechanisms of water regulation- Osmotic thirst(K1,K2,K3)
- 3.2 Hypovolemic thirst and sodium specific hunger(K1,K2,K3,K4)
- 3.3 Hunger: Digestion and food selection(K2,K3,K4)
- 3.4 Short- and long-term regulation of feeding-Brain mechanisms(K2,K3,K4)
- 3.5 Eating Disorders(K2,K3,K4)

**UNIT IV:****[18 Hours]**

- 4.1 Emotions: Introduction, Emotions and Autonomic arousal (K1,K2,K3)
- 4.2 James-Lange theory(K3,K4)
- 4.3 Brain areas associated with emotions- The functions of emotions(K1,K2,K3)
- 4.4 Attack and Escape Behaviours: Attack behaviours(K1,K2,K3)
- 4.5 Escape - Fear and anxiety(K1,K2,K3)
- 4.6 Stress and Health(K2,K3)

**UNIT V:****[18 Hours]**

- 5.1 Memory: Localized representations of memory(K1,K2,K3)
- 5.2 Types of memory- The hippocampus (K1,K2,K3)
- 5.3 Theories on the function of the hippocampus(K2,K3,K4)
- 5.4 Other types of amnesia: Korsakoff's syndrome(K2,K3,K4)
- 5.5 Alzheimer's Disease(K1,K3,K4)
- 5.6 The role of the other brain areas(K1,K2,K3)

**TEXT BOOKS:**

1. Carlson, N. R. (2007). Foundations of physiological psychology (6th ed.). New Delhi, India: Pearson India Education Services Pvt Ltd.
2. Kalat, J.W. (2011). Biopsychology. Delhi, India: Cengage Learning India Private Limited.

**REFERENCESBOOKS:**

1. Pinel, J. (2007). *Biopsychology* (6th ed.). New Delhi, India: Pearson India Education Services Pvt Ltd.
2. Purves, D., Brannon, E., Huettel, S.A., Labar, K.S., Platt, M.L., &Woldorff, G.M. (2008). *Principles of cognitive neurosciences*. Sunderland, MA: Sinauer Associates, Inc. Publishers.

## SEMESTER-II

### UAOBA20 – ALLIED II: ORGANIZATIONAL BEHAVIOR

<u>Year/ Sem</u>	<u>Course Code</u>	<u>Title of the Course</u>	<u>Course Type</u>	<u>Course Category</u>	<u>H/W</u>	<u>Credits</u>	<u>Marks 100</u>
<u>I / II</u>	<u>UAOBA20</u>	Organizational behavior	<u>Theory</u>	<u>Allied</u>	<u>5</u>	<u>5</u>	<u>40+60=100</u> <u>0</u>

#### UNIT-I

- 1.1 Meaning -nature-importance-role(K1,K2,K3)
- 1.2 Historical development of OB(K1,K2,K3,K4)
- 1.3 Organizational as a social system-social technical system(K1,K2,K3,K4)
- 1.4 Open system-factors influencing of OB(K1,K2,K3,K4)
- 1.5 Environmental factors-constraints over organization and managerial performance.(K1,K2,K3,K4)

#### UNIT-II

- 2.1 Meaning of group dynamic-reason for formation of group(K1,K2,K3,K4)
- 2.2 Characteristic of group(K1,K2,K3,K4)
- 2.3 Theories of group dynamics(K1,K2,K3,K4)
- 2.4 Types of group in organization-group cohesiveness(K1,K2,K3,K4)
- 2.5 Group decision making process-small group behavior(K1,K2,K3,K4)

#### UNIT-III

- 3.1 Leadership concept-characteristic leadership theories(K1,K2,K3,K4)
- 3.2 Leadership styles-managerial grid(K1,K2,K3,K4)
- 3.3 Leadership effectiveness(K1,K2,K3,K4)
- 3.4 Motivation-financial and non financial(K1,K2,K3,K4)
- 3.5 Theories of motivation(K1,K2,K3,K4)
- 3.6 Morale-meaning-characteristic-determinant of morale(K1,K2,K3,K4)

#### UNIT-IV

- 4.1 Organizational culture-definition-determinance of organizational culture(K1,K2,K3,K4)
- 4.2 Characteristics-types-fuctions-organizational climate(K1,K2,K3,K4)
- 4.3 Determinance of organizational climate-distinguish between organizational climate and culture(K1,K2,K3,K4)
- 4.4 Organizational effectiveness and approaches to organizational effectiveness(K1,K2,K3,K4)
- 4.5 Organizational conflicts-definition-features-sources of conflicts-different stages of conflicts-measures to stimulate conflicts.(K1,K2,K3,K4)

## **UNIT-V**

5.1 Management of changes-meanings-importance(K1,K2,K3,K4)

5.2 Resistance to change-causes(K1,K2,K3)

5.3 Dealing with resistance(K1,K2,K3)

5.4 Concept of social change and organization causes factors contribution to organization change(K1,K2,K3,K4)

5.5 Organization development-meaning-process(K1,K2,K3,K4)



**AUXILIUM COLLEGE (Autonomous)**  
**(Accredited by the NAAC with A+ Grade with a CGPA of 3.55 in**  
**the 3<sup>rd</sup> Cycle) Gandhi Nagar, Vellore – 632 006**

**ACADEMIC PROGRAMME – REGULATIONS (PG)**

**With effect from the Academic Year 2021 - 2022**

Auxilium College, an autonomous institution, follows the Semester pattern with Choice Based Credit System (CBCS) of evaluation, requiring 3 years of study for an Undergraduate Degree Programme and 2 years of study for a Postgraduate Degree Programme. The duration of a semester is 90 days of instruction.

The CBCS offers internal assessment, inter-departmental academic collaboration and course credits. It offers freedom to the departments to design the course structure, to frame rules pertaining to academic programmes and also to introduce new study programmes. It aims at making the academic programme student-oriented, interdisciplinary, flexible and relevant to the times. Under this system, the students will have ample freedom to select the electives to suit their interest, aptitude and needs.

A curriculum is a programme of studies and/or activities (curricular, co-curricular and extra curricular). Arising from the basic needs and moving on to individual, social and cultural needs, the curriculum attempts to fulfill the ideal needs also, such as moral, intellectual, aesthetic and spiritual needs.

### **Credit System**

The Autonomous status of the College offers a student the benefits of Choice Based Credit System. Every paper is allotted a certain number of credits. A student is awarded the specified credits on obtaining a pass in the respective paper.

The student has abundant opportunities during the course of study to obtain additional credits by doing Optional Certificate Courses offered by different Programmes of the College. This facility will strengthen the academic potential of the student, as it provides flexibility in the choice of courses offered beyond the framework of the respective discipline of study. The introduction of the CBCS ensures compatibility with the academic norms practiced in other educational institutions of repute in India and abroad.

The structure of undergraduate programmes provides a wide range of choice for students to opt for courses based on their eligibility, aptitude and career goals. The undergraduate curriculum will include the following categories of courses in order to accomplish a holistic approach to undergraduate education.

**Structure of Postgraduate Degree Programmes as  
per R.C. No. 2909/M1/08 dated 02.05.2008**

**(a) Core Courses**

**(b) Major Electives**

**(c) Human Rights**

**(i) Core Course**

Each Programme has a set of Core courses spread over four Semesters. The syllabi of the Core courses will help the student to acquire an in-depth knowledge in the course and to stay abreast with the recent developments in the respective discipline. This Programme includes Project work.

**(ii) Major Electives**

Each department offers a course in Major electives which consists of three/four papers spread over the course of study.

**(iii) Human Rights Education**

A course in Human Rights Education is offered in the II Semester. It is mandatory for every student to obtain a pass in this Paper.

**(iv) Teaching and Research Aptitude**

A course in Teaching and Research Aptitude is offered in the III Semester. It is aimed to assess the teaching and research capabilities of the students. Common classes will be held outside normal working hours.

**(v) Independent Elective course**

It was made mandatory for all the Pg Students to take up one independent elective course every semester with effect from 2018 onwards.

**(vi) Online Course**

Each semester a student should complete one course conducted by -----  
This is to make the student gain more knowledge other than their own courses.

**Medium of Instruction and Examination**

The medium of instruction and examination will be English.

## Distribution of Hours:

Postgraduates: 15 Weeks/Semester

Course	Hours/Week				Total Credits
	Sem I	Sem II	Sem III	Sem IV	
<b>Core (Including Practical and Project)</b>	<b>25</b>	<b>23</b>	<b>25</b>	<b>25</b>	<b>65</b>
<b>Major Electives</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Human Rights</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>
<b>Teaching and Research Aptitude</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>
<b>Total</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>90 Credits</b>

## Requirements of Attendance

1. The minimum requirement of attendance for a candidate is 75% per semester, to enable her to appear for the Semester Examinations.
2. If the attendance of a candidate is between 65 - 75%, due to any of the following reasons, the candidate is eligible to appear for the current Semester Examinations only after obtaining condonation from the Principal, by payment of the prescribed Condonation Fee:
  - a. Prolonged illness
  - b. Major surgery
  - c. Accident, which requires a long period of rest

The reason for the long period of absence should be informed to the Principal and the sanction obtained, within a week from the commencement of absence.

If the attendance of a candidate is between 50% - 65% in a semester, she is not eligible to appear for the current Semester Examinations. But she is permitted to appear for the arrear courses, if any. She is also permitted to move to the next Semester.

If the attendance of a candidate is below 50%, she is not eligible to continue her studies but can complete the Programme by re-joining the same Semester in the following academic year, if vacancy is available. She should obtain the approval from the University through the concerned Head of the Department and the Principal.

### **TESTING, ASSESSING AND VALUATION**

There are two components in the Valuation and Assessment of a student - Internal and External. These are implemented through

1. Continuous Assessment (CA) during the Semester for 40 marks. It consists of two written tests and an innovative component.
2. Semester Examination (SE) at the end of the Semester for 100 marks which will be converted to 60.

The maximum marks for each Paper shall be 100.

Each Postgraduate Programme consists of four Semesters.

### **Continuous Assessment (CA):**

1. The Continuous Assessment of each student will be done by the respective Departments.
2. Each written test is of two hours duration for 50 marks. The tests will be conducted centrally. The average of two such CA is calculated for 35 marks.
3. The innovative component is for 5 marks, conducted during the class hours by the Staff member in charge of the course, in the form of assignments/ quiz/ seminars /presentations/Online/Open Book/Viva Voce/ Group work/ Mini Project/Exhibition, etc. The topic and time for submission/ presentation will be announced by the staff member in charge of the course in advance. Each student should explain and defend her presentation.
4. **Syllabus of not less than two units shall be included for each CA.**
  5. **A retest for CA will be conducted for a student only if a student is absent due to NSS/NCC/Sports camps on prior written permission obtained through the concerned staff member.**
  6. **There is no passing minimum for CA.**
  7. **There is no provision for improvement in CA.**

### **Semester Examinations (SE)**

1. A student should register herself to appear for the Semester Examinations by payment of the prescribed fee.
2. The Semester Examinations will be in the form of a comprehensive examination covering the entire syllabus in each course. It will be of 3 hours duration, irrespective of the number of credits allotted to it.

### **Valuation of Answer Scripts**

1. There shall be single valuation for Postgraduate Courses. The Panel of Examiners will consist of internal and external examiners.
2. The valuation will be centralised.
3. A student has a maximum period of five years from the Date of Admission to clear all the courses prescribed for the Programme at the time of her admission. After the fifth year, to complete the programme, the student has to appear for an examination in the same/equivalent paper offered under the revised syllabus structure.
4. Fraction of final marks in CA and SE shall be rounded off to the nearest integer.

### ***Revaluation***

1. A student can apply for the photocopy of answer scripts, if needed, on payment of the prescribed fee.
2. A student can apply for revaluation of any paper, on payment of the prescribed fee within the specified date. Receipt of the photocopy of the answer script is a pre-requisite for revaluation.

### **Supplementary Examination**

After the declaration of the results of the final semester, a student who has only one paper in any semester can apply by the specified date, for Supplementary Examination, either for reappearance or for improvement. This facility is available only for those students who have not obtained a pass due to one paper. The examination will be conducted and results published within a month of the first publication of the result.

### **Improvement:**

The facility to improve one's performance in any paper(s) is offered to all the students. A student, who wishes to improve her performance in any paper(s), may apply for the examination in the same, if the examination is conducted in that paper(s) during that particular semester/ Supplementary Examination.

This provision is available till the Supplementary Examination after the final semester examination.

### **Note:**

A student can report any grievance regarding CA or SE, to the Controller of Examinations, who in turn, will present the same to the Examination Committee, chaired by the Principal.

### **CA and SE for Laboratory and Practical Work**

<b>CA</b>		<b>SE</b>	
<b>Components</b>	<b>Marks</b>	<b>Components</b>	<b>Marks</b>
<b>Performance during regular practicals</b>	<b>10</b>	<b>Record</b>	<b>10</b>
<b>Regularity and submission of Observation Notebook and Record</b>	<b>5</b>	<b>Practical Examination</b>	<b>45</b>
<b>Practical Examination</b>	<b>25</b>	<b>Viva Voce</b>	<b>5</b>
<b>Total</b>	<b>40</b>	<b>Total</b>	<b>60</b>

### **Passing Minimum:**

A candidate shall be declared to have passed in a course if she secures 50% and above in the SE. If a candidate fails in any paper, she shall be required to appear only for the SE in the respective paper.

### **Classification of Successful Candidates:**

### **Conversion of Marks to Grade Points and Letter Grade:**

<b>Range of Marks</b>	<b>Grade Points</b>	<b>Letter Grade</b>	<b>Description</b>
<b>90 - 100</b>	<b>9.0 – 9.5</b>	<b>O</b>	<b>Outstanding</b>
<b>80 – 89</b>	<b>8.0 – 8.9</b>	<b>D+</b>	<b>Excellent</b>
<b>75 – 79</b>	<b>7.5 – 7.9</b>	<b>D</b>	<b>Distinction</b>
<b>70 – 74</b>	<b>7.0 – 7.4</b>	<b>A+</b>	<b>Very Good</b>
<b>60 – 69</b>	<b>6.0 – 6.9</b>	<b>A</b>	<b>Good</b>
<b>50 – 59</b>	<b>5.0 – 5.9</b>	<b>B</b>	<b>Average</b>
<b>00 – 49</b>	<b>0.0</b>	<b>U</b>	<b>Re-appear</b>
<b>ABSENT</b>	<b>0.0</b>	<b>AA</b>	<b>ABSENT</b>

### Calculation of Grade Point Average

Based on the grades obtained by a candidate, the Grade Point Average (GPA) is calculated as follows:

**Grade Point Average (GPA) =**

$$\frac{\sum CiGi}{i}$$

$$\sum_i C_i$$

i.e.,  $GPA = \frac{\text{Sum of the multiplication of Grade Points by the credits of the courses}}{\text{Sum of the credits of the courses in a Semester}}$

Where

$C_i$  = Credits earned for course  $i$  in any semester

$G_i$  = Grade Point obtained for course  $i$  in any semester

**For the Entire Programme:**

Based on the grades obtained by a candidate for the entire programme, the Cumulative Grade Point Average (CGPA) is calculated as follows:

**Cumulative Grade Point Average (CGPA) =**

$$\frac{\sum C_i G_i}{\sum C_i}$$

$$\frac{\sum_{i=1}^n G_{ni}}{\sum_{i=1}^n C_{ni}}$$

i.e., CGPA = Sum of the multiplication of Grade Points by the credits of the entire programme  
 Sum of the credits of the courses of the entire programme

Where

$C_i$  = Credits earned for course  $i$  in any semester

$G_{ni}$  = Grade Point obtained for course  $i$  in any semester

$n$  refers to the Semester in which such courses were credited.

The final classification is based on the following Grade Conversion Table:

<b>CGPA</b>	<b>GRADE</b>	<b>CLASSIFICATION OF FINAL RESULT</b>
<b>9.5 – 10.0</b>	<b>O+</b>	<b>First Class with Exemplary*</b>
<b>9.0 and above but below 9.5</b>	<b>O</b>	
<b>8.5 and above but below 9.0</b>	<b>D++</b>	<b>First Class with Distinction*</b>
<b>8.0 and above but below 8.5</b>	<b>D+</b>	
<b>7.5 and above but below 8.0</b>	<b>D</b>	
<b>7.0 and above but below 7.5</b>	<b>A++</b>	<b>First Class</b>
<b>6.5 and above but below 7.0</b>	<b>A+</b>	<b>First Class</b>
<b>6.0 and above but below 6.5</b>	<b>A</b>	
<b>5.5 and above but below 6.0</b>	<b>B+</b>	<b>Second Class</b>
<b>5.0 and above but below 5.5</b>	<b>B</b>	
<b>0.0 and above but below 5.0</b>	<b>U</b>	<b>Re-appear</b>

**\* The candidates who have passed in the first appearance and within the prescribed semester of the P.G. programme only are eligible.**

### **Ranking of Successful Candidates**

**Ranking will be based on CGPA. Candidates who passed in all the examinations prescribed for the Programme in the very first appearance only are eligible for ranking.**

### **Malpractices:**

**Resolved that the following norms be followed in dealing with the cases of malpractices in CA/Semester Examinations.**

<b>S.No.</b>	<b>Nature of Malpractice</b>	<b>Action Suggested</b>
<b>1.</b>	<b>Appeal by a candidate for favourable consideration or mercy in the answer script</b>	<b>Warn the candidate</b>
<b>2.</b>	<b>Letter of appeal for favourable consideration, promising bribe in cash or kind.</b>	<b>Cancel the examination taken in that particular Course only</b>
<b>3.</b>	<b>Candidate writing her own name in any part of the answer book</b>	<b>Warn the candidate</b>
<b>4.</b>	<b>Candidate writing her own Register Number in any part of the answer book other than on the front page</b>	<b>Warn the candidate</b>
<b>5.</b>	<b>Possessing notes or books relevant to the course of the examination</b>	<b>Cancel the examination taken in that particular Course only</b>
<b>6.</b>	<b>Possessing notes or books relevant to the course of the examination (repeated)</b>	<b>Cancel the examinations taken previously and not to allow to appear for the remaining examinations in that Semester</b>

7.	Using or copying from notes or books relevant to the course of the examination	Cancel the examination taken in that particular Course only
8.	Using or copying from the answer scripts of other candidates	Cancel the examination taken by both the candidates in that particular Course only
9.	Inserting pre-written answer sheet(s) brought from outside, in the main answer book.	Cancel the examinations taken previously and not to allow to appear for the remaining examinations in that Semester
10.	Threatening or assaulting the Invigilator or behaving in any insubordinate manner	Cancel the examination taken
11.	Manhandling or injuring any examination personnel	Cancel the examination taken
12.	Impersonation	Cancel the examination taken and debar from the examination for the next three years
13.	Tampering with spelling/ name/initials in any certificate	The candidate has to produce fresh certificates and a fine of 1,000/-
14.	Tampering with the Date of Birth in the certificate issued by the College	The candidates should not be permitted to appear for any examination of this College for a period of two years from the date of submission of documents and not to pursue any course of studies for the corresponding period

15.	<b>Tampering with the Grade Certificate or any other Certificate issued by the College</b>	<b>The College will retain the tampered certificate and duplicate certificate will not be issued for three years from the date of presentation of documents. The candidate should not pursue any course of studies in this College for the corresponding period</b>
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**Important Note:**

**The decision of the Principal shall be final in all matters pertaining to the Academic Programme.**

**M.A..English**

**Outcome Based Education Syllabus (with effect from 2021-2022)**

<b>Sem</b>	<b>Paper Code</b>	<b>Title</b>	<b>Hours/ Week</b>	<b>Exam Hours</b>	<b>Credits</b>	<b>Marks</b>
<b>I</b>	<b>PCENA20</b>	<b>Chaucer and Elizabethan Literature</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PCENB20</b>	<b>Restoration Literature and Eighteenth Century</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PCENC20</b>	<b>Classical Literature of the World</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PCEND20</b>	<b>Indian Literature in English</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENA20</b>	<b>Elective I A: Essential English Grammar</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENB20</b>	<b>Elective I B:Modern English Grammar</b>				
	<b>PIENA20</b>	<b>Independent Elective I A:Literary Skills for Employability –I</b>				<b>40+60</b>
	<b>PIENB20</b>	<b>Independent Elective I B: Technical and Business Writing</b>				<b>40+60</b>
		<b>Total</b>	<b>30</b>		<b>20</b>	<b>500</b>

<b>Sem</b>	<b>Paper Code</b>	<b>Title</b>	<b>Hours/ Week</b>	<b>Exam hours</b>	<b>Credits</b>	<b>Marks</b>
<b>II</b>	<b>PCENE20</b>	<b>American Literature</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENF20</b>	<b>Literary Criticism</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENG20</b>	<b>Language and Linguistics</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PCENH20</b>	<b>Women's Writing</b>	<b>5</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENC20</b>	<b>Elective II A: Postcolonial Literature</b>	<b>5</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENE20</b>	<b>Elective II B: Literature of the Marginalised</b>				
	<b>PIENC20</b>	<b>Independent Elective II A: Literary Skills for Employability -II</b>				<b>40+60</b>
	<b>PIEND20</b>	<b>Independent Elective II B: Creative Writing</b>				<b>40+60</b>

	<b>PNHRA20</b>	<b>Human Rights</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>40+60</b>
			<b>30</b>		<b>24</b>	<b>600</b>

<b>Sem</b>	<b>Paper Code</b>	<b>Title</b>	<b>Hours / Week</b>	<b>Exam Hours</b>	<b>Credits</b>	<b>Marks</b>
<b>III</b>	<b>PCENI20</b>	<b>Romantic and Victorian Literature</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENJ20</b>	<b>Shakespeare Studies</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENK20</b>	<b>Contemporary Critical Theory</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENL20</b>	<b>Research Methodology</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENF20</b>	<b>Elective III A: Translation Studies</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENG20</b>	<b>Elective III B: Literature For Academic And Professional Purposes</b>				

	<b>PIENE20</b>	<b>Independent Elective III A: Literary Skills for Employability -III A</b>				<b>40+60</b>
	<b>PIENF20</b>	<b>Independent Elective III B: Content Writing</b>				<b>40+60</b>
			<b>30</b>		<b>23</b>	<b>500</b>

<b>Sem</b>	<b>Paper Code</b>	<b>Title</b>	<b>Hours/ Week</b>	<b>Exam Hours</b>	<b>Credits</b>	<b>Marks</b>
<b>IV</b>	<b>PCENM20</b>	<b>Literature of the Modern Age</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENN20</b>	<b>Contemporary Writing</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENO20</b>	<b>English Language Teaching</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENP20</b>	<b>Project</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENH20</b>	<b>Elective IV A: History of Ideas</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENI20</b>	<b>Elective IV B: Cultural Theory and Popular Culture</b>				
	<b>PIENG20</b>	<b>Independent Elective IV A: Literary Skills for Employability –IV</b>				<b>40+60</b>

	<b>PIENH20</b>	<b>Independent Elective IV B: Literature and Environment</b>				<b>40+60</b>
			<b>30</b>		<b>23</b>	<b>500</b>

### **Programme Outcomes (POs)**

#### **On completion of the PG Programme, students will be able to:**

**PO1:**Attain an in-depth knowledge in the respective domains augmented through self-learning.

**PO2:**Assimilate and apply principles and concepts towards skill development and employability.

**PO3:**Apply critical and scientific approaches to address problems and find solutions.

**PO4:**Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO5:**Integrate issues of social relevance in the field of study.

**PO6:**Persist in life-long learning for personal and societal progress.

#### **On completion of M.A. Programme in English, students will be able to**

**PSO1:** Demonstrate wide knowledge of literary periods and movements, intellectual, linguistic, religious, and artistic influences

**PSO2:**Analyse and interpret Literature using traditional, modern, and contemporary theories and approaches

**PSO3 -** Appreciate and discuss varying opinion of literary works (K4)

**PSO4:** Critically interpret emerging traditions of literature, culture and thought in the canon of new literatures

**PSO5:** Demonstrate skills in Research Methods and tools to initiate and attempt research projects in Literature and Language

**PSO6:** Innovate and apply the skills of oral, written communication and analytical skills in the prospective areas of teaching, training, writing, editing, translating, publishing, advertising etc.

**PO-PSO MAPPING**

PSO/ PO	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	<b>H</b>	H	H	M	M	M
PSO2	H	<b>H</b>	H	M	M	M
PSO3	H	H	<b>H</b>	M	M	M
PSO4	H	H	H	<b>H</b>	M	M
PSO5	H	H	H	H	<b>H</b>	M
PSO6	H	H	H	H	H	<b>H</b>

**H - High – (3), M - Moderate (2), L - Low (1)**

**SEMESTER - I**  
**PCENA20 - CHAUCER AND ELIZABETHAN LITERATURE**

<b>Year: I</b> <b>SEM : I</b>	<b>Course Code:</b> PCENA20	<b>Title Of The Course:</b> Chaucer and Elizabethan Age	<b>Course Type :</b> Theory	<b>Course Category :</b> Main	<b>H/W</b> 6	<b>Credits</b>	<b>Marks</b> <b>100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Recall the historical, social and biographical Influence
2. Discuss the literary significance of the Era
3. Interpret literary texts
4. Analyse the evolution of English Language in Literature
5. Assimilate writing and analytical Skills

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Age of Chaucer**                      **K1-K6**                      **(10 hours)**

1.1 The Age of Chaucer: from Anonymity to Individualism (pg 22-50)      **K4, K5, K6**

(Carter, Ronald. & McRae, John. *The Routledge History of Literature in English*. London: Routledge, 2001. Print)

1.2 Geoffrey Chaucer :The Prologue to Canterbury Tales (Detailed Study) -  
The Knight

1.3Geoffrey Chaucer : The Wife of Bath (Detailed Study)

1.4Geoffrey Chaucer: The Pardoner(Detailed Study)

1.5Geoffrey Chaucer: The Miller(Detailed Study)

1.6 Geoffrey Chaucer:The Summoner(Detailed Study)

**Unit II: Renaissance Poetry**                      **K1-K6**                      **(10hours)**

2.1 Introduction to Elizabethan Poetry                      **K4, K5, K6**

2.2 Renaissance Poetry (pg 57-61; 94-101)                      **K4, K5, K6**

(Carter, Ronald. & McRae, John. *The Routledge History of Literature in English*. London: Routledge, 2001. Print)

2.3 Edmund Spenser: Epithalamion(Detailed Study)

2.4John Donne : Canonization(Detailed Study)

2.5John Donne: A Valediction: Forbidding Mourning(Detailed Study)

2.6John Donne: The Flea(Detailed Study)

**Unit III: Prose**                      **K1-K6**                      **(10 hours)**

3.1The Decline of the Renaissance – The Art of Criticism (pg 146-170)                      **K4, K5, K6**  
(Compton-Rickett, Arthur. “A History of English Literature”.New Delhi: UBSPA, 2014. Print)

3.2Renaissance Prose (pg 70-79)                      **K4, K5, K6**  
(Carter, Ronald. & McRae, John. *The Routledge History of Literature in English*. London: Routledge, 2001. Print.)

- 3.3 The Bible:St. Mark’s Gospel(Detailed Study)
- 3.4Francis BaconOf Truth (Detailed Study)
- 3.5Francis BaconOf Revenge, Of Love (Detailed Study)
- 3.6Francis BaconOf Unity in Religion (Detailed Study)

**Unit IV:Drama** **K1-K6** **(50 hours)**

- 4.1 Introduction to Elizabethan Drama **K4, K5, K6**
- 4.2 Jacobean Drama - To the Closure of the theatres (1642) (pg 101 – 113) **K4, K5, K6**  
(Carter, Ronald. & McRae, John. *The Routledge History of Literature in English.*  
London: Routledge, 2001. Print.)
- 4.3Thomas KydThe Spanish Tragedy (Act I & II Detailed Study) **K4, K5, K6**
- 4.4 Thomas KydThe Spanish Tragedy (Act III, IV& VDetailed Study)
- 4.5.John WebsterThe Duchess of Malfi (Act I & II Detailed Study detailed Study)**K4, K5, K6**
- 4.6 John WebsterThe Duchess of Malfi (Act III, IV & V Detailed Study)

**Unit V: Reading and Interpreting Playwrights** **K4-K6** **(10 hours)**

- 5.1 Introduction to Jacobean Drama
- 5.2 Thomas Dekker
- 5.3 Middleton and Rowley
- 5.4 Beaumont and Fletcher
- 5.5 Christopher Marlowe
- 5.6 Edmund Spenser Prothalamion (Essential Reading)

**Books for Study:**

1. Compton-Rickett, Arthur. *“A History of English Literature.”* New Delhi: UBSPA, 2014. Print
2. Carter, Ronald. & McRae, John. *The Routledge History of Literature in English.* London: Routledge, 2001. Print.

**Books for Reference:**

1. Fermor, Una Ellis. *The Jacobean Drama.* London: University Paperback, 1965.
2. Ford, Boris. *A Guide to English Literature. Vol 1The Age of Chaucer.* London: Penguin, 1961.
3. Grierson H.J.C. *Metaphysical Lyrics and Poems of the Seventeenth Century.* Oxford University Press, 1972.
4. Jonathan Dollimore(1984). *Radical Tragedy – Religion Ideology and power in the Drama of Shakespeare and his contemporaries.*

5. Lovelock, Julian. *Donne: Songs and Sonnets*. London: Macmillan, 1989.
6. Rickert, Edith. *Chaucer's World*. London: Columbia University Press, 1964.
7. *Representative Poetry - Vol I*. Canada: The University of Toronto Press, 1941.
8. Jonathan Golding and the Politics of Literature: Jonson, Shakespeare, Donne and their contemporaries John Hopkins.
9. Montrose Louis (1983) Shaping Fantasies Figuration of Gender and Power in Elizabethan Culture Representation 1-2, 61-94

## PCENB20 - RESTORATION AND EIGHTEENTH CENTURY LITERATURE

<b>Year: I Sem: I</b>	<b>Course Code:</b> PCENB20	<b>Title Of The Course :</b> Restoration And Eighteenth Century Literature	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Explain the characteristics of the Eighteenth century and Restoration Literature
2. Identify and analyze the writer's perspective, expression and their reflection of life representing the Restoration age
3. Critically interpret the variety of literary genres, new trends, themes and style in Literature of this age
4. Analyze the ways in which the authors from the Restoration constructed the literary values and to trace their influence upon the age
5. Evaluate the traditional, religious, political, and aesthetic authority of this age

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**Unit I** **k2-k6** **(20 Hours)**

- 1.1** Transitions (Pg 1 – 15) The Era of Sincerity (Pg 98-118)  
[Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]  
The Century's End (Pg 193-201)  
[from Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]

**Poetry – (Detailed Study)**

- 1.2** John Milton Paradise Lost Book IX (1-200 lines)  
**1.3** John Milton Paradise Lost Book IX (201-403 lines)  
**1.4** Alexander Pope Essay on Man- Epistle I (I-V)  
**1.5** Alexander Pope Essay on Man- Epistle I (VI-X)  
**1.6** Thomas Gray Elegy written in the Country Churchyard

**Unit II:** **k2-k6** **(40 Hours)**

- 2.1** The Age of Dryden (Pg 196 – 201)  
[Compton-Rickett, Arthur. *A History of English Literature*. New Delhi: UBSPD. 2014. Print]  
The Century's End (Pg 201-203)  
[from Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]

**Drama – (Detailed Study)**

- 2.2** John Dryden All for Love (Act I- III)  
**2.3** John Dryden All for Love (Act IV- V)

**Poetry – (Detailed Study)**

- 2.5** William Blake The Little Black Boy  
**2.6** William Blake The Little Girl is Lost

**Unit III** **k2-k6** **(10 Hours)**

- 3.1** Samuel Johnson: His Time and His Circle (Pg 161-170)  
**3.2** Samuel Johnson: His Time and His Circle (Pg 171-182)  
**3.3** The Age of Disguise (Pg 16 – 36) Mid-century Fiction and Drama (Pg 119-129)  
**3.4** The Age of Disguise (Pg 16 – 36) Mid-century Fiction and Drama (Pg 130-139)  
[Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]

### Prose (Detailed Study)

- 3.5 Samuel Johnson Preface to the Plays of Shakespeare (Three Unities)  
3.6 Samuel Johnson Preface to the Plays of Shakespeare (Tragic-comedy)

**Unit IV** **k2-k6** **(10 Hours)**

### Non Detailed Study

#### Poetry

- 4.1 George Herbert The Collar  
4.2 Andrew Marvel The Garden

#### Prose

- 4.3 Jonathan Swift The Battle of Books  
4.4 Addison and Steele Coverley Papers 1-4

#### Drama

- 4.5 William Congreve The Way of the World  
4.6 R.B. Sheridan The Rivals

**Unit V** **k2-k6** **(10Hours)**

**5.1 Fiction** The Century's End (Pg 183-193)

[from Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]

#### **5.2 Focused study of writers of personal choice**

Daniel Defoe - Henry Fielding - Samuel Richardson - Laurence Sterne - Horace Walpole - Oliver Goldsmith

#### **5.3 Reading and Interpreting fiction**

**5.4 Formal Elements of Fiction:** Plot Construction, Narrative point of View, Characterization

**5.5 Formal Elements of Fiction:** Setting, Tone, Style, Symbolism and Irony.

#### **5.6 Close Reading & Critical Interpretation:**

To facilitate a deeper understanding of the period when the novel rose to dominate the literary marketplace, defining the form and its modes of representing the private lives of individuals. The critical reading includes the late eighteenth century which saw a medieval revival, in which writers venerated and imitated archaic language and forms. The important development of this movement was the Gothic novel, which typically features such forbidden themes as incest, murder, necrophilia, atheism, and sexual desire.

**Books for study:**

1. Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983
2. Dryden, John, *All for Love*. Indian Private Limited, Bloomsbury, 2014

**Books for Reference:**

1. Compton-Rickett, Arthur. *A History of English Literature*. New Delhi: UBSPD. 2014. Print
2. Bottrall Margaret. Ed. *Songs of Innocence and Experience*. New York: Macmillan, 1970.
3. Clifford L., James. Ed. *Eighteenth Century English Literature*. London: OUP, 1977.
4. Dobree, Bonamy and Wilson F. P. Ed. *English Literature*. London: OUP, 1963.
5. Hammond, Gerald. Ed. *The Metaphysical Poets*. New York: Macmillan, 1974.
6. Sanders, Andrews. *English Literature*. India: OUP, 2011.
7. Tillyard, E.M. *Milton*. London: Chatto & Windus Ltd, 1966.
8. Bottrall Margaret. Ed. *Songs of Innocence and Experience*. New York: Macmillan, 1970.
9. Clifford L., James. Ed. *Eighteenth Century English Literature*. London: OUP, 1977.
10. Dobree, Bonamy and Wilson F. P. ed. *English Literature*. London: OUP, 1963.
11. Hammond, Gerald. Ed. *The Metaphysical Poets*. New York: Macmillan, 1974.
12. Sanders, Andrews. *English Literature*. India: OUP, 2011.
13. Tillyard, E.M. *Milton*. London: Chatto & Windus Ltd, 1966.

## PCENC20 - CLASSICAL LITERATURE OF THE WORLD

<b>Year :</b> <b>I</b>	<b>Course Code :</b> PCENC20	<b>Title Of The Course :</b> Classical Literature of the World	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>4</b>	<b>Marks</b> <b>100</b>
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Explain the greatness of literary works and their influence on world literature
2. Interpret the best that was known and thought in the world
3. Apply the knowledge gained through plots, characters, themes etc. to real life situations
4. Analyse literary works to understand the world and interpret everyday situations
5. Evaluate human life and experience in texts and in reality

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	M	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	M	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

## Course Syllabus

### Unit I

(10 hours)

#### Introduction

1.1 T.S.Eliot What is a Classic? (pg 95 -104) [K2]  
From Walder, Dennis. Literature in the Modern World: Critical Essays and Documents.OUP.  
New York .2004

1.2 Italo Calvino Why read the Classics? (pg 3-9) [K2]  
[Calvino, Italo. *Why Read the Classics?* Great Britain: Penguin Books, 1999]

#### Fiction

##### Focused study of writers of personal choice

1.3 Voltaire,Miguel De Cervantes

1.4 Dostoevsky, Kafka

1.5 Honoré De Balzac, Leo Tolstoy

1.6 Gabriel Garcia Marquez,Herman Hesse

##### Formal Elements of Fiction: [K2,K3,K4]

Plot Construction, Narrative point of View, Characterization,  
Setting, Tone, Style, Themes Symbolism and Irony.

##### Close Reading & Critical Interpretation: [K2,K3,K4]

language, originality, freshness, seminal,  
longevity, identity, eternal truths, grand themes

### Unit II

[K2-K5]

(20 hours)

#### Greek and Roman

2.1 Homer The Odyssey - Book IX, XVIII[Comprehensive view]

2.2 Homer The Odyssey - Book XXIII [Comprehensive view]

2.3 Sophocles Antigone

2.4 Virgil Aeneid Book IV

2.5 Ovid Metamorphosis Book 6

2.6 Aristophanes The Wasps

### Unit III

(20 hours)

#### European [K2-K5]

3.1 Dante The Divine Comedy [Comprehensive view]

3.2 Goethe Faust

3.3 Moliere The Miser

3.4 Albert Camus The Myth of Sisyphus - An Absurd Reasoning (pg 17-32)

3.5 Anton Chekov The Bet, The Student and other stories

3.6 Leo Tolstoy Alyosha the Pot, God Sees the Truth but Waits and other stories

### Unit IV

(20 hours)

#### Indian & Asian

[K2-K5]

- 4.1 Thiruvalluvar Impartiality
- 4.2 Thiruvalluvar Listening, Folly
- 4.3 Vyasa The Mahabharata (Retold by R.K. Narayan)
- 4.4 Murasaki Shibuki The Tale of Genji
- 4.5 Shi Nai'an Water Margin
- 4.6 Panchatantra Tales [Comprehensive view]

**Unit V [K2-K5]**

**(20 hours)**

**Others**

- 5.1 Omar Khayyam The Rubaiyat of Omar Khayyam (Trans. Fitzgerald)
- 5.2 Khalil Gibran Giving, Joy and Sorrow, Crime and Punishment
- 5.3 From The Bible Genesis (Creation) and The Sermon on the Mount
- 5.4 Rumi Be Lost in the call
- 5.5 The Arabian Nights
- 5.6 *Kebra Negast*, or Book of Kings

**Internal Assessment**

Paper Presentation

Group Discussion

Individual Author Study, Analysis and Presentation

**Reference Books**

1. Bhattecharji, Amal. *Four Essays on Tragedy*. Calcutta: OUP, 1977.
2. Bloom, Harold. *The Rubaiyat of Omar Khayyam*. India: Viva Books, 2007.
3. Canning, John, ed. *Hundred Great Books*. New Delhi: Rupa & co, 1993.
4. Croally, Neil and Roy Hyde. *Classical Literature*. London: Routledge Publications, 2011.
5. Fischer, Carl. *The Myth and Legend of Greece*. Geo A, Pflaum, Publisher, Inc, 1968.
6. Hornstein, Lillian Herlands, Leon Edel and Horst Frenz. *World Literature*. New York: New American Library, 1973.
7. Kirk, G.S. *The Nature of the Greek Myths*. Great Britain: Penguin Books, 1982.
8. McGrady S.H. *Legends and Myths of Greece and Rome*. Longmans.
9. Trawick, Buckner B. *World Literature*. New York: Barnes & Noble, 1967.
10. Narayan, R.K. *The Mahabharata*. New Delhi: Vision Books. 1987. Print.

**PCEND20 - INDIAN LITERATURE IN ENGLISH**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> PCEND20	<b>Title of the Course:</b> Indian Literature in English	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W:</b> <b>6</b>	<b>Credits:</b> <b>4</b>	<b>Marks:</b> <b>100</b>
<b>Sem - I</b>							

**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Recognize the characteristics of major movements and figures of Indian Literature in English through the study of selected literary texts
2. Explain different literary genres; poetry, fiction and non-fiction
3. Interpret different styles of writing: expository, narrative and descriptive
4. Analyse literary concepts and underlying aesthetics
5. Evaluate original writing in English by Indian authors and translated texts from regional languages

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

## I) Course Syllabus

### Unit I: Poetry

(15 Hours)

1.1 Introduction to English writing before independence		K1,K2
1.2 Kalidas	Meghadhutham (Detailed)	K2,K4
1.3 Toru Dutt	Lotus (Detailed)	K2,K4
1.4 A.K.Ramanujam	Snakes (Detailed)	K2,K4
1.5 Sarojini Naidu	Palanquin Bearers	K2,K4
1.6 IlangoAdikal	Prologue: The Cilappatikaram Tr. R. Parthasarathy	K2,K4

### Unit II: Poetry

(15 Hours)

2.1 Introduction to English writing since independence		K1,K2
2.2 Critical appreciation of Poetry		K5,K6
2.3 Nizzim Ezekiel	Lawn (Detailed)	K2,K4
2.4 Kamala Das	Old Playhouse (Detailed)	K2,K4
2.5 ArunKolatkarr	Sarpasarita	K2,K4
2.6 Keki N. Daruwalla	Boat Ride along the Ganga	K2,K4

### Unit III: Post World War Dramatists

(25 Hours)

3.1 Life and Works of Rabindranath Tagore		K1,K2
3.2 Rabindranath Tagore	The King of the Dark Chamber (Detailed)	K5,K6
3.3 Life and Works of Girish Karnad		K1,K2
3.4 Girish Karnad	The Dreams of Tipu Sultan (Detailed)	K5,K6
3.5 Life and Works of Mahesh Dhattani		K1,K2
3.6 Mahesh Dhattani	Dance Like a Man	K5,K6

### Unit IV: Prose and Criticism

(25 Hours)

4.1 Spiritual Writing		K3,K4
4.2 Autobiography as a genre		K2,K4
4.3 Sri Aurobindo	The Essence of Poetry (Detailed) From Future Poetry	K5
4.4 M.K. Gandhi	My Experiments with Truth (Detailed)	K5
4.5 AnandhaCoomarasamy	The Dance of Siva	K5
4.6 Nirad C. Chaudhari	The Autobiography of an Unknown Indian	K5

### Unit V: Novelists after 1950's

(10 Hours)

#### Reading and Interpreting fiction

5.1 How to read fiction critically K5  
5.2 Introduction to Diasporic Writing K2  
5.3 Focused study of writers of personal choice: K4

Raja Rao, Mulk Raj Anand, R. K. Narayan, Amitav Ghosh, Vikram Seth, Rohinton Mistry

**5.4 Focused study of women writers of personal choice:** K4

Anitha Desai, Kamala Markandaya, Shashi Deshpande, Chitra Banarjee Divakaruni, Manju Kapoor

**5.5 Formal Elements of Fiction:** Plot Construction, K6  
Narrative point of View, Characterization, Setting, Tone, Style, Symbolism and Irony

**5.6 Close Reading & Critical Interpretation:** K6

To enhance a comprehensive understanding of fiction written in English in India since its emergence in the 19th century. Apart from a chronological survey, to focus on the historical and literary origins of the genre, its political and economic underpinnings, the debates and controversies such as Post-independence writing, women and the question of gender, feminist concerns, the idea of 'home', caste, secularism, region and identity, nationalism and postcolonial nation.

### **Books for Reference:**

#### **Secondary Texts:**

1. Arvind Krishna Mehrota Ed ' An Illustrated History of Indian Literature in English' , Permanent Black Publishers, New Delhi, 2003.
2. Ilankoatikal, The Cilappatikaram: The Tale of an Anklet
3. Translated, with an introduction and postscript, by R. Parthasarathy
4. Penguin books, New Delhi, 1993.

## PEENA20 - ESSENTIAL ENGLISH GRAMMAR

<b>Year:</b> <b>I</b>	<b>Course Code:</b> PEENA18	<b>Title of the Course:</b> Essential English Grammar	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W:</b> <b>6</b>	<b>Credits:</b> <b>4</b>	<b>Marks:</b> <b>100</b>
<b>Sem -</b> <b>I</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss grammatical structures common to British English
2. Interpret how the various systems of English grammar function in relation to one another
3. Apply both traditional and contemporary methods in written and oral presentations
4. Practice all covered material through classroom activities and presentations and achieve linguistic competence in using language effectively, efficiently and appropriately
5. Edit written and spoken performance and present original research and analysis in standard written academic language

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit: I Words and Phrases****(15 Hours)**

1.1 Nouns, Pronouns, Determiners, Verbs, Adverbs	K2, K3
1.2 Prepositions, Conjunctions, Interjections	K2, K3
1.3 Phrases: Noun, Verb, Adjective, Adverb, Preposition	K2, K3
1.4 Word formation: Acronyms, Analogy, Back formation, Blending	K3, K4
1.5 Borrowing, Clipping, Coining	K3, K4
1.6 Compounding, Reduplication, Prefixes, Suffixes	K3, K4

**Unit II: Sentences And Clauses****(15 Hours)**

2.1 Major and Minor, Simple and Multiple, Clauses	K3, K4
2.2 Sentence types- Positive and Negative - Active and Passive	K4, K5
2.3 Clause elements: Subject- Predicate -Verb- Object- Complement- Adverbial	K3, K4
2.4. Compound and Complex, Independent and Dependent, Coordination- Subordination, Subordinate clauses	K4, K5
2.5 Nominal or Noun clause- Adverbial, Relative, Comparative, Finite and Non Finite clauses	K4, K5
2.6 Restrictive and Non Restrictive clauses- Dangling Modifiers- Readability	K3, K4

**Unit III: Punctuation (15Hours)**

3.1 Apostrophe, Brackets,	K4, K5
3.2 Capital Letters, Colon,	K4, K5
3.3 Comma, Dash, Ellipsis, Exclamation mark	K4, K5
3.4 Full stop, Hyphen	K4, K5
3.5 Paragraph, Question mark	K4, K5

3.6 Quotation marks- Semicolon- Slash

K4,K5

-

**Unit IV: Figures of Speech And Literary Devices**

**(20 Hours)**

4.1 Allegory, Alliteration, Anacoluthon, Analogy, K3, K5  
Anticlimax, Antithesis

4.2 Apostrophe, Assonance, Bathos, Catch phrases, K3, K5  
Clerihew, Cliché, Colloquialism

4.3 Dead Metaphor, Doubles, Epigram, Euphemism, K4, K5  
Haiku, Hyperbole, Idiom,

4.4 Innuendo, Irony, Limerick, Litotes, Malapropism, K4, K5  
Meiosis, Metaphor, Metonymy

4.5 Metre, Onomatopoeia, Oxymoron, Palindrome, K4, K5  
Paradox, Personification, Proverb

4.6 Pun, Rhetorical question, Simile, Spoonerism, K4, K5  
Syllepsis, Synecdoche, Zeugma.

**Unit V:**

K2,K6

**(20 Hours )**

5.1. Elementary Rules of Usage

5.2. Elementary Principles of Composition

5.3. A Few Matters of Form

5.4. Words and Expressions Commonly Misused\_

5.5. An Approach to Style (70-75)

5.6. An Approach to Style (76-81)

Strunk, Oliver. Strunk and White. *The Elements of Style*, ALLYN & BACON, 'A Pearson Education Company' & 'The New Yorker Magazine', 2000,

**Books for Study:**

1. Jarvie, Gordon. *Bloomsbury Grammar Guide*, second Edition, New Delhi. Bloomsbury. 2007
2. Strunk, Oliver. Strunk and White. *The Elements of Style*, ALLYN & BACON, 'A Pearson Education Company' & 'The New Yorker Magazine', 2000,

**Books for Reference:**

1. Eastwood, John. *Oxford Guide to English Grammar*. India: OPU, 2003.
2. Fitikides, T. J. *Common Mistakes in English*. Mumbai: Orient Longman, 1997
3. Leech, Geoffrey, Deucher Margeret, Robert Hoogenrad. *English Grammar for Today*. New York: Palgrave Macmillan, 2011
4. Palmer, Frank. *Grammar - Great Britain*: Viney Ltd, 1978
5. Palmer, Richard. *The Good Grammar Guide*. London: Routledge, 2005.

## PEENB20 - MODERN ENGLISH GRAMMAR

Year: 2020	<b>Course Code:</b> PEENB20	<b>Title of the Course:</b> Modern English Grammar	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective - I B	<b>H/W:</b> 6	<b>Credits:</b> 5	<b>Marks:</b> 100
Semester -IV							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Establish the feasibility of following the rules and concepts that aid in usage
2. Identify grammar learning strategies to aid in comprehensibility
3. Explore learning strategies that integrate language and grammatical construction for standard language acquisition
4. Justify the application of grammar for best outcomes in language learning
5. Create activities that have a great impact to develop grammatical usage to suit student's ability

CO/PSO	PSO					6
	1	2	3	4	5	
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					6
	1	2	3	4	5	
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit: I** (15 Hours)

- |   |     |
|---|-----|
| 1.1. Introduction to English Language and its Grammar | K2. |
| 2.2. Good grammar, bad grammar                        | K3, |
| 3.3. Grammar – Rules and Problems                     | K3, |
| 4.4. Prescriptive and Descriptive Grammar             | K3, |
| 5.5. Influences in Grammar                            | K4  |
| 6.6. Summary  | K4  |

**Unit: II** (20 Hours)

- |   |    |
|---|----|
| 2.1. Part A: What Grammar Is and Is Not   | K3 |
| 2.2. Variation in language                | K3 |
| 2.3. Part B: Analysis                     | K4 |
| 2.4. Sentences and Their Parts            | K4 |
| 2.5. Words – Parts of Speech              | K4 |
| 2.6. Phrases – Form, Function and Meaning | K5 |

**Unit: III** (15 Hours)

- |   |    |
|---|----|
| 3.1. Part B: Clauses: Identification and Function     | K4 |
| 3.2. Elements of the clause                           | K4 |
| 3.3. Complex sentences, Finite and non-finite clauses | K4 |
| 3.4. Clause patterns                                  | K5 |
| 3.5. Parsing a simple sentence                        |    |
| 3.6. Clauses: Subordination and Coordination          | K5 |

**Unit: IV** (15Hours)

- |  |    |
|--|----|
| 4.1. Transformation and Generative Grammar | K3 |
| 4.2. Syntactic structures                  | K3 |
| 4.3. Surface and Deep Structure            | K4 |
| 4.4. Rules in Generative grammar           | K4 |
| 4.5. Generative patterns                   | K5 |
| 4.6. Immediate Constituent Analysis        | K3 |

**Unit: V** K2 - K5 (20 Hours)

- 5.1. Elementary Rules of Usage
- 5.2. Elementary Principles of Composition
- 5.3. A Few Matters of Form
- 5.4. Words and Expressions Commonly Misused
- 5.5. An Approach to Style (70-75)
- 5.6. An Approach to Style (76-81)

Strunk, Oliver. Strunk and White. *The Elements of Style*, ALLYN & BACON, 'A Pearson Education Company' & 'The New Yorker Magazine', 2000,

**Primary Texts:**

Leech, Geoffrey, Deucher Margeret, Robert Hoogenrad, (2011). *English Grammar for Today*. New York: Palgrave Macmillan.

Palmer, Frank (1978). *Grammar*. Great Britain: Viney Ltd.

**Secondary Texts:**

Eastwood, John (2003). *Oxford Guide to English Grammar*. India: OUP.

Krishnaswamy L. and Lalitha Krishnaswamy (2011). *Methods of Teaching English*. Chennai: Macmillan Publishers India Limited.

Palmer, Richard (2005). *The Good Grammar Guide*. London: Routledge.

Tickoo, M. L (2010). *Teaching and Learning English*. New Delhi: Orient Blackswan

**PIENA20 - INDEPENDENT ELECTIVE I A: LITERARY SKILLS FOR  
EMPLOYABILITY –I**

Year: 2020  Sem -I	<b>Course Code:</b> PIENA20	<b>Title of the Course:</b> Literary Skills For Employability –I	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective - I A	<b>H/W:</b> 6	<b>Credits:</b> 5	<b>Marks:</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Remember and recall names of authors, literary works, dates, facts, terms and concepts
2. Demonstrate knowledge of English Language and Linguistics
3. Apply knowledge of literary criticism to analyse literary works
4. Demonstrate knowledge in Application-oriented areas like Research Methodology, Translation and English Language Teaching
5. Develop effective strategies to prepare for competitive examinations

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H



### **Books for Reference:**

1. Albert, Edward. *A History of English Literature*. Oxford: Oxford University Press, 1979. Print.
2. Chowdhury, Aditi and Rita Goswami. *A History of English Literature: Traversing the Centuries*. Hyderabad: Orient Blackswan, 2014. Print.
3. Daiches, David. *A Critical History of English Literature*. London: Secker & Warburg, 1960. Print.
4. Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford, UK: Oxford University Press, 1994. Print
- A. P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
5. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
6. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
7. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
8. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
9. Yule, George. *The Study of Language*. Cambridge University Press, 1985.

**PIENB20 - INDEPENDENT ELECTIVE I B: TECHNICAL AND BUSINESS WRITING**

<b>Year :2020 SEM :I</b>	<b>Course Code :PIENB20</b>	<b>Title Of The Course :Independent Elective: Technical and Business Writing</b>	<b>Course Type : Theory</b>	<b>Course Category : Self-Study</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to::

1. Recognize, analyze, and accommodate diverse audiences and produce documents appropriate to audience, purpose, and genre and edit for appropriate style, including attention to word choice, sentence structure, punctuation, and spelling
2. Acquire communication Skills – to include effective development, interpretation, and expression of ideas through written, oral, and visual communication
3. Develop critical Thinking Skills – to include creative thinking, innovation, inquiry and analysis, evaluation and syntheses of information
4. Analyze the ethical responsibilities involved in technical communication
5. Analyze an audience, both domestic and international, and write effective technical and business documents for that audience and locate, evaluate, and incorporate pertinent information

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I : Writing And Reading**

**K3,K4,K5**

- 1.1 Introduction to writing
- 1.2 Writing in Everyday Life
- 1.3 Writing in the Workplace
- 1.4 Writing in the Public Sphere
- 1.5 Understanding the Rhetorical Situation
- 1.6 Persuasion and Responsibility

**Unit II : Writing Projects**

**K3,K4,K5**

**(18 hours)**

- 2.1 Genres of Writing
- 2.2 Letters
- 2.3 Memoirs
- 2.4 Public Documents
- 2.5 Profiles
- 2.6 Plagiarism

**Unit III : Writing Projects**

**K3,K4,K5**

**(18 hours)**

- 3.1 Critical Essays
- 3.2 Reports
- 3.3 Commentary
- 3.4 Proposals
- 3.5 Reviews
- 3.6 Research Projects

**Unit IV : Writers At Work**

**K3,K4,K5**

**(18 hours)**

- 4.1 The shape of the Essay: How Form Embodies Purpose
- 4.2 Planning
- 4.3 Drafting
- 4.4 Revising
- 4.5 Working Together: Collaborative Writing Projects
- 4.6 Online Collaboration

**Unit V : Presentation Of The Work**

**K3,K4,K5**

**(18 hours)**

- 5.1 Delivering the Message
- 5.2 Visual Design
- 5.3 Web Design
- 5.4 Oral and PowerPoint Presentations
- 5.5 Writing Portfolios

## 5.6 Writing Essay

### **Books for Study:**

1. Trimbur, John. *The Call to Write*. WadsworthCengageLearning, U.S.A 2011

### **Books for Reference:**

1. Rizvi, M. Ashraf. *Effective Technical communication*. Chennai: McGraw Hill Education Pvt. Ltd. 2018.
2. Pal, Rajendra, J.S. Korlahalli *Essentials of Business Communication*. New Delhi: Sultan Chard a sons, 1998.
3. Kapoor, A.N. *Bussiness Letter for Different Occasions*, New Delhi: S. Chard and Company Pvt. Ltd. 1987.
4. Ramesh, M.S. C.C. Pattarshetti, *Business Communications*, New Delhi: R. Chard & Co Publishers, 1997.

## SEMESTER II

### PCENE18 - AMERICAN LITERATURE

<b>Year :2020 SEM :II</b>	<b>Course Code :PCENE18</b>	<b>Title Of The Course : American Literature</b>	<b>Course Type :Theory</b>	<b>Course Category :Core</b>	<b>H/ W 6</b>	<b>CREDIT S 5</b>	<b>MARKS 100</b>
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Interpret American life and Culture against the background of History and Literary development
2. Discuss American Literary artists, who were innovative in their outlook and literary temper.
3. Identify key ideas, representative authors and works, significant historical or cultural events, and characteristic perspectives or attitudes expressed in the literature of different periods or regions
4. Analyze literary works as expressions of individual or communal values within the social, political, cultural, or religious contexts of different literary periods
5. Write research-based critical papers about the assigned readings in clear and grammatically correct prose, using various critical approaches to literature

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Transcendentalism And Romanticism (K2,K3,K4) (15 Hours )**

**Poetry**

1.1. Edgar Allan Poe Raven (Detailed)

**Prose**

1.2. Emerson Nature

1.3. Transcendentalism

1.4. Romanticism

1.5. Henry David Thoreau Where I lived and What I lived for (Detailed)

**Short Fiction**

1.6. Nathaniel Hawthorne Young Goodman Brown

**Unit II: The Humanitarian Sensibility And Inevitable Conflict (K3,K4,K5) (15 Hours)**

**Poetry**

2.1. H. W. Longfellow Seaweed (Detailed)

2.2. Russell Lowell A Fable for Critics (846-847)

**Prose**

2.3. Fredrick Douglas Narrative of the Life of Fredrick Douglas –Ch I & II

2.4. Harriet A. Jacobs I. Childhood

II. The New Master And Mistress

III. The Slaves' New Year's Day

From *Incidents in the Life of A Slave Girl*

**Age Of Expansion: Realists And Regionalists**

**Poetry**

2.5. Walt Whitman Beat! Beat! Drums (Detailed)

2.6. Emily Dickinson There came a Day at Summer's Fall (Detailed)

**Unit III -Poets Of Idea And Order (K3,K4,K5) (20 Hours)**

3.1. Wallace Steven Anecdote of the Jar (Detailed)

William Carlos Williams Portrait of a Lady

3.2. Hart Crane To Brooklyn Bridge

Robert Frost Home Burial (Detailed)

3.3. Carl Sandburg Chicago

Ezra Pound The Seafarer

3.4. Amy Lowell Meeting House Hill



1. Mac Gowan, Christopher. *Twentieth- Century American Poetry*. London: Blackwell Publishing, 2004.
2. Vinson, James. *Twentieth Century American Literature*. London: Great Writers Students Library. Macmillan, 1980.
3. Donald, Heiney and Lenteil H. *Essentials of Contemporary Literature of the Western World*, (Vol. 3 & 4). USA: Barron's Educational Series.
4. Gray, Richard. *A Brief History of American Literature*. UK: Wiley – Blackwell, 2011.
5. Hoffmann, Daniel. ed. *Harvard Guide to Contemporary American Writing*. London: Oxford University Press, 2004.
6. Massa, Ann. *American Literature in Context*. London and New York: Methuen & Co. Ltd., 1982.

## PCENF20 - LITERARY CRITICISM

<b>Year :</b> <b>I</b>	<b>Course Code :</b> PCENF20	<b>Title Of The Course</b> Literary Criticism	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
<b>Sem :</b> <b>II</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss the characteristics of the works of seminal literary critics
2. Explain critical concepts and literary genres through literary criticism
3. Apply Critical concepts to literary texts
4. Analyse literary texts and critical works
5. Evaluate literary texts based on critical ideas acquired from seminal works

CL//PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CL//PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I** **K1 – K5** **(18 hours)**

**1.1 Introduction – Definition, Types**

**Classical**

- 1.2 Plato From *Republic* Book II (pg 45-52) [Comprehensive View]  
1.3 Aristotle From *Poetics* Chapter 6 (pg 92-94) [Comprehensive View]  
1.4 Horace *Ars Poetica* (pg 126-127) [Comprehensive View]  
1.5 Longinus *On Sublimity* (pg 138-139) [Comprehensive View]  
1.6 Quintilian *From Institutio Oratoria* *From Book 8 From Chapter 5* (pg 158- 162)

**Unit II** **K1 – K5** **(18 hours)**

**Medieval and Renaissance**

- 2.1 Introduction to the Age – Literature - Criticism  
2.2 Dante Alighieri From *The Letter to Can Grande* (6-10) (pg 188-190)  
2.3 Giovanni Boccaccio From *Genealogy of the Gentle Goods: VII- The Definition of Poetry its Origin and Function* (pg 195-197)  
2.4 Philip Sidney From *the Defense of Poetry* (Pg. 270-276) [Comprehensive View]  
2.5 Giambattista Giraldis *From Discourse on The Composition of Romances* (274- 275)  
2.6 Pierre Corneille *Of the Three Unities of Action, Time and Place* (pg 288-300)

**Unit III** **K1 – K5** **(18 hours)**

**Neo-Classical**

- 3.1 Introduction –Neoclassical Age – Literature – Criticism  
3.2 John Dryden From *an Essay of Dramatic Poesy* (pg 302- 304) [Comprehensive View]  
3.3 Joseph Addison *The Spectator* No. 62: *True and False Wit* (pg 339 – 343)  
3.4 Edward Young *Conjectures On Original Composition* (427 - 434)  
3.5 Alexander Pope *An Essay on Criticism: Part II* (Lines 200 -470) [Comprehensive View]  
3.6 Samuel Johnson From *Lives of the English Poets: From Cowley (On Metaphysical Wit)* (pg 386- 388)

## Unit IV

K1 – K5

(18 hours)

### Romantic and Victorian

- 4.1 Introduction to Romantic and Victorian Age – Literature – Criticism - Critics
- 4.2 William Wordsworth                      From Preface to Lyrical Ballads, with Pastoral and Other Poems (1802) (pg 559-564) [Comprehensive View]
- 4.3. From Biographia Literaria: from Part II – Chapter 1 and 4 (pg 584 -585) [Comprehensive View]
- 4.4. From the Function of Criticism at the Present Time (pg 712 – 7144) [Comprehensive View]
- 4.5 Henry James                              From the Art of Fiction (744-759)
- 4.6 Oscar Wilde                              The Critic as Artist: From Part 2 (pg 803 – 806)

## Unit V

K1 – K5

(18 hours)

### New Criticism

- 5.1. Introduction to New Criticism- Tenets – Critics
- 5.2. Tradition and Individual Talent (pg 955- 961) [Comprehensive View]
- 5.3 John Crowe Ransom                      Criticism, Inc 4 (pg 978- 980)
- 5.4 Cleanth Brooks      From the Well Wrought Urn Chapter 11 – The Heresy of Paraphrase (pg 1217- 1220)
- 5.5 William K. Wimsatt Jr and              The Intentional Fallacy – I (pg 1232- 1235)
- 5.6 Monroe C. Beardsley                      The Affective Fallacy – IV (pg 1257-1261)

### Books for Study

1. *The Norton Anthology of Theory and Criticism*. Vincent B. Leitch Ed. New York: W.W. Norton & Company. 2010. Print.

### Books for Reference

1. Das and Kumar, Bijay - Twentieth Century Literary Criticism -Atlantic Publishers,
2. Habib, M. A. R. *A History of Literary Criticism*. Black Publishing, USA. 2006
3. ... *Modern Literary Criticism and Theory*. Blackwell Publishing, New Delhi. 2008.

4. Lodge, David, ed. *Modern Criticism and Theory* - II edition, New Delhi: Pearson Education, 1998.
5. Ramaswami and Seturaman V.S. ed. - *The English Critical Tradition: An Anthology of English Literary Criticism: Vol. 1.* - Macmillan, 1986.
6. Seturaman, ed. – *Indian Aesthetics: An Introduction*-New Delhi: Macmillan, 2005
7. Waugh, Patricia - *Literary Theory and Criticism* - New Delhi: Oxford University Press, 2006.
8. Wolfreys, Julian. *Modern European Criticism and Theory – A Critical Guide.* Edinburgh University Press. 2006.

## PCENG20 - LANGUAGE AND LINGUISTICS

<b>Year :</b> <b>I</b>	<b>Course Code :</b> PCENG20	<b>Title Of The Course :</b> Language and Linguistics	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
<b>SEM :</b> <b>II</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Recognize the structure, function and varieties of language
2. Demonstrate knowledge of the English language in terms of its history, structure, acquisition and applications
3. Understand the speech mechanism of language
4. Demonstrate knowledge of the sound structure of the English language and pronounce English vowels and consonants individually and in connected speech accurately
5. Distinguish and accurately enunciate voiced and voiceless sounds

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit – I: The History Of English Language K1 – K5**

**(18 hours)**

1. The Descent of the English language
2. The Old English (Anglo-Saxon) Period
3. The Middle English Period
4. The Renaissance and After
5. Evolution of Standard English
6. The Foreign Contribution

**Unit – II: Phonetics**

**K1 – K5**

**(18 hours)**

- 2.1. Introduction, Air Stream Mechanisms
- 2.2. The Organs of Speech
- 2.3. Classification and Description of Speech Sounds I: Consonants
- 2.4. Classification and Description of Speech Sounds II: Vowels
- 2.5. Phonetic Transcription
- 2.6. The International Phonetic Alphabet

**Unit – III: Phonology**

**K1 – K5**

**(18 hours)**

- 3.1. Phonology
- 3.2. The Syllable
- 3.3. Accent and Rhythm
- 3.4. Intonation
- 3.5. Assimilation and Elision
- 3.6. Practice in Phonetic Transcription

**Unit – IV: Levels Of Linguistic Analysis K1 – K5**

**(18 hours)**

- 4.1. Morphology
- 4.2. Syntax
- 4.3. Semantics
- 4.4. Pragmatics
- 4.5. Discourse Analysis
- 4.6. First Language Acquisition

**Unit – V: Multilingualism In India**

**K1 – K5**

**(18 hours)**

- 5.1. Contexts of Multilingualism
- 5.2. Demographic Context
- 5.3. Communicative Context
- 5.4. Functional Context
- 5.5. Political Context
- 5.6. Cultural Context

**Books For Study**

1. Balasubramanian T., *A Textbook of English Phonetics for Indian Students*. Madras: Macmillan, 1993.
2. Connor, J.D.O.', *Better English Pronunciation*. Cambridge : Cambridge University Press, a. 1980.]
3. Kachru, Braj B, Yamuna Kachru, and S N Sridhar (Eds). *Language in South Asia*. Cambridge and New York: Cambridge University Press. 2008.
4. Krishnaswamy N., S.K. Verma – *Modern Linguistics* – New Delhi: Oxford University Press, 1989.
5. Wood F.T., *An Outline History of the English Language*. Madras: Macmillan, 2001.
6. Yule, George. *The Study of Language*. 6<sup>th</sup> Ed., Cambridge University Press, 2017.

### **Books For Reference**

1. Jones, Daniel. *English Pronouncing Dictionary*. 17<sup>th</sup> Ed., Cambridge University Press, 2006.

### **Web sources**

1. The History of Teaching English as a Foreign Language, from a British and European Perspective A. P. R. Howatt& Richard Smith  
<<http://www.tandfonline.com/doi/pdf/10.1179/1759753614Z.00000000028?needAccess=true>>  
>

## PCENH18 - WOMEN'S WRITING

<b>Year:</b> <b>I</b>	<b>Course Code:</b> PCENH18	<b>Title of the Course:</b> Women's Writing	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W:</b> 5	<b>Credits:</b> 4	<b>Marks:</b> 100
<b>Sem – II</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss aspects of women's writing
2. Explain diversity of women's experiences and their varied cultural moorings
3. Interpret different forms of literature: poetry, fiction, short fiction and critical writings
4. Analyse women's literary history and feminist criticism
5. Evaluate literary works by women

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## Course Syllabus

### Unit I: Poetry

(10 Hours)

1.1 Maya Angelou	Still I Rise	K2,K4
1.2 Wendy Cope	Difference of Opinion	K2,K4
1.3 E.B. Browning	From Aurora Leigh	K2,K4
1.4 Sylvia Plath	Mad Girls Love Song	K2,K4
1.5 Carole Ann Duffy	Little Red Cap	K2,K4
1.6 MeenaKandasamy	Apologies of Living on	K2,K4

### Unit II: Prose

(20 Hours)

2.1	Literary Background - Victorian Age- Angel in the House	K2,K4
2.2	Virginia Woolf Profession for Women	K5,K6
2.3	Marx's Critique – Commodity in Capitalism	K1,K2
2.4	Luce Irigrary Women on the Market	K5,K6
2.5	The Stereotypical Idea of Feminism And The Word Feminist	K1,K2
2.6	ChimamandaNgoziAdichie We all should be Feminist	K5,K6

### Unit III: Drama

(25 Hours)

3.1	Oppression of women on the basis of caste, class and gender.	K3,K6
3.2	Susan Glaspell Trifles	K4.K6
3.3	Subaltern Literature	K1, K2
3.4	Mahasweta Devi Rudali	K6
3.5	Poile Sengupta Mangalam	K1, K2
3.6	Poile Sengupta and the Theatre of Protest	K6

### Unit IV

(25 Hours)

## **Feminism**

- 4.1 Historical Background K6  
4.2 Different waves of feminism K2, K4

### **4.3 Terms:** K1, K4

Androcentric; androgyny; biocriticism; biologism/biological; body consciousness-raising; cross-dressing; cyborg; desire; difference; dubbing; écriture feminine; erotics; female affiliation complex; femaling; feminism; gaze; gender; genrer; gothic; gynocratic; gynocritics; immasculation; logic of the same; magic realism; male-as-norm; marginality; masquerade; matriarchy; minoritizing/universalism; muted; normalism; object-relations theory/criticism; other; patriarchy; pejoration; phallogentrism; pleasure; pornoglossia; queer theory; quest narrative; reading position; realism; recruitist; romance; script; second-wave feminism; sexism; standpoint theory; syntagmatic; text and work.

### **Text:**

- 4.4 Elaine Showalter Towards a Feminist Poetics K6  
4.5 Sandra Gilbert & Susan Gubar The Queen's Looking Glass: K6  
Female Creativity, Male Images  
of Women and Metaphor of  
Literary Paternity  
4.6 Analysis: Frailty, Thy Name is Hamlet: K6  
Hamlet and Women

## **Unit V**

### **Fiction**

**(10 Hours)**

#### **Reading and Interpreting fiction**

- 5.1 Critical reading of fiction K6  
5.2 Introduction to Writings of women K2  
**5.3 Formal Elements of Fiction:** Plot Construction, K3,K5  
Narrative point of View, Characterization, Setting,  
Tone, Style, Symbolism and Irony  
**5.4 Close Reading & Critical Interpretation:** To consider K3, K5  
women's fiction in relation to the several determinants  
such as gender, race, power, class and culture.  
**5.5 Focused study of Indian writers of personal choice:** K6  
Arundati Roy - Bharati Mukerjee  
**5.6 Focused study of non-Indian writers of personal choice:** K6

Jane Austen - Virginia Woolf - Charlotte Bronte - Emily Bronte –  
Toni Morrison - Alice Walker - Margaret Atwood- Jean Rhys –  
Zora Neale Hurston

## **Books for Reference**

### **Secondary Texts:**

1. Gilbert, Sandra and Susan Gubar, *The Mad Woman in the Attic: The Women Writer and the Nineteenth Century Literary Imagination*. Yale: Yale Nota Bene, 2000
2. Hansberry Lorraine. *A Raisin in the Sun*. ed, Robert Nermiroff. New York: Vintage Books, 1958
3. Devi, Mahasweta and UshaGanguli, Rudali. Seagull Books, 1997.
4. Wandor, Michelene. *Post-War British Drama: Looking Back in Gender*. London : Routledge, 2001
5. Showalter, Elaine. *Inventing Herself*. New York : Scribner, 2001
6. Eagleton, Mary Ed. *Feminist Literary Theory: A Reader*. 2<sup>nd</sup> edition. Blackwell Publishers: UK, 1994.
7. Jaidka, Manju. *From Slant to Straight: Recent Trends in Women's Poetry*. New Delhi: Prestige Books, 2000.
  
8. *Body Blows Women, Violence and Survival - Three Plays* , Ed.by Poile Sengupta Manjula Padmanabhan, Dina Mehta (Author)Seagull Books; 2000th Edition (January 1, 2000)

## PEENC20 - POSTCOLONIAL LITERATURE

<b>Year: I</b>	<b>Course Code :</b> PEENC20	<b>Title Of The Course :</b> Elective II A: Postcolonial Literature	<b>Course Type</b> :Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>5</b>	<b>Credits</b> <b>4</b>	<b>Marks</b> <b>100</b>
<b>SEM: II</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Trace the aspects of subjectivity, race, class and feminism in the Postcolonial space
2. Understand how literature shapes ideas about society and social identities in interaction with other discourses such as history and politics
3. Analyse the history of Colonial rule, liberation movements in various nations and develop a critical thinking on the movement of Postcolonialism
4. Possess a coherent knowledge and a critical understanding of Postcolonial literature and its historical, cultural and theoretical developments.
5. Reinterpret and examine the values of literary texts, by focusing on the contexts in which they were produced, and reveal the colonial ideologies that are concealed within.

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**



**Unit III****KI - K5****(20 hours)**

- 3.1. Judith Wright                      Woman to Man (Detailed Poetry)
- 3.2. Gabriel Okara                      The Mystic Drum (ND)
- 3.3 Manjula Padmanabhan              Harvest (Drama Act III)
- 3.4 Edward Said Crisis:                Orientalism
- 3.5 Characterization and Setting
- 3.6 Amitav Ghosh                      The Hungry Tide

**Unit IV****K1-K5****(20 hours)**

- 4.1 Jessie MacKay                      The Grey Company(Detailed Poetry)
- 4.2 Derek Walcott                      A Far Cry from Africa (ND)
- 4.3 Jane Harrison                      Stolen (Drama)
- 4.4 Ashcroft, Griffin and Tiffin        The Empire Writes Back: Introduction(Prose)
- 4.5. Tone, Style, Symbolism
- 4.6 Yann Martel                      Life of Pi

**Unit V:****K1 – K5****(20 Hours)**

- 5.1 David Rubadri                      An African Thunderstorm(Detailed Poetry)
- 5.2 Jane Harrison                      Stolen (Drama)
- 5.3 V.S.Naipaul                      A House for Mr.Biswas
- 5.4 Symbolism and Imagery
- 5.5 Irony, Wit, Marginalisation, Rootlessness
- 5.6 Salman Rushdie                      Midnight's Children

**Books for Study**

1. Ashcroft, Bill, Gareth Griffiths and Helen Tiffin - The Empire Writes Back - London and New York: Routledge, 1989.
2. Narasimiah C.D. Anthology of Commonwealth Poetry – Macmillan
3. Okpewho, Esidore –The Heritage of African Poetry- Longman England 1985

### **Books for Reference**

1. Abraham, Taisha. Introducing Postcolonial Theories. New Delhi: Macmillan Publishers India, 2007.
2. Ashcroft, Bill and Pal Ahluwalia. Edward Said. London: Routledge Taylor & Francis Group, 2007.
3. Boehmer, Elleke. Colonial and Postcolonial Literature. New York: OUP, 2005.
4. King, Bruce - New National and Postcolonial Literatures - Clarendon Paperbacks.
5. Nasta, Susheila. Writing Across Worlds. London: Routledge Taylor & Francis Group, 2004.
6. Patke, Rajeev S. Postcolonial Poetry in English. New Delhi: OUP,2006.
7. Sarangi, Jaydeep and Binod Mishra. Explorations in Australian Literature. India: Sarup& Sons, 2006

## PEEND18 - LITERATURE OF THE MARGINALIZED

<b>Year: I  SEM: II</b>	<b>Course Code :</b> PEEND18	<b>Title Of The Course :</b>  Literature of the Marginalized	<b>Course Type :Theory</b>	<b>Course Category :</b> Elective II A	<b>H/W 5</b>	<b>Credits 4</b>	<b>Marks 100</b>
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss the concept of ‘marginalized’ and ‘subaltern’ from the socio-cultural and literary context
2. Identify and analyze the themes of place, gender, class, caste, class and nationality in literature from subaltern perspective
3. Apply subaltern theories and critically interpret the nuances of subaltern elements in literature
4. Analyze the voice of marginalized recorded in literature from the global and local context with comparative and analytical methodology
5. Create an oral and written form of interpretation on subaltern literature

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

## Unit I

**K1 – K5**

**(15 Hours)**

### Poetry

- 1.1 N.D. Raj Kumar (Tamil- India) You, My Demon who Delights in Dancing  
 1.2 Ravi Kumar (Tamil- India) Have you Heard the Rain Crying?  
 1.3 S. Sukirtharani (Tamil- India) Portrait of My Village  
 1.4 Samuel Wagan Watson (Australia) Last exit to Brisbane

### Prose

- 1.5 Arundhati Roy (India) The Doctor and the Saint- Arundhati Roy's  
 Introduction to B.R.Ambedkar's  
 Annihilation of Caste (pg: 1-20)  
 1.6 Arundhati Roy (India) The Doctor and the Saint- Arundhati Roy's  
 Introduction to B.R.Ambedkar's  
 Annihilation of Caste (pg: 21-47)

## Unit II

**K1 – K5**

**(20 Hours)**

### Autobiography, Drama and criticism

#### Criticism

- 2.1 Nellie McKay and Culture in Black The Narrative Self: Race, Politics,  
 American Women's Autobiography – Part I  
 2.2 Nellie McKay The Narrative Self: Race, Politics,  
 and Culture in Black  
 American Women's Autobiography- Part II

#### Autobiography

2.3 Urmila Pawar (Marathi- India)	The Weave of My Life
2.4 Living Smile Vidhya (Tamil- India)	I am Vidhya; A Transgender's Journey
<b>Drama</b>	
2.5 Hansberry (Afro-American)	A Raisin in the Sun
2.6 Athol Fugard (Africa)	Sizwe Bansi is Dead

**Unit III** **K1 – K5** **(15 Hours)**

**Short Story and Criticism**

3.1 Gayatri Spivak	Translator Foreword- Draupadi by Mahasweta Devi
3.2 Mahasweta Devi	Draupadi (Short Story)
3.3 Gayatri Spivak	Translator's Preface and Afterword to Mahasweta Devi, Imaginary Maps
3.4 The Legend of Pawngvina (oral tales - Mizoram)	Translated by Lalrindiki T. Fanai
3.5 Basil Fernando (Sri Lanka)	When Will They Be Free?
3.6 Flora Nwapa (Nigeria)	Wives at War

**Unit IV Theory and Criticism** **K1 – K5** **(20 Hours)**

4.1 Sharankumar Limbale	Dalit Aesthetics
4.2 David Ludden	Reading Subaltern Studies- Introduction : Part I
4.3 David Ludden	Reading Subaltern Studies- Introduction : Part II
4.4 David Ludden	Reading Subaltern Studies- Introduction : Part III
4.5 David Ludden	Reading Subaltern Studies- Introduction : Part IV
4.6 Dua and Lawrence	Understanding the Indigenous Struggle: The Limitation of Postcolonial Theory (Pg 13-27)

**Unit V Fiction** **K1 – K5** **(20 Hours)**

5.1 Nadia Hashimi (Afghanistan)	The Pearl that Broke its Shell
5.2 Mohja Kahf (Syria)	The Girl in the Tangerine Scarf

5.3 Elif Shafak (Turkey)	Three Daughters of Eve
5.4 Laura Esquivel (Mexico)	Like Water for Chocolate
5.5 Meena Kandasamy (India)	The Gypsy Goddess
5.6 Bama (Tamil)	Sangati

### **Books for study:**

1. Devi, Mahasweta. Bitter Soil (trans) Ipsita Chanda, Calcutta: Seagull, 2009
2. Vidhya, Living Smile. I am Vidhya, New Delhi: Rupa Publication India, 2013
3. Pawar, Urmila. The Weave of My Life, (trans) Maya Pandit, Kolkata: Mandira Sen for STREE, 2018
4. Fugard, Athol. Sizwe Bansi is Dead, London: Oberon Books, 2009
5. Hashimi, Nadia. The Pearl that Broke its Shell, London and New York: Harper Collins, 2015
6. Kahf, Mohja. The Girl in the Tangerine Scarf, London and New York: Carroll & Graf, 2006
7. Shafak, Elif. Three Daughters of Eve, Bloomsbury USA, 2017
8. Esquivel, Laura. Like Water for Chocolate, USA: Random House, 1995
9. Meena Kandasamy, The Gypsy Goddess, London and New York: Harper Collins, 2015
10. Bama, Sangati. (trans) Lakshmi Holmstrom, OUP, 2005
11. Ch. Zama, Margaret (ed). Contemporary Tales from Mizoram, Chennai: Sahiya Akademi, 2017.

### **Books for Reference:**

1. Landry, Donna and Maclean, Gerald (ed) The Spivak Reader Gayatri Chakravorty. New York and London: Routledge, 1996.
2. Limbale, Sharankumar. Towards an Aesthetics of Dalit Literature (trans) Alok Mukherjee, New Delhi: OUP, 2012
3. Ravikumar and R. Azhagaras (ed). The Oxford India Anthology of Tamil Dalit Writing. New Delhi: Oxford University Press, 2012.
4. Amdedkar, B.R. Annihilation of Caste. New Delhi: Navayana, 2014
5. Devy, G.N (ed) From Voice and Memory: Indigenous Imagination and Expression. Hyderabad: OBS, 2011
6. McKay, Nellie Y. The Narrative Self: Race, Politics, and Culture in Black American Women's
7. Autobiography. Smith, Sidonie and Watson, Julia (ed). Women, Autobiography, Theory: A Reader, Madison: University of Wisconsin Press, 1998

**PEENE20 - INDEPENDENTELECTIVE II A: LITERARY SKILLS FOR  
EMPLOYABILITY-II**

<b>Year: I</b>	<b>Course Code :</b>	<b>Title Of The Course :</b>	<b>Course Type</b>	<b>Course Category :</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
SEM: II	PEENE20	Literary Skills for Employability- II	:Theory	Elective II A			

**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Remember and recall names of authors, literary works, dates, facts, terms and concepts
2. Demonstrate knowledge of English Language and Linguistics
3. Apply knowledge of literary criticism to analyze literary works
4. Discover interest and demonstrate knowledge in literature in English outside Britain and America
5. Demonstrate knowledge in Application-oriented areas like Research Methodology, Translation and English Language Teaching

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	M	M	M	M
<b>CO2</b>	H	H	H	M	M	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: English Poetry** **k2-k6** **(18 Hours)**

- 1.1. English Poetry, Elements of Poetry
- 1.2. Other Forms of Poetry, Figurative/Connotative Devices
- 1.3. History of Poetry in English: Pre-Chaucerian Age, Anglo-Norman Poets
- 1.4. Age of Chaucer, Geoffrey Chaucer
- 1.5. The Canterbury Tales, Other Poets of the Age of Chaucer
- 1.6. Model Questions & Solved Question papers

**Unit II: Poetry in the Age of Revival** **k2-k6** **(18 Hours)**

- 2.1. Literature of the Age of Revival
- 2.2. Poetic Trends in the Age of Revival
- 2.3. English Chaucerians
- 2.4. Scottish Chaucerians
- 2.5. New Court Poets
- 2.6. Model Questions & Solved Question papers

**Unit III: Elizabethan Poetry** **k2-k6** **(18 Hours)**

- 3.1. The Elizabethan Poetry: Introduction
- 3.2. Popular forms of Elizabethan Poetry
- 3.3. Petrarchan Sonnet, Shakespearean Sonnet, Spenserian Sonnet
- 3.4. Main Poets of the Elizabethan Age
- 3.5. Literary Criticism in Elizabethan Age
- 3.6. Model Questions & Solved Question papers

**Unit IV: Puritan and Restoration Poetry** **k2-k6** **(18 Hours)**

- 4.1. English Renaissance Poetry, The Puritan Age
- 4.2. Spenserian Poets, Cavalier Poets
- 4.3. Milton, Paradise Lost
- 4.4. Other Poets of the Puritan Age
- 4.5. Restoration Age, John Dryden
- 4.6. Model Questions & Solved Question papers

#### **Unit V: Neo-Classical/Augustan Age**

**k2-k6**

**(18 Hours)**

- 5.1. Augustan Age: An Introduction
- 5.2. Poetic Trends in the Augustan Age
- 5.3. Major Poets of Augustan Age: Alexander Pope Samuel Johnson
- 5.4. Edward Young, James Thompson, Thomas Gray, William Collins
- 5.5. Oliver Goldsmith, William Cowper, Robert Burns
- 5.6. Model Questions & Solved Question papers

#### **Books for Reference:**

1. Albert, Edward. *A History of English Literature*. Oxford: Oxford University Press, 1979. Print.
2. Chowdhury, Aditi and Rita Goswami. *A History of English Literature: Traversing the Centuries*. Hyderabad: Orient Blackswan, 2014. Print.
3. Daiches, David. *A Critical History of English Literature*. London: Secker & Warburg, 1960. Print.
4. Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford, UK: Oxford University Press, 1994. Print
- A. P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
5. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
6. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
7. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
8. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
9. Yule, George. *The Study of Language*. Cambridge University Press, 19

**PIEND19 - INDEPENDENT ELECTIVE II B: CREATIVE WRITING**

<b>Year:</b> 2020	<b>Course Code:</b> PIEND19	<b>Title of the Course:</b> Independent Elective: Creative Writing	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent ElectiveIIB	<b>H/W:</b>	<b>Credits:</b>	<b>Marks:</b> 100
Sem - II							

**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Understand how to describe critical ideas
2. Apply critical and theoretical approaches to the reading texts
3. Examine the relationship between the individual works and conventional literary work
4. Evaluate how ideas, themes and values create an impact on societies
5. Create poems or literary non-fictional pieces those are original and engaging

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	M	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	M	H

### Unit I Introducing Creative Writing

(18 Hours)

1.1 Analyze Purpose of writing	K4
1.2 Learning to Write	K3
1.3 Inventions of Creative Writing	K1
1.4 Rhetoric's Play	K1
1.5 Reading and the Individual writer	K1
1.6 Publishing and Editing	K2

### Unit II Challenges of Creative Writing

2.1 Reflective Criticism	K3
2.2 Challenges to Writer	K4
2.3 Challenges of Translation	K4
2.4 Challenges of Experiment	K4
2.5 The Challenge of Design	K4
2.6 The Challenge of Quality	K4

### Unit III Process of Creative Writing

K3, K4

(18 Hours)

3.1 Seven Processes (Preparing, Planning, Incubation, Beginning, Flowing, Breakthroughs and finish lines, On titles)
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- 3.2 The writer post- performance
- 3.3 Precisions of Process
- 3.4 Confidence and Practise
- 3.5 'Method' Writing
- 3.6 Effacement

**Unit IV            Composition and Creative Writing K5, K6            (18 Hours)**

- 4.1 Habits of mind, Principles of practice
- 4.2 Discipline
- 4.3 Notebooks and rituals
- 4.4 Compositions and action
- 4.5 Language's Mercury
- 4.6 Influence and Imitation

**Unit V: Practice of Poetry, Fiction and Nonfiction K6            (18 Hours)**

- 5.1 Writing literary fiction (Flash fiction- Short story- Novel- Character- Story making)
- 5.2 Writing literary fiction (Novel- Character- Story making)
- 5.3 Writing creative nonfiction (writing about yourself- writing about people and the world)
- 5.4 Writing poetry (listening to language- finding language- awakening language- shaping language- playing with language- poetry's reason)
- 5.5 Form and Structure
- 5.6 Subverting the form

**Books for Study:**

Morley, David. *The Cambridge Introduction to Creative Writing*. Cambridge: CUP, 2007.

**Books for Reference:**

1. Best, Wilfred D. *The Students Companion*. London: Rupa Paperback, 1984.
2. Dawson S.W. *Drama and Dramatic: The Critical Idiom Series*. London: Methuen & Co, 1984.
3. Doubtfire, Dianne. *Creative Writing*. Britain: The Chaucer Press Ltd, 1983.
4. Evans, Ifor B. *The Use of English*. London and New York: Staples Press, 1949.
5. Hall Donald and Sven Birkerts. *Writing Well*. New York: Harper Collins Publishers, 1991.
6. Kahn John Ellison (Ed.) *Reader's Digest: How to Write and Speak Better*. New York: Reader's Digest, 1993.

7. Millward Celia. *Handbook for Writers, 2<sup>nd</sup> Edition*. New York: Holt, Rinehart & Winston, 1980.
8. Reid Ian. *The Short Story: The Critical Idiom Series*. London: Methuen & Co, 1986.
9. Saxena Sunil. *Headline Writing*. New Delhi: Sage Publications, 2006.
10. Schwartz Helen J. *Interactive Writing: Composing with a Word Processor*. New York: Saunders College Publishing, 1985.
11. Scott Bill. *The Skills of Communicating*. Mumbai: Jaico Publishing House, 1995.

## SEMESTER III

### PCENI20 - ROMANTIC AND VICTORIAN LITERATURE

<b>Year : II Sem III</b>	<b>Course Code :</b> PCENI20	<b>Title Of The Course :</b> Romantic and Victorian Literature	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>4</b>	<b>Marks</b> <b>100</b>
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Explain the nature of Industrial Revolution, the subsequent scientific and material progress and to explore a society that was being re-organized around Science, Factories and Business.
2. Connect the works of the Romantics and Victorians to their social and historical backgrounds and evaluate it
3. Analyse and appreciate the interconnectedness of human life and nature as reflected in works written during the Romantic period.
4. Differentiate the traits of Romanticism and Victorianism in English literature with emphasis on concepts of self, imagination, and the unconscious.
5. Evaluate the impact of Romanticism and Victorianism on the development of English literature, with emphasis on development of literary forms and literary modes of expression.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

### Unit I

**K1 – K6**

**(18 hours)**

- 1.1 Introduction to Key Concepts and Ideas of Romantic age Didacticism, Hellenism, Philosophic Content
- 1.2 William Wordsworth      The World is too much with us (Detailed Romantic Poetry)
- 1.3 Robert Browning      Fra Lippo Lippi (Lines 1- 60) (Detailed Victorian Poetry)
- 1.4 Charles Lamb      Dream Children (Detailed Romantic Prose)
- 1.5 Emily Bronte (Romantic)
- 1.6 Jane Austen (Romantic)

### Unit II

**K1-K5**

**(18 hours)**

- 2.1 Mysticism, Pathetic Fallacy, Pastoral Elegy
- 2.2 S. T. Coleridge      Kubla Khan (Detailed Romantic Poetry)
- 2.3 Matthew Arnold      Dover Beach (Detailed Victorian Poetry)
- 2.4 William Hazlitt      On Going a Journey (Detailed Romantic Prose)
- 2.5 P.B. Shelley      The Cenci (ND Romantic Drama)
- 2.6 Oscar Wilde      The Importance of Being Earnest (Detailed Victorian Drama)

### Unit III

**KI - K5**

**(18 hours)**

3.1. Cult of Beauty, Love of Nature, Supernatural Elements

3.2. Elizabeth Barrett Browning    Sonnets from the Portuguese (ND Victorian Poetry)

3.3 Thomas De Quincey

These preliminary confessions, or introductory  
narrative...Than tempt her to do ought may merit praise  
From Preliminary Confession From De Quincey's  
Confessions of an English Opium-eater  
(ND Romantic Prose)

3.4 John Ruskin            Unto the Last: Chapter 1 The Roots of Honour  
(ND Victorian Prose)

3.5 Thomas Carlyle            Hero Worship: On Poets (Detailed Victorian Prose)

3.6 Walter Scott (Romantic)

#### **Unit IV**

**K1-K5**

**(18hours)**

4.1 Negative Capability, Humanitarianism, Lyricism

4.2 John Keats                    Ode on a Grecian Urn (Detailed Romantic Poetry)

4.3 Christina Rossetti            The Goblin Market (ND Victorian Poetry)

4.4 Charles Lamb                New Year's Eve (Detailed Romantic Prose)

4.5. Formal Elements of Fiction: Plot Construction, Narrative point of View,  
Characterization

4.6 Charles Dickens (Victorian)

#### **Unit V**

**K1 – K5**

**(18 Hours)**

5.1 References to Distant Lands and Past Ages, Melancholy, Truth of Life and Sensuous  
Imagery

5.2 Tennyson                    Morte D'Arthur (Detailed Victorian Poetry)

P. B. Shelley                To a Skylark (Detailed Romantic Poetry)

5.3 Reading and Interpreting fiction, Setting, Tone, Style, Symbolism and Irony

5.4 Oscar Wilde                      The Importance of Being Earnest(Detailed Victorian Drama)

5.5 Thomas Hardy (Victorian)

5.6 George Eliot(Victorian)

### **Books for Study:**

1. Raymond Wilson Ed., *A Coleridge Selection*. London: Macmillan Ltd., 1988.
2. John Beeg Ed., *Coleridge Poems*. An Everyman Paperback Publication, New York, 1973.
3. Edmund Blunden Ed., *The Poems of John Keats*. New Delhi: Rupa Publication, 2000.
4. Philip Wayne Ed., *William Wordsworth's Poems*. London: J. Mocerant & Sons Ltd., 1907.
5. Jane Austen, *Persuasion*. New Delhi: Rupa Co. Publication House, 2000.
6. Thomas Hardy, *Far From the Madding Crowd*. New York: Oxford University Press, 2008.
7. George Eliot, *Middlemarch*. London: Macmillan, 1972.
8. Charles Lamb, *Essays of Elia*. Bombay: Macmillan, 1895.
9. Charles Dickens, *Oliver Twist*. London: Thomas Nelson & Sons Ltd, 1958.
10. John Holloway, *Selected Poems of Percy Bysshe Shelley* – Ed Heinemann. London: Publication, 1960.

### **Books for Reference:**

1. Geoffrey Durant *William Wordsworth* — Cambridge: Cambridge University Press, 1969.
2. Kelvin Everest, *John Keats* — New Delhi: Atlantic Publication, 2002.
3. J.M. Johri, *Shelley's Adonais* –, Bareilly: Prakash Book Depot, 1996
4. *Critical Essays on the poetry of Tennyson*, Ed by John Killbam, Roritledge & Kegan Paul. London: 1960.
5. Geoffrey H. Hastman, *Hopkins: A Collection of Critical Essays*, Ed by. New Delhi: Prentice-Hall of India Pvt Ltd., 1980.
6. Birijadish Prasad, *Arnold's Thesis*, Bombay: B.I. Publication, 1982.
7. Andrew H. Wright, *Jane Austen's Novels*. A Peregrine Book, Middlesex: Penguin Books Ltd., 1953.
8. Rod Mengham, *Charles Dickens*. New Delhi: Atlantic Publishers, 2001.
9. R.T. Jones, *British Authors, Introductory Critical Studies, George Eliot*. London: Cambridge University Press, 1970.
10. Graham Handley, *Middlemarch by George Eliot*. Hampshire: Palgrave Macmillan, 1985.
11. Lance St. John Butler, *Studying Thomas Hardy*. Essex: Longman York Press – 1986.

## PCENJ20 - SHAKESPEARE STUDIES

<b>Year:</b> <b>II</b>	<b>Course Code:</b> PCENJ20	<b>Title of the Course:</b> Shakespeare Studies	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W:</b> 6	<b>Credits:</b> 5	<b>Marks:</b> 100
<b>Sem - III</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss Elizabethan and Jacobean context in connection with the ideas of culture, history and politics of these periods
2. Understand and explore the language, key terms, concepts, dramatic genres and themes of Shakespearean theater thus gaining an insight into the age of Shakespeare.
3. Analyze verbally and in writing Shakespeare as a product of his society
4. Read analytically to determine Shakespeare's purpose, historical and cultural perspective, and use of rhetorical and dramatic strategies in creating a play.
5. Evaluate Shakespeare's contribution to the English language and to the development of the modern drama and recognize various theories of literary criticism applied to Shakespeare's plays

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	M	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H		M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## Course Syllabus

### Unit I

Introduction to William Shakespeare K1,K2,K3,K4 (10 Hours)

1.1 Life

1.2 Plays & Sonnets

1.3 Language, Audience and Theatre

**(Detailed Plays)**

Tragedy: Hamlet K3.K4,K5 (10 Hours)

1.4 Shakespearean Tragedy

1.5 Sources, Plot, overview and Themes

1.6 Analysis and Criticism

### Unit II

Comedy: Twelfth Night K3,K4,K5 (15 Hours)

2.1 Shakespearean Comedy

2.2 Sources, Plot, overview and Themes

2.3 Analysis and Criticism

Last Plays: The Tempest K3,K4,K5 (15 Hours)

2.4 Tragicomedy

2.5 Sources, Plot overview, Themes and Motifs

## 2.6 Analysis and Criticism

### **Unit III**

K2,K3,K4

(10 Hours)

#### **(Non - Detailed Plays)**

3.1 Roman Plays

3.2 Antony and Cleopatra

3.3 Sources, Plot Overview, Themes and Motifs

3.4 Analysis and Criticism

3.5 Problem Plays

3.6 Measure for Measure

### **Unit IV Shakespeare and Theory I**

K3,K4,K5,K6

(10 Hours)

4.1 Structuralism

4.2 Roman Jakobson – The Structures of Sonnet 129.

4.3 Freudian Psychoanalysis

4.4 Ernest Jones – Reading the Oedipus Complex in Ernest Jones .

4.5 Feminism - Virginia Woolf

4.6 Shakespeare and the Question of Female Authorship. From Jonathan Gil Harris, *Shakespeare and Theory*. New York: Oxford University Press, 2012.

### **Unit V Shakespeare and Theory II**

K3,K4,K5,K6

(10 Hours)

5.1 Maxism

5.2 Karl Marx

5.3 *Timon of Athens* and the Power of Money

5.4 Post Structuralist Marxism

5.5 Terry Eagleton

5.6 Language and Reification in *Macbeth* and *Twelfth Night*.

#### **Books for Study:**

1. Shakespeare, William, Ed Chaise McEacheru. *The Tempest*. New Delhi: The Arden Shakespeare Bloomsbury, 2013.
2. Shakespeare, William, Ed Chaise McEacheru. *Twelfth Night*. New Delhi: The Arden Shakespeare Bloomsbury, 2013.

3. Shakespeare, William, Ed John Wilder. *Antony and Cleopatra*. The Arden Shakespeare New Delhi: Bloomsbury, 2013.
4. Shakespeare, William, Ed By J.W. Lever. *Measure for Measure*. London & New York: Rutledge, 1988.
5. Shakespeare, William, Ed by Ann Thompson and Neil Taylor. *Hamlet*. New Delhi: Bloomsbury, 2006.
6. Shakespeare, William. *Antony and Cleopatra*. New York: Palgrave Macmillan, 1987.
7. Jonathan Gil Harris, *Shakespeare and Theory*. New York: Oxford University Press, 2012.

### **Books for Reference**

1. Dover Wilson, *What Happens in Hamlet*. London: Cambridge University, 1974.
2. G.K. Stead, *Measure for Measure: A Selection of critical Essays*. London: Macmillan, 1971.
3. Nigel Alexander, *Shakespeare's Measure for Measure*. London: Studies in English Literature Edward Arnold, 1986.
4. AniaLoomba, *Shakespeare, Race and Colonization*. New York: Oxford University Press 2012.
5. John Russell Prown, *Shakespeare's Antony and Cleopatra*. London: Macmillan Press Ltd., 1977.
6. Diana Henderson Ed. *Alternative Shakespeare 3*. Oxford: Routledge Abington, 2008.
7. A.C. Bradley, *Shakespeare Tragedy*. New Delhi: Atlantic Publishers and Distributers Pvt. Ltd., 2010.
8. Robin Lee, *Shakespeare's Antony and Cleopatra – Studies in English Literature*. London: Edward Arnold, 1984.

## PCENK20 - CONTEMPORARY CRITICAL THEORY

<b>Year : II SEM : III</b>	<b>Course Code : PCENK20</b>	<b>Title Of The Course : Contemporary Critical Theory</b>	<b>Course Type : Theory &amp; Practical</b>	<b>Course Category : Core</b>	<b>H/W 6</b>	<b>Credits 5</b>	<b>Marks 100</b>
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss the role of historical context in the interpretation of literary texts
2. Examine various critical theories for their success, drawbacks and influence
3. Analyse critical ideas for an accurate understanding of literary works
4. Compare and Contrast various critical theories and the practice
5. Evaluate literary works using appropriate critical ideas/concepts/theories

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## Unit I

K2-K5

(18 hours)

### 1.1 Introduction

Jonathan Culler

Literary Theory (Pg. 201 – 216)

From Joseph Gibaldi *Introduction to Literary Scholarship in Modern Languages and Literatures*

### Structuralism and Post structuralism

1.2 Historical Background - Structuralism

1.3 Historical Background – Post Structuralism

1.4 **Terms/ Concepts:** Allography; arbitrariness; author; bricoleur; convention; deviation; diachronic and synchronic; diacritical; difference; digital and analogic communication; écriture; formulaic literature; function; functions of language; heterobiography, homology; hymen; langue and parole; linguistic paradigm; nominalism; post-structuralism; reference; sign; speech; structure in dominance; syntagmatic and paradigmatic; structuralism; textualist; transgressive strategy.

1.5 Structuralism

**Text:** Roland Barthes                      The Death of the Author

**Analysis**                                      Micheal Ryan pg. 25-31

1.6 Poststructuralism

**Text:** Jacques Derrida                      Structure, Sign and Play in the Discourse of Human Sciences

**Analysis**                                      Micheal Ryan Pg.83-84

## Unit II

K2-K5

(18 hours)

### Psychoanalysis

2.1 Historical Background

2.2 **Terms:** Abject; alterity; archetypal criticism; arche-writing; body; censorship; chora; condensation and displacement; contiguity; cross talk; desire; disavowal; double-bind; fetishism; figure and ground; fort/da; gaze; Gestalt; hommelette; imaginary/symbolic/real; intersubjectivity; jouissance; linguistic paradigm; méconnaissance; mirror stage; *Nachtraglichkeit*; Name-of-the – Father; object-relations theory/ criticism; objet a/objet A; other; overdetermination; panoptism/ panopticism; phallogentrism; pleasure; point de capiton; primary process, projection characters; psychoanalytic criticism; repression; revisionism; schizoanalysis; scopophilia/scopophobia; scotomization; sinthom; slippage; solution from above/below; subject and subjectivity; symptom; syntagmatic and paradigmatic; topographical model of the mind, transference; True-Real; Unconscious.

2.3 **Text:**Harold Bloom                      Poetry, Revisionism and Repression

**Analysis:***Young Goodman Brown: Id versus Superego*

Guerin Wilfred L., Earle Labour et al. *A Handbook of Critical Approaches to Literature*. New York: OUP, 1999

## **Marxism**

### 2.4 Historical Background

**2.5 Terms:** Absence; against the grain; alienation; alienation effect; always-already; aura; base and superstructure; class; coherence; co-optation; Copernican revolution; critical theory; dialectics; economism; English; epistemological break; fetishism; flaneur; formation; Frankfurt school; gest; hegemony ; homology; ideologeme; ideology; incorporation; instance; intellectuals; interpellation; legitimation; literary mode of production; Marxist literary theory and criticism; materialism; moment; Montage; myth; popular; praxis; problematic; realism; reification; slippage; structure in dominance; structure of feeling; subject and subjectivity;

### **2.6 Text:** Marxist Criticism Terry Eagleton

From Welder, Dennis. *Literature in the Modern World: Critical Essays and Documents*. Reprinted. New York: Oxford UP, 2008. Print.

Analysis: Silence, Violence and Souther Agrarian Class Conflict in William Faulkner's *Barn Burning*

## **Unit III**

**K2-K5**

**(18 hours)**

## **Post colonialism**

### 3.1 Historical Background

**3.2 Terms:** Affiliation; Africanist/Nationalist; Alterity; Authenticity; Bolekaja Critics; Comprador; Contamination; Creolization; Diaspora literature; Disidentification; Double Colonization; Double consciousness; double-voiced; dubbing; ethnoscope; Eurocentric; fictograph; hybrid/hybridization; imagined community; liminal; marvellous realism; master narrative; mediascape; mimicry; nation/nationalism; nativism; négritude, neo-Tarzanism; Nomad; orature; orientalism; other; passing; postcolonialism; relativism; relexification; subaltern; transculturation; west.

### **3.3 Text:** Chinua Achebe Colonialist Criticism

From Chinua Achebe. *Hope and Impediments. Selected Essays 1965-87*

**Analysis:** Colonialism and Authenticity: V.S.Naipaul's *The Mimic Men*  
From *The Empire Writes Back* –Pg 87-90

## **Multiculturalism**

### 3.4 Historical Background

**3.5 Terms** Binary/binarism; bricoleur; culture; cultural studies; fiction; formulaic literature; myth; New Historicism and cultural materialism; Sapir-Whorf hypothesis; script; structures of feeling; thick description/thin; utterance.

### **3.6 Text:** Overlapping Territories, Intertwined Histories – Edward W. Said

**Analysis:** Victims Already: Violence and Threat in Nadine Gordimer's *Once upon a Time*

## **Unit IV**

**(18 hours)**

## **Reader Response Theory**

#### 4.1 Historical Background

**4.2 Terms/ Concepts** Appreciation; code; coduction; cross talk; ecological validity, exegesis; genre; hermeneutics; ideation; interpretation; intrepretative communities; interrogate; intersubjectivity; jouissance; meaning and significance; ontological status; open and closed texts; oppositional reading; parabolic text; performance; politeness; prepublication/postpublication reading; punctuation; readerly and writerly text; readers and reading; reading community; reading position; reception theory; self consumingartcraft; sense and reference; sub-text; suspense; theme and thematics; topic; transactional theory of the literary work.,

#### 4.3 Stanley Fish

Is There a Text in the Class?

### **New Historicism**

#### 4.4 Historical Background

**4.5 Terms:** Circulation; emplotment; energy; exchange; New Historicism and Cultural Materialism; resonance; structure

#### 4.6 Text: Professing the Renaissance: The Poetics and Politics of Culture – Louis A. Montrose

**Analysis:** To His Coy Mistress: Implied Culture versus Historical Fact

### **Unit V**

**K2-K5**

**(18 hours)**

### **Ecocriticism**

#### 5.1 Historical Background

#### **5.2 Terms**

Ecofeminism, Ecology, Deep Ecology, Eco-consciousness, Logocentricism, Phallogentrism, Ecosystem, Biosphere or Ecosphere, Anthropocentric, Biocentric, Environmental Crisis, Symbiosis, Nature and Culture, Environmental Psychology, Ecocentric Egalitarianism, Ecosion, Green theory, Eco poetics, Eco-centric values, Apocalypse, Ozone depletion, Global warming, Deforestation, Survival of the fittest, Sense of self and Sense of place, Landscape theory.

#### **5.3 Text:**

Glen. A. Love. Revaluing Nature: Toward an Ecological Criticism - (Page 225-238)

**Analysis:** Walden: H.D.Thoreau- American pastoral Pg 48-56

From Greg Garrard. *Ecocriticism*. Routledge. London and New York. 2007.

### **Memory Studies**

#### **5.4 Historical Background**

Astrid Erll

Cultural Memory Studies: An Introduction

1. Towards a Conceptual Foundation for

Cultural Memory Studies (Over the past two decades.. complemented by other modes).



1. Hawkes, Terence. *Structuralism and Semiotics*. London and New York: Routledge, 1977.
2. Holquist, Michael. *Dialogism*. London and New York: Routledge, 1990.
3. Allen, Graham. *Roland Barthes*. London and New York: Routledge, 2003.
4. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
5. Belsey, Catherine. *Critical Practice*. London and New York: Routledge, 1980.
6. Bennett, Tony. *Formalism and Marxism*. London and New York: Routledge, 1979.
7. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
8. Culler, Jonathan Barthes. *A Very Short Introduction*. New York: OUP, 2002.
9. Fillingham, Lydia Alix and MousheSusser. *Foucault for Beginners*. India: Orient Longman, 2000.
10. Iyengar, Srinivasa K.R. *The Adventure of Criticism*. New Delhi: Sterling Publishers, 1985.
11. Krishnaswamy N. John Varghese and Sunita Mishra. *Contemporary literary Theory: A Student's Companion*. New Delhi: Macmillan, 2001
12. Kundara, Milan. *The Art of the Novel*. New York: Penguin Books & Faber & Faber, 1986.
13. Lane, J. Richard. *Fifty Key Literary Theorists*. New York and London: Routledge, 2006.
14. Murfin, Ross and Supriya M. Raj. *The Bedford Glossary of Critical Terms*. Boston and New York: Bedford, 1998.
15. Nagarajan M.S. *English Literary Criticism and Theory*. Hyderabad: Orient Longman, 2006.
16. Norris, Christopher. *Deconstruction*. London and New York: Routledge, 1982.
17. Powell, Jim and Van Howell. *Derrida for Beginners*. India: Orient Longman, 2000.
18. Powell, Jim. *Postmodernism*. Chennai: Orient Longman, 1998.
19. Rainbow, Paul. *The Foucault Reader*. New York: Pantheon Books, 1984.
20. Royle, Nicholas. *Jacques Derrida*. London and New York: Routledge, 2003.

## PCENL20 - RESEARCH METHODOLOGY

<b>Year :</b> <b>II</b> <b>SEM :</b> <b>III</b>	<b>Course Code :</b> PCENL20	<b>Title Of The Course :</b> Research Methodology	<b>Course Type :</b> Theory & Practical	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>4</b>	<b>Marks</b> <b>100</b>
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Identify and contextualize research problems
2. Identify the tools specific to the research problem
3. Collect and catalogue data and gather the inference
4. Develop research questions for qualitative and quantitative research
5. Formulate a hypothesis, write a research proposal and Plan out the research

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	M	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	M	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Introduction                      K2-K5                      (18 hours)**

1. Research Skills, Methods, and Methodologies
2. Personal Essays and Research Paper (MLA VII ed. pg. 3) – T
3. Types of Research (MLA VII ed. pg.3)
4. Using Secondary Research (MLA VII ed. pg.3)-
5. Combining Research and Original Ideas (MLA VII ed. pg.3-4)
6. Secondary Sources and Some Problems in Literary Theory (D.B. Pirie pg.36-45)

**Unit II: Organizing and Conducting Research      K2-K5                      (18 hours)**

- 2.1. Finding an Appropriate Focus (MLA VII ed. pg.6-7)
- 2.2. Planning an Argument (D.B.Pirie pg. 51)
- 2.3. Reference Works (MLA VII ed. pg.10-30)
- 2.4 Working Bibliography (MLA VII ed. pg.31-32)
- 2.5. Tools and Techniques for Literary Research (Shafquat Toweed pg. 9-34)
- 2.6. . W.R.Owens - Planning , Writing and Presenting a dissertation or Thesis

**Unit III: Documentation                      K2-K5                      (18 hours)**

- 3.1. Documenting Sources - Plagiarism and Academic Dishonesty
- 3.2. Evaluating Sources
- 3.3. Gathering Information about Sources
- 3.4. Finding Facts about Publication (MLA VIII ed.53-91)
- 3.5. The List of Works Cited – The Core Elements (MLA VIII ed. pg.97-177) Optional Elements, In-text Citations (MLA VIII ed. pg. 189-201)
- 3.6. Introducing Research (in Second Language) (from *Doing Second Language Research* by Brown pg.3-15)



4. Fabb Nigel and Durant Allan. *How to Write Essays Theses Dissertations in Literary Studies*. London: Longman Publishing, 1993.
5. Gibaldi, Joseph and Walters, Achtert. *MLA Handbook for Writers of Research Papers*, 2<sup>nd</sup> Edition. New Delhi: Wiley Eastern Ltd., 1977.
6. Kumar, Anand Raju. *American British and Commonwealth*. Chennai: Affiliated East-West Press Ltd, 1990.
7. Woolf, Judith. *Writing About Literature*. London and New York: Routledge, 2005.

**PEENF20 - ELECTIVE III A: TRANSLATION STUDIES**

<b>Year : II SEM : III</b>	<b>Course Code : PEENF20</b>	<b>Title Of The Course : Translation Studies</b>	<b>Course Type :</b>	<b>Course Category : Elective III A</b>	<b>H/W 6</b>	<b>CREDITS 4</b>	<b>MARKS 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to::

1. Identify the technical terms in translation theory
2. Explain the theoretical principles in translation theory and their implications
3. Apply the knowledge of translation theories to research in translation
4. Appraise the problems of equivalence and loss and gain between the SL and TL texts, leading to comparative evaluation of available versions of translations of a text
5. Translate literary and non-literary works

<b>CO/PSO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**Unit I: Central Issues (Theory I)                      K2-K5                      (18 hours)**

1. Language and Culture
2. Types of Translation
3. Decoding and Recoding
4. Problems of Equivalence
5. Loss and Gain
6. Untranslatability

**Unit II: History of Translation Theory (Theory II)                      K2-K5                      (18 hours)**

- 2.1. Problems of “Period Study”
- 2.2. The Romans
- 2.3. Bible Translation
- 2.4. Education and the Vernacular
- 2.5. Early Theorists
- 2.6. Archaizing

**Unit III: History of Translation Theory (Theory III)                      K2-K5                      (18 hours)**

- 3.1. The Renaissance
- 3.2. The Seventeenth Century
- 3.3. The Eighteenth Century
- 3.4. Romanticism and Post Romanticism
- 3.5. The Victorian
- 3.6. The Twentieth Century

**Unit IV: Critical Issues in Translation (Theory IV)                      K2-K5                      (18 hours)**

- |                       |   |
|-----------------------|---|
| 4.1. Albrecht Neubert | Translation as Text   |
| 4.2. Roman Jakobson   | On Linguistic Aspects of Translation                          |
| 4.3. Sherry Simon     | A.K.Ramanujan: What happened in the library                   |
| 4.4. Lawrence Venuti  | The Translator, the Name-of-the-father, and the Mother Tongue |
| 4.5 Lawrence Venuti   | The Translator's Unconscious(pg 232-237).                     |
| 4.6. Susan Bassnett   | Literary Research and Translation                             |

## **Unit V: Translation in Practice      K2-K5**

**(18 hours)**

A field work on anyone of the topics given below has to be undertaken by the students to attempt a translation of the same and to be submitted for **internal assessment**.

- 5.1. Oral stories, songs and traditions of the village  
History of the local or town temple or masque or churches- worship places.
- 5.2. History of the monuments in the village or town, Family History, Life of the ancestors in the village or town  
The origin of the name of the village /town
- 5.3. Great personalities of the past and present who lived in the village/town  
Extraordinary Historical event.
- 5.4. The development of the village or town  
The description of special occupation of the village or town  
The Landscape, details of the source of water.  
Culture of the village or town.
- 5.5. Typical village festival, its origin and the celebrations.  
The natural treatment and cure of the diseases.
- 5.6. Biographies, literary texts, newsletters, documents from regional languages

### **Books for Study**

1. Bassnett, Susan - *Translation Studies*, 3<sup>rd</sup> Edition – Routledge, New Delhi, 2005.
2. Richard, Alessandra. Ed. *Translation Studies: Perspectives on an Emerging Discipline*. New Delhi: Cambridge University Press, 2002.
4. Nair, RukminiBhaya. *Lying on the Postcolonial Couch*. New Delhi: Oxford University press, 2002.
5. Wakabayashi, Judy and Rita Kothari, Eds. *Decentering Translation Studies, India and Beyond*, Hyderabad : Orient Blackswan, 2014
6. Correa, Delia Da Sousa and W.R.Owens (Eds). *The Handbook to Literary Research*, 2<sup>nd</sup> Edition. London: Routledge, 2010.
7. Naikar, Basavaraj. *Glimses of Indian Literature in English Translation*. Delhi: Authors press, 2008.

### **Books for Reference**

1. Dharwadker, Vinay (Ed). *The Collected Essays of A.K. Ramanujan*. New Delhi: Oxford University Press, 2004.

2. Bassnett, Susan and Harish, Trivedi. *Post-Colonial Translation: Theory Practice*. London and New York: Routledge, 1999.
3. Kumar, Bijay Das. *A Handbook of Translation Studies*. New Delhi: Atlantic Publishers and Distributors, 2005.
4. Seturaman, ed. *Indian Aesthetics: An Introduction*. New Delhi: Macmillan, 2005.
5. Mukherjee Sujit. *Translation as Recovery*. Delhi: Pencraft International.
6. Naikar, Basavaraj. *Glimpses of Indian Literature in English Translation*. Delhi: Authors press, 2008.
7. Nair, Rukmini Bhaya. *Lying on the postcolonial couch*. New Delhi: Oxford University press, 2002.

**PEENG20 - ELECTIVE III B: LITERATURE FOR ACADEMIC AND PROFESSIONAL PURPOSES**

<b>Year : II SEM : III</b>	<b>Course Code :</b> PEENG20	<b>Title Of The Course :</b> Literature For Academic And Professional Purposes	<b>Course Type :</b> Theory	<b>Course Category :</b> Elective III B	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Recognize the various literary genres and Literature written from various socio-political, cultural and historical backgrounds
2. Examine the transition and transformation of text, context, and theory in the literary scenario from period to period
3. Develop subject- specific academic writing skill, critical thinking and writing Skills
4. Demonstrate the mastery of answering the question in a competitive examination in English Literature
5. Acquaint with secondary sources in Literature and to demonstrate strategies for research

<b>CO/PSO</b>	<b>PSO</b>					<b>6</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	
<b>CO1</b>	H	H	M	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I: Characteristics of British Literary Movements – Renaissance to Postmodernism**  
**K2-K5 (18 hours)**

- 1.1 Old English ( or Anglo-Saxon) Period: Middle English Period : The Renaissance
- 1.2 Elizabethan Age: Jacobean Age: Caroline Age : Commonwealth Period ( or Puritan Interregnum)
- 1.3 The Neoclassical Period: The Restoration : The Augustan Age ( or Age of Pope ) : The Age of Sensibility ( or Age of Johnson)
- 1.4 The Romantic Period : The Victorian Period : The Pre-Raphaelites: Aestheticism and Decadence
- 1.5 The Edwardian Period: The Georgian Period:
- 1.6 The Modern Period 1945-present : Postmodern Period

**Unit II: American History of Literature** **K2-K5 (18 hours)**

- 2.1 The Colonial Period 1607- 1765
- 2.2 The Revolutionary Period 1765-1815
- 2.3 The Era of National Expansion 1815 1837
- 2.4 The Concord Writers 1837-1861
- 2.5 The Cambridge Scholars 1837-1861  
Literature in the Cities 1837 -
- 2.6 Literature Since 1861

**Unit III: History of Indian English Literature** **K2-K5 (18 hours)**

- 3.1 The Literary Landscape: The Nature and Scope of Indian English Literature
- 3.2 From The Beginnings to 1857, Early Prose – Early Poetry
- 3.3 The Winds of Change : 1857 to 1920

Poetry – Prose – Biography and Autobiography - Travel Books – Essays – Literary and Art Criticism – Drama – Fiction – The Short Story

3.4 The Gandhian Whirlwind : 1920 – 1947

### **Prose**

Political Prose-Mahatma Gandhi – Jawaharlal Nehru – Other associates of Gandhi Critics of Gandhism Hindu Mahasabha ideology – Muslim Political thought

3.5 Communist thought – Socialist thought Moderate thought – Journalism –

History – Religious and Philosophical Prose – Radhakrishnan Biography and Autobiography – Travel Books – Essays – Literary and Art Criticism Poetry –

The School of Sri Aurobindo – Religious and Philosophical verse – Romantic verse Minor verse writers Drama – Fiction – Novel – Short Story

3.6 Independence And After

### **Poetry**

The Romantic School – Women Poets : Kamala Das – Other modern Poets

fiction – The Novel – Women Novelists – The Short Story – Women Writers Drama – Poetic Drama – Prose Drama

Prose – Autobiography – Biography – Politics and History – Religion and

Philosophy

Travel Books – Essays and Belles-Letters – Literary and Art Criticism

## **Unit IV: Basic Tenets of various Schools of Criticism – Classical to Contemporary**

**K2-K5 (18 hours)**

4.1 Moral Criticism, Dramatic Construction

4.2 Formalism, New Criticism, Neo-Aristotelian Criticism

4.3 Psychoanalytic Criticism, Marxist Criticism, Reader-Response Criticism

4.4 Structuralism/Semiotics, Post-Structuralism/Deconstruction

4.5 New Historicism/Cultural Studies, Post-Colonial Criticism

4.6 Feminist Criticism, Gender/Queer Studies

**Unit V: K2-K5 (18 hours)**

**Literary Forms:**

5.1 Poetry, Essay, Short Story, Novel  
5.2 Drama, Biography, Autobiography

### **Rhetoric**

5.3 Figure of speech, words  
5.4 Sentences, paragraph, composition

### **Prosody**

5.5 Accent – rhythm and meter  
5.6 Scansion

### **Innovative Component**

Review of literary texts  
Preparing a paper (Analysis, study and Research)

### **Books for Reference:**

1. Stephen, Martin. *English literature*. New York: Longman, 1986.
2. Burton S.H. *Workout English literature 'A' Level: Macmillan Master Series*. Macmillan Education Ltd. London .1986.
3. V.S.Seturaman,C.T.Indira, T.Sriraman. *Practical criticism*. India,Macmillan.1999
4. Klarer, Mario. *An Introduction to Literary Studies*. London: Routledge, 2004.
5. Leech, Geoffrey, Margaret Deuchar and Robert Hoogenraad. *English Grammar for Today*. New York: Palgrave Macmillan, 2011.
6. R.J. Rees ,*English Literature : An Introduction for Foreign Readers*. London : Macmillan , 1978.
7. M. H. Abrams , *A Glossary of Literary Terms* , Seventh Edition . Singapore : Thomson Heinle , 2008.
8. Gray , Martin . *A Dictionary of Literary Terms* . New Delhi : Pearson , 2008.
9. Jaytip Sarkar and Anindya Battacharya. *A Handbook of Rhetoric and Prosody Paperback*. Chennai. Orient Blackswan.2018
10. Day, Gary. *Literary Criticism: A New History*. Hyderabad : Orient Black Swan, 2008.
11. Albert, Edward. *A History of English Literature*. Oxford: Oxford University Press, 1979.Print.
12. Chowdhury, Aditi and Rita Goswami. *A History of English Literature: Traversing theCenturies*. Hyderabad: Orient Blackswan, 2014. Print.
13. Daiches, David. *A Critical History of English Literature*. London: Secker& Warburg, 1960. Print.

14. Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford, UK: Oxford University Press, 1994. Print
- A.P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
15. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
16. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
17. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
18. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
19. Yule, George. *The Study of Language*. Cambridge University Press, 1985.

#### **Web sources**

<http://english.columbia.edu/graduate/orals-reading-list#Medieval>

**PIENE20 - INDEPENDENTELECTIVE III A: LITERARY SKILLS FOR  
EMPLOYABILITY- III**

<b>Year : II SEM : III</b>	<b>Course Code : PIENE20</b>	<b>Title Of The Course : Literary Skills For Employability- III</b>	<b>Course Type : Theory</b>	<b>Course Category :Elective III A</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:l

1. Remember and recall names of authors, literary works, dates, facts, terms and concepts
2. Demonstrate knowledge of English Language and Linguistics
3. Apply knowledge of literary criticism to analyse literary works
4. Discover interest and demonstrate knowledge in literature in English outside Britain and America
5. Demonstrate knowledge in Application-oriented areas like Research Methodology, Translation and English Language Teaching

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: The Romantic Age Poetry                      K2-K5                      (18 hours)**

- 1.1. Literary Background of the Romantic Age
- 1.2. First Generation Romantic Poets – Blake, Southey
- 1.3. Wordsworth and Coleridge
- 1.4. Second Generation Romantic Poets – Byron, Shelley, Keats
- 1.5. Age of Chaucer, Geoffrey Chaucer
- 1.6. Model Questions & Solved Question papers

**Unit II: Victorian Poetry                                      K2-K5                                      (18 hours)**

- 2.1. The Victorian Age
- 2.2. Literary Movements of the Victorian Age
- 2.3. English Chaucerians
- 2.4. Scottish Chaucerians
- 2.5. New Court Poets
- 2.6. Model Questions & Solved Question papers

**Unit III: The Modern, Contemporary Age and American Poetry                                      K2-K5                                      (18 hours)**

- 3.1. Modern Poetry
- 3.2. Major Poets of the Modern Age
- 3.3. Contemporary Poetry
- 3.4. American Poetry
- 3.5. American Poets
- 3.6. Model Questions & Solved Question papers

**Unit IV: Fiction and Short Stories                                      K2-K5                                      (18 hours)**

- 4.1. Pre-Chaucerian to Elizabethan Age
- 4.2. Puritan, Restoration and Neo-Classical Age

- 4.3. The Romantic Age
- 4.4. The Victorian Age and Modern Age
- 4.5. Contemporary Period
- 4.6. Model Questions & Solved Question papers

**Unit V: Non-Fictional Prose**

**K2-K5**

**(18 hours)**

- 5.1. Non-Fiction in Anglo-Norman Period
- 5.2. Non-Fiction in Puritan Age, Non-Fiction in the Restoration Age
- 5.3. Major Non-Fiction Writers in Neo-Classical and Romantic Age
- 5.4. The Victorian and Modern Age Non-Fiction
- 5.5. Contemporary American and Non-British Fiction
- 5.6. Model Questions & Solved Question papers

**Books for Reference:**

1. Albert, Edward. *A History of English Literature*. Oxford: Oxford University Press, 1979. Print.
2. Chowdhury, Aditi and Rita Goswami. *A History of English Literature: Traversing the Centuries*. Hyderabad: Orient Blackswan, 2014. Print.
3. Daiches, David. *A Critical History of English Literature*. London: Secker & Warburg, 1960. Print.
4. Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford, UK: Oxford University Press, 1994. Print
- A. P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
5. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
6. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
7. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
8. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
9. Yule, George. *The Study of Language*. Cambridge University Press, 1985.

**PIENF20 - ELECTIVE III B: CONTENT WRITING**

<b>Year :</b> <b>II</b>	<b>Course Code :</b> PIENF20	<b>Title Of The Course :</b> Elective III B: Content Writing	<b>Course Type :</b> Theory	<b>Course Category :</b> Independent Elective	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> <b>100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Cultivate technical writing Skills
2. Develop editing skills
3. Create using analytic skills
4. Display skills in publication and advertising
5. Engage in Freelance writing and entrepreneurship

<b>CO/PSO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**Unit I:** **K4-K6 (18 hours)**

1. 1. SEO Content Writing
1. 2. Technical Writing
1. 3. Communication and Marketing Writing
1. 4. Publication Based and Editorial Writing, Instructional Design
- 1.5. Profile Writing (Individual, Institution, Corporate)
1. 6. Research and Report Writing

**Unit II:** **K1 – K6 (18 hours)**

2. 1 Writing on Corporate Social Responsibility (CSR)
2. 2. Feature Writing and headlines
- 2.3. Business Writing
- 2.4. Press Release Writing
- 2.5. Magazine Writing
- 2.6. Copywriting

**Unit III:** **K1-K6 (18 hours)**

- 3.1 ISBN – The International Standard Book Number, ISSN – The International Standard Serial Number, Foreword – Preface
- 3.2 Introduction to copy- editing- making the typescript - Copyright Permission and acknowledgement
- 3.3 Making corrections- House Style- Abbreviation - Bias and Parochialism

3.4 Capitalization - Cross- References - Dates and Time- Italic - Proper Names

3.5 Punctuation – Spelling - Miscellaneous Points

3.6 Preliminary Pages

Butcher, Judith, Drake Caroline, and Leach, Maurice. *Butcher's Copy-editing: The Cambridge Handbook for Editors, Copy-editors and Proof readers.*

**Unit IV:**

**K1, K4-K6**

**(18 hours)**

4.1 Report Writing

4.2 Proofreading

4.3 Editing

4.4 Review Writing

4.5 Book and Film Review

4.6 Transcribing audio talks or interviews

Mukhopadhyay, Lina *et al.* *Polyskills: A Course in Communication Skills and Life Skills.*  
Chennai and New Delhi: Foundation Books CUP, 2012

**Essential Reading**

**Writing for the Media**

Introduction to Scriptwriting

*Mike Harris*

Writing for the Stage

*Brighde Mullins*

Writing for Radio

*Mike Harris*

Writing for Television

*Stephen V. Duncan*

Writing for Television

*John Milne*

Writing for Film

*Bonnie O'Neill*

Steven Earnshaw (Ed) *The Handbook of Creative Writing* Edited by Edinburgh University Press Ltd. Edinburgh 2007

**Unit V:**

**K1, K3-K6**

**(18 hours)**

5.1 User's Manual

5.2 Technical Letters

5.3 Newsletters

5.4 Writing Instruction

5.5. Brochure, Poster/flyer and Leaflets

5.6 Pamphlets, invitations and advertisements

Pauley, Steven E. and Daniel, G. Riordan. *Technical Report Writing.* New Delhi:  
A.I.T.B.S. Publishers and Distributors, 2006.

**Essential Reading in General:**

## Other Writing

Writing as Experimental Practice	<i>Thalia Field</i> 305
Writing as ‘Therapy’	<i>Fiona Sampson</i> 312
Writing in the Community	<i>Linda Sargent</i> 320
Writing for the Web	<i>James Sheard</i> 327
Copyright	<i>Shay Humphrey, with Lee Penhaligan</i>

Steven Earnshaw (Ed) *The Handbook of Creative Writing* Edited by Edinburgh University Press Ltd. Edinburgh 2007

### Books for Study:

1. Butcher, Judith, Drake Caroline, And Leach, Maurice. *Butcher’s Copy-editing: The Cambridge Handbook for Editors, Copy-editors and Proof readers*. Fourth Edition Cambridge University Press, 2007
2. Steven Earnshaw (Ed) *The Handbook of Creative Writing* Edited by Edinburgh University Press Ltd. Edinburgh 2007

### Books for Reference:

1. Gerson, Sharon. J. and Steven M. Gerson. *Technical Writing: Process and Product - III* edition. New Delhi: Pearson Education Inc., 2005.
2. Pauley, Steven E. and Daniel, G. Riordan. *Technical Report Writing*. New Delhi: A.I.T.B.S. Publishers and Distributors, 2006.
3. <https://content-writing-india.com/blog/different-types-of-content-writing/>

## SEMESTER IV

### PCENM20 - LITERATURE OF THE MODERN AGE

<b>Year :</b> II <b>SEM</b> :IV	<b>Course Code :</b> PCENM20	<b>Title Of The Course :</b> Literature of the Modern Age	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Recognize the broad spectrum of literary and artistic movements of the Twentieth century and thereby develop critical insight to comprehend the plots, characters and techniques in the literary works.
2. Explain the relationship between literature and social structures.
3. Discuss major issues related to the cultural and social context of the 20th century.
4. Appreciate the masterpieces of literature of this literary period and to analyze formal and thematic aspects of modern age in the background of larger cultural and historical movements.
5. Realize the degeneration of morality and human values in the modern age.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I** **K1 – K5** **(18 hours)**

1.1 Introduction:Key concepts and Ideas:Objective Co-relative, Dissociation of Sensibility,  
Unification of Sensibility, Fusion of Thought and Feeling

1.2 T. S. Eliot The Wasteland (Detailed Poetry)

1.3 Seamus Heaney Death of a Naturalist (ND Poetry)

1.4 E. M. Forster What I Believe (Detailed Prose)

1.5 Bernard Shaw Arms and Man(Detailed Drama)

1.6 E.M. Forster

**Unit II** **K1-K5** **(18 hours)**

2.1 W. H. Auden Easter 1960 (Detailed Poetry)

2.2 Stephen Spender TheLabourer in the Vineyard(ND)

2.3 Sylvia Plath Daddy

2.4 ShelaghDelaney A Taste of Honey (ND Drama)

2.5 Formal Elements of Fiction: Plot Construction, Narrative point of View

2.6 James Joyce

**Unit III** **KI - K5** **(18 hours)**



1. Harold Bloom Ed, *Samuel Beckett's Waiting for Godot: Viva Modern Critical Interpretations*. New Delhi: First Indian Edition, 2007.
2. Morris Beja, A. E. Dyson Ed. *James Joyce : Dubliners and A portrait of the Artist as a Young man: A selection of critical essays*, 1<sup>st</sup> ed. London: The Macmillan Press Ltd, 1973.
3. Gamini Salgado, A. E. Dyson Ed., *D.H. Lawrence Sons and Lovers: A selection of Critical Essays*. London: The Macmillan Press Ltd, 1973.
4. R.D. Draper, *Sons and Lovers by D.H. Lawrence Macmillan Master Guides*. New York: Palgrave Macmillan, 1986.
5. Harold Bloom ed., *F. Scott Fitzgerald's The Great Gatsby Viva Bloom's Notes*. New Delhi: Viva Books Pvt. Ltd, 2007.
6. Harold Bloom ed., *F. Scott Fitzgerald's The Great Gatsby Viva Bloom's Notes*. New Delhi: Viva Books Pvt. Ltd, 2001.
7. William Stephenson, *Fowler's The Lieutenant's Woman: Reader's Guide* Viva-continuum edition. London: Continuum International Publishing Group first South Asian Edition, 2008.
8. Heiney, Donald and Downs, Lenthel H., *Twentieth Century and Critical Theory*. Essentials of Contemporary Literature of the Western World - Vol.2
9. Hudson, Derek, *English Critical Essays: Twentieth Century (Second Series)*. London: OUP, 1963.
10. James, Pickering H. and Jeffrey D. Hoepfer, *Concise Companion to Literature*. New York: Macmillan Publishing Co., Inc., 1981.
11. Jones M., Phyllis, *English Critical Essays: Twentieth Century (First Series)*. London: OUP, 1964.
12. Orr, John, *The Making of the Twentieth Century Novel: Lawrence, Joyce, Faulkner and*
13. *Beyond*. Hongkong: Macmillan, 1987.
14. Rama, R.P. ed. *Critical Interactions: Reading Twentieth Century Literary Texts*. Jaipur: Pointer Publishers. 1992.
15. Salgaonkar, V.D. Ed. *The Gates of Wisdom: Selections from Bertrand Russell*. Madras: The Macmillan Co. of India Ltd., 1971.
16. John Wain ed. *Anthology of Modern Poetry*. London: Hutchinson & Co Publishers Ltd.
17. A.J. Wilks, *T.S. Eliot: The Waste Land Macmillan Critical Commentaries*. London: Macmillan Education Ltd, 1971.

## PCENN20 - CONTEMPORARY WRITING

<b>Year : II SEM : IV</b>	<b>Course Code :</b> PCENN20	<b>Title Of The Course :</b> <b>Contemporary Writing</b>	<b>Course Type :</b> <b>Theory</b>	<b>Course Category :</b> <b>Main</b>	<b>H/W</b>  <b>6</b>	<b>Credits</b>  <b>5</b>	<b>Marks</b>  <b>100</b>
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss the significance of Contemporary literary works
2. Appreciate contemporary writing for the form and theme
3. Evaluate Contemporary writers for their contribution to literature and society
4. Evaluate the contemporary literary schools /movements
5. Create critical essays on contemporary writing

<b>CO/ P SO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	H	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**Unit I: Poetry      K3-K6      (18 hours)**

1.1 World War II and the horrors of the war, genocide and corruption, real-life themes and the beginning of a new period of writing.

1.2 Social and political viewpoints, connections to current events and socioeconomic messages

1.3 Trends that illuminate societal strengths and weaknesses

1.4 Introduction to Contemporary Writing

1.5 Contemporary Style

1.6 Genres in Contemporary literature

**Unit II: Prose      K3-K6      (18 hours)**

2.1 Jo Shapcott      Hairless

2.2 Simon Armitage      Remains

2.3 Bob Dylan      With God on Our Side, The Times They Are A-Changing

2.4 Adrienne Rich      A Mark of Resistance

2.5 Pablo Neruda      Poetry

2.6 John McGrath      -      Behind the Cliches of Contemporary Theatre

From John McGrath. A Goodnight Out; Popular Audience; Class and Form  
A lecture series given at Cambridge University in 1979

**Unit III: Drama & Short Stories**                      **K 3-K6**                      **(26 hours)**

- 3.1 Samuel Beckett                      Waiting for Godot
- 3.2 Harold Pinter                      The Birthday Party
- 3.3 Bertolt Brecht                      Mother Courage and her Children
- 3.4 Borges                      Pierre Menard, Author of the Quixote
- 3.5 Alice Munro                      Face
- 3.6 Vikram Seth                      Beastly Tales from Here and There

**Unit IV: Postmodernism & Posthumanism**                      **K1, K3-K6**                      **(18 hours)**

- 4.1 Terms: Abject; alienation; archetypal criticism; aura; bricoleur; cancelled character; character; closure; erasure; flaneur; frame
- 4.2 Terms: hetero biography; hyperspace; hypertext; ludism; marginality; metafiction; modernism and post-modernism; montage; nomad
- 4.3 Terms: polyphonic; popular; precession; realism; repetition; short-circuit; syntagmatic and paradigmatic; True-Real
- 4.4 Linda Hutcheon -                      Theorizing the Postmodern
- 4.5. Terms: anthropocene, anti-anthropocentrism, anti-humanism, transhuman, alterity, science fiction, technicity
- 4.6 Neil Badmington -                      Post humanism

[From Literature and Science]

**Unit V: Fiction**                      **K4-K6**                      **(10 hours)**

- 5.1 Thomas Pynchon, Orhan Pamuk
- 5.2 Jose Saramago, Isabelle Allende
- 5.3 Kurt Vonnegut Jr, Umberto Eco
- 5.4 Kazuo Ishiguro, Haruki Murakami
- 5.5 Gabriel Garcia Marquez, Ian McEwan

## 5.6 John Updike

### **Books for Reference:**

1. Jennifer Birkett. *Waiting for Godot by Samuel Beckett*. New York: Palgrave Macmillan, 1987.
2. Harold Bloom Ed, *Samuel Beckett's Waiting for Godot: Viva Modern Critical Interpretations*. New Delhi: First Indian Edition, 2007.
3. Rama, R.P. ed. *Critical Interactions: Reading Twentieth Century Literary Texts*. Jaipur: Pointer Publishers. 1992.
4. Heiney, Donald and Downs, Lenthel H., *Twentieth Century and Critical Theory*. Essentials of Contemporary Literature of the Western World - Vol.2
5. Hudson, Derek, *English Critical Essays: Twentieth Century (Second Series)*. London: OUP, 1963.
6. James, Pickering H. and Jeffrey D. Hoeper, *Concise Companion to Literature*. New York: Macmillan Publishing Co., Inc., 1981.
7. Jones M., Phyllis, *English Critical Essays: Twentieth Century (First Series)*. London: OUP, 1964.
8. Frankenstein; or, the trials of a posthuman subject An investigation of the Monster in Mary Shelley's "Frankenstein" and his attempt at acquiring human subjectivity in a posthuman state by Isa Ring  
<https://sh.diva-portal.org/smash/get/diva2:1178476/FULLTEXT01.pdf>

## PCENO20 - ENGLISH LANGUAGE TEACHING

<b>Year: II</b>	<b>Course Code:</b> PCENO20	<b>Title of the Course:</b> English Language Teaching	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W:</b> <b>6</b>	<b>Credits:</b> <b>5</b>	<b>Marks:</b> <b>100</b>
<b>Sem - IV</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Identify approaches to enable language learning and establish the feasibility of following a bilingual approach for the teaching of English.
2. Create a resource bank of language teaching strategies, ideas and techniques to be used for English Language teaching.
3. Analyse the concepts that relate and integrate content and language instruction for language acquisition.
4. Evaluate the characteristics of the approaches to enhance performance for best outcomes in language learning.
5. Design activities that allow learners to practice academic language and to develop second language acquisition at the best of the student's ability.

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Major trends in twentieth-century**

**(15 Hours)**

**Language teaching**

1.1 A brief history of early developments in Language Teaching K1,K2

1.2 Interlanguage K1, K2

From Rod Ellis. *Second Language Acquisition*. OUP.New Delhi. 2017

1.3 The Oral Approach and Situational K2, K3

Language Teaching

1.4 The Audiolingual Method K2, K3

1.5 Whole Language K2, K3

1.6 Multiple Intelligences K2, K3

**Unit II: Current approaches and methods**

**(20 Hours)**

2.1 Communicative Language Teaching K2,K4

2.2 Competency-Based Language Teaching K2,K3

2.3 Task-Based Language Teaching K3,K4

2.4 Cooperative Language Learning K3, K4

2.5 Content Based Instruction K3, K4

2.6 Neurolinguistic Programming (NLP) K3, K4

**Unit III: Alternative twentieth-century approaches and methods**

**(15 Hours)**

3.1 The Natural Approach	K3.K4
3.2 Total Physical Response	K3, K4
3.3 The Silent Way	K3, K4
3.4 Community Language Learning	K3, K4
3.5 The Lexical Approach	K3, K4
3.6 The post-methods era	K3, K4

#### **Unit IV: Four basic Skills (LSRW)**

**(20 Hours)**

4.1 Tasks for Language teachers, Using the Tasks	K5, K6
4.2 Carrying out small scale research in the classroom	K5, K6
Devising and evaluating Tasks	
4.3 Lesson Planning, Syllabus, Tests, Assessment	K5, K6
4.4 Practical Lesson management	K5, K6
4.5 Using Websites for Language Teaching	K4, K5
4.6 Micro-Teaching and Self Observation	K5, K6

#### **Unit V: Teaching Literature**

**(20 Hours)**

5.1 Theories of Teaching Literature (pg 21-41)	K3, K4
5.2 Methods of Teaching Literature (Pg42-61)	K3, K4
5.3 Teaching Poetry (Pg62-78)	K4, K5
5.4 Teaching Drama (Pg79- 87)	K4, K5
5.5 Teaching Fiction (Pg88-102)	K4, K5
5.6 Teaching Literature in Dark Times	K4, K5

Elaine Showalter. (2003) *Teaching Literature*. Blackwell Publishing: UK.

#### **Books for Reference**

1. Gabbard, Jerry S. and Robert Oporandy (2009). *Language Teaching Awareness*. Chennai: OBS Publications
2. Parrot, Martin (1993). *Tasks for Language Teaching*. New Delhi: CUP.
3. Richards, Jack C. Theodore S. Rodgers (2015). *Approaches and Methods in Language Teaching* UK: Cambridge University Press.
4. Ur, Penny (1999). *A Course in Language Teaching: Trainee Book*. UK: First Asian Edition.
5. Elaine Showalter. (2003) *Teaching Literature*. Blackwell Publishing: UK.

6. Howatt, P. R. and H.G. Widdowson (2004). *A History of English Language Teaching*. New York: OUP.
7. Krishnaswamy, N and Lalitha Krishnaswamy (2011) *Methods of Teaching English*. Chennai: Macmillan, 2011.
8. Nunan, David (1992). *Research Methods in Language Learning*. New Delhi: CUP.
9. Richards, Jack C. and Willy A. Renandya (2000) ed. *Methodology in Language Teaching: An Anthology of Current Practice*. New Delhi: CUP
10. *An Anthology of Current Practice*. New Delhi: CUP
11. Ur, Penny (1991). *A Course in Language Teaching: Practice and Theory*. UK: CUP.
12. Wallace, Michael. J. (1991) *Training Foreign Language Teachers*. New Delhi: CUP.

## RESEARCH PROJECT

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Demonstrate knowledge of research methods, theories and research context in Literature and Language teaching
2. Explain a research problem/question foregrounded against the relevant literary context and/or research context
3. Apply relevant and result-yielding research methods, approaches and theories to the conduct of qualitative and quantitative research
4. Organise and evaluate the relevant sources of scientific evidence to construct a well-supported, research statement and/or logical argument
5. Devise a framework of expository writing to present the trajectory, context and outcome of the research

CO/PLO	PLO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

### **Preliminary Requirements:**

- Knowledge of the types of Research, Deductive and Inductive Arguments, Critical Approach, Research ethics, Bibliography.
- The research work must be strictly an individual sincere work, the result of ardent study and pursuit of excellence. The work should not exceed 10,000 words and there will be viva- voce by an examiner.
- This module gives the opportunity to undertake supervised work on a dissertation in Literature or English Language Teaching up to 10,000 words, on a topic of one's choice agreed with the Guide/supervisor.
- **It is strongly recommended that the student must be motivated to begin the Preliminary reading and survey of related secondary sources for the dissertation in the first summer term and vacation holidays.**
- The students can be encouraged to present papers in the conferences and to publish in the proposed topic.

### **Essential Reading**

a) Where And How To Find Secondary Literature

b) How to Write a Scholarly Paper

From *An Introduction to Literary Studies*- Mario Klarer Pub.London,Routledge. 2004

c)The Undergraduate Dissertation

From *In Pursuit of English Studies*.Barry,Peter.New Delhi, Bloomsbury.2014

d)Gupta,Suman.ThePlace of Theory In LiteraryDisciplines

From DaSousa, Delia Correa and W.R.Owens. *The Handbook to Literary Research*, second Edition. Routledge: Taylor and Francis Group, The Open University Abingdon-Oxon. 2010.

**PEENH20 - Elective IVA: HISTORY OF IDEAS**

<b>Year: II SEM : IV</b>	<b>Course Code:</b> PEENH20	<b>Title Of The Course:</b> History of Ideas	<b>Course Type :</b> Theory	<b>Course Category :</b> Elective IV A	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Identify the evolution of human thought and history of ideology
2. Explain the germ and growth of different schools of philosophy, their episteme and ontological development
3. Interpret social behaviour and cultural practices of human beings according to each train of thought focussed on the course
4. Evaluate the ethical attributes of the schools of philosophy
5. Critique the attributes of other disciplines against the evolutionary changes in human thought

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H



## **Nineteenth Century**

b) Darwin: Natural Selection (Chapter IV)

3. Survival Instinct and Sexual Selection

Marx: The Communist Manifesto:Chapter I

4. Capitalism and Class struggle

:Bourgeois and Proletarians [Pg 246 – 255]

5. History as the story of class struggles

6. Envisioning a classless society

From McLellan, David. *Karl Marx Selected Writings*. New York: Oxford University Press, 2000.

## **Unit IV: Twentieth Century                      K2-K6                      (18 hours)**

a)Sigmund Freud: The Structure of the Unconscious K5

1. Conscious versus unconscious mind

2. Id, ego and superego.

b) Simone de Beauvoir: The Second Sex-Introduction

3. Woman, as the other,object

4.Woman, as individualized self and subject

5. S. Radhakrishnan:Introduction to The Principal *upaniShads*

5.6 The term Upanishads

## **Unit V Contemporary    K2-K6    (18 hours)**

Theodore Adorno

Aesthetics

1. Introduction to Aesthetics

2. Defensive Reactions to Modern Art (L 19; Pg. 185-187)

3. A Critique of the theory of Aesthetic experience (L 20; Pg. 203-205)

4. The ambiguity of the work of art (L 20; Pg. 203-205)

5. The Psychology of the Artist (L 21; Pg. 211-213)

6. Subjectivism and Objectivism in Aesthetic (L 17; Pg.166-167)

From Theodore W. Adorno. *Aesthetics 1958/59*. Ed. Eberhard Ortland. Tr. Wieland Hoban. Polity Press. UK. 2018.

### **Books for Study and Reference**

1. McDermott Robert A. Ed. *The Basic writings of S. Radhakrishnan*.
2. Jaico Publishing House, Mumbai 2004
3. Lear, Jonathan. *Freud*. New York. Routledge, 2005
4. Annas, Julia. *Plato, A Very Short Introduction*. New Delhi: Oxford University Press, 2006.
5. Shields, Christopher. *Aristotle*. Oxon: Routledge, 2007.
6. Lewens, Tim. *Darwin*. New York. Routledge, 2007.
7. Darwin, Charles. *The Origin of Species*. New Delhi: Peacock Books, 2012.
8. Dent, Nicholas. *Rousseau*. Oxon: Routledge, 2005.
9. Stevensen, Leslie & David L. Haberman. *Ten Theories of Human Nature*. Fourth Edition. New Delhi: Oxford University Press, 2006.

**PEENI20 - ELECTIVE IV B: CULTURAL THEORY AND POPULAR CULTURE**

<b>Year: II SEM : IV</b>	<b>Course Code: PEENI20</b>	<b>Title Of The Course: Cultural Theory &amp; Popular Culture</b>	<b>Course Type : Theory</b>	<b>Course Category : Elective IV B</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to::

1. Recognize the role of Culture in human thought, expression and art
2. Remember the names of the thinkers who initiated the cultural turn in analyzing all the productions of the human mind and both individually and collectively, and their contribution to cultural studies
3. Analyse literary and other related art forms in cultural perspective
4. Apply Cultural Theory as a research methodology
5. Evaluate literary text for their cultural value

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	M	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**



- 4.1. Feminisms
- 4.2. Women at the cinema
- 4.3. Reading women's magazines
- 4.4. Post-feminism
- 4.5. Men's studies and masculinities
- 4.6. Queer theory

## **Unit V**

**K2 – K6**

**(18 Hours)**

- 5.1. 'Race' and racism
- 5.2. The ideology of racism
- 5.3. Orientalism
- 5.4. Whiteness
- 5.5. Anti-racism and cultural studies
- 5.6. The ideology of mass culture

### **Books for Study**

1. Storey, John. *Cultural Theory and Popular Culture*, VI Edition, New Delhi: Pearson, 2014
2. Storey, John. Ed. *What is Cultural Studies? A Reader*. London: HodderHeadline Group, 1997

### **Books for Reference**

1. Stuart Hall. "The Foundation of Cultural Studies". *Cinema on the Brain*. YouTube, 2014
2. Prof. Avishk Parui, Dept. of Humanities and Social Sciences, IIT Madras. "Introduction to Cultural Studies". NPTEL – NOC IITM, YouTube, 2018
3. ---. "British Cultural Studies: Raymond Williams and Culture and Society". University Quick Course, 2018
4. John Hall, F R Leavis and Raymond Williams – "Two Very Different Positions on 'Culture'". BBC., 2017
5. Prof. Anju Narayan, Delhi University. "Culture and Class Struggle in Literature: Antonio Gramsci, Raymond Williams". Vidya-Mitra. YouTube, 2017
6. Prof. Rutger de Graff, University of Amsterdam. "Popular Culture: Reflection or Illusion", *Introduction to Communication Science*. Courseera. YouTube, 2013.

**PIENG20 - INDEPENDENT ELECTIVE IV A: LITERARY SKILLS FOR  
EMPLOYABILITY –IV**

<b>Year: II SEM : IV</b>	<b>Course Code:</b> PIENG20	<b>Title Of The Course:</b> Literary Skills For Employability – IV A	<b>Course Type :</b> Theory	<b>Course Category : Core</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Remember and recall names of authors, literary works, dates, facts, terms and concepts
2. Demonstrate knowledge of English Language and Linguistics
3. Apply knowledge of literary criticism to analyse literary works
4. Discover interest and demonstrate knowledge in literature in English outside Britain and America
5. Demonstrate knowledge in Application-oriented areas like Research Methodology, Translation and English Language Teaching

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (2), L - Low (1)**

CO/PO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I: Language: Basic Concepts, Theories and Pedagogy K2 –K6 (18 Hours)**

- 1.1. Language: Introduction and Definitions
- 1.2. Features of Language
- 1.3. Main Components of Language, Idiolect, Dialect and Language
- 1.4. Origin and Development of Language
- 1.5. Learning and Teaching Approaches
- 1.6. Model Questions & Solved Question papers

**Unit II: English in India: History, Evolution and FuturesK2 –K6 (18 Hours)**

- 2.1. Historical Background
- 2.2. Evolution and Development of English in India
- 2.3. Introduction to Indian English Literature
- 2.4. Indian English Writers: From Tagore to Nissim Ezekiel
- 2.5. Indian English Writers: From Vijay Tendulkar to Contemporary Writers
- 2.6. Model Questions & Solved Question papers

**Unit III: Cultural Studies K2 –K6 (18 Hours)**

- 3.1. Introduction to Cultural Studies
- 3.2. Major Thinkers of Cultural Studies
- 3.3. Feminism
- 3.4. Postcolonialism
- 3.5. Marxism and Poststructuralism
- 3.6. Model Questions & Solved Question papers

**Unit IV: Literary Criticism and Literary Theory K2 –K6 (18 Hours)**

- 4.1. Criticism, Its Nature and Definition
- 4.2. Major and Minor Critics and their Works

- 4.3. Introduction to Literary Theory
- 4.4. New Criticism, Cultural Materialism, Feminist Criticism, Formalism
- 4.5. Postcolonialism, Psychoanalytic Criticism, Structuralism
- 4.6. Model Questions & Solved Question papers

**Unit V: Research Methods and Materials in English      K2 –K6                      (18 Hours)**

- 5.1. Research: Meaning, Definitions and Types
- 5.2. Characteristics of Research
- 5.3. Objectives and Approaches
- 5.4. Research Problem, Literature Review, Research Hypothesis, Research Design Sampling, Data Collection, Data Analysis,
- 5.5. Literary Research, Qualitative and Quantitative Methods, Research Materials
- 5.6. Model Questions & Solved Question papers

**Books for Study and Reference**

1. Albert, Edward. *A History of English Literature*. Oxford: Oxford University Press, 1979. Print.
2. Et. Al. NTA-UGC (NET/JRF/SET) English Paper -2. Arihant Publications Limited: New Delhi,
3. Chowdhury, Aditi and Rita Goswami. *A History of English Literature: Traversing the Centuries*. Hyderabad: Orient Blackswan, 2014. Print.
4. Daiches, David. *A Critical History of English Literature*. London: Secker & Warburg, 1960. Print.
5. Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford, UK: Oxford University Press, 1994. Print
- A. P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
6. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
7. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
8. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
9. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
10. Yule, George. *The Study of Language*. Cambridge University Press, 1985.

**Web sources**

<http://english.columbia.edu/graduate/orals-reading-list#Medieval>

<http://meet.google.com/cmd-sxfb-fyr>

**PIENH20 - INDEPENDENT ELECTIVE–IV B: LITERATURE AND ENVIRONMENT**

<b>Year: II SEM : IV</b>	<b>Course Code:</b> PIENH20	<b>Title Of The Course:</b> Literature And Environment	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b>	<b>Credits</b>	<b>Marks</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Explore various eco-critical perspectives through nature studies
2. Engage with environmental issues through literary narratives
3. Understand about the ecological degradation and various natural calamities that affect the planet earth due to the reckless nature of human beings
4. Develop critical awareness about sustainability practices
5. Identify environmental issues via historical narratives

<b>CLO/PSO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (2), L - Low (1)**

CLO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**Unit I Detailed Poems      K1, K2, K3      (18 Hours)**

- 1.1 Admiration of Nature and Deforestation
- 1.2 William Wordsworth      The Education of Nature
- 1.3 Coleridge      To the Nightingale
- 1.4 G.M.Hopkins      Spring
- 1.5 Gieve Patel      On killing a Tree
- 1.6 Robert Frost      Tree at my Window

**Unit II Non Detailed Poems      K1, K4, K5,K6      (18 Hours)**

- 2.1 Global Warming and Climate Change
- 2.2 Nissim Ezekiel      After Rain
- 2.3 Eunice De Souza      Landscape
- 2.4 Hilda Doolittle      Heat
- 2.5 Wilfred Campbell      The Winter Lakes
- 2.6 H.W.Longfellow      Nature

**Unit III: Prose      K2-K6      (18 Hours)**

- 3.1. Conservation of Water and Protection of Animals
- 3.2. ThakazhiSivasankaraPillai      In the Flood
- 3.3. Rabindranath Tagore      The Horse
- 3.4. Sir.J.ArthurThomas      The Donkey (Detailed)
- 3.5. C. Rajagopalachari      The Tree Speaks (Detailed)
- 3.6. C.V.Raman      Water: The Elixir of Life (Detailed)

**Unit IV: Short Stories      K2-K6      (18 Hours)**

- 4.1. History of Nature

4.2. Rudyard Kipling	How the Leopard got his spots
4.3. Jim Corbett	The Kanda Man-Eater
4.4. Sufi Saints	When the Waters were changed
4.5. Ruskin Bond	The Cherry Tree
4.6. Ruskin Bond	Dust on the Mountain

### **Unit V: Fiction**

**K2-K6**

**(18 Hours)**

5.1. Ecological Study	
5.2. Timothy Morton	Without Nature
5.3. Barbara Kingsolver	Prodigal Summer
5.4. Mamang Dai	The Black Hill
5.5. Upton Sinclair	The Jungle
5.6. Patrick White	The Tree of Man

### **Innovative Component**

Ecocritical analysis of Poetry, Prose, Drama, Short story and Novels

### **Books for Study and Reference**

1. C.D.Narasimhaiah. ed. An Anthology of Commonwealth Poetry. Macmillan India Limited, Chennai. 1990.
2. C.N.Ramachandran. Ed. Five Centuries of Poetry. RadhaAchar Macmillan Publishers India Ltd, New Delhi, 1991.
3. De Souza, Eunice. Ed. Nine Indian Women Poets: An Anthology. Oxford University Press, New Delhi, 1997.
4. Dickinson, Emily. Selected Poems. Dover Publications. Newyork.1990.
5. Dr. S. Sen. Robert Frost: Selected Poems (A Critical Evaluation). Unique Publishers, New Delhi. 1984.
6. Dr. A. Shanmugakani. Ed. A Bouquet of Poems: An Anthology of Poems. Manimegalai Publishing House, Madurai. 2012.
7. Holloway, John. Ed. Selected Poems of Percy Bysshe Shelley. Heinemann Educational Books, London.1960.
8. M.Khatri. Great Short Stories of Sufi Saints. The Book Paradise, New Delhi, 2006.
9. M.W.Gardsen. ed. Life and Literature (Prose Selections). Macmillan Co. Ltd, Madras, 1971.

10. R.Parthasarathy. Twentieth Century Indian Poets. Oxford University Press, Delhi, 1976.  
11. Satpathy, Sumanyu. Ed. Early Modern Poetry. Macmillan India Limited, Chennai, 1999.

### **End-Semester Examination 100 Marks**

#### 1. Question Paper Pattern A:

Section A – Annotations 150 words – 4 questions out of 6 (4x5 = 20)

Section B – Short Answers - 300 words - either/or pattern (4x5 = 20)

Section C – Essays - 900 words - 4 questions out of 6 (4x15 = 60)

#### 2. Question Paper Pattern B:

Section A – Short Questions 80 words – 10 questions out of 12 (10x2 = 20)

Section B – Short Answers - 300 words - either/or pattern (4x5 = 20)

Section C – Essays - 900 words - 4 questions out of 6 (4x15 = 60)

#### 3. Question Paper Pattern C:

Independent Elective I A, II A, IIIA, IV A

Section A – (1x20 = 20)

Objective Type questions on Identification:

Section B – (1x20 = 20)

Objective Type questions on History and Theory of Literary Criticism:

Section C – (1x40 = 40)

Objective Type questions on Cultural and Historical Contexts:

#### 4. Question Paper Pattern D:

Independent Elective – Course I B, II B, III, IV B

Answer any five questions out of 8 - 5x20=100

# Department of Commerce (PG)

## SYLLABUS AND REGULATIONS

Under

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

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**AUXILIUM COLLEGE (Autonomous)**

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**Gandhinagar, Vellore – 632 006**

**Department of Commerce (PG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighbouring districts.

**B) NAME OF THE PROGRAMME: M.Com.**

**Vision:**

To become a Centre of Academic Excellence with total commitment to Quality Education in Commerce and enable students to acquire skills in various aspects of Commerce through higher education.

**C) ELIGIBILITY CRITERIA OF THE PROGRAMME**

A candidate who has secured a minimum of 50% marks in aggregate in B.Com or B.B.A.

## D) List of Courses

Sem	Part	Code	Title of Paper	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
I	III	PCCOA20	Advanced Corporate Accounting	6	3	-	4	40+60
	III	PCCOB20	Direct Taxation I	6	3	-	4	40+60
	III	PCCOC20	Organisational Behaviour	6	3	-	4	40+60
	III	PCCOD20	Financial Services and Markets	6	3	-	4	40+60
	III	PECOA20	Elective IA: Company Law	6	3	-	4	40+60
	III	PECOB20	Elective IB: Customer Relationship Management					
	III	PICOA20	Independent Elective IA: Risk Management	-	-	-	2	40+60
				<b>Total</b>	<b>30</b>			<b>22</b>
II	III	PCCOE20	Indirect Taxation: Law and Practice	5	3	-	4	40+60
	III	PCCOF20	Direct Taxation II	6	3	-	4	40+60
	III	PCCOG20	Research Methodology	6	3	-	4	40+60
	III	PCCOH20	Bank Financial Management	6	3	-	4	40+60
	III	PECOC20	Elective IIA: International Marketing Management	5	3	-	4	40+60
	III	PECOD20	Elective II B: Management of Financial Derivates					
	III	PICOB20	Independent Elective IIA: Managerial Economics					
	III	PNHRA16	Human Rights	2	3	-	2	40+60
				<b>Total</b>	<b>30</b>			<b>24</b>
	III	PCCOI20	Advanced Cost and Management Accounting	6	3	-	4	40+60
	III	PCCOJ20	Services Marketing	6	3	-	4	40+60
	III	PCCOK20	Advanced Business Statistics	6	3	-	4	40+60

III	III	PCCOL20	Human Resource Management	6	3	-	4	40+60
	III	PECOE20	Elective IIIA: Principles of Insurance	5	3	-	4	40+60
	III	PECOF20	Elective III B: Principles of Event Management					
	III	PCCOM20	Internship Training Programme	2	-	3	2	100
	III	PICOC20	Independent Elective IIIA: Total Quality Management					
	III	PGTRA16	Teaching and Research Aptitude		3		3	40+60
			<b>Total</b>	<b>30</b>			<b>25</b>	<b>700</b>
IV	III	PCCON20	Financial Management	6	3	-	4	40+60
	III	PCCOO20	Industrial Relations and Labour Laws	6	3	-	4	40+60
	III	PCCOP20	Enterprise Resource Planning and Tally (Theory)	4	3	-	3	40+60
	III	PCCOQ20	Tally (Practical)	3	-	3	2	40+60
	III	PECOG20	Elective IVA: Business Environment	6	3	-	4	40+60
	III	PECOH20	Elective IVB: Legal aspects of Business					
	III	PCCOR20	Project	5	-	3	2	100
	III	PICOD20	Independent Elective IVA: Entrepreneurial Development					
			<b>Total</b>	<b>30</b>			<b>23</b>	<b>700</b>
		<b>Grand Total</b>	<b>120</b>			<b>90</b>	<b>2700</b>	

## **Scheme of Examination**

### **Continuous Assessment ( Duration – 1<sup>1</sup>/<sub>2</sub> Hours)**

**SEC A – 5x6 = 30 Marks** (All Questions to be answered with Either or Choice)

**SEC B - 1x20 = 20 Marks** (1 out of 2 Questions to be answered)

<b>Total</b>	<u>50 Marks</u>
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### **Semester Assessment (Duration – 3 Hours)**

**SEC. A –5x8 =40 Marks** (All the Questions to be answered with Either or Choice)

**SEC. B - 3x20 =60 Marks** (3 out Of 5 Questions to be answered)

<b>Total</b>	<u>100 Marks</u>
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## **PROGRAM OUTCOME**

**On completion of the PG Programme, students will be able to:**

**PO1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.

**PO2:** Assimilate and apply principles and concepts towards skill development and employability.

**PO3:** Apply critical and scientific approaches to address problems and find solutions.

**PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO5:** Integrate issues of social relevance in the field of study.

**PO6:** Persist in life-long learning for personal and societal progress.

### **PROGRAMME EDUCATIONAL OBJECTIVE:**

Within few years of obtaining PG Degree in commerce, the students will be able to

**PSO1:** Possess professional skills for employment and lifelong learning in Commerce and Become successful entrepreneurs and professionals in the field of Banking, Auditing and Accounting, Insurance, Manufacturing industries and finance.

**PSO2:** Integrate cognitive and analytical skills to manage financial aspects of Business and Banks.

**PSO3:**To inculcate the practical knowledge in the field of auditing, tax filing, share market and other finance related services.

**PSO4:**To make students employable as per the requirements of different types of business organizations through projects and Internship Training Programme.

**PSO5:**To provide a platform to enhance technical, accounting, financial and business skills for developing solutions for business problem

**PSO6:** To introduce the students to career oriented courses like Enterprise Resource Planning and Tally

**PSOs consistency with POs**

PO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>PO1</b>	3	3	2	3	2	2
<b>PO2</b>	2	3	3	3	3	3
<b>PO3</b>	3	3	2	3	3	3
<b>PO4</b>	3	3	3	3	3	3
<b>PO5</b>	3	3	2	2	3	3
<b>PO6</b>	3	3	3	3	3	3

(STRONGLY CORRELATED - 3, MODERATELY CORRELATED - 2, WEAKLY CORRELATED -1)

**SEMESTER – I**  
**PCCOA20 – Advanced Corporate Accounting**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PCCOA20	Advanced Corporate Accounting	Theory	Core	6	4	100

**Course Objectives**

To provide knowledge to the students about a few advanced aspects in company accounts

**Course Outcomes (CO)**

The learners will be able to

1. Prepare consolidated final accounts of holding and subsidiary companies.
2. Illustrate and compute the accounts of electricity companies.
3. Demonstrate about the accounts of life insurance companies.
4. Comprehend the generally accepted accounting principles and accounting standards and to elucidate the procedures of liquidation of companies.
5. Understand and acquire knowledge on human resources accounting and inflation accounting.

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	H	H	M
3	H	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I : Introduction**

**(15 hours)**

- 1.1 Introduction to Holding company theory, Goodwill given in balance sheet, Unrealized profit in stock (K1, K2)
- 1.2 When date of purchase of shares is unknown (K1, K2, K3)
- 1.3 When shares are purchased at the beginning of the current year problems (K2, K3, K4)
- 1.4 When shares are purchased during the current year problems (K2, K3, K4)
- 1.5 Issue of bonus shares to holding company problems (K1,K2, K3)
- 1.6 Treatment of dividend (K3,K4, K5, K6)

### **Unit II: Accounts of Electricity Companies**

**( 15 hours)**

- 2.1 Accounts of electricity companies theory, nature, features of double accounting system (K1, K2, K3)
- 2.2 Receipts & Expenditures on capital a/c, general balance sheet (K2, K3, K4)
- 2.3 Replacement of assets (K2, K3, K4)
- 2.4 Disposal of surplus (K2, K3, K4)
- 2.5 Final accounts of electricity company (K2, K3, K4, K5, K6)
- 2.6 Double account system with adjustments (K3,K4, K5, K6)

### **Unit III: Accounts of Life Insurance Companies**

**(15 hours)**

- 3.1 Accounts of Life Insurance Company – Introduction (K1, K2, K3)
- 3.2 Ascertaining correct assurance fund (K1, K2, K3)
- 3.3 Journal entries for recording Claims (K1, K2)
- 3.4 Preparation of Revenue Account (K1, K2, K3)
- 3.5 Preparation of Balance sheet of Life Insurance Companies (K2,K3, K4, K5)
- 3.6 Preparation of Final Accounts of Life Insurance Companies (K2,K3,K4, K5)

### **Unit IV: Generally Accepted Accounting Practices (GAAP), Accounting Standards (AS) and Liquidation of Companies**

**(15 hours)**

- 4.1 Concept of Generally Accepted Accounting Principles (GAAP) (K1, K2, K3)

- 4.2 Accounting Standards (AS) - Concept (K1, K2, K3)
- 4.3 Liquidation of Companies - Preparation of Statement of Affairs (K2, K3, K4)
- 4.4 Preparation of Deficiency a/c & Surplus a/c (K2, K3, K4)
- 4.5 Preparation of Liquidators Final Statement of Accounts (K2,K3, K4, K5, K6)
- 4.6 Piecemeal distribution (K2,K3, K4, K5, K6)

**Unit V: Human Resource Accounting and Inflation Accounting (15 hours)**

- 5.1 Concept of Human Resource accounting (K1, K2, K3)
- 5.2 Approaches to HR accounting & assumptions (K1, K2, K3)
- 5.3 Methods of HR accounting, Financial Reporting (K1, K2, K3)
- 5.4 Inflation Accounting - Computation of Conversion factor (K2, K3, K4)
- 5.5 Valuation of cost of sales & closing inventory (K1,K2,K3)
- 5.6 Preparation of Final accounts under Current Purchase Power method (K2,K3,K4,K5, K6)

**Theory : Problems – 20:80**

**Textbook:**

Reddy T. S. & Murthy A. – Corporate Accounting – Margham Publications, Chennai, 2016

GAAP Papers issued by The Institute of Chartered Accountants of India

**Books for Reference:**

1. Jain S.P. and Narang K. L. – Advanced Accounts – Vol II – Kalyani Publishers, New Delhi, Reprint 2018
2. Gupta R.L. and Radhaswamy M. – Advanced Accounts – Vol II – S. Chand & Sons., New Delhi, Reprint 2017
3. Dr. Maheswari S.N. – Corporate Accounting – Vikas Publishing House, New Delhi, Reprint 2017
4. Shukla M.C. and Grewal T. S. – Advanced Accounts – Vol II - S.Chand & Sons., New Delhi, Reprint 2019
5. Dr. Arulanandam M. A. and Raman K.S. – Advanced Accountancy – Himalaya Publishing House, Revised Edition 2015

**Web Resources:**

1. <https://ebizfiling.com/blog/holding-company-vs-subsidiary-company/>
2. <https://tallysolutions.com/accounting/double-entry-system-of-accounting/#gref>
3. <https://www.dynamictutorialsandservices.org/2017/09/accounts-of-life-insurance-companies.html>
4. <https://www.taxmann.com/research/account-audit/accounting-standards/accounting>
5. <https://khatabook.com/blog/what-is-human-resource-accounting/>

**SEMESTER – I**  
**PCCOB20 – Direct Taxation - I**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PCCOB20	Direct Taxation - I	Theory	Core	6	4	100

**Course Objectives**

To provide knowledge about calculation of income under different Heads of Income through the application of the provisions of the Income Tax Act, 1961

**Course Outcomes (CO)**

The learners will be able to

1. Define and understand the residential status of assesseees.
2. Calculate gross and net salary based on the provisions of the Act
3. Find out income from house property of the assesseees
4. Compute the income from business or profession based on various related provisions and to calculate taxable and exempt capital gains
6. Find out the taxable income under the head Income from other sources

**COs consistency with POs**

<b>CO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

<b>CO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>1</b>	H	M	H	H	M	M
<b>2</b>	H	H	M	H	H	M
<b>3</b>	H	M	H	M	M	M
<b>4</b>	H	HM	M	H	H	H
<b>5</b>	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Residential Status (15 hours)**

- 1.1 Basic Concepts (K1, K2)
- 1.2 Residence of Assesses (K2, K3, K4)
- 1.3 Tax liability calculation based on Residential status (K4, K5)
- 1.4 Incomes Exempt from Tax (K3, K4)
- 1.5 Incomes from Salaries – Provisions (K3,K4)
- 1.6 Incomes from Salaries – Problems (K4, K5)

### **Unit II: Income from Salary and House Property (15 hours)**

- 2.1 Income from Salaries (Gratuity) (K3, K4)
- 2.2 Income from Salaries (Encashment of Earned leave) (K3,K4)
- 2.3 Income from Salaries (Provident Funds and other retirement benefits) (K4 ,K5)
- 2.4 Income from House Property (Let-out) (K2, K3, K4)
- 2.5 Income from House Property (Self occupied) (K2, K3, K4)
- 2.6 . Income from House Property (Self occupied and let out) (K4 ,K5)

### **Unit III: Profits and Gains of Business or Profession (15 hours)**

- 3.1 Profits and Gains of Business or Profession – Basics (K1, K2)
- 3.2 Principles governing assessment of business income (K2,K3)
- 3.3 Method of Accounting of taxable profits (K4, K5)
- 3.4 Deductions expressly allowed – General deductions – Expenses disallowed( K4, K5)
- 3.5 Computation of profits and gains of business and profession (K4,K5)
- 3.6 Depreciation (K4, K5)

### **Unit IV: Income from Capital Gains (15 hours)**

- 4.1 Capital Gains – Basis of charge (K1,K2)
- 4.2 Capital Assets –Concept (K1,K2)
- 4.3 Assets not included as Capital Assets (K1,K2)
- 4.4 Computation of Capital Gains (K3,K4)
- 4.5 Capital Gains exempted from tax (K4, K5)
- 4.6 Comprehensive problems on calculation of taxable Capital Gains (K4, K5, K6)

**Unit V: Income from Other Sources (15 hours)**

- 5.1 Income from Other Sources – Basis of charge (K1, K2)
- 5.2 Chargeable Incomes under this head (K1,K2)
- 5.3 Interest from securities (K2, K3)
- 5.4 Deductions under this head (K3,K4)
- 5.5 Incomes exempt under this head (K3,K4)
- 5.6 Calculation of taxable income under this head (K4, K5, K6)

**Theory : Problem – 20:80**

**Textbook:**

Dr. Mehrotra H.C and Dr. Goyal S. P. – Income Tax including Tax Planning and Management – Sahithya Bhawan Publications, New Delhi (Relevant Edition).

**Books for reference:**

1. Dr. Vinod. K. Singhania – Direct Taxes, Law and Practice – Taxmann Publications, New Delhi, (Relevant Edition)
2. Gaur V.P., Narang D.B., Puja Gaur, Rajeev Puri - Income Tax Laws and Practice – Kalyani publications, New Delhi (Relevant Edition)
3. N. Hariharan – Income Tax Law and Practice – Vijay Nicole Imprints Pvt. Ltd., Chennai (Relevant Edition)
4. Reddy T.S. – Income Tax Law and Practice – Margham Publications, Chennai (Relevant Edition)

**Web Resources:**

1. <https://www.5paisa.com/stock-market-guide/tax/residential-status-under-income-tax-act>
2. <https://learn.quicko.com/income-from-house-property-and-taxes>
3. <https://incometaxmanagement.com/Pages/Tax-Ready-Reckoner/GTI/Business-Profession/Definition-Of-Head-Business-or-Profession.html>
4. <https://www.investopedia.com/terms/c/capitalgain.asp>
5. <https://www.canarahsbclife.com/faqs/tax-saving/how-is-income-from-other-sources-taxed-in-india>

**SEMESTER – I**  
**PCCOC20 – Organisational Behaviour**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PCCOC20	Organisational Behaviour	Theory	Core	6	4	100

**Course Objectives**

To provide the students a basic knowledge on the dynamics of individual and group behaviour for efficient and effective utilization of human resources in organisations

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concepts of organisational behaviour.
2. Analyse the factors influencing personality perception, values, attitudes and beliefs of human behaviour in organisation.
3. Understand and classify the techniques of group decisions and reasons for organizational change.
4. Discuss the reasons for organisational conflict and its consequences.
5. Understand the symptoms of stress and formulate measures to deal with stress.

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	H	H	H
3	H	M	M	M	M	M
4	H	M	H	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction to Organizational Behaviour (15 hours)**

- 1.1 Organisational Behaviour - Definition – Nature and Scope – Challenges faced by management (K1, K2, K3 )
- 1.2 Process – Foundation of Individual Behaviour (K1, K2, K3)
- 1.3 Personality (K1, K2, K3, K4)
- 1.4 Perception (K1, K2, K3, K4)
- 1.5 Values (K1, K2, K3 & K4)
- 1.6 Attitudes and Beliefs (K1, K2, K3)

### **Unit II: Group Behaviour (15 hours)**

- 2.1 Foundation of Group Behaviour – Theories – Types – Stages (K1, K2, K3)
- 2.2 Decision Making – Quality circles (K1, K2 & K4)
- 2.3 Organisational conflict – Definition – Sources – Types (K1, K2 , K3)
- 2.4 Process and Conflict Management (K1, K2, K4)
- 2.5 Communication – Needs – Process – Channels (K1, K2 ,K3)
- 2.6 Communication Network and Barriers to Communication (K1, K2, K3)

### **Unit III: Organisational Change and Development (15 hours)**

- 3.1 Forces of Change – Managerial Responses to Pressures for Change (K1, K2 K3)
- 3.2 Model of change Process – Resistance to change (K1, K2 , K3)
- 3.3 Approaches to Planned Changes (K1, K2, K3)
- 3.4 Organisational Development – Meaning – Characteristics – objectives (K1, K2, K3)
- 3.5 OD Models – OD interventions – Factors influencing choice of an OD intervention (K1, K2 ,K3)
- 3.6 Organisational Effectiveness (K1, K2, K3, K4)

### **Unit IV: Dynamics of Organisation (15 hours)**

- 4.1 Dynamics of Organisation – Meaning – Types (K1, K2 ,K3)
- 4.2 Organisational structure- Elements (K1, K2, K3)

4.3 Typology of structure – Life Cycle vs. Structure of Organisation – Organisational Structure and Employee Behaviour (K1, K2, K3)

4.4 Organisational Theory – Types (K1, K2, K3)

4.5 Organisational Climate (K1, K2, K3)

4.6 Organisational Culture (K1, K2, K3)

**Unit V: Job Stress**

**(15 hours)**

5.1 Job Stress – Meaning – Measurement (K1, K2, K3)

5.2 Causes of job stress (K1, K2 & K3)

5.3 Consequences of Job Stress (K1, K2, K3)

5.4 Typical Symptoms of Stress (K1, K2, K3)

5.5 Dealing with stress (K1, K2 & K3)

5.6 Methods to overcome stress (K1, K2 & K3)

**Textbook:**

Dr. Khanka S.S. – Organisational Behaviour – S.Chand & Company Pvt. Ltd., New Delhi, Reprint 2017

**Books for Reference:**

1. Aswathappa – Organisational Behaviour – Himalaya Publishing House, New Delhi, Revised Edition 2016
2. Shuchi Sharma – Organisational Behaviour – Tata McGraw Hill Publication Pvt. Ltd., New Delhi, Revised Edition 2016
3. Arun Kumar N. Meenakshi – Organisation Behavioural – Vikas Publishing House Pvt. Ltd., New Delhi, Revised Edition 2015
4. Yogendra Singh, Mamta Pandey – Principles of Organisational Behavioural – AITBS Publishers, New Delhi, Revised Edition 2016

**Web Resources:**

1. <https://open.umn.edu/opentextbooks/textbooks/30>
2. <https://www.geektonight.com/organizational-behavior/>
3. <https://www.investopedia.com/terms/o/organizational-structure.asp>
4. <https://www.britannica.com/topic/organizational-culture>

**SEMESTER – I**  
**PCCOD20 – Financial Services and Markets**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PCCOD20	Financial Services and Markets	Theory	Core	6	4	100

**Course Objectives**

To enable the students to understand commonly used financial instruments and the services provided by financial institutions and markets

**Course Outcomes (CO)**

The learners will be able to

1. Understand the functions of financial markets and services
2. Attain empirical knowledge about venture capital and functioning of credit rating agencies
3. Acquire knowledge on the concepts of mutual funds and its regulations
4. Procedural knowledge on the development and functions of financial market instruments
5. Understand the functioning of Government securities market.

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	H	M	H	M	M
2	H	H	M	H	H	M
3	H	M	M	M	M	M
4	H	M	H	M	H	M
5	M	M	M	H	M	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Financial Services (15 hours)**

- 1.1 Introduction-features - functions-Types (K1,K2,K3)
- 1.2 Constituents of financial markets – Factors affecting financial markets (K1,K2,K3)
- 1.3 Lease Financing – features – process (K1,K2 ,K3,K4,K5)
- 1.4 constituents of leasing leasing industry – Advantages & disadvantages of leasing (K1,K2,K3,K4,K5)
- 1.5 Securitization – process – types – benefits (K1,K2,K3,K4,K5)
- 1.6 Factoring - meaning-Process – functions – benefits – forfeiting – features – process (K1,K2,K3,K4,K5)

### **Unit II: Venture Capital (15 hours)**

- 2.1 Types- benefits-venture capital financing (K1,K2,K3,K4,K5,K6)
- 2.2 Investment nurturing – methods – techniques (K1,K2,K3,K4,K5)
- 2.3 Status of venture capital in India – SEBI venture capital funds (Amendment) Reg. Act,2000 (K1,K2,K3,K4,K5)
- 2.4 Foreign venture capital investors – Credit rating – classifications – advantages – limitations (K1,K2,K3,K4,K5)
- 2.5 Rating process – framework – CIBIL Score – importance – foreign direct investment (K1,K2,K3,K4,K5,K6)
- 2.6 Credit Rating Agencies – Credit rating agencies & SEBI (K1,K2,K3,K4,K5)

### **Unit III: Mutual Funds (15 hours)**

- 3.1 Introduction – Concept (K1,K2,K3)
- 3.2 Growth of mutual fund in India (K1,K2)
- 3.3 Structure of Mutual fund (K1,K2,K3,K4,K5)
- 3.4 Schemes on the basis of investment objectives (K1,K2,K3,K4,K5,K6)
- 3.5 Regulation of mutual fund – lacunae in regulations (K1,K2,K3,K4,K5)
- 3.6 Types of mutual fund (K1,K2,K3,K4,K5)

### **Unit IV: Financial Markets (15 hours)**

- 4.1 Call money market – Participants – functioning of call money market (K1,K2,K3,K4,K5)

4.2 Transactions – Advantages – call money rates – reasons for fluctuations (K1,K2,K3, K4,K5)

4.3 REPO market – concept – history – mechanism – Types – risk & Advantages (K1,K2,K3,K4,K5)

4.4 Commercial Paper market (K1,K2,K3,K4,K5)

4.5 Certificates of Deposit (K1,K2,K3,K4,K5)

4.6 CBLO market – features – advantages (K1,K2,K4,K5)

## **Unit V: Money Market and Government Securities Market (15 hours)**

5.1 Money market requirements – Evolution (K1,K2,K3)

5.2 Commercial bill market – features – classifications – Importance (K1,K2,K3, K4,K5)

5.3 Measures taken to develop bill market –bill market scheme (K1,K2,K3,K4,K5)

5.4 Features of developed bill market-reasons for non – development (K1,K2,K4,K5)

5.5 Guidelines by bank for discounting bills (K1,K2,K3,K4,K5)

5.6 Government (Gilt edged securities – Govt. securities – sale of Govt. Securities – types – role of Govt. securities market) (K1,K2,K3,K4,K5)

### **Textbook:**

Punithavathy Pandian – Financial Services and Markets – Vikas Publishing House Pvt. Ltd., Noida, Reprint 2017

### **Book for Reference:**

1. Agarwal O.P. – Management of Financial Services – Himalaya Publishing House Pvt. Ltd., New Delhi Edition 2015
2. Guruswamy A. – Financial Services – Margham Publications Ltd., Chennai, Reprint 2017
3. Rajesh Kothari – Financial Services in India – Concept and Application – SAGE Publication India Private Ltd., New Delhi, Reprint 2012
4. Sandeep Goel - Financial Services – PHI Learning Ltd., New Delhi, Edition 2014

### **Web Resources:**

1. <https://insights.btoes.com/what-is-financial-services>
2. <https://www.edupristine.com/blog/venture-capital>
3. <https://www.investopedia.com/terms/m/mutualfund.asp>
4. <https://www.wallstreetmojo.com/financial-market/>
5. <https://www.rbi.org.in/Scripts/FAQView.aspx?Id=79>

**SEMESTER – I**  
**PECOA20 – Elective IA: Company Law**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PECOA20	Company Law	Theory	Elective	6	4	100

**Course Objectives**

The objective of the course is to enable the students to get familiarized with the existing Company Law and Secretarial Procedure

**Course Outcomes (CO)**

The learners will be able to

1. Familiarise the meaning of a company, its types and highlights of The Companies Act, 2013
2. Get insight of the formation procedure of a company
3. Understand the key managerial personnel of a company, their rights, duties and responsibilities
4. Gain knowledge about the type of company meetings, its procedure and secretarial duties with regard to meetings
5. Cognise the constitution of audit committee and its importance to a company with winding up procedure

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	H
2	H	H	M	H	H	M
3	M	M	M	M	M	M
4	H	H	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction to Company (15 hours)**

- 1.1 Meaning and Definition – Features – Lifting of Corporate (K1, K2 ,K3)
- 1.2 Circumstances where corporate veil can be lifted (K1, K2 ,K3)
- 1.3 Highlights of Companies Act 2013 (K1, K2 ,K3)
- 1.4 Types of Companies – One person company – Small Company - Private Company - Public Company (K1, K2, K3)
- 1.5 Company limited by Guarantee - Company limited by Shares - Holding Company - Subsidiary Company - Government Company (K1, K2 , K3)
- 1.6 Associate Company - Small Company - Foreign Company - Global Company - Body Corporate - Listed Company – Dormant Company – One Person Company (K1, K2, K3)

### **Unit II: Formation of a Company (15 hours)**

- 2.1 Promotion Stage - Meaning of Promoter - Position of Promoter & Functions of Promoter (K1, K2, K3)
- 2.2 Incorporation Stage – Meaning and contents of Memorandum of Association and Articles of Association - Distinction between Memorandum of Association and Articles of Association - Certificate of Incorporation (K1, K2, K3)
- 2.3 Subscription Stage – Meaning and contents of Prospectus –Deemed Prospectus – Red-herring Prospectus - Statement in lieu of Prospectus (K1, K2, K3)
- 2.4 Commencement Stage – Documents to be filed - E-filing (K1, K2, K3)
- 2.5 Registrar of Companies - Certificate of Commencement of Business (K1, K2 ,K3)
- 2.6 Duties of Secretary in connection with promotion and incorporation (K1, K2, K3)

### **Unit III: Company Administration (15 hours)**

- 3.1 Key Managerial Personnel – Managing Director, Whole time Directors, the Companies Secretary (K1, K2, K3)
- 3.2 Chief Financial Officer, Resident Director, Independent Director (K1, K2, K3)
- 3.3 Auditors – Appointment – Powers – Duties and Responsibilities (K1, K2, K3)
- 3.4 Managing Director – Appointment – Powers – Duties and Responsibilities - Audit Committee - CSR Committee (K1, K2, K3)

3.5 Company Secretary - Meaning, Types, Qualification, Appointment, Position, Rights, Duties, Liabilities & Removal or dismissal (K1, K2, K3)

3.6 Managerial remuneration – Meaning – Determination of net profits – Power of Central Government to fix remuneration (K1, K2, K3)

**Unit IV: Corporate Meetings (15 hours)**

4.1 Corporate Meetings - Types of Meetings (K1, K2, K3)

4.2 Annual General Meeting – Extraordinary General Meetings (K1, K2, K3)

4.3 Board Meetings and Resolutions – Class Meetings (K1, K2, K3)

4.4 Creditors Meetings – Committee Meetings – Statutory Meeting (K1, K2, K3)

4.5 Requisites of a valid meeting (K1, K2, K3)

4.6 Duties of Company Secretary before and after meeting (K1, K2, K3)

**Unit V: Winding up a Company (15 hours)**

5.1 Meaning of Winding up – Modes – Winding up by the Tribunal – Filing of petition for winding up – Power of Tribunal on receiving the petition – Power to Tribunal to restrain the proceedings against the company – Power of Tribunal on hearing petition – Power of Tribunal to refuse an order of winding up (K1, K2, K3)

5.2 Official liquidator – Winding up Committee – Duties of official liquidator – Powers exercisable without the sanction of the Tribunal (K1, K2, K3)

5.3 Contributory – List of contributories – liabilities of contributories – Liability of present members (K1, K2, K3)

5.4 Procedure followed in compulsory winding up (K1, K2, K3)

5.5 Voluntary winding up of the company – Declaration of Solvency – Commencement of Voluntary Winding up (K1, K2, K3)

5.6 Procedure for Voluntary winding up – Duties of Secretary in respect of members' voluntary winding up (K2, K3, K4)

**Textbook**

Kapoor N.D. - Company Law and Secretarial Practice - Sultan Chand & Co. Pvt. Ltd., New Delhi, Edition 2019

**Books for Reference:**

1. Maheshwari S.N. - Elements of Corporate Law - Himalaya Publishing House Pvt. Ltd., Mumbai, 2015
2. Venkataramana K. - Corporate Administration - Seven Hills Book Publication, India, Edition, 2010
3. Bhandari M.C. - Guide to Company Law Procedures - Wadhwa Publication, Edition 2010

**Web Resources:**

1. <https://cleartax.in/s/types-of-company>
2. <https://legalstudymaterial.com/steps-in-formation-of-a-company/>
3. <https://www.theinsolvencyexperts.co.uk/company-administration/>
4. <https://www.airgram.io/blog/corporate-meeting>
5. <https://www.indiafilings.com/winding-up-of-a-company>

**SEMESTER – I**  
**PECOB20 – Elective IB: Customer Relationship Management**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PECOA20	Company Law	Theory	Elective	6	4	100

**Course Objectives**

The objective of the course is to enable the students to get familiarized with the existing Company Law and Secretarial Procedure

**Course Outcomes (CO)**

The learners will be able to

1. Gain knowledge of customer relationship and its management
2. Apply the knowledge in the business process and other associated activities
3. Analyse the phases of relationship marketing
4. Apply the strategies in various relevant programmes
5. Become aware various models of CRM and use of technology in CRM

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	H	H	M
3	M	M	M	M	M	M
4	H	M	M	M	H	H
5	M	H	M	M	M	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction**

**(15 hours)**

- 1.1. Introduction to customer Relationship Management (K1, K2)
- 1.2. Emergence of Relationship Marketing (K2, K3)
- 1.3. Distinction between Traditional Marketing and Relationship (K2, K3)
- 1.4. Six Market Model – Three Cornerstones of CRM (K3, K4)
- 1.5. CRM Survey Design – Advances of CRM (K4, K5)
- 1.6. Types of Customer Relationship Programmes – Scope for CRM (K4, K5)

### **Unit II: Relationship Cycle and KYC**

**(15 hours)**

- 2.1. Customer Relationship – Categorizing Relationship – The Relationship Life Cycle (K2, K3)
- 2.2. Customer Acquisition – Customer Retention (K2, K3)
- 2.3. Relationship Stages – Relationship Longevity (K2, K3)
- 2.4. Know Your Customer (KYC) – CRM Business Transformation Process (K3, K4)
- 2.5. Integration of CRM with ERP (K4, K5)
- 2.6. Data Warehousing (K4, K5)

### **Unit III: Phases of Relationship Marketing**

**(15 hours)**

- 3.1. The analysing Phase of Relationship Marketing (K2, K3, K4)
- 3.2. Target Planning – Customer Segmentation in Relationship Marketing (K2, K3, K4)
- 3.3. Customer Loyalty – Relationship Marketing (K3, K4)
- 3.4. Customer Satisfaction Process (K3, K4)
- 3.5. Customer Partnership (K5)

### **Unit IV: Styles of CRM**

**(15 hours)**

- 4.1. Implementing Relationship Marketing Programmes (K1, K2)

4.2. Strategy, Structure and Systems (K1, K2)

4.3. The Mckinsey 7 'S' Framework (K2, K3)

4.4. Ending Relationships – Total Quality Management (TQM) (K2, K3)

4.5. Shared Values, Staff, Skills and Styles of Implementing RM Programmes (K3, K4)

**Unit V: Approaches to CRM**

**(15 hours)**

5.1. Monitoring and Controlling relationships – Approaches (K2, K3)

5.2. Measures of Relationship success – Satisfaction (K2, K3)

5.3. Relationship Returns measuring financial performance – Complaints analysis and handling (K2, K3)

5.4. Service Recovery – Service quality – The GAPS Model for managing service quality(K2, K3, K4)

5.5. Technology for Relationship Marketing(K2, K3)

5.6. Criteria for creating value for customers (K3, K4)

**Textbook:**

Customer Relationship Management – Dr.S.Sheela Rani, Margham Publications, Chennai, Edition 2016

**Books for References:**

1. Kaushik Mukerjee – Customer Relationship Management: A Strategic Approach to Marketing – PHI Learning Pvt. Ltd, New Delhi 2008
2. Kumar V. and Werner J. – Customer Relationship Management: A Databased Approach – John Wiley & Sons, Mumbai
3. Shanmugasundaram S. – Customer Relationship Management – Prentice Hall of India Pvt.Ltd., New Delhi, 2008
4. Alok Kumar Rai – Customer Relationship Management – Concepts and Cases - Prentice Hall of India Pvt.Ltd., New Delhi, 2011

**Web Resources:**

1. <https://search.yahoo.com/search?fr=mcafee&type>
2. <https://whitelabel-loyalty.com/blog/loyalty-industry-insight/customer-loyalty-and-relationship-marketing>
3. <https://whatfix.com/blog/mckinsey-7s-model>
4. <https://www.investopedia.com/terms/f/financialperformance.asp>
5. <https://blog.hubspot.com/service/customer-acquisition-vs-retention>

**SEMESTER – I**  
**PICOA20 – Independent Elective IA: Risk Management**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PICOA20	Risk Management	Theory	Elective	-	2	100

**Course Objectives**

To give students the knowledge about risk and managing the risk

**Course Outcomes (CO)**

The learners will be able to

1. Gain knowledge of the basics of risks and risk management
2. Familiarise with the sources of risks in various fields like banking and currency exchange
3. Gather skills to manage risks at the corporate level
4. Acquire skills to manage risks using derivatives as tools
5. Understand the areas of risks and manage the same

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	M	M	H	H	M	M
2	H	H	M	H	H	M
3	M	M	H	M	M	M
4	H	M	M	M	H	H
5	M	H	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction to Risk Management**

- 1.1 Risk management: meaning, definition (K1, K2, K3)
- 1.2 Elements of uncertainty (K1, K2)
- 1.3 Peril, hazards (K1, K2)
- 1.4 Types of risk management, risk management process(K1, K2)
- 1.5 Definition, types & various meanings of risk management(K1, K2, K3)
- 1.6 Limitations of risk management(K1,K2,K3,K4)

### **Unit II: Sources of Risk and Exposure**

- 2.1 Sources of risk & exposure (K1, K2, K3)
- 2.2 Pure & speculative risk (K1, K2)
- 2.3 Acceptable & non-acceptable risk (K1, K2)
- 2.4 Static & dynamic risk (K1, K2)
- 2.5 Elements of risk (K1,K2,K3)
- 2.6 Various elements of cost of risk (K1,K2,K3,K4)

### **Unit III: Corporate Risk Management**

- 3.1 Introduction: corporate risk management (K1, K2, K3)
- 3.2 Risk of returns (K1, K2)
- 3.3 Approaches & processes of corporate risk management (K1, K2)
- 3.4 Management of business risk, currency & interest rate risk (K1, K2)
- 3.5 Assets & liability management (K1,K2,K3)
- 3.6 Guidelines & tools of risk management (K1,K2,K3,K4)

### **Unit IV: Derivatives as Risk Management Tools**

- 4.1 Derivatives & risk management tools: Introduction (K1, K2, K3)
- 4.2 Derivatives as risk management tools (K1, K2)
- 4.3 Features of hedging, forward (K1, K2)

4.4 Features of future, options & swaps (K1, K2)

4.5 Classification of derivatives (K1,K2,K3)

4.6 Important features of derivatives (K1,K2,K3,K4)

### **Unit V: Hedging and Options**

5.1 Hedging risks, currency risk, interest rate risk (K1, K2, K3)

5.2 Hedging risks with currency & interest rate futures (K1, K2)

5.3 Index futures & commodity futures (K1, K2)

5.4 Fundamentals concepts & hedging & options, risk management with options (K1, K2)

5.5 Fundamentals of currency & interest rate, swaps (K1,K2,K3)

5.6 Risk management with swaps, fundamental concepts of VAR, Approaches & insurance (K1,K2,K3,K4)

### **Textbook:**

Indian Institute of Banking and Finance – Risk Management – Mac Millan Publishers India, New Delhi, Revised Edition 2018

### **Books for Reference:**

1. Carl L.Pritchard – Risk Management:Concept and Guidance – Auebach Publications, UK, 2017
2. Risk Management Institute – Practice Standard for Project Risk Management – Risk Management Institute, Bangalore 2009
3. Michel Crouhy ,Dan Galai et., - Essentials of Risk Management – Mc GrawHill Education, New Delhi 2013

### **Web Resources:**

1. <https://corporatefinanceinstitute.com/resources/risk-management/risk-management/>
2. <https://www.yourarticlelibrary.com/business/risk-management/risk-significance-sources-and-indicators/89504>
3. <https://www.diligent.com/insights/risk-management/strategies-corporate-risk-management/>
4. <https://www.invensislearning.com/blog/risk-management-tools-techniques-in-pm/>
5. <https://www.ig.com/en/trading-strategies/how-to-hedge-with-options-201102>

**SEMESTER – II**  
**PCCOE20 – Indirect Taxation: Law and Practice**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: II</b>	PCCOE20	Indirect Taxation: Law and Practice	Theory	Core	5	4	100

**Course Objectives**

To introduce the students to Indirect Taxes, provisions of the Goods and Services Tax Act, 2017 and The Customs Act, 1964.

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concept of indirect taxation
2. Get insight on the concept of Goods and Service Tax.
3. Cognise on supply and goods in Goods and Service Tax.
4. Illustrate problems by using various provisions of Goods and Service Tax. And various procedures for registration
5. Understand the concept of Customs Act and to elucidate and compute Customs duty with Goods and Service Tax

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	H
2	M	H	M	H	H	M
3	H	M	H	M	M	M
4	H	M	M	M	H	H
5	M	H	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction (15 hours)**

- 1.1 History of Taxation – Meaning, Definition and Features of Taxation (K1, K2, K3)
- 1.2 Characteristics or elements of Taxation, Objectives of Taxation (K1, K2)
- 1.3 Canons of Taxation (K3, K4, K5, K6)
- 1.4 Characteristics of a Good Tax System - Indian tax system - features & problems (K2, K3, K4)
- 1.5 Classification of taxes, direct taxes in India, indirect taxes in India (K3, K4, K5, K6)
- 1.6 Single tax system - Origin, merits & demerits, Multiple tax system; merits & limitations (K2, K3, K4)

### **Unit II: Introduction to GST (15 hours)**

- 2.1 Introduction GST, history of GST, Rates of GST, Enactments of GST, dimensions of GST (K1, K2, K3)
- 2.2 Effects of GST on Indian economic growth, differences between present tax structure & GST (K1, K2)
- 2.3 GST; Strengths, weakness, threats & objectives (K1, K2, K3, K4)
- 2.4 GST; Challenges, opportunities, justification (K2, K3, K4)
- 2.5 Salient features of GST, Types of GST (K3, K4, K5, K6)
- 2.6 GST impact on central & state government, advantages & disadvantages, impact & its Implications

### **Unit III: Supply and Goods in GST (15 hours)**

- 3.1 Definition of various terms (K1, K2, K3)
- 3.2 Goods exempted from GST, Services exempted from GST (K1, K2, K3)
- 3.3 Original works, Legal service, Recognized sports body – Meaning and concepts (K2, K3)
- 3.4 Supply - Introduction - Meaning - Scope
- 3.5 Meaning of Related person, Impact of service job work (K3, K4, K5)

3.6 Time of supply, value of supply, Inter & Intra state supply (K2,K3,K4)

**Unit IV: Calculation of GST (15 hours)**

4.1 Provisions relating & collection of GST, ITC-eligibility, conditions for auditing, exempt supplies (K1, K2, K3, K4)

4.2 Appointment of credits & blocked creditors, non-availability of ITC, job work (K2, K4)

4.3 Imports & exports of goods & services, zero rated supply (K3, K4, K5)

4.4 Person liable for registration, procedure for registration, issuance and cancellation of registration (K3, K4, K5)

4.5 Unregistered person, revoking of assessment order, adjudicating authority, powers of CGST & Proper commissioner officer, provisions relating to refund of tax (K2,K3, K4, K5)

4.6 Computation of amount levy to GST (K1,K2,K3,K4)

**Unit V: Customs Act (15 hours)**

5.1 Customs act – Meaning – Objectives – Rules (K1, K2, K3)

5.2 Officers of Customs - Powers of levy & collection of Customs duty (K1, K2, K3)

5.3 Different types of customs duty, classification of goods (K1, K2, K5)

5.4 Import & Export procedure, exemptions from customs duty, clearance of imported goods, customs duty drawback (K1,K2,K3)

5.5 Import & Export procedure, exemptions from customs duty, clearance of imported goods, customs duty drawback (K1,K2,K3)

5.6 Computation of amount chargeable under Customs Act (K1,K2,K3,K4)

**Theory: Problem - 60:40**

**Textbook:**

Reddy T.S. and Hariprasad Reddy Y. – Business Taxation with introduction to GST, Margham Publications, Chennai, 10<sup>th</sup> Revised Edition, 2018

**Books for Reference:**

1. Dinkar Pagar – Business Taxation – Sultan Chand & Sons, New Delhi, (Relevant Edition)
2. Balachandran V. – Business Taxation – Sultan Chand & Sons, New Delhi, (Relevant Edition)
3. Govindan V. S – Indirect Taxes Made Easy – Sitaraman & Co., Chennai, (Relevant Edition)
4. Datey V.S – Indirect Taxation, Law and Practice – Taxmann Publication, New Delhi, (Relevant Edition)
5. Notification by Govt. of India - GST Act, 2016

**Web Resources:**

1. <https://groww.in/p/tax>
2. <https://www.bajajfinservmarkets.in/gst>.
3. <https://navi.com/blog/supply-under-gst/>
4. <https://cleartax.in/s/gst-registration>
5. <https://www.indiacode.nic.in/>

**SEMESTER – II**  
**PCCOF20 – Direct Taxation - II**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: II</b>	PCCOF20	Direct Taxation – II	Theory	Core	6	4	100

**Course Objectives**

To provide knowledge to the students on calculation of incomes under different Heads of Income, Gross Income Total, Total Income and Tax liability of various assesses through the application of the provisions of Income Tax Act, 1961

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concept of clubbing of incomes of assesses
2. Gain knowledge of Carrying forward and set off of losses under different heads of income
3. Compute the total income of individuals after considering deductions, rebate and relief
4. Assess the taxable income of Firms and compute the tax liability of firm and partners
5. Assess the taxable income of Companies and Co-operative societies compute the tax liability

**COs consistency with POs**

<b>CO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

<b>CO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>1</b>	H	M	H	H	M	M
<b>2</b>	H	H	M	H	H	M
<b>3</b>	H	M	M	M	M	M
<b>4</b>	H	M	M	M	H	H
<b>5</b>	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Clubbing and Set off (15 hours)**

- 1.1. Clubbing and set-off and aggregation of incomes (K1, K2, K3)
- 1.2. Income of other persons included in the assessee's total income (K1, K2, K3)
- 1.3. Aggregation of Incomes or Deemed Incomes (K1, K2, K3)
- 1.4. Set-off and carry forward of losses inter-head (K3, K4, K5)
- 1.5. Set-off and carry forward of losses intra-head (K3, K4, K5)
- 1.6. Problems in set-off and carry forward of losses (K3, K4, K5)

### **Unit II: Rebate and Relief of Tax (15 hours)**

- 2.1. Rebate and Relief of Tax – Provisions and computation (K2, K3)
- 2.2. Computation of Gross Total Income of Individuals (K3, K4, K5)
- 2.3. Deductions from Gross Total Incomes of Individuals (K3, K4, K5)
- 2.4. Computation of Total Income of Individuals (K3, K4, K5)
- 2.5. Computation of Tax liability with agricultural income (K4, K5, K6)
- 2.6. Computation of Tax liability without agricultural income (K4, K5, K6)

### **Unit III: Assessment of Firms (15 hours)**

- 3.1. Assessment of Firms – Calculation of Book profit (K2, K3)
- 3.2. Calculation of Total Income of Firm (K3, K4, K5)
- 3.3. Calculation of Tax liability of Firm (K3, K4, K5)
- 3.4. Calculation of Tax liability of partners (K3, K4, K5)
- 3.5. Assessment of Firm as AOP (K3, K4, K5)

### **Unit IV: Assessment of Companies and Co-operative Societies (15 hours)**

- 4.1. Meaning and types of Companies (K2, K3)
- 4.2. Incomes taxable for Companies (K2, K3)
- 4.3. Deductions from Gross total income for Companies (K2, K3)
- 4.4. Provisions for computing total income of Companies (K2, K3)

4.5 Computation of Book profit and tax liability of Companies(K2, K3)

4.6 Computation of tax liability of Cooperative Societies (K3, K4, K5)

### **Unit V: Tax Planning**

**(15 hours)**

5.1. Tax planning, Tax evasion and Tax avoidance- Meaning (K2, K3)

5.2. Tax Management – Meaning and areas of Tax Management (K2, K3)

5.3 Differences between Tax planning, tax evasion and tax avoidance (K2, K3)

5.4. Need, precautions and limitations of Tax planning (K2, K3)

5.5 Tax planning of Individuals under various heads of Incomes (K2, K3)

5.6. Tax planning in relation to starting a new business (K2, K3)

**Theory: Problem – 40: 60**

#### **Textbook:**

Dr. Mehrotra H.C. and Dr. Goyal S.P. – Income Tax including Tax Planning and Management – Sahithya Bhawan Publications, New Delhi (Relevant Edition).

#### **Books for reference:**

1. Dr. Vinod. K. Singhania – Direct Taxes, Law and Practice – Taxmann Publications, New Delhi, (Relevant Edition)
2. Gaur V.P., Narang D.B., Puja Gaur, Rajeev Puri - Income Tax Laws and Practice – Kalyani publications, New Delhi (Relevant Edition)
3. N. Hariharan – Income Tax Law and Practice – Vijay Nicole Imprints Pvt. Ltd., Chennai (Relevant Edition)
4. Reddy T.S. – Income Tax Law and Practice – Margham Publications, Chennai (Relevant Edition)

#### **Web Resources:**

1. <https://cleartax.in/s/set-off-carry-forward-losses>
2. <https://taxguru.in/income-tax/rebates-reliefs-income-tax-law.html>
3. <https://taxguru.in/income-tax/assessment-firms.html>
4. <https://incometaxmanagement.com/Pages/Tax-Ready-Reckoner>
5. <https://www.canarahsbclife.com/tax-university/articles/what-is-tax-planning>

**SEMESTER – II**  
**PCCOG20 – Research Methodology**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: II</b>	PCCOG20	Research Methodology	Theory	Core	5	4	100

**Course Objectives**

To introduce to the students the concept of research, process of conducting research, methods and techniques of presenting research report

**Course Outcomes (CO)**

The learners will be able to

1. To understand the concept of research methodology
2. To collect and compile data for the purpose of research
3. To get in depth knowledge on sampling and sampling methods
4. To analyse and present the data using statistical tools
5. To construct research report

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	M	H	M	H	H	H
3	M	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction to Research**

**(15 hours)**

- 1.1 Research – Definition – Characteristics – Nature and scope - Social Science research – Usefulness of social science research (K1, K2, K3)
- 1.2 Approaches to Research – Historical Approach- Descriptive Approach – Case study Approach – Experimental Approach – Exploratory research Approach (K2, K3, K4)
- 1.3 Research Process – meaning – stages in research work- Formulation of Research Problem (K2, K3, K4)
- 1.4 Survey Of literature – determining the sources of information – screening and compiling the information-presenting the relevant information – review of concept – review of past studies (K1, K2, K3)
- 1.5 Research Design - Meaning – Content – features of Good research design – Types – Factors affecting Research Design (K1, K2 , K3, K4)
- 1.6 Hypothesis- Meaning – Definition – Need – Formulation of Hypothesis – Characteristics of Hypothesis - Types of Hypothesis – Test of Hypothesis – General problems in testing Hypothesis (K2, K3, K4)

### **Unit II: Nature and Collection of Data**

**(15 hours)**

- 2.1 Nature of Data – meaning – classification of Data : Primary and Secondary data – Source of information (K1, K2, K3)
- 2.2 Secondary data- sources- problems in using the data- selection of appropriate method of data collection (K1, K2, K3)
- 2.3 Interview technique – meaning – types – Merits and demerits of interview as a method of Data collection – How to make interview successful (K3, K4, K5)
- 2.4 Observation – Meaning – Definition – Types – Merits and Limitation – Steps to make Observation successful (K3, K4, K5)
- 2.5 Questionnaire Method – Meaning – Definition – Types of Questionnaire – Features of

good Questionnaire- Pilot study – Merits and Demerits (K3, K4, K5)

2.6 Schedule Method - Meaning – Features – Distinction between Questionnaire and Schedule- Use of Schedules (K1, K2, K3)

**Unit III: Sampling (15 hours)**

3.1 Sampling – introduction – merits and demerits of sampling (K2, K3)

3.2 Law of sampling (K2, K3)

3.3 Essentials of sampling (K3, K4, K5)

3.4 Methods of Sampling (K2, K3)

3.5 Determination of Sample Size – Factors determining sample size (K2, K3)

3.6 Sampling and Non – sampling errors (K3, K4)

**Unit IV: Statistical Techniques and Research Presentation (15 hours)**

4.1 Statistical Analysis- measures of central tendency ((K3, K4, K5)

4.2 Measures of Dispersion (K3, K4, K5)

4.3 Skewness and Kurtosis (K3, K4, K5)

4.4 Simple Correlation – Karl Pearson’s Coefficient of Correlation – Spearman’s Rank Correlation Coefficient (K3,K4,K5)

4.5 Linear Regression Model ( K4, K5, K6)

4.6 Diagrammatic and Graphical Representation – Interpretation of results – Percentages – Bar Diagrams – Pie charts (K2, K3, K4, K5)

**Unit V: Research Reports (15 hours)**

5.1 Research Reports (K1, K2, K3)

5.2 Structure and Components of Reports(K2, K3, K4)

5.3 Types of Reports (K1, K2, K3)

5.4 Features of Good Research Report (K1, K2, K3)

5.5 Foot Notes and Citation (K1, K2, K3)

5.6 Plagiarism and consequences of Plagiarism (K1, K2, K3)

**Theory : Problems – 80:20**

**Textbook:**

Kothari C. R – Research Methodology Methods and Techniques – New Age International Publishers, New Delhi, 2019

**Book for Reference:**

1. Ravilochanan P. – Research methodology – Margham Publications, Chennai, Revised Edition 2017.
2. Ranjith Kumar – Research Methodology – Sage Publications, New Delhi, Reprint 2015
3. Gupta S.L and Hitesh Gupta – Business Research Methods – Tata McGraw Hill Publications, New Delhi, Reprint 2012
4. David Dooly – Social Research Methods – Prentice Hall India Pvt, Ltd., New Delhi, Revised Edition 2016

**Web Resources:**

1. <https://www.scribbr.com/dissertation/methodology/>
2. <https://www.simplilearn.com/what-is-data-collection-article>
3. <https://www.questionpro.com/blog/types-of-sampling-for-social-research/>
4. <https://visme.co/blog/research-presentation/>
5. <https://financialcrimeacademy.org/characteristics-of-a-good-report/>

**SEMESTER – II**  
**PCCOH20 – Bank Financial Management**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: II</b>	PCCOH20	Bank Financial Management	Theory	Core	6	4	100

**Course Objectives**

To impart knowledge to the students on the Financial Management techniques applied by banks

**Course Outcomes (CO)**

The learners will be able to

1. To demonstrate on correspondent banking system and its functions
2. To be informed about letter of credit and various rules governing letter of credit.
3. To ascertain the knowledge on foreign exchange and its operations.
4. To manage and hedge risks involved in forex business.
5. To be aware on various components of banks balance sheet

**COs consistency with POs**

<b>CO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

<b>CO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>1</b>	H	M	H	H	M	H
<b>2</b>	M	H	M	H	H	M
<b>3</b>	H	M	M	M	M	M
<b>4</b>	M	M	M	M	H	H
<b>5</b>	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Correspondent Banking System**

**(15 hours)**

- 1.1 Correspondent Banking – Meaning – Functions – Bank Account (K1,K2, K4)
- 1.2 Electronic modes of Transmission/ Payment Gateways – SWIFT, CHIPS, CHAPPS, etc.  
(K1, K2 & K3)
- 1.3 NRI Banking – NRE Account - Facilities to NRIs – Loans and Advances (K1, K2, K3, K4)
- 1.4 Exchange Control Guidelines for exporters – facilities for Exporters – Export Finance - Exporters Gold Card scheme – Forfeiting and factoring (K2,K3, K4)
- 1.5 Exchange Control Guidelines for importers – Import Finance (K2,K3, K4)
- 1.6 Trade credit – Supplier’s credit and buyer’s credit (K2,K3)

### **Unit II: Letter of Credit**

**(15 hours)**

- 2.1 Documentary Letter of credit – Meaning – Definition – Types of LC - Operation of Letter of credit (K1, K2, K3)
- 2.2 UCPDC 600 and Important Articles (K2, K4)
- 2.3 Liabilities, Responsibility and Rights of the Parties to LC- Risk Relating to LC Transactions (K2, K3)
- 2.4 Document under Letter of Credit (K1, K2, K4)
- 2.5 Stand by letter of credit (K2, K3)
- 2.6 Uniform Rules for Bank- to- Bank Reimbursements-525 (K2, K4)

### **Unit III: Foreign Exchange and its Operation**

**(15 hours)**

- 3.1 Foreign Bank – Meaning – Foreign Branch – Meaning –Foreign Exchange Rate and Foreign Exchange Business – Definition – Foreign Exchange Markets – Factors determining exchange rates (K1, K2, K3)
- 3.2 Exchange Rate mechanism Foreign exchange Dealing Room Operations – Management and Control of a Dealing Room (K2, K4)
- 3.3 RBI / FEDAI Guidelines (K2, K3, K4)

3.4 Basics of Foreign Exchange Derivatives (K1, K2, K3)

3.5 Risk – meaning – definition – Risks in foreign exchange operations (K1, K2)

3.6 Management of risk and guidelines on Risk management (K2, K4)

**Unit IV: Risk Management (15 hours)**

4.1 Risk Management in Foreign Trade – Role of ECGC – Introduction – Definition of Risk and Risks in International Trade – Country Risk (K1, K2, K3)

4.2 Export Credit in International Trade – ECGC of India – Role and Products - ECGC Policies and financial Guarantees - Other aspects relating to ECGC Policies and Guarantees (K2, K4)

4.3 EXIM Bank - Role – Functions and Facilities (K1, K2, K3)

4.4 RBI: Role and Exchange Control Regulations in India – Foreign Exchange Management Act (1999) (K1, K2, K3)

4.5 FEDAI: Role – Rules (K1, K2, K3, K4)

4.6 External Commercial borrowings – American Depository Receipts (K1, K2, K3)

**Unit V: Balance Sheet Management (15 hours)**

5.1 Components of Assets and Liabilities in Bank's Balance Sheet – Banks Profit and loss account (K1, K2, K3)

5.2 Asset and Liability Management – Significance- Purpose and Objective (K1, K2, K4)

5.3 Banking Regulation and Capital (K1, K2, K4)

5.4 Capital Adequacy- The Basel-II (K1, K2, K4)

5.5 Supervisory Review Process (K1, K2, K4)

5.6 Market Discipline (K1, K2, K3)

**Textbook:**

Bank Financial Management – Indian Institute of Banking and Finance - MacMillan Publishers India Ltd., 2016

### **Books for Reference**

1. Sankaran S. - International Trade - Margham Publications Ltd., Chennai, Reprint 2017
2. Raj Agrawal - Indian Foreign Trade - Excel Books – New Delhi, Reprint 2012
3. Foreign Exchange Facilities for individuals - Indian Institute of Banking and Finance - MacMillan Publishers India Ltd. Mumbai, Reprinted 2016
4. Jeevanandan C. – Foreign Exchange and Risk Management – Sultan. Chand and Sons – Educational Publisher, New Delhi, Reprint 2015

### **Web Resources:**

1. <https://www.investopedia.com/terms/c/correspondent-bank.asp>
2. <https://www.investopedia.com/terms/l/letterofcredit.asp>
3. <https://www.ecb.europa.eu/ecb/tasks/forex/html/index.en.html>
4. <https://www.universalcargo.com/6-risks-in-international-trade-how-to-manage-them/>
5. <https://www.occ.treas.gov/topics/supervision-and-examination/capital-markets/balance-sheet-management/index-balance-sheet-management.html>

**SEMESTER – II**  
**PECOC20 – Elective II A: International Marketing Management**

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PECOC20	International Marketing Management	Theory	Core	5	4	100

**Course Objectives**

To enable the students to learn the procedures and strategies in International Marketing, Foreign Exchange regulations and Documentation for exporting

**Course Outcomes (CO)**

The learners will be able to

1. To understand the concepts and approaches of international marketing.
2. To construct the knowledge on product awareness, pricing system and methods of physical distribution in international trade.
3. To acquaint skills to promote product internationally.
4. To identify various channels of distribution for overseas market.
5. To determine various factors contributing to global trade and to manage such risks in international marketing

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	H	M
2	H	H	M	H	H	M
3	H	M	H	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction (15 hours)**

- 1.1 International Marketing Management – Meaning – Definition – Scope (K1, K2, K3)
- 1.2 International Marketing Vs Domestic Marketing (K1, K2, K3)
- 1.3 Need and Importance of International Marketing (K1, K2, K3)
- 1.4 Problems and Challenges in International Marketing (K1, K2, K3)
- 1.5 Reasons for rapid Internationalization (K1, K2, K3)
- 1.6 Global Marketing of Services (K1, K2, K3)

### **Unit II: Product Planning for Export (15 hours)**

- 2.1 Need for product planning – Product Life Cycle in International Marketing (K2, K3, K4)
- 2.2 Packaging – Role of IIP in Export packaging (K2, K3, K4)
- 2.3 Pricing for Export – factors determining prices (K2, K3, K4)
- 2.4 Role of price and non-price factors in International marketing (K2, K3, K4)
- 2.5 Marginal cost pricing – Elements of costs for export price quotations – Impact (K2, K3, K4)
- 2.6 Quotations – Export price strategy (K2, K3, K4)

### **Unit III: Promotion of Product internationally (15 hours)**

- 3.1 Nature of International Advertising – Unified or Diversified Advertising Strategy (K2, K3, K4)
- 3.2 Promotional Methods – Campaign Design – Generic promotion in International Marketing (K2, K3, K4)
- 3.3 Market entry and Overseas Distribution System - Methods of entry in the foreign market (K2, K3, K4)
- 3.4 Channels of Distribution – Elements of Distribution Policy (K2, K3, K4)
- 3.5 Factors affecting channels of decisions (K2, K3, K4)
- 3.6 Exporting through agents or distributors – Role of Export Trading Houses (K2, K3, K4)

### **Unit IV: Market Research (15 hours)**

- 4.1 Overseas Market Research – Meaning and Need (K3, K4)
- 4.2 Designing and testing of a Questionnaire (K3, K4)
- 4.3 Conduct of Overseas Market Research (K3, K4)
- 4.4 Marketing plan for exports (K3, K4)

### **Unit V: Risks and Risk Management in International Marketing (15 hours)**

- 5.1 Risks and Management of Risks in International Marketing (K3, K4, K5)
- 5.2 Export Documentation (K3, K4)

- 5.3 Role of Export Documentation (K3, K4)
- 5.4 Significance of some export documents (K3, K4)
- 5.5 Common defects in export documents (K3, K4, K5)
- 5.6 Processing of an Export Order (K3, K4)

**Textbook:**

Bhattacharya R. L. and Varshney –International Marketing Management – Sultan Chand, New Delhi, (Latest Edition)

**Books for Reference:**

1. V. Kumar – International Marketing Research – PHI Learning Private Limited, New Delhi, Revised Edition 2012
2. Philip R. Cateora, John L. Graham, Prashant Salwan – International Marketing, Tata McGraw–Hill Publishing Company Ltd. New Delhi, Reprint 2014
3. Philip Kotler - Marketing Management - Prentice Hall, New Delhi, Revised Edition 2015
4. Sak. Onkvist and John J. Shaw - International Marketing - Prentice Hall, New Delhi, Edition 2012

**Web Resources:**

1. <https://businessjargons.com/international-marketing.html>
2. <https://www.yourarticlelibrary.com/export-management/5-tips-for-product-planning-for-exports-export-management/5796>
3. <https://www.convert.com/blog/growth-marketing/how-to-promote-your-product-globally/>
4. <https://www.investopedia.com/terms/m/market-research.asp>
5. <https://www.nbc.ca/business/advice/exports/five-things-you-can-do-to-reduce-international-business-risk.html>

**SEMESTER – II**  
**PECOD20 – Elective II B: Management of Financial Derivatives**

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PECOD20	Management of Financial Derivatives	Theory	Core	5	4	100

**Course Objectives**

To provide adequate knowledge about wide range of financial derivatives having pivotal role in enhancing shareholders' value by ensuring access to the cheapest source of funds.

**Course Outcomes (CO)**

The learners will be able to

1. Gain knowledge of the basics of derivatives and instruments involved in the same
2. Acquire knowledge of the different types of contracts and its role in foreign exchange
3. Become acquainted with the various models related to derivatives and different markets
4. Apply the theories in real life situations
5. To decide when an investment has to be made

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	M	H	M	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	H	H	H
3	H	M	M	M	M	M
4	H	M	M	H	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction (15 hours)**

- 1.1 Derivative – Definition – Meaning (K1, K2)
- 1.2 Characteristics of derivatives (K1, K2)
- 1.3 Objectives of derivatives (K1, K2)
- 1.4 Types of derivatives (K1, K2)
- 1.5 Instruments of derivatives (K1, K2)
- 1.6 Policies in financial risk (K1, K2)

### **Unit II: Future Contracts (15 hours)**

- 2.1 Forward contract structure (K1, K2, K3)
- 2.2 Features, forward spread agreement (K1, K2)
- 2.3 Exchange rate agreement (K1, K2)
- 2.4 Forward exchange rates in India, value of forward contract (K1, K2)
- 2.5 Forward rates computation, forward contract (K1, K2, K3)
- 2.6 Delivery cancellation, extension, terms & conditions (K1, K2, K3)

### **Unit III: Forward Contracts (15 hours)**

- 3.1 Forward contract structure & features specifications (K1, K2, K3)
- 3.2 Mechanism of trading, types of trading, determining gains & issues (K1, K2)
- 3.3 Daily settlement, stock exchange of future contracts (CBOT & CME) (K1, K2)
- 3.4 Principle of forward & future contract, option on future (K1, K2)
- 3.5 Hedging in future & regulations of future contract (K1, K2, K3)
- 3.6 Difference: forward & future contract (K1, K2, K3)

### **Unit IV: Option Contracts (15 hours)**

- 4.1 Options structure & features (K1, K2, K3)
- 4.2 Options terminology, market margin requirement (K1, K2)
- 4.3 Taxation of option pricing, option pricing model (K1, K2)

4.4 Principles of option pricing, option pricing model (K1, K2)

4.5 Binomial model, Black Schole model (K1, K2, K3)

4.6 Stock option, determining option premium, option pricing strategies (K1,K2,K3, K4)

### **Unit V: Hedging**

**(15 hours)**

5.1 Hedging of foreign exchange and its exposure (K1, K2, K3)

5.2 Hedging with the money market (K1, K2)

5.3 Current options (K1, K2)

5.4 Currency future (K1, K2)

5.5 Internal Hedging strategy (K1, K2, K3)

5.6 Speculation in foreign exchange & money market (K1,K2,K3, K4)

### **Textbook:**

Apte P G – International Financial Management – Tata McGraw Hill Publication, New Delhi, 2012

### **Books for Reference:**

1. Robert W.Kolb – Financial Derivatives: Pricing and Risk Management, John Wiley & Sons, Mumbai, 2008
2. Dom M Chance – Introduction to Derivatives and Risk Managemnt – South Western Cengage Learning, Mumbai, 2012
3. Satyajit Deas – Derivatives Products and Pricing – John Wiley and Sons, Mumbai, 2011
4. Satyajit Das – Risk Management and Financial Derivative – McGraw Hill, New Delhi, 2012

### **Web Resources:**

1. <https://www.investopedia.com/terms/d/derivative.asp>
2. <https://economictimes.indiatimes.com/definition/futures-contract>
3. <https://www.investopedia.com/ask/answers/06/forwardsandfutures.asp>
4. <https://www.contractsounsel.com/t/us/options-contract>
5. <https://corporatefinanceinstitute.com/resources/derivatives/hedging/>

**SEMESTER – II**  
**PICOB20: Independent Elective II A: Managerial Economics**

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PICOB20	Managerial Economics	Theory	Elective	-	2	100

**Course Objectives**

To teach the students the basics of Managerial Economics and its application in various fields

**Course Outcomes (CO)**

The learners will be able to

1. To analyse the demand situation in the market and the factors affecting demand for a product
2. To forecast the costs involved in a business and understand the theories of production
3. To assess the different types of markets prevalent in the economy and the pricing policies used
4. Compute national income of a country with knowledge about its components
5. Assess the validity of Foreign Direct Investments in the macro economic environment

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	M	H	M	H	H	M
3	H	M	M	M	M	M
4	M	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: General Foundations and Demand Analysis**

- 1.1 General Foundations of Managerial Economics - Economic Approach (K1, K2, K3)
- 1.2 Circular Flow of Activity (K1, K2, K3)
- 1.3 Firm - Nature of the Firm - Objectives of Firms (K1, K2, K3)
- 1.4 Demand Analysis and Estimation - Individual, Market and Firm demand -Determinants of demand (K1, K2, K3, K4, K5)
- 1.5 Elasticity measures and Business Decision Making (K2, K3, K4)
- 1.6 Demand Forecasting (K2, K3, K4)

### **Unit II: Law of Proportions and Cost functions**

- 2.1 Law of Variable Proportions (K1, K2, K3, K4, K5, K6)
- 2.2 Theory of the Firm (K1, K2, K3)
- 2.3 Production Functions in the Short and Long Run (K1, K2, K3, K4)
- 2.4 Cost Functions – Determinants of Costs – Cost Forecasting - Short Run and Long Run Costs
- 2.5 Type of Costs (K1, K2, K3)
- 2.6 Analysis of Risk and Uncertainty (K1, K2, K4)

### **Unit III: Markets and Competition**

- 3.1 Product Markets -Determination Under Different Markets – Market Structure (K1, K2, K3)
- 3.2 Perfect Competition – Monopoly (K1, K2, K3, K4)
- 3.3 Monopolistic Competition (K1, K2, K3, K4)
- 3.4 Duopoly – Oligopoly (K1, K2, K3, K4)
- 3.5 Pricing and Employment of Inputs Under Different Market Structures (K1, K2, K3, K4)
- 3.6 Price Discrimination - Degrees of Price Discrimination (K1, K2, K3, K4)

### **Unit IV: National Income, Business Cycles, Fiscal and Monetary Policies**

- 4.1 Introduction to National Income – National Income Concepts (K1, K2, K3)
- 4.2 Models of National Income Determination (K1, K2, K3, K4)
- 4.3 Economic Indicators (K1, K2, K3)

4.4 Technology and Employment - Issues and Challenges (K1, K2)

4.5 Business Cycles – Phases– Management of Cyclical Fluctuations (K1, K2, K3)

4.6 Fiscal and Monetary Policies (K1, K2, K3)

### **Unit-V Macro Economics**

5.1 Macro Economic Environment (K1, K2, K3)

5.2 Economic Transition in India (K1, K2, K3, K4)

5.3 Liberalization, Privatization and Globalization (K1, K2, K3)

5.4 Business and Government (K1, K2, K3)

5.5 Public-Private Participation (PPP) (K1, K2, K3)

5.6 Industrial Finance - Foreign Direct Investment(FDIs) (K1, K2, K3)

### **Textbook:**

Yogesh Maheswari- Managerial Economics- PHI learning Pvt. Ltd.,New Delhi, 2<sup>nd</sup> Ed.

### **Book for Reference:**

1. Debabrata Datta - Managerial Economics- PHI learning Pvt. Ltd., New Delhi, 2017
2. Donald N. Stengel - Managerial Economics Concept and Principles - Business Expert Press LLC,New York, 2011
3. Gupta G.S.- Managerial Economics- Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2012
4. Ahuja H.L.- Managerial Economics-S. Chand Publications, New Delhi, 9th edition, 2017

### **Web Resources:**

1. <https://www.mbaskool.com/business-concepts/marketing-and-strategy-terms/10953-demand-analysis.html>
2. <https://www.britannica.com/science/law-of-definite-proportions>
3. <https://www.povertycure.org/learn/issues/market-competition>
4. <https://corporatefinanceinstitute.com/resources/economics/monetary-policy/>
5. <https://www.imf.org/en/Publications/fandd/issues/Series/Back-to-Basics/Micro-and-Macro>

**SEMESTER – III**  
**PCCOI20 – Advanced Cost and Management Accounting**

<b>Year:</b> II	<b>Course Code:</b> PCCOI20	<b>Title of the Course:</b> Advanced Cost and Management Accounting	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Objectives**

To teach the students the advanced techniques in Cost and Management Accounting, enabling corporate reporting and decision making

**Course Outcomes (CO)**

The learners will be able to

1. To teach the students the advanced techniques in Cost and Management Accounting, enabling corporate reporting and decision making
2. Compute profits or losses of processes through equivalent production units
3. Analyse the profitability of contracts by preparing Contract Accounts
4. Ascertain and assess variances in material, labour, overheads and sales using Variance Analysis
5. Prepare Funds flow statement and find out the increase or decrease in working capital

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	H	H	M
3	H	M	H	M	M	M
4	H	M	H	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Costing Concepts, Process and Contract Costing (15 hours)**

- 1.1. Uniform Costing- Inter-firm Comparison (K1, K2, K3)
- 1.2. Cost Reduction and Cost Control - Activity Based Costing (K1, K2, K3)
- 1.3. Process Costing - Ascertainment of Equivalent Production Units (K1, K2, K3)
- 1.4. Process Costing - Inter Process Profits (K1, K2, K3)
- 1.5. Contract Costing - Cost Plus Contract (K1, K2, K3)
- 1.6. Contract Costing – Escalation Clause (K1, K2, K3)

### **Unit II: Managerial Decision Making (15 hours)**

- 2.1. Decision Making – Marginal Costing (K2, K3, K4)
- 2.2. Limiting or Key Factor – Selling Price Decision (K2, K3, K4)
- 2.3. Pricing of Export Sales (K2, K3, K4)
- 2.4. Sales Mix Decision - Plant shut down Decision (K2, K3, K4)
- 2.5. Differential Cost Analysis (K3, K4, K5)
- 2.6. Practical Applications of Differential Cost Analysis (K3, K4, K5)

### **Unit III: Standard Costing and Variance Analysis (15 hours)**

- 3.1. Standard Costing and Variance Analysis- Material (K2, K3, K4)
- 3.2. Standard Costing and Variance Analysis- Labour (K2, K3, K4)
- 3.3. Standard Costing and Variance Analysis- Overheads (K2, K3, K4)
- 3.4. Standard Costing and Variance Analysis- Sales (K2, K3, K4)
- 3.5. Standard Costing and Variance Analysis- Profit (K2, K3, K4)
- 3.6. Problems on Material and Labour Variances together (K3, K4, K5)

### **Unit IV: Funds Flow Analysis (15 hours)**

- 4.1. Funds Flow Statement - Calculation of changes in Working Capital (K2, K3, K4)
- 4.2. Calculation of Funds from operations (K2, K3, K4)

4.3. Preparation of Funds Flow Statement without adjustments (K2, K3, K4)

4.4. Preparation of Fund Flow Statement with adjustments (K2, K3, K4)

### **Unit V: Cash Flow Analysis**

**(15 hours)**

5.1 Calculation of Cash from operations (K2, K3, K4)

5.2. Calculation of Cash from Operating activities (K2, K3, K4)

5.3. Calculation of Cash from Investing activities (K2, K3, K4)

5.4. Calculation of Cash from Financing activities (K2, K3, K4)

5.5. Preparation of Cash Flow Statement (K2, K3, K4)

### **Theory: Problems – 20: 80**

#### **Textbook:**

Arora M. N. – A Textbook of Cost and Management Accounting – Vikas Publishing House, Chennai, 10<sup>th</sup> Edition, 2017

#### **Books for Reference:**

1. Maheswari S.N. – Cost and Management Accounting – Sultan Chand & Sons, New Delhi, Reprint 2017
2. Pillai R.S.N and Bhagavathi – Management Accounting – S. Chand & Company Pvt. Ltd., New Delhi, Reprint 2017
3. Ravi M. Kishore – Cost and Management Accounting – Taxmann Publications, New Delhi, Reprint 2018
4. Tulsian P.C. – Cost Accounting – S.Chand & Company Pvt.Ltd., New Delhi, Reprint 2016
5. Jain S.P and Narang K.L – Advanced Cost Accounting – Kalyani Publications, New Delhi, Reprint 2015

#### **Web Resources:**

1. <https://www.vedantu.com/commerce/concept-of-costs>
2. <https://www.simplilearn.com/management-decision-making-article>
3. <https://in.indeed.com/career-advice/career-development/what-is-standard-costing>
4. <https://www.5paisa.com/stock-market-guide/generic/fund-flow-statement>
5. <https://www.netsuite.com/portal/resource/articles/financial-management/cash-flow-analysis.shtml>

**SEMESTER – III**  
**PCCOJ20 – Services Marketing**

<b>Year:</b> II	<b>Course Code:</b> PCCOJ20	<b>Title of the Course:</b> Services Marketing	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Objectives**

To make the students aware of the basic concepts of various Services and their Marketing aspects

**Course Outcomes (CO)**

The learners will be able to

1. To understand the concept of services marketing and services sectors in India
2. To analyse and forecast demand situations and patterns in service sectors
3. To develop skills on producing products to meet out the needs of target market
4. To segment market into different groups based on various factors
5. To get insight knowledge on consumer behaviour and need for customer relationship management

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	M	H	M	H	H	H
3	H	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction**

**(15 hours)**

- 1.1 Introduction to services marketing - Meaning and Definition (K1, K2, K3)
- 1.2 Differentiating goods from services - characteristics of services (K2, K3, K4)
- 1.3 Reasons for the growth of service sector (K2, K3, K4)
- 1.4 Career opportunities in service sector (K1, K2, K6)
- 1.5 The service sector in Indian Economy - Reasons for the growth of service sector in India (K1, K2, K3)
- 1.6 Key service businesses in India (K2, K3, K4, K6)

### **Unit II: Product Mix**

**(15 hours)**

- 2.1 Service demand management - Demand situation - Demand patterns - Demand variations (K2, K3, K4, K5)
- 2.2 Demand forecasting methods - Demand management - Waiting line management (K2, K3, K4)
- 2.3 Basic service package - Customer value hierarchy - Flower of service (K3, K4, K5)
- 2.4 Development of new service - Service product mix, Service Life cycle Management (K2, K3, K4)
- 2.5 Pricing of a service - objectives, approaches & strategies (K2, K3, K4, K5)
- 2.6 Service: transaction, location, provider - Distribution - Flow of service - Channels of Distribution (K2, K3, K4, K5, K6)

### **Unit III: Market Segmentation**

**(15 hours)**

- 3.1 Market Segmentation - Approaches to Market Segmentation - Bases for Market Segmentation - Technographic segmentation (K1, K2, K3, K4)
- 3.2 Criteria for Market Segmentation - Stages in Market Segmentation (K1, K2, K3, K4)
- 3.3 Competitive threats: from industry perspective, market perspective (K1, K2, K3)
- 3.4 Competition analysis - Competitive strategies - Achieving competitive analysis (K1, K2, K3)

3.5 Perception of Service Quality - Determinants of Service Quality - Process of service Quality Management (K1,K2,K3, K4)

3.6 The GAP Model of service quality – SERVQUAL - Research on service quality (K2,K3,K4,K5, K6)

**Unit IV: Consumer Behaviour (15 hours)**

4.1 Consumer Behavior - Introduction - buyers, consumers, customers (K1, K2, K3)

4.2 Factors influencing Consumer Behaviour – Development of consumer expectations (K1, K2, K5, K6)

4.3 Service Perception - Consumer purchase decision process (K2, K3, K4)

4.4 Process of Strategies Planning - Steps in strategic planning (K2, K3, K4)

4.5 Market oriented service strategy - Service triangle (K2, K3, K4)

4.6 Service marketing mix - Strategy implementation, evaluation & control (K2, K3, K4)

**Unit V: Customer Relationship Management in different areas (15 hours)**

5.1 CRM - benefits, successful drives and frame work (K2, K3, K4)

5.2 Goals of CRM - Organizational system for CRM – ERM -Interaction process (K2, K3, K4)

5.3 CRM budget, the interaction process, e-CRM & its types (K2, K3, K5)

5.4 The marketing of banking services (K1, K2)

5.5 Consumer expectations from industries & business (K1,K2,K3)

5.6 Consumer movement in India, legal & administrative mechanism for consumer protection in India (K2,K3,K5,K6)

**Textbook:**

Rama Mohana Rao K. – Services Marketing – Pearson Education, Chennai, Second Edition 2017

**Books for Reference:**

1. Srinivasan R. – Services Marketing – PHI Learning Pvt. Ltd., New Delhi, Reprint 2015
2. Rajendra Nargondkar – Services Marketing – Tata McGraw Hill, Chennai, Reprint 2015
3. Govind Apte – Services Marketing – Tata McGraw Hill, Chennai, Reprint 2012.
4. Balaji B. – Services Marketing and Management – Sage Publications, Chennai, Reprint 2012.

## Web Resources:

1. <https://www.pixel506.com/insights/services-marketing-characteristics-innovations>
2. <https://corporatefinanceinstitute.com/resources/management/product-mix/>
3. <https://www.surveymonkey.com/market-research/resources/market-segmentation/>
4. <https://www.omniconvert.com/blog/consumer-behavior-in-marketing-patterns-types-segmentation/>
5. [https://www.softwaresuggest.com/crm-software?utm\\_source=goad&utm\\_medium=crm-ppc-dsearch-india&utm\\_term=&campaign\\_id=15374076883&gclid=eaiaiqobchmihdwsolgmgamvaznmah0etw7aeaayasaaegk-m\\_d\\_bwe](https://www.softwaresuggest.com/crm-software?utm_source=goad&utm_medium=crm-ppc-dsearch-india&utm_term=&campaign_id=15374076883&gclid=eaiaiqobchmihdwsolgmgamvaznmah0etw7aeaayasaaegk-m_d_bwe)

**SEMESTER – III**  
**PCCOK20 – Advanced Business Statistics**

<b>Year:</b> II	<b>Course Code:</b> PCCOK20	<b>Title of the Course:</b> Advanced Business Statistics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Objectives**

To teach the students the application of statistical techniques for interpreting and drawing conclusion for business problems.

**Course Outcomes (CO)**

The learners will be able to

1. Determine and use partial and multiple correlation and regression.
2. Create awareness on non-parametric tests and their application in research real life situation.
3. Frame and test a hypothesis and ability to determine statistical significance between two variables.
4. Apply and compute chi-square and test a hypothesis on specific value of population variance.
5. Apply, compute and interpret f-distribution and ANOVA.

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	M	H	M	H	H	M
3	H	M	M	M	M	M
4	H	H	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## Course Syllabus

### **Unit I: Partial and Multiple Correlations and Regressions (15 hours)**

1.1 Correlation – Meaning – Importance – Zero order, first order and second order Correlation – Properties of correlation – significance of Correlation coefficient (K1,K2,K3)

1.2 Partial Correlation (K3,K4, K5, K6)

1.3 Part Correlation (K3,K4, K5, K6)

1.4 Multiple Correlation (K3,K4, K5, K6)

1.5 Multiple Regression- least Square regression model (K3,K4, K5, K6)

1.6 Multiple regression- alternative model for least square regression (K3,K4, K5, K6)

### **Unit II: Non – Parametric Tests (15 hours)**

2.1 Non- Parametric test – meaning – characteristic - Merits and limitation (K1 & K2)

2.2 Sign test – one sample sign test – paired sample sign test – sign test for large sample (K3,K4, K5, K6)

2.3 Mann- Whitney U- test (K3,K4, K5, K6)

2.4 One Sample Run Test (K3,K4, K5, K6)

2.5 Kruskal-Wallis test ( H Test ) (K3,K4, K5, K6)

2.6 Spearman's Rank Correlation (K3,K4, K5, K6)

### **Unit III: Testing of Hypotheses (Z and T- Test) (15 hours)**

3.1 Hypothesis testing – Procedure of testing Hypothesis – Types of error in testing hypothesis (K1,K2,K3)

3.2 Hypothesis testing for Population parameter with Large samples ( z- test ) – Test for specified mean – Test for equality of 2 mean – test for specified standard deviation – Test for equality of 2 standard deviation (K3,K4, K5, K6)

3.3 Hypothesis testing for Population parameter with Large samples ( z- test ) – Test for specified Proportion - Test for equality of 2 Proportion- Test for observed small Correlation coefficient – Test for observed high Correlation coefficient –Test for difference between 2 observed high correlation coefficient (K3,K4, K5, K6)

- 3.4 Hypothesis testing for population mean With Small Samples- Properties –Uses of t-distribution (K1,K2,K3)
- 3.5 T- test: significance of the mean of a random sample- testing difference between mean of two sample (independent sample ) (K3,K4, K5, K6)
- 3.6 T- test: hypothesis testing for difference between mean of two sample ( Dependent / Paired observation ) – testing significance of observed correlation coefficient (K3,K4, K5, K6)

**Unit IV: Chi-square Distribution (15 hours)**

- 4.1 Chi square Distribution – properties of  $\chi^2$  distribution condition for application on Chi-square distribution (K1,K2,K3)
- 4.2 Test of Independency (K3,K4, K5, K6)
- 4.3 Test of goodness of fit (I) (K3,K4, K5, K6)
- 4.4 Test of goodness of fit (II) (K3,K4, K5, K6)
- 4.5 Test of Population variance (K3,K4, K5, K6)
- 4.6 Test for homogeneity (K3,K4, K5, K6)

**Unit V: F-Distribution and Analysis of Variance (15 hours)**

- 5.1 F- test – Assumptions – Applications (K1,K2)
- 5.2 F-test Or the Variance Ratio Test (K1, K3, K4, K5, K6)
- 5.3 Analysis of Variance – One Way Classification (I) (K3,K4, K5, K6)
- 5.4 Analysis of Variance – One Way Classification (II) (K3,K4, K5, K6)
- 5.5 Analysis of Variance – Two Way Classification (I) (K3,K4, K5, K6)
- 5.6 Analysis of Variance – Two Way Classification (II) (K3,K4, K5, K6)

**Theory: Problems – 20: 80**

**Textbook:**

Gupta S.P. - Statistical Methods - Sultan Chand & Sons, New Delhi, Revised Edition 2013

**Books for Reference:**

1. Sancheti D.C. and Kapoor V. K., Business Statistics, Sultan Chand and Sons, New Delhi, 7<sup>th</sup> Edition, 2015
2. Sharma J.K – Business Statistics – Pearson Education, New Delhi, 2<sup>nd</sup> Edition 2016
3. Richard I Levin and David S. Rubit, Statistics for Management – Pearson education, New Delhi, Edition 2015
4. Dr. Joseph Anbarasu D. - Business Statistics and Operations Research –Learntech Press, Trichy, 2015

**Web Resources:**

1. <http://faculty.cas.usf.edu/mbrannick/regression/Partial.html>
2. <https://corporatefinanceinstitute.com/resources/data-science/nonparametric-tests>
3. <https://www.analyticsvidhya.com/blog/2020/06/statistics-analytics-hypothesis-testing-z-test-t-test>
4. <https://www.scribbr.com/statistics/chi-square-distributions/>
5. <https://www.analyticsvidhya.com/blog/2018/01/anova-analysis-of-variance/>

**SEMESTER – III**  
**PCCOL20 – Human Resource Management**

<b>Year:</b> II	<b>Course Code:</b> PCCOL20	<b>Title of the Course:</b> Human Resource Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Objectives**

To provide knowledge to the students regarding the management of Human Resources in organizations

**Course Outcomes (CO)**

The learners will be able to

1. Imbibe the knowledge on human resources management and its functions.
2. Design and analyse a job in organisation.
3. Evaluate a job in organisational structure.
4. Assimilate the knowledge on career development and to develop career path to employees of an organisation.
5. Identify and appraise performance of employees of an organisation.

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	M	M	H	H	M	M
2	H	H	M	H	H	H
3	H	M	H	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction to Human Resource Management (15 hours)**

- 1.1. Human Resource Management – Evolution (K1, K2, K3)
- 1.2. Objectives – Responsibilities ( K2, K3)
- 1.3. Man Power Planning – Objectives ( K2, K3)
- 1.4. Man Power Planning – Elements ( K2, K3)
- 1.5. Process of Man Power Planning ( K2, K3)

### **Unit II: Job Analysis and Design (15 hours)**

- 2.1. Job Satisfaction – Concept – Determinants and measurements (K2, K3, K4)
- 2.2. Job Analysis – Methods of Job Analysis (K2, K3, K4)
- 2.3. Job Design – Job Description – Job Specification (K2, K3, K4)
- 2.4. Job Evaluation – Job Enrichment (K2, K3, K4)
- 2.5. Recruitment and Selection – Sources of Recruiting Human Resource (K2, K3, K4)
- 2.6. Selection process – Testing and Interviewing (K2, K3, K4)

### **Unit III: Career Planning Development and Evaluation (15 hours)**

- 3.1. Career Planning and Development – Stages and Process of Career Development(K3,K4)
- 3.2. Training, Placement and Development – Training Needs (K3,K4)
- 3.3. Training Programmes (K3, K4, K5)
- 3.4. Executive Development – Importance (K2, K3, K4)
- 3.5. Evaluation Process (K2, K3, K4)
- 3.6. Internal Mobility and Separation – Promotion, Transfer, Lay-off and Discharge (K2, K3, K4)

### **Unit IV: Performance Appraisal of Employee (15 hours)**

- 4.1. Appraising Employee Performance – Basic considerations (K1, K2, K3)
- 4.2. Methods of Performance Appraisal (K3, K4, K5)

4.3. Requisites of a Sound Performance Appraisal System (K2, K3, K4)

4.4. Employee Incentives and Benefits (K3, K4, K5)

4.5. Effective Measures of Incentives and Benefits (K3, K4, K5)

**Unit V: Grievances and Work life balance**

**(15 hours)**

5.1. Employee Grievances – Causes (K1, K2, K3)

5.2. Essentials of Sound Grievance Procedure - Redressal of Grievances (K2, K3, K4)

5.3. Employee Discipline – Objectives – Types – Enforcement of Discipline (K1, K2, K3)

5.4. Causes of Indiscipline – Procedure – Disciplinary actions (K2, K3)

5.5. Quality of Work Life – Concept and Determinants of Quality of Work Life (K2, K3, K4)

5.6. Recent Trends in HRM – Talent Management (K2, K3, K4)

**Textbook:**

Khanka S.S – Human Resource Management – S. Chand and Co., New Delhi, Reprint 2015

**Books for Reference:**

1. Shashi K. Gupta and Rosi Joshi – Human Resource Management –Kalyani Publishers, New Delhi, Edition 2014
2. Jaya Sankar J. – Human Resource Management – Kalyani Publishers, New Delhi, Edition 2018
3. Lalitha Balakrishnan and Srividhya S. – Human Resource Development – Himalaya Publishing House, Chennai, Edition 2016
4. Aquains P. G. – Human Resource Management – Vikas Publising House Pvt. Ltd., New Delhi, Revised Edition 2012

**Web Resources:**

1. [https://www.tutorialspoint.com/human\\_resource\\_management/human\\_resource\\_management\\_introduction.htm](https://www.tutorialspoint.com/human_resource_management/human_resource_management_introduction.htm)
2. <https://www.iedunote.com/job-analysis>
3. <https://www.indeed.com/career-advice/career-development/steps-to-create-a-career-development-plan>
4. <https://kissflow.com/hr/performance-management/employee-performance-appraisal-method/>
5. <https://jpt.spe.org/twa/worklife-balance-21st-century>

**SEMESTER – III**  
**PCCOM20 – Internship Training Programme**

<b>Year:</b> II	<b>Course Code:</b> PCCOM20	<b>Title of the Course:</b> Internship Training Programme	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 2	<b>Credits</b> 2	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Objectives**

To give practical training to students in the areas of accounts, taxation, human resource management, etc.

**Course Outcomes (CO)**

The learners will be able to

1. Handle the accounts of any type of concern
2. File Income tax returns of individuals, firms and other type of organisations
3. File GST returns of individuals, firms and other type of organisations
4. Conversant with the procedures for claiming Insurance claims on various occasions
5. Manage the human resource of organisations

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	H	H	H
3	M	M	M	M	M	M
4	M	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## Design of Internship Training Programme (ITP)

- **Period:** The Internship Training Programme (ITP) is for a period of 45 working days only, from December of the previous year to June of the next year (5 days in December, 4 days in April and balance days in May and June ), with a minimum of 5 hours and a maximum of 8 hours per day. The ITP shall be during the day only (8 a.m. to 6 p.m.)
- **Attendance:** The attendance of the trainee shall be strictly monitored by the Supervisor. If the trainee does not commence the training on the specified date or if the trainee is irregular during the programme, the same shall be immediately intimated to the Coordinator
- **Assignment:** The trainee shall be assigned work related to Audit / Finance and Accounts / H.R. / Stores or any other Commerce related areas.
- **Fortnightly Report:** To ensure proper utilisation of time by the trainee, a fortnightly report duly attested by the Supervisor after checking its authenticity shall be maintained and this report shall be finally submitted by the trainee to the Coordinator at the end of the training period.
- **Final Report by the trainee:** The trainee shall write a detailed report of the Training Programme, get it authenticated by the Supervisor and submit the same to the Coordinator of the Programme, based on which a *Viva voce* Examination shall be conducted.
- **Supervisor's Final Report:** After the completion of the programme the Supervisor shall fill up the 'Supervisor's Final Report' in the given format and send the same to the Coordinator within a week of completion of the Programme.
- **Viva voce Examination:** The trainee shall undergo a *Viva voce* Examination based on the Final report submitted by her. The *Viva voce* shall be conducted by an External Examiner.
- The allotment of marks for the Internship Training Programme is as follows:

Criteria	Marks
Internal Examiner ( ITP Report)	40
External Examiner ( ITP Report)	40
<i>Viva voce</i>	20

**SEMESTER – III**  
**PECOE20 – Elective III A: Principles Of Insurance**

<b>Year:</b> II	<b>Course Code:</b> PECOE20	<b>Title of the Course:</b> Principles of Insurance	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Objectives**

To provide students the basic knowledge of the Principles of Insurance and the methods of risk management

**Course Outcomes (CO)**

The learners will be able to

1. To understand the basic principles of insurance.
2. To elaborate the principles of life, fire, marine, motor vehicle, health and miscellaneous insurances
3. To assess various policies and to illustrate settlement of claims
4. To file claims in case of happening of the event or on maturity of the policy
5. To comprehend the laws of insurance according to the IRDA Act.

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	M	H	H
3	H	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction**

**(15 hours)**

- 1.1 Introduction to Insurance - Characteristics of Insurance - Purpose and Needs (K1, K2, K3)
- 1.2 Benefits of Insurance - Functions of Insurance – Importance of Insurance (K1, K2, K3)
- 1.3 Principles of Insurance – Nature of Insurance Contract - Types of Insurance Contracts - Fundamentals of Insurability (K2, K3, K4)
- 1.4 Insurance Contract Vs. Wagering Agreement (K2, K3, K4)
- 1.5 Assurance Vs Insurance - Gambling Vs Insurance (K2, K3, K4)
- 1.6 Classification of Insurance (K2, K3, K4)

### **Unit II: Life Insurance**

**(15 hours)**

- 2.1 Life Insurance – Essential features of Life Assurance – Advantages of Life Assurance (K1, K2, K3)
- 2.2 Types of life Insurance Plans – Reinsurance (K1, K2, K3)
- 2.3 Channels of Distribution (K1, K2, K3)
- 2.4 Surrender Value and Paid-up Value (K1, K2, K3)
- 2.5 Issue of Duplicate Policy - Lost policies (K1, K2, K3)
- 2.6 Settlement of Claims in Life Insurance (K1, K2, K3)

### **Unit III: Fire and Marine Insurances**

**(15 hours)**

- 3.1 Fire Insurance – Scope of Fire insurance – Fire Insurance Principles (K2, K3, K4)
- 3.2 Types of Fire policies – Assignment of Fire policies (K2, K3, K4)
- 3.3 Settlement of Claims under Fire policies (K2, K3, K4)
- 3.4 Marine Insurance- Scope of Marine Insurance (K2, K3, K4)
- 3.5 Marine Insurance Contracts – Fundamental Principles (K2, K3, K4)
- 3.6 Marine Insurance Policy (K2, K3, K4)

### **Unit IV: Motor Vehicle and Health Insurances**

**(15 hours)**

- 4.1 Motor Vehicle Insurance – Taxonomy of Motor vehicle (K2, K3, K4)
- 4.2 Kinds of Motor Vehicle Insurance Policies- Procedure for Motor Vehicle Insurance (K2, K3, K4)
- 4.3 Procedure for Motor Vehicle Insurance (K2, K3, K4)
- 4.4 Claims settlement under Motor Vehicle Insurance (K2, K3, K4)
- 4.5 Health Insurance – Types of Health Insurance Policies (K2, K3, K4)
- 4.6 Health Insurance Schemes in India (K2, K3, K4)

## Unit V: Miscellaneous Insurances

(15 hours)

- 5.1 Fidelity Guarantee Insurance- Property Insurance (K2, K3, K4)
- 5.2 Building Insurance – Earthquake Insurance – Flood Insurance (K2, K3, K4)
- 5.3 Burglary Insurance - Cattle Insurance (K2, K3, K4)
- 5.4 Engineering Insurance - Liability Insurance (K2, K3, K4)
- 5.5 Crop Insurance - Insurance Pricing (K2, K3, K4)
- 5.6 Underwriting (K2, K3, K4)

### Textbook:

Jyotsna Sethi and Niswan Bhatia – Principles of Insurance - PHL Learning Pvt. Ltd. New Delhi, Revised Edition 2015

### Books for Reference:

1. Dr. Periasamy P. – Fundamentals of Insurance – Vijay Nicole Imprints Pvt. Ltd., Chennai, Edition 2016
2. Gupta P. K. – Legal Aspects of Insurance – Himalaya Publishing House Pvt. Ltd., Mumbai Revised Edition 2015
3. Inderpal Singh – Insurance: Principles and Practice – Kalyani Publishers, New Delhi, Edition 2017
4. Mishra M N. – Modern Concepts of Insurance – S. Chand & Co. New Delhi, Edition 2010
5. Premavathy S. - Principles of Insurance – S. Chand & Co., New Delhi, Edition 2016

### Web Resources:

1. <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2020/07/ifrs17-first-impressions-2020.pdf>
2. <https://ptgmedia.pearsoncmg.com/images/9780789732606/samplepages/0789732602.pdf>
3. [https://elearning.londonschoolofinsurance.com/pdf/en/Introduction\\_to\\_Reinsurance.pdf](https://elearning.londonschoolofinsurance.com/pdf/en/Introduction_to_Reinsurance.pdf)
4. <https://www.owlgen.in/what-is-miscellaneous-insurance-or-non-life-insurance-discuss-its-types>
5. <https://corpbiz.io/learning/double-insurance-and-how-it-works/>

**SEMESTER – III**  
**PECOF20 – Elective III B: Principles of Event Management**

<b>Year:</b> II	<b>Course Code:</b> PECOF20	<b>Title of the Course:</b> Principles of Event Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Objectives**

To provide students with a conceptual knowledge of Event Management, Event Services, Conducting Events and Managing Public Relations

**Course Outcomes (CO)**

The learners will be able to

1. Become aware of the basics of Event Management and duties of an Event Manager
2. Hold events of various Government and Local authorities
3. Acquire knowledge about planning for conducting events
4. Familiarise with the importance of media for organising events
5. Prepare oneself as a Master of Ceremony

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	M	M	H	H	M	M
2	H	H	M	H	H	M
3	M	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction to Event Management (15 hours)**

- 1.1 Event - Meaning – Need for Event Management (K1, K2, K3)
- 1.2 Analysis of Event - Scope of Event (K1, K2, K3)
- 1.3 Decision Makers - Event Manager and Technical Staff (K1, K2, K3)
- 1.4 Establishing of Policies and Procedures (K1, K2, K3)
- 1.5 Developing Record Keeping Systems (K1, K2, K3)

### **Unit II: Event Management Procedure (15 hours)**

- 2.1 Principles for holding an Event - General Details (K1, K2, K3)
- 2.2 Policies - Permissions - Government and Local Authorities (K1, K2, K3)
- 2.3 Phonographic Performance License – Utilities (K1, K2, K3)
- 2.4 Five Bridge Ambulance (K1, K2, K3)
- 2.5 Catering, Electricity (K1, K2, K3)
- 2.6 Water Taxes Applicable (K1, K2, K3)

### **Unit III: Conduct of an Event (15 hours)**

- 3.1 Preparing a Planning Schedule – Organizing Tables (K2, K3, K4)
- 3.2 Assigning Responsibility (K2, K3, K4)
- 3.3 Communication and Budget of Event – Checklist (K2, K3, K4)
- 3.4 Computer-Aided Event Management (K2, K3, K4)
- 3.5 Roles and Responsibilities of Event Managers for Different Events (K2, K3, K4)
- 3.6 Master of Ceremonies (K2, K3, K4)

### **Unit IV: Public Relations (15 hours)**

- 4.1 Introduction to Public Relations – Concept – Nature (K2, K3, K4)
- 4.2 Public Relations - Importance – Limitations (K2, K3, K4)
- 4.3 Media - Types of Media (K2, K3, K4)
- 4.4 Media Management - Public Relation Strategy and Planning (K2, K3, K4)
- 4.5 Brain Storming Sessions (K2, K3, K4)
- 4.6 Writings for Public Relations (K2, K3, K4)

### **Unit V: Corporate Events (15 hours)**

- 5.1 Planning of Corporate Events - Job Responsibility of Corporate Event Organizer (K3, K4, K5)
- 5.2 Arrangements – Budgeting (K3, K4, K5)
- 5.3 Safety of Guests and Participants (K3, K4, K5)
- 5.4 Creating Blue Print (K3, K4, K5)

5.5 Need for Entertainment in Corporate Events (K3, K4, K5)

5.6 Reporting of Corporate events (K3, K4, K5)

**Students will be asked to take up Case studies of Event Management Firms**

**Textbook**

Sita Ram Singh – Event Management - APH Publishing House Corporation New Delhi, Edition 2009

**Book for Reference:**

1. Wagen – Event Management – Pearson Education, New Delhi Edition 2005
2. Sharma D. – Event Planning and Management – Deep and Deep Publishing Pvt. Ltd., New Delhi, Edition 2005

**Web Resources:**

1. <https://www.eventeducation.com/introduction.php>
2. <https://socio.events/blog/event-management-process>
3. <https://www.in.gov/idem/nps/watershed-education/how-to-conduct-a-successful-event/>
4. <https://www.indeed.com/career-advice/career-development/pr-event-planning>
5. <https://www.socialtables.com/blog/event-planning/types-of-corporate-events/>

**SEMESTER – III**  
**PICOC20 – Independent Elective III A: Total Quality Management**

<b>Year:</b> II	<b>Course Code:</b> PICOC20	<b>Title of the Course:</b> Total Quality Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b>	<b>Credits</b> 2	<b>Marks</b> 100
<b>Sem:</b> III							

**Course Objectives**

To introduce to the students the concept of Quality and Total Quality Management in Organisations and teach about the various quality standards to be adopted in various businesses

**Course Outcomes (CO)**

The learners will be able to

1. Understand the concept of Quality Control and the procedures for implementing quality
2. Gain knowledge about customer satisfaction and customer relations management and the dimensions of service quality
3. Associate the importance of quality standards for human resource management
4. Frame quality standards for all aspects of the organisation
5. Practice the quality parameters as required by government regulations

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	H	H	M
3	H	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Concept of Total Quality Management**

- 1.1 Quality – Definition – Dimensions - Total Quality Management – Definition – Core Concepts of TQM – Basics (K1, K2, K3)
- 1.2 Principles of TQM – Quality Planning – Statements - Strategic Planning – Basic Concepts of TQM (K1, K2, K3)
- 1.3 Leadership – Role of Senior Manager – Quality Control – Quality Objective – Team Building (K1, K2, K3)
- 1.4 Barriers to Implementation of TQM – Factors Influencing Quality Cost (K1, K2, K3)
- 1.5 Cost of Quality – Analysis Techniques of Quality Cost (K1, K2, K3)
- 1.6 Economics of Quality – Quality Assurance (K1, K2, K3)

### **Unit II: Customer Satisfaction**

- 2.1 Customer Focus – Customer Satisfaction – Customer Perception of Quality – Customer Relations Management (K1, K2, K3)
- 2.2 Customer Complaints – Service Quality – Customer Retention (K1, K2, K3)
- 2.3 Customer Feedback – Supplier Relationship (K1, K2, K3)
- 2.4 Partnering, Sourcing, Supplier Selection (K1, K2, K3)
- 2.5 Rating, Certification (K1, K2, K3)
- 2.6 Relationship Development (K1, K2, K3)

### **Unit III: Continuous Process Improvement**

- 3.1 Continuous Process Improvement – PDSA cycle – Kaizen – Gemba Kaizen (K1, K2, K3)
- 3.2 5s of Continuous Process Improvement – Quality Circles (K1, K2, K3)
- 3.3 Re-engineering – Employee Involvement – Motivation – Empowerment (K1, K2, K3)
- 3.4 Teams – Recognition and Reward – Performance Appraisal (K1, K2, K3)
- 3.5 Benefits of Employee Involvement – Performance Measures (K1, K2, K3)
- 3.6 Basic Concept - Balanced Score Card – Performance Measure Presentation (K1, K2, K3)

#### **Unit IV: Seven tools of Quality and Bench Marking**

- 4.1 Seven tools of quality – Check Sheet – Pareto Diagram (K3, K4, K5)
- 4.2 Histograms – Flow chart – Causes and Effect diagrams (K3, K4, K5)
- 4.3 Control Charts – Scatter Diagrams - Bench Marking – Types (K3, K4, K5)
- 4.4 Bench Marking - Process – Shortcomings (K3, K4, K5)
- 4.5 Total Productive Maintenance – Concept (K3, K4, K5)
- 4.6 Improvement Needs (K3, K4, K5)

#### **Unit V: Quality Function Deployment**

- 5.1 Quality Function Deployment – Process – Benefits (K2, K3, K4)
- 5.2 House of Quality – Quality Management Systems – Need (K2, K3, K4)
- 5.3 Quality Management Systems - Principles – Revision of Standards – Documentation (K2, K3, K4)
- 5.4 Implementation – Auditing (K2, K3, K4)
- 5.5 Certification – ISO 9000: 2000 Quality system – ISO 14000 – Concepts (K1, K2, K3)
- 5.6 Certification – ISO 9000: 2000 Quality system – ISO 14000 – Requirement and Benefits (K1, K2, K3)

#### **Textbook:**

Ramakrishnan R. – Total Quality Management – Eswar Press, Chennai, Reprint 2017

#### **Books for Reference:**

1. Srinivasa Gupta N. and Valarmathi B. – Total Quality Management – Vijay Nicole Imprints, Chennai, Reprint 2017
2. Shridhara Bhat K. – Total quality Management – Himalaya Publishing House, Mumbai , Edition 2018
3. Pike, John and Barnes, Richard – TQM in Action – London, Chapman & Hill, Edition 2016
4. Spenley Paul – World Class Performance through TQ – Chapman & Hall, London, Revised Edition 2017
5. Senthil Arasu B. and Praveen Paul J. – Total Quality Management – Scitech Publications (India) Pvt. Ltd., Hyderabad 2017

**Web Resources:**

1. <https://assignmentpoint.com/basic-concepts-of-tqm/>
2. [https://www.slideshare.net/rehan\\_ehsan/customer-satisfactiontotal-quality-management-tqm](https://www.slideshare.net/rehan_ehsan/customer-satisfactiontotal-quality-management-tqm)
3. <https://www.solvexia.com/blog/what-is-continuous-process-improvement>
4. <https://www.mddionline.com/design-engineering/7-basic-tools-can-improve-quality>
5. <https://www.sciencedirect.com/topics/engineering/quality-function-deployment>

**SEMESTER – IV**  
**PCCON20 – Financial Management**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: IV</b>	PCCON20	Financial Management	Theory	Core	6	4	100

**Course Objectives**

To provide knowledge to students about the tools and techniques applicable for efficient management of finance in an organisation

**Course Outcomes (CO)**

The learners will be able to

1. Comprehend financial management and financial planning
2. Apply general management principles to financial resources of a business
3. Identify and use various financial instruments to increase the potential return of investments
4. Determine capital and working capital requirement of a business
5. Analyse the cost of capital through various theories

**COs consistency with POs**

<b>CO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

<b>CO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>1</b>	H	M	H	H	M	M
<b>2</b>	H	H	M	H	H	M
<b>3</b>	H	M	H	M	H	M
<b>4</b>	H	M	M	M	H	H
<b>5</b>	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction to Financial Management and Financial Planning (15 hours)**

- 1.1 Financial Management – Meaning – Definition – Nature of Financial Management - Objectives – Scope and Functions – Role of Financial Manager (K1, K2, K3)
- 1.2 Financial Planning – Meaning – Definition – Scope – Characteristics – Essentials of Sound (K1, K2, K3)
- 1.3 Financial Planning (K1, K2, K3)
- 1.4 Theories of Capitalisation (K1, K2, K3)
- 1.5 Sources of Long Term Finance: Equity, Preference, Debentures, Term Loans, Public Deposits (K1, K2, K3)
- 1.6 Short Term Finance: Trade Credit, Bank Credit, Customer Advances, Instalment Credit, Commercial Credit etc. - Fixed Capital – Working Capital

### **Unit II: Leverages (15 hours)**

- 2.1 Leverage – Meaning - Types and Significance of Leverages (K1, K2, K3)
- 2.2 Calculation of Leverages – Degree of Leverages (K2, K3, K4)
- 2.3 Capital structure – Meaning - Features of appropriate Capital Structure (K2, K3, K4)
- 2.4 Factors affecting Capital structure (K1, K2, K3)
- 2.5 Theories of Capital structure – Net Income Approach, Net Operating Income Approach (Problems included) (K2, K3, K4)
- 2.6 Theories of Capital structure – Traditional Approach and Modigliani and Miller Approach (Problems included) (K2, K3, K4)

### **Unit III: Cost of Capital (15 hours)**

- 3.1 Cost of Capital – Meaning - Importance – Computation of Cost of Capital (K1, K2, K3)
- 3.2 Cost of Debt before and after tax (K1, K2, K3)
- 3.3 Cost of Preference Share Capital (K1, K2, K3)
- 3.4 Cost of Equity Share capital (K1, K2, K3)
- 3.5 Cost of Retained Earnings (K1, K2, K3)
- 3.6 Weighted Average Cost of Capital (K1, K2, K3)

### **Unit IV: Working Capital Management (15 hours)**

- 4.1 Working Capital Management – Meaning – Definition (K1, K2, K3)
- 4.2 Types of Working Capital – Advantages – Factors Determining Working Capital (K1, K2, K3)
- 4.3 Need for Working Capital – Working Capital Cycle (K1, K2, K3)
- 4.4 Factors affecting Working Capital Requirements (K1, K2, K3)
- 4.5 Forecasting Working Capital Requirements (K1, K2, K3)

#### 4.6 Funding of Working Capital Requirement (K1, K2, K3)

### **Unit V: Investment and Dividend Decision**

**(15 hours)**

5.1 Capital Budgeting – Meaning – Definition (K2, K3, K4)

5.2 Project Evaluation Techniques - Payback Period, Accounting Rate of Return, Net Present Value (K2, K3, K4)

5.3 Internal Rate of Return - Profitability Index (K2, K3, K4)

5.4 Decision Tree, PERT and CPM (K2, K3, K4)

5.5 Dividend Policy Consideration – Dividend Payout Methods (K2, K3, K4)

5.6 Dividend Theories – Walter and M.M. Theories (K2, K3, K4)

**Theory: Problem – 60: 40**

#### **Textbook:**

Dr Murthy A. – Financial Management – Margham Publications, Chennai, Reprint 2018

#### **Books for Reference:**

1. Khan M. Y, Jain P.K. – Financial Management – Tata McGraw Hill, New Delhi, 6<sup>th</sup> Edition 2019
2. Pandey I.M. – Financial Management – Vikas Publishing House Pvt. Ltd., New Delhi, Reprint 2018
3. Sudharsana Reddy G. – Financial Management: Principles and Practice – Himalaya Publishing House, Chennai, Edition 2018
4. Periasamy P. – Financial Management – Tata McGraw Hill, New Delhi, Edition 2018
5. Dr. Palanivelu V.R. – Financial Management – S. Chand and Co., New Delhi,

#### **Web Resources:**

1. <https://www.csun.edu/~zz1802/Finance%20303/Web-Stuff/Lecture-Notes-Mid1.pdf>
2. [https://business.baylor.edu/steve\\_rich/fin3310/Ch12PLN-3310.pdf](https://business.baylor.edu/steve_rich/fin3310/Ch12PLN-3310.pdf)
3. <https://www.wallstreetprep.com/knowledge/capital-structure/>
4. <https://khatabook.com/blog/fund-flow-statement-with-examples/>
5. [https://thalis.math.upatras.gr/~tsantas/DownloadFiles/Hillier&Lieberman\\_7th-edition\\_Chapter10.pdf](https://thalis.math.upatras.gr/~tsantas/DownloadFiles/Hillier&Lieberman_7th-edition_Chapter10.pdf)

**SEMESTER – IV**  
**PCCOO20 – Industrial Relations and Labour Laws**

<b>Year:</b> II	<b>Course Code:</b> PCCOO20	<b>Title of the Course:</b> Industrial Relations and Labour Laws	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> IV							

**Course Objectives**

To teach the students the laws prevalent for the protection of the welfare of employees in industries

**Course Outcomes (CO)**

The learners will be able to

1. Understand the significance of Industrial relations in organizations
2. Gain knowledge on the process and procedures to handle industrial disputes
3. Good base of labour laws and computation methods of compensation
4. Acquainted with the concept, principles and functions of trade union, collective bargaining and workers' participation in management
5. In-depth knowledge of laws relating to Payment of Wages Act and Factories Act and its judicial set up

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	M	M	H	H	M	H
2	H	H	M	H	H	M
3	M	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Industrial Relations (15 hours)**

- 1.1 Industrial Relations – Meaning - Nature of Industrial Relations (K1, K2, K3)
- 1.2 Significance - Factors pertaining to Good Industrial Relations (K1, K2, K3)
- 1.3 Causes and effects of poor Industrial Relations (K1, K2, K3)
- 1.4 Industrial Disputes – Forms and causes (K1, K2, K3)
- 1.5 Methods of Settlement of Industrial Disputes (K1, K2, K3)

### **Unit II: Industrial and Labour Laws (15 hours)**

- 2.1 Industrial Laws and Labour Law – Need for Labour Legislation (K1, K2, K3)
- 2.2 Principles of Labour Legislation (K1, K2, K3)
- 2.3 History of Labour Legislation (K1, K2, K3)
- 2.4 Workmen’s Compensation – Determination (K1, K2, K3)
- 2.5 Time for payment of Compensation (K1, K2, K3)

### **Unit III: Trade Union (15 hours)**

- 3.1 Trade Union - Definition – Need (K1, K2, K3)
- 3.2 Trade Union- Objectives – Structure (K1, K2, K3)
- 3.3 Trade Union Theories (K1, K2, K3)
- 3.4 Functions of Trade Union (K1, K2, K3)
- 3.5 Trade Unions Act, 1926 – Concept and benefits of Collective bargaining (K1, K2, K3)
- 3.6 Workers’ Participation in Management (K1, K2, K3)

### **Unit IV: Payment of Wages Act, 1936 and Factories Act, 1948 (15 hours)**

- 4.1 Payment of Wages, Act 1936 – Objectives – Scope (K1, K2, K3)
- 4.2 Rules for payment of wages (K1, K2, K3)
- 4.3 Authorised deductions from Wages (K1, K2, K3)
- 4.4 Factories Act, 1948 – Objectives (K1, K2, K3)
- 4.5 Provisions relating to Health, Safety and Welfare of Employees (K1, K2, K3)

### **Unit V: Employees State Insurance Act, 1948 (15 hours)**

- 5.1 Employees State Insurance Act, 1948 – Objectives (K1, K2, K3)
- 5.2 Employees State Insurance Corporation – Constitution, Powers (K1, K2, K3)
- 5.3 Duties of Standing Committee (K1, K2, K3)
- 5.4 Benefits to the Employees – Sickness, Maternity, Disablement (K1, K2, K3)
- 5.5 Benefits to the Employees – Dependents, Medical and Funeral Benefits (K1, K2, K3)

**Textbook:**

Saravanel P. – Labour Legislations – Eswar Press, Chennai, Reprint 2015

**Books for Reference:**

1. Srivastava S. C. – Industrial Relations and Labour Laws – Vikas Publishing House Pvt. Ltd., New Delhi, Edition 2015
2. Tripathi P.C. and Gupta C.B. – Industrial Relations and Labour Laws – Sultan Chand & Sons, New Delhi, Edition 2018
3. Venkata Ratnam C. S. – Industrial Relations and Labour Laws – Oxford University Press, New Delhi, Reprint 2017
4. Nair N. G. and Latha Nair – Personnel Management and Industrial Relations – Sultan Chand & Sons, New Delhi, Reprint 2016

**Web Resources:**

1. <https://labour.gov.in/industrial-relations>
2. <https://www.britannica.com/topic/labour-law>
3. <https://www.britannica.com/money/trade-union>
4. <https://www.whatishumanresource.com/the-payment-of-wages-act-1936>
5. <https://incometaxindia.gov.in/pages/acts/factories-act.aspx>
6. <https://www.esic.in/web/esic/esi-act>

**SEMESTER – IV**  
**PCCOP20 – Enterprise Resource Planning And Tally**

<b>Year:</b> II	<b>Course Code:</b> PCCOP20	<b>Title of the Course:</b> Enterprise Resource Planning and Tally	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 3	<b>Marks</b> 100
<b>Sem:</b> IV							

**Course Objectives**

To provide an introduction to the operation of Enterprise Resource Planning and the related technologies

**Course Outcomes (CO)**

The learners will be able to

1. Gain knowledge about the various Enterprise Resource Planning soft wares
2. Understand the technologies associated with ERP
3. Decide about a software suitable for the type of business of their choice
4. Understand the theoretical aspects of Tally Software and its application in various areas of a business
5. Prepare financial statements and extracts reports in existing ERP model

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	M	H	M	H	H	H
3	H	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## Course Syllabus

### **Unit I: Introduction (12 hours)**

- 1.1 Enterprise Resource Planning (ERP) – Introduction – History (K1, K2, K3)
- 1.2 Common Myths about ERP – Reasons for growth of ERP Market – Advantage of ERP (K1, K2, K3)
- 1.3 Roadmap for successful implementation of ERP packages – Importance of ERP to a Company (K1, K2, K3)
- 1.4 Values created by ERP – Benefits of ERP system (K1, K2, K3)
- 1.5 Risks of ERP – Implementation of ERP – Challenges (K1, K2, K3)
- 1.6 Strategies and Process – Future directions and trends in ERP (K1, K2, K3)

### **Unit II: ERP and related technologies (12 hours)**

- 2.1 ERP and Related Technologies – Business Process Reengineering – Data Warehousing – Data Mining (K1, K2, K3)
- 2.2 Online Analytical Processing (OLAP) – Supply Chain Management (SCM) (K1, K2, K3)
- 2.3 Customer Relationship Management (CRM) – Business Process Reengineering – Evolution – Phases – Success in BPR (K1, K2, K3)
- 2.4 Data Warehousing – Related Terms – Data Warehousing System – System (K1, K2, K3)
- 2.5 Structure of Data Warehouse – Advantages (K1, K2, K3)
- 2.6 Obstacles and Uses of Data Warehouse (K1, K2, K3)

### **Unit III: Data Mining (12 hours)**

- 3.1 Data Mining – Meaning – Process – Advantages (K1, K2, K3)
- 3.2 Technologies used (K1, K2, K3)
- 3.3 OLAP – Meaning – Relationship with Data Warehousing (K1, K2, K3)
- 3.4 OLAP - Uses – Features – Styles (K1, K2, K3)
- 3.5 Product Life Cycle Management – Meaning – Benefits (K1, K2, K3)
- 3.6 Phases of Product Life Cycle – Product Life Cycle Management's support to product Life Cycle (K1, K2, K3)

### **Unit IV: Supply Chain Management and Security in ERP (12 hours)**

- 4.1 Supply chain Management – Evolution – Advantages – Business Benefits (K1, K2, K3)
- 4.2 Customer Relationship Management – Meaning – Function – Components – Uses – Features and Forms of CRM system – Benefits (K1, K2, K3)
- 4.3 Advanced Technology and ERP security – ERP Bolt –ons – Middleware – Computer crimes – Types (K1, K2, K3)
- 4.4 Security and ERP – Physical Access – Restrictions – Passwords – Firewalls – Backup (K1, K2, K3)
- 4.5 Emerging Security solutions – Human security concerns (K1, K2, K3)
- 4.6 Preventing employee crimes – Tips for defending hackers (K1, K2, K3)

## **Unit V: Tally Software**

**(12 hours)**

- 5.1 Tally Software – History – Features (K1, K2, K3)
- 5.2 General and Accounting – Group and Ledgers (K1, K2, K3)
- 5.3 Inventory in Tally – Stock Group and Items – Vouchers – Accounting and Inventory (K3, K4, K5)
- 5.4 Cost Centers and Categories – Budgets and Control (K3, K4, K5)
- 5.5 Bill wise details – Interest Calculation – Security control (K3, K4, K5)
- 5.6 GST in Tally – Additional Features in Tally 9 Release 13 (K3, K4, K5)

**Textbook:** Study Material will be provided

### **References:**

1. Alexis Leon – Enterprise Resource Management – Tata McGraw Hill Publications, New Delhi, Second Edition, 2008
2. Marianne Bradford - Modern ERP: Select, Implement, and Use Today's Advanced Business Systems (E-book)
3. Veena Bansal – Enterprise Resource Planning – Pearson Education , New Delhi, 2012
4. Tally Education Pvt. Ltd. – GST using Tally – Sahaj Enterprises, Bengaluru, 2018
5. Ashok K.Nandhini – Tally ERP 9 – Training Guide – BPB Publications, Chennai, 2016
6. Kogent Learning Solutions – TALLY ERP 9 in simple steps (E-Book)

### **Web Resources:**

1. <https://www.geeksforgeeks.org/introduction-to-erp/>
2. <https://dynamics.microsoft.com/en-in/erp/erp-software>
3. <https://www.investopedia.com/terms/d/datamining.asp>
4. <https://www.oracle.com/in/scm/what-is-supply-chain-management>
5. <https://www.antraweb.com/blog/2022-Tally-tips-and-tricks-blog-by-antraweb>

**SEMESTER – IV**  
**PCCOQ20 – TALLY (PRACTICALS)**

<b>Year:</b> II	<b>Course Code:</b> PCCOP20	<b>Title of the Course:</b> Tally	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 100
<b>Sem:</b> IV							

**Course Objectives**

To provide knowledge of the advanced operations of Tally ERP 9 and its practical application

**Course Outcomes (CO)**

The learners will be able to

1. Post transactions in Tally Software and generate required reports and financial statements
2. Calculate GST for various purchase and sales transactions
3. Compute and ascertain outstanding interests, bills receivable and payable using Tally Software

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	H
2	M	H	M	H	H	M
3	H	M	M	M	M	M
4	M	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

**Practical Exercises:**

1. Profit and Loss Account and Balance Sheet
2. Inventory – Stock Summary and P&L Account
3. Cost Centres and Cost Categories
4. Bill-Wise Details
5. Interest Calculation – Simple and advanced mode
6. Application of GST

**SEMESTER – IV**  
**PCCOR20 - PROJECT**

<b>Year:</b> II	<b>Course Code:</b> PECOH20	<b>Title of the Course:</b> Project	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 2	<b>Marks</b> 100
<b>Sem:</b> IV							

**Course Objectives**

To develop an interest for research among students and expose them to the practical aspects in Business, Trade and Industry

**Course Outcomes (CO)**

The learners will be able to

1. Conduct a survey about a topic on Commerce, Marketing, Finance or Social Sciences
2. Prepare a Research Report on the study and its findings using relevant data analysis
3. Suggest to organizations and the society regarding various research problems

**COs consistency with POs**

CO	PO									
	1	2	3	4	5	6	7	8	9	10
CO1	H	H	H	H	M	M	M	H	M	H
CO2	H	H	H	H	H	H	M	H	H	H
CO3	H	H	H	H	H	H	M	H	H	H

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	H	H	H	M	M
2	H	H	M	H	H	M
3	H	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High – H

## Course structure

<b>Period</b>	<b>Student's Activity</b>	<b>Staff Supervisor's Activity</b>	<b>Department's Activity</b>
<b>II Semester</b>	The student selects a topic related to Business/ Finance/Trade/ Marketing for study.	The student is introduced to the Methodology and Techniques of research through the Paper Research Methodology	Each student is assigned to a staff supervisor with the help of who she is made to select a topic related to Business/ Finance/ Trade/ Marketing for Study.
<b>Summer Holidays after II Semester</b>	The student prepares the first draft of the Questionnaire.	The student is made to review and collect literature related to her topic. The first draft of the Questionnaire	
<b>III Semester</b>	The student finalises the Questionnaire The student selects the sample (Sample size is 100) and collect data. The Student prepares the rough draft of the Dissertation.	The first draft of the Questionnaire is checked.	A workshop is conducted on 'SPSS and its application in Research', with special reference to the topics selected.
<b>IV Semester</b>	The student prepare the final draft of the Dissertation after two reviews by the staff supervisor. The student submits the Dissertation in two copies.	The final draft of the Dissertation is reviewed.	A Viva Voce is conducted before the End-Semester Examination during late February/early March by an external Examiner.

**SEMESTER – IV**  
**PECOG20 – Elective IV A: Business Environment**

<b>Year:</b> II	<b>Course Code:</b> PECOG20	<b>Title of the Course:</b> Business Environment	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> IV							

**Course Objectives**

To teach the students about the various micro and macro environmental factors, forces and policies that influence business operations

**Course Outcomes (CO)**

The learners will be able to

1. Familiarize with business environment and financial system
2. Cognise on economic and non-economic environment
3. To understand the constitutional and legal environment in India
4. To facilitate the knowledge on socio-cultural environment
5. To be aware on technical and global environment

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	M	M	H	H	M	H
2	H	H	M	H	H	M
3	H	M	M	M	M	M
4	M	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Overview of Business Environment and Financial System (15 hours)**

- 1.1 Introduction to Business Environment – Nature and Scope – Characteristics (K1, K2, K3)
- 1.2 Changing concepts of business – Demographic factors (K1, K2, K3)
- 1.3 Environmental Analysis (K1, K2, K3)
- 1.4 Ecological environment – Water, Air and Noise Pollution (K1, K2, K3)
- 1.5 Financial system - Financial Institutions – Importance – Role (K1, K2, K3)
  
- 1.6 Banking functions – Financial Markets (K2, K3, K4)

### **Unit II: Economic and Non-Economic Environment (15 hours)**

- 2.1 Economic - Basic aspects of Business – Economic Environment of business - Monetary Policy and business – Fiscal Policy (K2, K3, K4)
- 2.2 Physical Controls – Foreign Trade Policy - Economic system and Business - Economic planning (K2, K3, K4)
- 2.3 Resource Endowment (K2, K3, K4)
- 2.4 Non- Economic - Sociological Factors – Educational – Cultural Factors (K2, K3, K4)
- 2.5 Historical – Political – Legal – More classifications of Business Environment – Static and Dynamic Environment (K2, K3, K4)
- 2.6 Business Cycle – Inflation – Control of Business Cycle (K2, K3, K4)
  
- 2.7 Characteristics of Inflation – Degree of Inflation (K2, K3, K4)

### **Unit III: Constitutional and Legal Environment (15 hours)**

- 3.1 Constitutional Environment in India – Preamble to the Constitution – Fundamental Rights – Directive Principles of State Policy (K2, K3, K4)
- 3.2 Directives shaping the policy of the States – Non-justifiable rights – Criticisms of the Directive Principles (K2, K3, K4)
- 3.3 Legal environment - Introduction – History (K2, K3, K4)
- 3.4 Objectives of the Companies Act, 1956 – Definition, Meaning & Features of a Company (K2, K3, K4)
- 3.5 Kinds and classifications of Company (K2, K3, K4)
- 3.6 Holdings and Subsidiary Companies – Investment Company (K2, K3, K4)

### **Unit IV: Socio - Cultural Environment (15 hours)**

- 4.1 Business and Culture – Family – Monistic Society – Social stratification in India – Social Transformation (K2, K3, K4)
- 4.2 Culture – Applied to Business – Culture – Applied to Business – Culture lag (K2, K3, K4)
- 4.3 Social responsibilities - Sole Proprietorship – Features (K2, K3, K4)

4.4 Social responsibilities - Merits – Demerits (K2, K3, K4)

4.5 Partnership –Features (K2, K3, K4)

4.6 Limits to Social Responsibility (K2, K3, K4)

## **Unit V: Technological and Global Environment**

**(15 hours)**

5.1 Technological Environment – Features – Impact of Technology (K2, K3, K4)

5.2 Business operations – Expenditure on Research and Development (K2, K3, K4)

5.3 Social Technology – Globalisation (K2, K3, K4)

5.4 Foreign Trade Direct Investment (K2, K3, K4)

5.5 Multinational Corporations (K2, K3, K4)

5.6 World Trade Organization (K2, K3, K4)

### **Text Book:**

Dr. S. Sankaran – Business Environment- Margham Publications, Chennai, Reprint 2018

### **Books for Reference:**

1. Gupta C.B. – Business Environment - Himalaya Publishing House, Mumbai, Reprint 2017
2. Francis Cherunilam R. – Business Environment – APH Publishing Corporation, New Delhi Reprint 2013
3. Vivek Mittal – Business Environment - Excel Books, New Delhi Revised Edition 2012
4. Dr. Sankaran S. - International and Business Environment – Margham Publications, Chennai, Reprint 2018

### **Web Resources:**

1. <https://www.investopedia.com/terms/f/financial-system>.
2. <https://www.yourarticlelibrary.com/business-environment/economic-and-non-economic-environment-of-business/62816>
3. <https://businesslaw.uslegal.com/the-constitutional-environment-of-business/>
4. <https://gyankovandar.com/2021/05/socio-cultural-environment-concept-and-components-socio-cultural-environment.html>
5. <https://timesofindia.indiatimes.com/readersblog/taneesha-ahuja/impact-of-technology-on-environment-43973/>

**SEMESTER – IV**  
**PECOH20 – Elective IVB: Legal Aspects of Business**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: IV</b>	PECOH20	Legal Aspects of Business	Theory	Elective	6	4	100

**Course Objectives**

To make the students understand the concept of administration in corporate and to create awareness about other laws available for citizens of India.

**Course Outcomes (CO)**

The learners will be able to

1. To familiarize with the role of various personnel in governing corporate entities
2. To file a complaint in case of any injustice happening to a consumer
3. To understand the importance of patents, copyrights, etc. and also the mode of safeguarding one's intellectual property right
4. To facilitate the knowledge on laws governing cyber activity and information technology
5. To comprehend any insurance policy or scheme

**COs consistency with POs**

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	H	H	M
3	H	M	M	M	M	M
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit - I: Corporate Governance (15 hours)**

- 1.1 Corporate Governance – Principles – Objectives – Needs (K1, K2, K3)
- 1.2 The role of ownership structure and group affiliation – The Corporate Governance of Banks (K1, K2, K3)
- 1.3 The role of Institutional Investors – State owned firm – Family owned firm (K1, K2, K3)
- 1.4 Listing Agreement – CEO/CEO certificate – Report on Corporate Governance (K1, K2)
- 1.5 Compliance – Government Manual – Role of Auditor in Corporate Governance (K1, K2)
- 1.6 Requirements to strengthen Corporate Governance (K1, K2, K3)

### **Unit - II: Consumer Protection Act, 1986 15 hours**

- 2.1 Introduction – Significance of Consumer Protection Act – Rights of Consumer – Definition (K1, K2, K3)
- 2.2 Compliant Related Provisions – Consumer Protection Councils - Central Consumer Protection Councils – State Consumer Protection Councils (K1, K2, K3)
- 2.3 Redressal Machinery under the Act – District Forum – State Commission National Commission – complaints before District Forum and State Commission (K1, K2, K3)
- 2.4 Limitation period for filing of Complaints – Administrative Control (K1, K2, K3)
- 2.5 Nature and Scope of Remedies under the Act (K1, K2, K3)
- 2.6 Appeals – Penalties – Judicial Decisions (K1, K2, K3)

### **Unit - III: Intellectual Property Rights 15 hours**

- 3.1 Intellectual Property – Meaning – Characteristic of Intellectual Property – Need for Intellectual Property Laws – Types of Intellectual Property (K1, K2, K3)
- 3.2 Design – Trade Mark: meaning - Trade Marks Act, 1999 - Classification of Goods and Services - Protection of Trade Marks - Registration of Trade Mark (K1, K2, K3)
- 3.3 Terms of Trade Marks - Renewal of Trade Mark - Infringement and Defences in

Infringement – Copyright: Meaning - Terms – Ownership - Procedure for Registration of Copyrights - Rights of the Author - Rights of Owner - Appeals (K2, K3, K4)

3.4 Geographical Indications of Goods: Geographical Indications - Goods - Indications – Prohibition of Registration - Registration of Geographical Indications (K2, K3, K4)

3.5 Rights Bestowed on the registered Proprietor- Action for Infringement – Trade Secrets (K2, K3, K4)

3.6 Patents Act, 1970 – Semiconductor Integrated Circuits Layout Design Act, 2000 (K2, K3, K4)

**Unit – IV: Cyber Law and Information Technology Act (15 hours)**

4.1 Introduction – Key definition used in the Act (K1, K2, K3)

4.2 Digital signature (K1, K2, K3)

4.3 Electronic governance (K1, K2, K3)

4.4 Security Procedure (K1, K2, K3)

4.5 Appointment of Control and other officers (K1, K2, K3)

4.6 Cyber Appellate Tribunal (K1, K2, K3)

**Unit – V: Insurance Law (15 hours)**

5.1 Introduction – Frame work of Law – The Insurance Act, 1938 (K1, K2, K3)

5.2 Life Insurance Corporation Act, 1956 – General Insurance Business Act, 1972 (K1, K2, K3)

5.3 Insurance Regulatory and Development Authority Act, 1999 (K1, K2, K3)

5.4 Insurance – Definition – Duties and Rights of Insurers (K1, K2, K3)

5.5 Principles of Insurance (K1, K2, K3)

5.6 Types of Insurance (K1, K2, K3)

**Textbook:**

Balachandran V. and Thotadri S. – Legal Aspects of Business – Vijay Nicole Imprints Pvt Ltd., Chennai

**Books for Reference:**

1. Ravi T.S. – Legal Aspects of Business – Margham Publicatio, Chennai, 2017
2. Akhileshwar Pathak - Legal Aspects of Business – Tata McGraw Hill Publishing Company ltd., New Delhi, 7<sup>th</sup> Edition.
3. Ravinder Kumar- Legal Aspects of Business – Cengage learning India Pvt Ltd., New Delhi , 4<sup>th</sup> Edition, 2016

**Web Resources:**

1. <https://www.techtarget.com/searchsecurity/definition/corporate-governance>
2. <https://unacademy.com/content/upsc/study-material/law/consumer-protection-act-1986/>
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3217699/>
4. <https://www.geeksforgeeks.org/information-technology-act-2000-india/>
5. <https://www.investopedia.com/terms/i/insurance.asp>

**SEMESTER – IV**  
**PICOD20 – Independent Elective IV B: Entrepreneurial Development**

<b>Year:</b> II	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: IV</b>	PICOD20	Entrepreneurial Development	Theory	Elective		2	100

**Course Objectives**

To introduce and inculcate the knowledge of Entrepreneurship among the students so that they can be self-employed and become successful entrepreneurs

**Course Outcomes (CO)**

The learners will be able to

1. To develop entrepreneurial skills and start up a new business.
2. To understand and acquire knowledge on support services provided to entrepreneurs by different agencies for entrepreneurial development.
3. To identify and formulate business proposals.
4. To understand the role of government in entrepreneurial development.
5. To understand the position and problems faced by women entrepreneurs.

**COs consistency with POs**

<b>CO</b>	<b>PLO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	H	H	M	M
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

**COs consistency with PSOs**

<b>CO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>1</b>	H	M	H	H	M	M
<b>2</b>	H	H	M	H	H	M
<b>3</b>	H	M	M	M	M	M
<b>4</b>	H	M	M	M	H	H
<b>5</b>	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction**

- 1.1 Entrepreneur – Meaning - Entrepreneurship – Meaning – Definition – Characteristics (K1, K2, K3)
- 1.2 Qualities of an Entrepreneur – Theories on Entrepreneurs (All) (K1, K2, K3)
- 1.3 Functions – Classification of Entrepreneurs (K1, K2, K3)
- 1.4 Factors influencing Entrepreneurship (K1, K2, K3)
- 1.5 Role of Entrepreneurs in the Economic development (K1, K2, K3)
- 1.6 Successful entrepreneurs in Vellore, Thirupathur and Ranipet districts (K1, K2, K3)

### **Unit II: Supporting Services to Entrepreneurs**

- 2.1 Entrepreneurial Development Agencies: Commercial Banks (K2, K3, K4)
- 2.2 District Industries Centre (K2, K3, K4)
- 2.3 National Small Scale Industries Corporation (K2, K3, K4)
- 2.4 Small Industries Development Organisation (K2, K3, K4)
- 2.5 Small Industries Services Institutes (K2, K3, K4)
- 2.6 The Khadi and Village Industries Commission (K2, K3, K4)

### **Unit III: Idea Generation**

- 3.1 Micro and Macro Enterprises - Project Identification and Selection (K2, K3, K4)
- 3.2 Project Formulation – Project Appraisal (K2, K3, K4)
- 3.3 Financing of Enterprises - Ownership Structures (K2, K3, K4)
- 3.4 Small Scale Entrepreneurs – Role of Small Scale Industries in the Indian Economy (K2, K3, K4)
- 3.5 Incentives and Subsidies for small scale industries (K2, K3, K4)
- 3.6 Policy measures to strength small, tiny and village enterprises (K2, K3, K4)

### **Unit IV: Entrepreneurial Development Programme**

- 4.1 Entrepreneurial Development Programmes – Need (K1, K2, K3)
- 4.2 Entrepreneurial Development Programmes– Objectives – Curriculum (K2, K3, K4)
- 4.3 Phases of EDP (K1, K2, K3)
- 4.4 Critical Evaluation of EDPs (K1, K2, K3)
- 4.5 Problems of EDPs (K2, K3, K4)
- 4.6 Role of Government in organizing EDP (K2, K3, K4)

### **Unit V: Women Entrepreneurship and Micro Finance**

- 5.1 Women Entrepreneur - Concept, Functions and Problems (K1, K2, K3)

- 5.2 Recent trends in the development of Women entrepreneurship (K2, K3, K4)
- 5.3 Self Help Groups – Objectives, Features and Achievements of SHGs (K2, K3, K4)
- 5.4 Growth in SHG – Concept and Features of Micro Finance (K2, K3, K4)
- 5.5 Distribution channels of Micro Finance – Bank Linkage through Micro credit (K2, K3, K4)
- 5.6 Subsidies and Incentives to Women Entrepreneurs (K2, K3, K4)

**Textbook:**

Khanka S. S – Entrepreneurial Development – Sultan Chand and Sons, New Delhi, Reprint 2014

**Books for Reference:**

- 1. Sangeeta Sharma- Entrepreneurial development –Asoke K.Ghosh Publishers, Reprint 2016.
- 2. David H. Holt – Entrepreneurship: New Venture Creation – Prentice Hall of India, New Delhi, Reprint 2017
- 3. Dr. Sanjay R. Ajmeri- Entrepreneurship Development- Pearson Education, Delhi, Reprint 2017
- 4. Poornima M. – Entrepreneurship Development, Small Business Enterprise – Pearson Education, Delhi, Revised Edition 2012

**Web Resources:**

- 1. <https://fredericodeigah.wordpress.com/2012/10/12/introduction-to-entrepreneurship-development/>
- 2. <https://callforhumanity.org/breaking-the-cycle-of-poverty-with-micro-entrepreneurship/>
- 3. <https://www.viima.com/blog/idea-generation>
- 4. <https://www.eshipsimplified.com/entrepreneurship-development-course>
- 5. <https://www.mba.com/business-school-and-careers/career-possibilities/30-most-successful-women-entrepreneurs-in-india-part-1>



# **PG Department of Biochemistry**

## **M.Sc. Biochemistry**

### **SYLLABUS AND REGULATIONS**

Under

### **OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**M.Sc. Biochemistry - OUTCOME BASED EDUCATION**  
**(Effective for the batch of students admitted from the Academic Year 2020-2021)**  
**STRUCTURE OF THE COURSE AND SCHEME OF EXAMINATIONS:**

<i>I YEAR</i>		<i>I SEMESTER</i>		
Subject Code	Title of the Paper	Hrs/Week	Credit	Marks
PCBCA20	Biomolecules	6	5	40+60
PCBCB20	Human Physiology and Nutrition	6	5	40+60
PCBCC20	Cell Biology	5	4	40+60
PCBCG20	Practical I: Main Practical I	5	-	-
PCBCH20	Practical II: Main Practical II	5	-	-
PEBCA20	Elective I A: Biophysical Chemistry	3	3	40+60
PEBCB20	Elective I B: Pharmaceutical Biochemistry			
PIBCA20	Independent Elective IA: Organic Farming	-	2	100
PIBCB20	Independent Elective IB: Food Preservation	-	2	100
<b>TOTAL</b>		<b>30</b>	<b>17</b>	<b>400</b>

<i>I YEAR</i>		<i>II SEMESTER</i>		
Subject Code	Title of the Paper	Hrs/Week	Credit	Marks
PCBCD20	Analytical Biochemistry	5	5	40+60
PCBCE20	Enzymology	5	5	40+60
PCBCF20	Intermediary Metabolism	5	4	40+60
PCBCG20	Practical I: Main Practical I	5	4	40+60
PCBCH20	Practical II: Main Practical II	5	4	40+60
PEBCC20	Elective IIA: Ecology, Evolution and Developmental Biology	3	3	40+60
PEBCD20	Elective II B: Toxicology			
PNHRA20	Human Rights	2	2	40+60
PIBCC20	Independent Elective II A: Horticulture	-	2	100
PIBCD20	Independent Elective II B: Cancer Biology	-	2	100
<b>TOTAL</b>		<b>30</b>	<b>27</b>	<b>700</b>

<i>II Year III Semester</i>				
<b>Subject Code</b>	<b>Title of the Paper</b>	<b>Hrs/Week</b>	<b>Credit</b>	<b>Marks</b>
PCBCI20	Advanced Endocrinology	6	5	40+60
PCBCJ20	Advanced Immunology	6	5	40+60
PCBCK20	Advanced Biotechnology	5	4	40+60
PCBCN20	Practical III: Main Practical III	5	-	-
PCBCO20	Practical IV: Main Practical IV	5	-	-
PEBCE20	Elective III A: Microbiology	3	3	40+60
PEBCF20	Elective III B: Research methodology			
PGTRA20	Teaching and Research Aptitude	-	3	40+60
PIBCE20	IE III A: Nanobiotechnology	-	2	100
PIBCF20	IE III B: Stem cell Technology	-	2	100
<b>TOTAL</b>		<b>30</b>	<b>20</b>	<b>500</b>

<i>II Year IV Semester</i>				
<b>Subject Code</b>	<b>Title of the Paper</b>	<b>Hrs/Week</b>	<b>Credit</b>	<b>Marks</b>
PCBCL20	Molecular Biology	6	5	40+60
PCBCM20	Advanced Clinical Biochemistry	6	5	40+60
PCBCN20	Practical III: Main Practical III	5	4	40+60
PCBCO20	Practical IV: Main Practical IV	5	4	40+60
PEBCG20	Elective IV A: Plant Biochemistry	3	3	40+60
PEBCH20	Elective IV B: Herbal Therapy			
	Project/ Dissertation with Viva-Voce	5	5	40+60
PIBCG20	IE IV A: Psychology	-	2	100
PIBCH20	IE IV B: Entrepreneurial Biochemistry	-	2	100
<b>TOTAL</b>		<b>30</b>	<b>26</b>	<b>600</b>
<b>GRAND TOTAL</b>			<b>90</b>	<b>2200</b>
Independent Elective			<b>8</b>	

## PROGRAMME OUTCOME (PO)

*On completion of the PG Programme, students will be able to:*

- PO1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.
- PO2:** Assimilate and apply principles and concepts towards skill development and employability.
- PO3:** Apply critical and scientific approaches to address problems and find solutions.
- PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.
- PO5:** Integrate issues of social relevance in the field of study.
- PO6:** Persist in life-long learning for personal and societal progress.

## PROGRAMME SPECIFIC OUTCOMES (PSO)

**On completion of the M. Sc Biochemistry Programme, the students will be able to:**

- PSO 1** Acquire in-depth knowledge in Biochemistry concepts and life science
- PSO 2** Develop techniques needed for the employability.
- PSO 3** Evaluate ideas and evidence rationally to produce and implement solution to the socially relevant problem
- PSO 4** Develop research skills and practice life science in an ethical and responsible manner
- PSO 5** Demonstrate understanding of the societal, health, safety, legal and cultural issues and consequent responsibilities
- PSO 6** Recognize the present need and have the ability to engage in independent and lifelong learning

	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>
<b>PSO 1</b>	H	H	H	M	M	L
<b>PSO 2</b>	H	H	H	H	M	L
<b>PSO 3</b>	H	H	H	H	H	L
<b>PSO 4</b>	H	M	H	H	H	H
<b>PSO 5</b>	M	M	H	H	H	H
<b>PSO 6</b>	L	L	H	H	H	H
H- High (3), M – Moderate (2), L – Low (1)						

**SEMESTER – I**  
**PCBCA20 BIOMOLECULES**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks 100
I / I	PCBCA20	Biomolecules	Theory	Core	6	5	40+60=100

**Objective:**

To understand the salient features of biomolecules in the organization of life.

**Course Outcome (CO)**

On completion of the course, the students will be able to;

1. Outline the structural features, properties and biological importance of carbohydrates
2. Attain idea on the structural and biological aspects of proteins
3. Examine the structure of nucleic acids, its isolation and sequencing techniques
4. Gain knowledge on the structure, different forms and significance of lipids in the system
5. List out the significance of vitamins, its deficiency diseases and about the porphyrin ring containing molecules in living system

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	M	M	H	M
CO 2	H	M	M	H	H	M
CO 3	H	H	M	H	H	M
CO 4	H	H	M	H	H	M
CO 5	H	H	L	L	H	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	M	M	M	H
CO 2	H	M	H	M	H	H
CO 3	H	H	H	H	M	H
CO 4	H	M	M	M	M	M
CO 5	H	H	M	M	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(18 Hours)**

- 1.1 Carbohydrates: Monosaccharides (Glucose, Fructose, Galactose, Mannose)- Structure, Functions. (K1, K2, K3)
- 1.2 Polysaccharides - Occurrence, structure, isolation, properties and functions of homoglycans - starch, glycogen, cellulose, dextrin, inulin, chitins, xylan, arabinans, galactans (K1, K2, K3, K4, K5)
- 1.3 Occurrence, structure, properties, and functions of heteroglycans - bacterial cell wall polysaccharides, glycosamino glycans (K1, K2, K3)

- 1.4 Occurrence, structure, properties, and functions of agar, alginic acid, pectin, amino sugars and deoxy sugars, blood group substances and sialic acids. (K1, K2, K3)
- 1.5 Glycoprotein and their biological applications. (K1, K2, K3)
- 1.6 Lectins structure and functions. (K1, K2, K3)

**Unit II: (18 Hours)**

- 2.1 Proteins: Classification of proteins on the basis of solubility and shape, structure, and biological functions. (K1, K2, K3)
- 2.2 Isolation, fractionation and purification of proteins. (K1, K2, K3)
- 2.3 Denaturation and renaturation of proteins. Primary structure - determination of amino acid sequence of proteins (K1, K2, K3)
- 2.4 Peptide bond: Ramachandran plot. (K1, K2, K3)
- 2.5 Secondary structure - weak interactions involved- alpha helix and beta sheet and beta turns structure. Pauling and Corey model for fibrous proteins. Collagen triple helix. Super secondary structures - helix-loop-helix. (K1, K2, K3)
- 2.6 Tertiary structure - alpha and beta domains. Quaternary structure - structure of hemoglobin. Solid state synthesis of peptides. (K1, K2, K3)

**Unit III: (18 Hours)**

- 3.1 Nucleic acids: Watson - Crick model of DNA structure. (K1, K2, K3)
- 3.2 A, B and Z - DNA Cruciform structure in DNA, formation and stability of cruciforms, miscellaneous alternative conformation of DNA, slipped mispaired DNA, parallel stranded, anisomorphic DNA (K1, K2, K3)
- 3.3 Palindrome, secondary and tertiary structure of DNA (K1, K2, K3)
- 3.4 Methods for nucleic acid sequence determination, denaturation, strand separation, fractionation, isolation and purification of DNA (K1, K2, K3, K4, K5, K6)
- 3.5 Cot curve, hypochromic effect, DNA-protein interactions. Molecular hybridization. (K1, K2, K3, K4)
- 3.6 Structure and functions of mRNA, rRNA and tRNA, Heterogenous nuclear RNA (HnRNA) (K1, K2, K3)

**Unit IV: (18 Hours)**

- 4.1 Lipids: Lipids – classification-simple, compound, derived. (K1, K2, K3)
- 4.2 Fatty acids: saturated and unsaturated fatty acids. (K1, K2, K3, K4)
- 4.3 Phospholipids - classification, structure and functions. (K1, K2, K3)
- 4.4 Amphipathic lipids -membranes, micelles, emulsions and liposomes. (K1, K2)
- 4.5 Steroids - structure and biological role of cholesterol, bile acids and bile salts. (K1, K2, K3)
- 4.6 Eicosanoids – Structure and Functions of Prostaglandins, thromboxanes, leukotriens. Types and functions of plasma lipoproteins. (K1, K2, K3)

**Unit V: (18 Hours)**

- 5.1 Vitamins - Sources, structure, daily requirements, biochemical functions and deficiency diseases of water-soluble vitamins (K1, K2, K3, K4)
- 5.2 Vitamins - Sources, structure, daily requirements, biochemical functions and deficiency diseases of fat -soluble vitamins. (K1, K2, K3)

- 5.3 Porphyrins – Biosynthesis (K1, K2, K3)
- 5.4 Porphyrins- the porphyrin ring system of chlorophyll (K1, K2, K3)
- 5.5 Porphyrins- the porphyrin ring system of hemoglobin and myoglobin (K1, K2, K3)
- 5.6 Porphyrin ring system of Cytochrome (K1, K2, K3)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create]**

**Text Books:**

1. David L. Lehninger’s Principle of Biochemistry. Nelson and Michael M. Cox. W. H. Freeman; 4<sup>th</sup> edition, 2004.
2. Voet and Voet. Fundamentals of Biochemistry. John Wiley and sons NY, 2<sup>nd</sup> edition, 2002.

**Reference Books:**

1. Martin David W, Harper, Harold A - Harper’s review of Biochemistry- 31<sup>st</sup>edition, 2018.
2. Stryer L. Biochemistry. W.H. Freeman and Co. 5<sup>th</sup> edition, 2002.
3. Thomas. M. Devlin. Text Book of Biochemistry with clinical correlation. John Wiley-Liss, Hoboken NJ publishers, 2006.
4. West, Todd, Mason, Vanbruggen - Textbook of Biochemistry, Oxford Publishers, - 4<sup>th</sup>edition,2000.
5. Eric E Conn, P.K Stumpf, G. Brueins and Ray H Doi, John. Outlines of Biochemistry. Wiley and Sons. 5<sup>th</sup> edition, 2005.

**Open Educational Resources (OER):**

1. <https://youtu.be/N64RAIG49rY>
2. <https://youtu.be/Nh0Km4bv18>
3. <https://youtu.be/eb5PPWFZzx1>
4. <https://youtu.be/Sh3eolzdrdl>
5. <https://youtu.be/Qv-KExGKAYw>

**SEMESTER – I**  
**PCBCB20 - HUMAN PHYSIOLOGY AND NUTRITION**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / I	PCBCB20	Human Physiology and Nutrition	Theory	Core	6	5	40+60= 100

**Objective:**

To study about the Physiological system of human body and Nutrients with their deficiencies.

**Course Outcomes (CO)**

On completion of the course, the students will be able to:

1. Outline the physiological system of the human body
2. Describe the general function of each organ system
3. Assess the activities of organs for maximum efficiency
4. Explain the physiology of muscle and neurotransmitters
5. Utilize knowledge on nutrients with their deficiencies

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	H	M	M
CO 3	H	H	L	H	M	M
CO 4	H	H	H	H	M	M
CO 5	H	L	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	L	M	M
CO 3	H	H	H	H	M	M
CO 4	H	H	H	H	M	M
CO 5	H	H	L	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(18 Hours)**

- 1.1 Composition and functions of blood and plasma. Blood groups (K1, K2, K3, K4)
- 1.2 Blood coagulation - mechanism, fibrinolysis, anticoagulants (K2, K3, K4)
- 1.3 Hemoglobin - structure, abnormal types of Hemoglobin (K2, K3, K4)
- 1.4 Structure of heart, cardiac cycle, heart sounds, E.C.G (elementary knowledge) (K2, K3)
- 1.5 Vasomotor circulation, coronary circulation, blood pressure (K2, K3)
- 1.6 Spleen, Lymph-composition and function of lymph -lymph Organs. (K2, K3)

**Unit II:** (18 Hours)

- 2.1 Composition, functions and regulation of saliva, gastric, pancreatic, intestinal and bile secretions (K1, K2, K3, K4)
- 2.2 Digestion and absorption of carbohydrates and lipids (K2, K3, K4)
- 2.3 Digestion and absorption of proteins (K2, K3, K4)
- 2.4 Excretory system - structure of Kidney and nephron (K2, K3)
- 2.5 Formation of urine - glomerular filtration (K2, K3, K4)
- 2.6 Tubular reabsorption of glucose, water and electrolytes, tubular secretion. (K2, K3, K4)

**Unit III:** (18 Hours)

- 3.1 Structure and functions of organs of respiration. (K2, K3, K4)
- 3.2 Mechanism and regulation of respiration Transport of gases - O<sub>2</sub> and CO<sub>2</sub>. (K2, K3)
- 3.3 Acid-base balance: Acidosis and alkalosis - Fluid electrolyte balance - regulation of water balance and sodium balance, Role of renin-angiotensin and ADH. (K2, K3, K4)
- 3.4 Structure and Function of Male and Female reproductive organs (K2, K3, K4)
- 3.5 Menstruation (K3, K4)
- 3.6 Physiology of pregnancy, parturition and lactation (K2, K3, K4)

**Unit IV:** (18 Hours)

- 4.1 Chemical composition and metabolic adaptation, neurotransmitters and cAMP, biochemical aspects of learning and memory, enkephalins and endorphins. (K2, K3)
- 4.2 Structure and function of nerves, neurons, resting and action potential. (K2, K3, K4)
- 4.3 Transmission of nerve impulses, synaptic transmission, compounds affecting synaptic transmission and neuromuscular junction. (K2, K3)
- 4.4 Composition and functions of cerebrospinal fluid. (K2, K3, K4)
- 4.5 Structure of muscle cells, muscle contraction and molecular organization of muscle (K2, K3, K4)
- 4.6 Proteins of contractile element - their organization and role in contraction (K2, K3)

**Unit V:** (18 Hours)

- 5.1 Basal metabolism- basal metabolic rate, factors affecting BMR, determination of BMR - direct and indirect method. (K1, K2, K3, K4)
- 5.2 Respiratory quotient - biological oxygen demand, their importance in nutrition (K2, K3)
- 5.3 Nutrition at different stages of life - during infancy, adolescence, pregnancy and Geriatrics. (K2, K3)

5.4 Role of fiber in diet and role of essential amino acids (K2, K3, K4)

5.5 Protein Malnutrition: Marasmus and Kwashiorkor. (K2, K3)

5.6 Minerals- macro and micro elements, [Fe, Cu, Zn, I, Ca, Na, Cl, K, P, Mg] daily requirements, functions and deficiency manifestations. (K2, K3)

**Text Books:**

1. Ross & Wilson- Anatomy and Physiology in Health and illness- Elsevier-13<sup>th</sup> Edition,2018
2. C.C. Chatterjee- Human Physiology- CBS publishers-12<sup>th</sup> Edition,2018

**Reference Books:**

1. Ganong's Review of Medical physiology- McGraw Hill Education-25<sup>th</sup> Edition,2016
2. Guyton and Hall -Textbook of Medical Physiology- Elsevier- 13<sup>th</sup> Edition,2016
3. Davidson -Human Nutrition and Dietetics- Churchill Livingstone- 8<sup>th</sup> Edition,2008
4. M.E. Skilis and V.R. Young-Modern Nutrition and Health Diseases,2008
5. M.S. Swami Nathan- Principles of Nutrition- New Age Publications-5<sup>th</sup> Edition ,2011

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=BxV06Zn0Kck>
2. <https://www.youtube.com/watch?v=tXXEn6IdLPY>
3. <https://www.youtube.com/watch?v=HI-R8uAh2fI>
4. <https://www.youtube.com/watch?v=YKULwuxgUE0>
5. [https://www.youtube.com/watch?v=LKZZrJjI\\_NI](https://www.youtube.com/watch?v=LKZZrJjI_NI)

**SEMESTER – I**  
**PCBCC20 - CELL BIOLOGY**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks 100
I / I	PCBCC20	Cell Biology	Theory	Core	5	4	40+60=100

**Objectives:**

To understand the Cell, Cell organelles structure, function and metabolism.

**Course Outcome (CO):**

On completion of the course, the students will be able to:

1. Relate cell as basic unit of life, its structure, organization and importance of molecular motors
2. Discuss about the various sub-cellular components of cells and its functions in the biological system
3. Assess the knowledge on techniques adopted for the identification of cellular components and cancerous cell
4. Identify the different types of cell-cell communication and its significance
5. Describe clearly about the mechanism of cell signalling and cell death

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	M	H	L
CO 2	H	H	H	H	L	M
CO 3	H	H	H	L	H	H
CO 4	H	H	L	H	H	M
CO 5	H	H	H	M	H	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	H	L
CO 2	H	M	H	H	H	M
CO 3	H	H	H	H	L	H
CO 4	H	L	M	H	H	M
CO 5	H	H	H	M	H	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(15 Hours)**

- 1.1 Scope of cell Biology- History of cell Biology - Cell Theory – Cell Diversity: Size, Shape, Internal organization - Cell types: Prokaryotic and Eukaryotic (K1, K2, K3)
- 1.2 Functions of Cell – Prokaryotic cell: Structural Organization with the examples: Mycoplasma, *E. Coli*, Cyanobacteria (K1, K2, K3)
- 1.3 Eukaryotic cell: Structural Organization - Plant cell and Animal Cell (K1, K2, K3)
- 1.4 Plasma membrane – Structure – Molecular Model of Plasma membrane – Functions (K1, K2, K3)

- 1.5 Specializations of cell membrane – microvilli, Desmosomes, Gap junction, Tight junctions, Plasmodesmata - Cell wall – Structure – pits – functions (K1, K2, K3)
- 1.6 Structure, Composition and function of Cilia – Flagella – Filaments - Microtubules – Centrioles - Basal bodies (K1, K2, K3)

**Unit II: (15 Hours)**

- 2.1 Cellular organelles: Morphology and functions of Cytoplasm, Nucleus and nucleolus (K1, K2, K3)
- 2.2 Morphology and functions of Endoplasmic reticulum (K1, K2, K3)
- 2.3 Morphology and functions of Golgi apparatus (K1, K2, K3)
- 2.4 Morphology and functions of Mitochondria (K1, K2, K3)
- 2.5 Morphology and functions of Plastids (K1, K2, K3)
- 2.6 Morphology and functions of Lysosomes and Microbodies (K1, K2, K3)

**Unit III: (15 Hours)**

- 3.1 Cell-cell interaction - Cell adhesion proteins - Cell surface of plant, animal and cancer cells (K1, K2, K3)
- 3.2 Overview of membrane protein - peripheral and integral, molecular model of cell membrane: fluid mosaic model and membrane fluidity (K1, K2, K3)
- 3.3 Transport systems: passive and active transport by ATP powered pumps. (K1, K2, K3)
- 3.4 Chromosome – Structure and Functions (K1, K2, K3)
- 3.5 Cell cycle - phases of cell cycle - Cell division - Mitosis, (K1, K2, K3)
- 3.6 Cell division: Meiosis - Regulation of cell growth (K1, K2, K3)

**Unit IV: (15 Hours)**

- 4.1 Cell aging and death - necrosis and apoptosis (K1, K2, K3)
- 4.2 Mitochondrial and death receptor pathway (K1, K2, K3)
- 4.3 Cell signaling –Types of cell signaling-Ion channel linked; G-protein coupled receptors (K1-K5)
- 4.4 Receptor tyrosine kinases and Ras, MAP kinase pathways (K1, K2, K3)
- 4.5 Insulin receptor pathway (K1, K2, K3)
- 4.6 Functions of cell surface receptors, pathways of intracellular signal transduction (K1, K2, K3)

**Unit V: (15 Hours)**

- 5.1 Methods in cell biology: Microscopy – fluorescence, electron microscopy and phase contrast microscope. (K1, K2, K3)
- 5.2 Methods for disrupting tissues and cells, organ and tissue slice techniques
- 5.3 Isolation of clones, tissue culture techniques (Animal and Plant) (K1, K2, K3)
- 5.4 Cell fixation -fluid fixatives, freezing and section drying, fixation for electron

microscopy - buffered osmium solutions, fixation of organic and inorganic substances (K1, K2, K3)

5.5 Staining techniques acid and basic, fluorescent and radioactive dyes, staining of lipids, steroids, nucleic acids, proteins and enzymatic reaction products. (K1, K2, K3)

5.6 Histopathological studies - organ specific morpho histological examination, identification of morphological changes related to pathology. (K1, K2, K3)

### **Textbooks:**

1. A.K Berry. A text book of Cell Biology. Emkey Publication,2014.
2. The Cell: A Molecular Approach by Cooper G.M and Hausman, 6<sup>th</sup> edition, Sinauer Associates, Inc, 2013.

### **Reference Books:**

1. Becker, Klein smith and Harden. The World of the Cell. Academic Internet Publishers; 5<sup>th</sup> edition, 2015.
2. Geoffrey M. Cooper and Robert E Hausma. The Cell: A Molecular Approach. Oxford University Press,7<sup>th</sup> edition, 2015.
3. Gerald Karp. Cell and Molecular Biology by concepts and experiments John Wiley sons &Inc, 2016.
4. Harvey Lodish. Molecular cell Biology. W. H. Freeman; Sol edition, 2007.
5. J. Brachet and A. E. Mirsky. The Cell - Biochemistry, physiology and morphology, Academic Press, 2014.

### **Open Educational Resources (OER):**

1. <https://m.youtube.com/watch?v=bRcjB11hDCU>
2. <https://m.youtube.com/watch?v=ZyWYID2cTK0>
3. <https://youtu.be/qAoa94WBaIc>
4. <https://m.youtube.com/watch?v=J5pWH1r3pgU>
5. <https://m.youtube.com/watch?v=jRZHDhHf3tA>

**SEMESTER – I**  
**PEBCA20 ELECTIVE I A: BIOPHYSICAL CHEMISTRY**

Year/ Sem I / I	Course Code PEBCA20	Title of the Course Biophysical Chemistry	Course Type  Theory	Course Category Elective I A	H/W  3	Credits  3	Marks  40+60=100
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**Objective:**

To make the students to understand the concepts of bioenergetics and techniques.

**Course Outcome (CO):**

On completion of the course, the students will be able to,

1. Demonstrate the concept of bioenergetics and its importance
2. Describe the spectroscopic techniques – NMR, UV and MS
3. Define and recognize covalent bonding between atoms in molecules.
4. Classify organic molecules by their functional groups
5. Compare the isomeric relationship

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	H	M	M
CO 3	H	H	L	H	M	M
CO 4	H	H	H	H	M	M
CO 5	H	L	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	L	M	M
CO 3	H	H	H	H	M	M
CO 4	H	H	H	H	M	M
CO 5	H	H	L	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(9 hours)**

- 1.1 Bioenergetics: Thermodynamics - basic concepts (K1, K2)
- 1.2 First, second and third laws of thermodynamics (K2, K3)
- 1.3 Enthalpy and entropy, exothermic and endothermic reactions - Free energy (K1, K3)
- 1.4 Measurement of free energy in chemical reactions (K1, K2, K3)
- 1.5 Equilibrium for biochemical reactions (K1, K2)
- 1.6 High energy phosphates, Redox reactions and free energy changes in biological reactions (K2, K3)

**Unit II:** (9 hours)

- 2.1 Spectroscopy and structural elucidation (K1, K2)
- 2.2 Regions of the spectrum (K2, K3)
- 2.3 Basic principles of UV, NMR and mass spectrometry and their biological applications (K3, K4)
- 2.4 FT-NMR Nuclear overhauser effect (K3)
- 2.5 Use of X-ray crystallography in the study of proteins and nucleic acids (K1, K3)
- 2.6 Use of CD in the study of proteins and nucleic acids (K1, K2)

**Unit III:** (9 hours)

- 3.1 Atomic structure and chemical bonds (K1, K2)
- 3.2 Atomic orbitals, quantum numbers. Shapes of s, p and d orbitals (K3)
- 3.3 Aufbau principle, Pauli exclusion principle and Hund's rule (K2, K3)
- 3.4 Electronic configuration of atoms (K2)
- 3.5 Formation of chemical bonds, octet rule (K1, K3)
- 3.6 Ionic bond, covalent bond and co-ordinate bonds with examples (K1, K2)

**Unit IV:** (9 hours)

- 4.1 Functional groups and reactions - Classification of organic compounds based on functional groups and their nomenclature (K1, K2, K3)
- 4.2 Biologically important organic compounds (names and structures) (K3)
- 4.3 Homolytic and heterolytic cleavage of covalent bonds (K1, K3)
- 4.4 Reactive species: electrophiles, nucleophiles and radicals (K1, K2)
- 4.5 Types of organic reactions with examples (K2, K3)
- 4.6 Inductive effect and resonance (K3)

**Unit V:** (9 hours)

- 5.1 Isomerism - Isomerism in organic compounds. Types of isomerism (K2, K3)
- 5.2 Tautomerism with special reference to lactic acid (K1, K2)
- 5.3 Stereoisomerism-Geometric isomerism with special reference to maleic acid and unsaturated fatty acids (K2, K3)
- 5.4 Partial double bond character of C-N bonds in amides. Geometrical isomerism in such compounds (K2, K3)
- 5.5 Optical isomerism, optical activity, enantiomers, diastereomers. Meso and dl forms. R-S and D-L notations in amino acids and sugars (K2, K4)
- 5.6 Conformational analysis, conformations of ethane and cyclohexane (K3)

**Text Books:**

1. K. Wilson and I. Walke - Practical Biochemistry - Cambridge University press - 5 th edition, 2000
2. David L. Nelson and Michael M- Lehninger's Principle of Biochemistry - Cox. W. H. Freeman - 7 th edition, 2017

**Reference Books:**

1. Victor Rodwell and David Bender- Harper's Illustrated Biochemistry - 31 st edition, 2018
2. E. S. West, W. R. Todd, H.S. Mason and J. T. V. Bruggen - Text book of Biochemistry - Oxford and IBH publishing - 4 th edition, 2017
3. Kensal E. Van Holde - Physical Biochemistry- 2 nd edition, 2006
4. Principle of Instrumental Analysis – Dougals A- 6 th edition, 2017.
5. Robert D. Braun - Introduction to Instrumental Analysis - Pharma Book Syndicate - 1 st edition, 2006

**Open Educational Resources (OER):**

1. <https://youtu.be/CiXDXpw9HyM?list=PLWPirh4EWFpHTPJZ7ATErCFsKxN0C7St7>
2. [https://youtu.be/AwKqO4Lg8\\_U](https://youtu.be/AwKqO4Lg8_U)
3. <https://youtu.be/5bhQXC6Uklo>
4. [https://youtu.be/JO8w\\_BnX-w4](https://youtu.be/JO8w_BnX-w4)
5. [https://youtu.be/3\\_H3YU5EbeY](https://youtu.be/3_H3YU5EbeY)

**SEMESTER – I**  
**PEBCB20 - ELECTIVE I B : PHARMACEUTICAL BIOCHEMISTRY**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / I	PEBCB20	Pharmaceutical Biochemistry	Theory	Elective I B	3	3	40+60=100

**Objective:**

To make the students aware of uses and abuse of drugs.

**Course Outcome (CO)**

On completion of the course, the students will be able to,

1. Outline the basic scientific concepts related to mechanism of drug action
2. Assess the drug tolerance and the factors that modify the effect of drugs
3. Explain the use of genetically engineered methods on novel drug delivery systems
4. Discuss the mechanism of action of drugs in the therapy of specific diseases
5. Use the medicinal plants in drugs as a curative

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	H	M	M
CO 3	H	H	M	H	M	M
CO 4	H	H	H	L	M	M
CO 5	H	L	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	M	M	M
CO 3	H	H	H	H	M	M
CO 4	H	H	H	H	L	M
CO 5	H	H	L	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit-I:**

**(9 hours)**

- 1.1 Drug - Structural feature and pharmacology activity (K1, K2, K4)
- 1.2 Prodrug concept (K1, K3)
- 1.3 Absorption -first –pass effect & distribution (K2, K4)
- 1.4 Metabolism- Phase I, II reactions, action of cytochrome p450 (K1, K2, K4)
- 1.5 Drug receptor- localization, type and subtypes, models and their drug (K2, K3)
- 1.6 Receptor interaction, agonist & antagonist (K2, K3)

**Unit-II:** (9 hours)

- 2.1 Adverse response to drugs and drug tolerance (K1, K3)
- 2.2 Idiosyncrasy (pharmacogenesis) and drug allergy - Tachyphylaxis (K2, K3, K4)
- 2.3 Drug abuse and vaccination against infection (K1, K3, K4)
- 2.4 Factor that modifies the effect of drug (K2, K3)
- 2.5 Assay of drug potency- Bioassay and immunoassay (K3, K4)
- 2.6 Plasma therapy (K1, K2, K3)

**Unit-III:** (9 hours)

- 3.1 Biotechnology and pharmacy: Genetically engineered protein and peptide agents (K2, K4)
- 3.2 Novel drug delivery systems (K1, K2, K4)
- 3.3 Non conventional routes of administration (K3, K4)
- 3.4 Anti-AIDS drug development (K1, K2, K4)
- 3.5 Oncogenes ras target for drugs (K1, K2)
- 3.6 Multi-drug resistance (K2, K3)

**Unit-IV:** (9 hours)

- 4.1 Mechanism of action of drugs used in therapy of: Respiratory system – cough, bronchial – asthma, pulmonary tuberculosis (K1, K2, K3)
- 4.2 GIT – Digestants, appetite suppressants, Hypolipidemic agents, vomiting, constipation and peptic ulcer (K2, K3)
- 4.3 Cardiovascular drugs - Structure and action of cardiac glycosides- Digoxin and Digitoxin (K2, K3)
- 4.4 Antimicrobial drugs – sulfonamides, trimethoprim, cotrimoxazole, penicillin, Aminoglycosides, Cephalosporin and bacterial resistance and macrolides (K1, K2, K3, K4)
- 4.5 Insulin and oral diabetic drugs (K2, K3, K4)
- 4.6 Antifertility and ovulation inducing drugs (K1, K2, K3)

**Unit-V:** (9 hours)

- 5.1 Drugs of plant origin: Drug dependence and abuse (K1, K3)
- 5.2 Management of self poisoning cancer (K2, K4)
- 5.3 Chemotherapy - Cytotoxic drug (K1, K2)
- 5.4 Immuno suppressive drug therapy (K3, K4)
- 5.5 New Biological Targets for Drug Development (K1, K3, K4)
- 5.6 Novel Drug Screening Strategies (K2, K3)

**Text Books:**

1. R. S. Satoskar. S. D. Bhandhakar and S.S. Anilapure - Pharmacology and pharmacotherapeutics - Popular Prakashar Bombay - 24<sup>th</sup> edition, 2015.
2. Goodman and Gillman, Mc Graw Hill - The pharmacology Vol I and II - 13<sup>th</sup> edition, 2017

**Reference Books:**

1. William O.F - Principles of Medicinal Chemistry- B.I waverks Pvt Ltd, New Delhi- 4<sup>th</sup> edition, 2016
2. D. G. Burgers- Medicinal Chemistry & Drug Discovery - Oxford textbook of Clinical Pharmacology and Drug therapy - 3<sup>rd</sup> edition, 2008
3. Michael Pakmer and Alice Chan - Biochemical Pharmacology – Wiley Publications – 1<sup>st</sup> edition - 2012
4. Katzung and Bertram - Basic & Clinical Pharmacology - McGraw-Hill Publishers – 14<sup>th</sup> edition - 2018
5. Charles P. Woodbury - Biochemistry for the Pharmaceutical Sciences- 1<sup>st</sup> edition, 2011.

**Open Educational Resources (OER):**

1. <https://youtu.be/oCPRi5JFMdg>
2. <https://youtu.be/GPoDNQhP0Mg>
3. <https://youtu.be/SZ7lgFb-KqM>
4. <https://youtu.be/j6J9cBGix-s>
5. [https://youtu.be/k8xat-XzgEA?list=RDQM2AXP\\_m3A14s](https://youtu.be/k8xat-XzgEA?list=RDQM2AXP_m3A14s)
6. <https://youtu.be/7O0V3ocMiAQ>

**SEMESTER II**  
**PCBCD20 - ANALYTICAL BIOCHEMISTRY**

Year/ Sem I / II	Course Code PCBCD20	Title of the Course Analytical Biochemistry	Course Type Theory	Course Category Core	H/W 5	Credits 5	Marks 40 + 60 =100
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**Objectives:**

To understand the principles and applications of analytical techniques. .

**Course Outcome (CO)**

On completion of the course, the students will be able to;

1. Identify the behavior of molecules and prioritize related analytical tools
2. Interpret and use the results from a given chromatographic technique
3. Apply the electrophoretic techniques for the separation of proteins and nucleic acids
4. Pursue knowledge about centrifugation and radioactivity and critically assess advances with in the field
5. Categorize, evaluate and implement a suitable technique for a given analytical problem

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	M	M	H	M
CO 2	H	M	M	H	H	M
CO 3	H	L	M	L	H	M
CO 4	H	H	M	H	H	M
CO 5	H	H	M	L	H	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	M	M	M	H
CO 2	H	M	H	M	H	L
CO 3	H	L	H	H	L	H
CO 4	H	M	M	M	M	M
CO 5	H	H	M	M	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit-I:**

**(15 Hours)**

- 1.1 Principle - electrochemical cells (K1, K2, K3)
- 1.2 Henderson - Hasselbalch equation - Buffer capacity (K1, K2, K3)
- 1.3 pH measurement- Glass electrode: Principle and application (K1, K2, K3, K4)
- 1.4 Ion-selective electrodes: Principle and application (K1, K2, K3, K4)

1.5 Gas sensing electrodes - Oxygen electrode: Principle and application (K1, K2, K3, K4)

1.6 Biosensors. (K1, K2, K3)

**Unit-II: (15 Hours)**

2.1 Planar and Column chromatography: Principle and application (K1, K2, K3, K4)

2.2 Ion – exchange chromatography: Principle and application (K1, K2, K3, K4)

2.3 Molecular exclusion chromatography: Principle and application (K1, K2, K3, K4)

2.4 Gas – liquid chromatography: Principle and application (K1, K2, K3, K4)

2.5 HPLC (Normal phase & Reverse phase): Principle and application (K1, K2, K3, K4)

2.6 Chromatofocusing - Immunoaffinity and Capillary electrochromatography. (K1, K2, K3, K4)

**Unit-III: (15 Hours)**

3.1 General principles - Support media for Electrophoresis (K1, K2, K3)

3.2 Electrophoresis of proteins: SDS – PAGE, 2D – PAGE (Native gels & Gradient gels) (K1, K2, K3, K4, K5)

3.3 Isoelectric focusing: Principle and application (K1, K2, K3, K4)

3.4 Cellulose acetate electrophoresis: Principle and application (K1, K2, K3, K4)

3.5 Detection, estimation and recovery of proteins in gels - Protein blotting (K1, K2, K3, K4)

3.6 Electrophoresis of nucleic acids: Agarose gel electrophoresis - DNA sequencing gels - pulsed field gel electrophoresis. (K1, K2, K3, K4)

**Unit-IV: (15 Hours)**

4.1 Centrifugation - Basic principles (K1, K2, K3)

4.2 Preparative ultracentrifugation: Differential and Density gradient centrifugation. (K1, K2, K3, K4)

4.3 Analytical centrifugation: Applications - Determination of molecular mass and purity of macromolecules. (K1, K2, K3, K4)

4.4 Radioactivity, Nature of radioactivity: Stable and Radioactive isotopes - Units and interaction of radioactivity with matter. (K1, K2, K3)

4.5 Detection and measurement of radioactivity - GM counter - Solid and Liquid scintillation counter - Autoradiography and Cerenkov counting. (K1, K2, K3, K4, K5)

4.6 Applications of radioisotopes in the Biological sciences. (K1, K2, K3)

**Unit-V:****(15 Hours)**

- 5.1 Laws of Absorption and Absorption spectrum - UV-VIS -IR spectrophotometer: Principle, instrumentation and Applications (K1, K2, K3, K4)
- 5.2 Luminometry: Principle and applications (K1, K2, K3, K4)
- 5.3 Flame Emission Spectrophotometer: Principle, instrumentation, operation and applications. (K1, K2, K3, K4)
- 5.4 Atomic flame and flameless spectrophotometer: Principle and applications (K1, K2, K3, K4)
- 5.5 NMR, MS, MALDI: Principle, and applications. (K1, K2, K3)
- 5.6 Use of lasers for spectroscopy. (K1, K2, K3, K4)

**Text Books:**

1. Keith Wilson and John Walker – Principles and Techniques of Practical Biochemistry Cambridge University - 7<sup>th</sup> Edition, 2010
2. Upadhyay - Upadhyay and Nath - Biophysical Chemistry – Principles and Techniques - Himalaya Publishing House, 4<sup>th</sup> Ed, 2022

**Reference Books:**

1. Chatwal Anand – Instrumental methods of Analysis – Himalaya Publishing House, 2011
2. Galen Wood Ewing McGraw - Instrumental methods of Chemical Analysis - Hill College - 5<sup>th</sup> Ed. 2015
3. Robert D. Braun - Introduction to Instrumental Analysis – Pharma Book Syndicate, 2006
4. David Frifelder - Physical Biochemistry - W.H. Freeman 4<sup>th</sup> Ed, 2017
5. Shawney SK and Randhir Singh - Practical Biochemistry - Alpha Science, 2005

**Open Educational Resources (OER):**

1. <https://youtu.be/P1wRXTI2L3I>
2. <https://youtu.be/VOSkyj1dtbc>
3. <https://youtu.be/5obiHqeYEc0>
4. <https://youtu.be/-YT44KP3do>
5. <https://youtu.be/tbUx-RaZS7M>

**SEMESTER II**  
**PCBCE20 ENZYMOLOGY**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / II	PCBCE20	Enzymology	Theory	Core	5	5	40 + 60=100

**Objectives:**

To learn the methodology involved in assessing the enzyme activity and mechanism of enzyme action.

**Course Outcomes (CO)**

On completion of the course, the students will be able to,

1. List the enzyme properties, nomenclature and purification of enzymes
2. Apply the biochemical calculation for enzyme kinetics
3. Compare methods for enzyme catalysis and various methods of inhibition
4. Outline the effect of coenzymes and isoenzymes in enzyme catalysis
5. Explain various industrial and clinical applications of enzymes as a catalyst in industries and also as a therapeutic aid

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	H
CO 2	H	H	H	H	H	M
CO 3	H	M	H	H	H	H
CO 4	H	M	H	M	M	H
CO 5	H	M	H	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	M	H
CO 2	H	H	H	H	H	H
CO 3	H	H	M	M	M	H
CO 4	H	H	H	M	M	M
CO 5	H	H	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit-I:**

**(15 hours)**

- 1.1 Nomenclature, classification, isolation and purification of enzymes (K1, K2)
- 1.2 Determination of enzymes by different methods, criteria of purity – specific activity (K2, K3)
- 1.3 Enzyme units - Katal, IU and turnover number (K1, K2)
- 1.4 Measurement of enzyme activity – Coupled kinetic assay, kinetic assay using radio labelled substrates (K1, K2, K4)

- 1.5 Active site - determination of active site amino acids- chemical probe, affinity label, and site-directed mutagenesis, intrinsic and extrinsic regulations (K1, K3)
- 1.6 Investigation of 3-D structure of active site and a brief account of nonprotein enzymes - ribozymes and DNA enzymes (K3, K4)

**Unit-II: (15 hours)**

- 2.1 Kinetics of single substrate enzyme - catalyzed reactions - Michaelis - Menten equation, importance of  $V_{max}$ ,  $K_m$  (K2, K4)
- 2.2 MM equation; Lineweaver - Burk plot, Eadie - Hofstee plot (K1, K2, K4)
- 2.3 Hanes - Woolf plot and Eisenthal and Cornish - Bowden plot (K2, K3)
- 2.4 Pre steady - state kinetics and relaxation kinetics (K1, K2, K4)
- 2.5 Kinetics of Allosteric enzymes - MWC and KNF models Hill equation coefficient (K2, K3)
- 2.6 Kinetics of multi - substrate enzyme - catalyzed reactions - Ping-pong bi-bi, random order and compulsory order mechanism (K1, K2, K3, K4)

**Unit-III: (15 hours)**

- 3.1 Mechanism of enzymic action - general acid-base catalysis, covalent catalysis (K2, K3)
- 3.2 Role of metal ion in enzyme catalysis (K1, K3)
- 3.3 Mechanism of serine proteases - Chymotrypsin, Lysozyme, Carboxy peptidase A and Ribonuclease (K1, K2, K3)
- 3.4 Reversible inhibition - competitive, uncompetitive, noncompetitive, mixed, (K1, K3)
- 3.5 Allosteric inhibition (K1, K2)
- 3.6 Irreversible inhibition – suicide inhibition (K1, K2)

**Unit-IV: (15 hours)**

- 4.1 Coenzymes - prosthetic group, classification - vitamin and nonvitamin coenzymes, thiamine pyrophosphate (K1, K2)
- 4.2 Mechanism of oxidative and nonoxidative decarboxylation, transketolase reaction (K2, K3)
- 4.3 FMN and FAD - flavoprotein enzymes -mechanism of oxidation and reduction of flavin enzymes, NAD and NADP role in enzyme catalysis (K1, K2, K3)
- 4.4 PALP and PAMP - role of PALP in transamination and decarboxylation reaction, Coenzyme A involved reactions (K2, K3)
- 4.5 Biotin - carboxylation reaction, folate coenzymes, coenzyme role of vitamin B<sub>12</sub> and vitamin C, metabolite and non-vitamin coenzymes, lipoic acid, coenzyme Q, nucleoside triphosphate and S-adenosyl methionine (K1, K2, K4)
- 4.6 Isoenzymes -Abzymes (K1, K2, K3)

**Unit-V: (15 hours)**

- 5.1 Industrial uses of enzymes - sources of industrial enzymes, thermophilic enzymes, amylases, glucose isomerases, cellulose degrading enzymes, lipases, proteolytic enzymes in meat and leather industry, detergents and cheesed production (K2, K3, K4)

- 5.2 Clinical enzymology – Enzymes as thrombolytic agents, anti-inflammatory agents, digestive aids (K2, K3)
- 5.3 Therapeutic use of Asparaginases (K1, K2)
- 5.4 Therapeutic use of Streptokinase (K1, K2)
- 5.5 Enzymes and isoenzymes in diagnosis - LD, CK, Transaminases, Phosphatases, Amylase and Cholinesterase (K2, K3)
- 5.6 Immobilization of enzymes and their applications (K1, K2, K4)

**Text Books:**

1. Trevor Palmer – Enzymes: Biochemistry, Biotechnology and Clinical Chemistry- Albion; Reprint edition - 4<sup>th</sup> Reprint Edition, 2004
2. Athel Cornels- Bowden, Fundamentals of Enzymes Kinetics - 4<sup>th</sup> edition, 2012

**Reference Books:**

1. Bowden A C - Fundamentals of Enzyme Kinetics- Medtech Publishers – 3<sup>rd</sup> edition - 2017
2. Enzymes by Boyer - Academic Press - 3<sup>rd</sup> edition, 1983
3. Metzlre – Text of Biochemistry - Academics Press, 2000
4. T.D.H Bugg - Introduction to Enzymes & coenzyme chemistry, 3<sup>rd</sup> edition, 2012
5. Stewen - Diagnostic Enzymology, 2<sup>nd</sup> edition, 2014

**Open Educational Resources (OER):**

1. <https://youtu.be/1rfwsCNfLCs>
2. <https://youtu.be/14s1TGGnT28>
3. <https://youtu.be/WfYawcKzyAM>
4. <https://youtu.be/pzdjg3iG4oM>
5. <https://youtu.be/Wrz7AISR8xY>

## SEMESTER II

### PCBCF20 - INTERMEDIARY METABOLISM

Year/ Sem I / II	Course Code PCBCF20	Title of the Course Intermediary Metabolism	Course Type Theory	Course Category Core	H/W 5	Credits 4	Marks 40 + 60=100
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#### Objective:

To make the students to understand the reactions catalyzed by different enzymes and their metabolic pathways.

#### Course Outcome (CO)

On completion of the course, the students will be able to;

1. Restate in own words how reduced electron carriers are used to generate ATP via Electron Transport System in Mitochondria
2. Translate the reactions catalyzed by different Enzymes in metabolic pathway
3. Compare the important characteristics of metabolic pathways and assess their regulation
4. Analyze complex chemical reactions and draw logical conclusion by interrelating metabolism
5. Interpret how plants convert energy to nourish themselves

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	H	M	M
CO 3	H	H	L	H	L	M
CO 4	H	H	H	H	M	M
CO 5	H	M	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	M	M	M
CO 3	H	H	H	H	L	M
CO 4	H	H	H	H	M	M
CO 5	H	H	L	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit-I:

(15 Hours)

- 1.1 Free energy and entropy - Enzymes involved in redox reactions (K1, K2, K3)
- 1.2 Electron Transport Chain (K1, K2, K3)
- 1.3 Oxidative Phosphorylation ATPase: Structure and mechanism of action (K1, K2)

- 1.4 Chemiosmotic theory – mechanism (K1, K2)
- 1.5 Inhibitors of respiratory chain and oxidative phosphorylation – Uncouplers (K1, K2, K3, K4)
- 1.6 Mitochondrial transport systems - ATP/ADP exchange - Malate and Glycerophosphate shuttle. (K1, K2)

**Unit-II: (15 Hours)**

- 2.1 Glycolysis - Citric acid cycle: Pathway, Key enzymes and regulations. (K1, K2, K3)
- 2.2 Metabolism of Glycogen: Pathway, Key enzymes and regulations. (K1, K2, K3)
- 2.3 Gluconeogenesis (Cori cycle): Pathway, Key enzymes and regulations. (K1, K2, K3)
- 2.4 Pentose phosphate pathway: Pathway, Key enzymes and regulations. (K1, K2, K3)
- 2.5 Uronic acid pathway: Pathway, Key enzymes and regulations. (K1, K2, K3)
- 2.6 Metabolism of galactose and fructose - Glyoxylate cycle: Pathway, Key enzymes and Regulations. (K1, K2, K3)

**Unit-III: (15 Hours)**

- 3.1 Oxidation of fatty acids - Alpha, Beta and Omega oxidation (K1, K2, K3)
- 3.2 Biosynthesis of fatty acids (K1, K2, K3)
- 3.3 Metabolism of ketone bodies - Biosynthesis of triglycerides (K1, K2, K3)
- 3.4 Metabolism of phospholipids and sphingolipids (K1, K2, K3)
- 3.5 Cholesterol – Biosynthesis and regulation (K1, K2, K3)
- 3.6 Cholesterol – Transport and excretion (K1, K2, K3)

**Unit-IV: (15 Hours)**

- 4.1 Overview of biosynthesis of nonessential amino acids (K1, K2, K3)
- 4.2 Catabolism of amino acid - Transamination, Deamination and ammonia formation (K1, K2, K3)
- 4.3 Urea cycle - Disorders of the urea cycle – Decarboxylation (K1, K2, K3)
- 4.4 Catabolism of carbon skeletons of amino acids: Phenyl alanine, Tyrosine and Histidine (K1, K2, K3)
- 4.5 Catabolism of carbon skeletons of amino acids: Methionine and Cysteine (K1, K2, K3)
- 4.6 Detoxification: Oxidation, Reduction, Hydrolysis and Conjugation (K1, K2, K3)

**Unit-V:****(15 Hours)**

- 5.1 Interrelationship of carbohydrates, proteins and fat metabolism. (K1, K2, K3, K5)
- 5.2 Purine anabolism: De novo and salvage pathways for biosynthesis - Purine catabolism (K1, K2, K3)
- 5.3 Biosynthesis and catabolism of pyrimidines (K1, K2, K3)
- 5.4 Photosynthesis - Photosynthetic apparatus - light reaction - cyclic and noncyclic photophosphorylation (K1, K2, K3)
- 5.5 Dark reaction - Calvin cycle - Hatch-Slack pathway (K1, K2, K3)
- 5.6 Photorespiration - Starch biosynthesis and degradation -Bioluminescence (K1, K2, K3)

**Text Books:**

1. David L. Nelson Michael M. Cox - Lehninger's Principles of Biochemistry - W H Freeman & co - 7<sup>th</sup> Edition, 2017
2. Robert K. Murray, et al. - Harper's Illustrated Biochemistry - McGraw Hill - 31<sup>st</sup> Edition, 2018

**Reference Books:**

1. Lippincott Williams and Wilkins - Davidson and Sittman Biochemistry NMS - 4<sup>th</sup> Edition
2. Donald Voet - Judith G. Voet – Biochemistry - Wiley - 4<sup>th</sup> edition
3. Jeremy M. Berg, John L. Tymoczko and Lubert Stryer – Biochemistry - W H Freeman - 7<sup>th</sup> edition, 2011
4. Christopher K. Mathews, K.E Van Holde, Kevin G. Ahern – Biochemistry –Pearson Education - 3<sup>rd</sup> Edition, 2000
5. U. Satyanarayana – Biochemistry - Elsevier - 5<sup>th</sup> Edition, 2019

**Open Educational Resources (OER):**

1. <https://youtu.be/nCr3iCzX4lc>
2. <https://youtu.be/ydhr0QAyxYg>
3. [https://youtu.be/Dc3\\_LLXsguw](https://youtu.be/Dc3_LLXsguw)
4. <https://youtu.be/fJScSmrR1MI>
5. <https://youtu.be/v-G-d27C1TU>

## SEMESTER - II

### PEBCC20 – ELECTIVE II A: ECOLOGY, EVOLUTION AND DEVELOPMENTAL BIOLOGY

<b>Year/ Sem</b>	<b>Course Code</b>	<b>Title of the Course</b> Ecology, Evolution and Developmental Biology	<b>Course Type</b> Theory	<b>Course Category</b> Elective II A	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 40+60=100
I /II	PEBCC20						

#### Objective:

The course enables the students to understand and analyze the role of ecological and evolutionary modifications in the development of organisms and their survival.

#### Course Outcome (CO)

On completion of the course, the students will be able to,

1. Outline the concept of ecosystem and its interaction
2. Apply the concept of evolution in population genetics
3. Describe the structures and the development of the embryo at different stages
4. Explain the insight on morphogenesis and organogenesis in plants
5. Schematize pedigree analysis and genetic mapping

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	M	M	H	H
CO 2	L	H	H	H	M	M
CO 3	M	H	L	M	H	H
CO 4	L	M	M	L	M	L
CO 5	H	H	L	M	H	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	H	M	H	H
CO 2	L	H	M	H	M	M
CO 3	H	M	H	L	H	M
CO 4	M	L	M	M	M	H
CO 5	M	H	L	H	L	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(9 hours)

- 1.1 Physical environment, biotic environment, biotic and abiotic interaction (K1, K2, K3, K4)
- 1.2 Concept of habitat and niche, niche width and overlap, fundamental and realized niche (K1, K2, K3, K4, K5, K6)

1.3 Characteristic of a population, population growth curves, population regulation (K1, K2, K3, K4, K5, K6)

1.4 Nature of communities, community structure and attributes, level of species diversity and its measurement. (K1, K2, K3, K4, K5, K6)

1.5 Types and mechanism of succession, concept of climax. (K1, K2, K3, K4)

1.6 Types of interaction, interspecific competition, herbivory, carnivory, pollination, symbiosis. (K1, K2, K3, K4)

**Unit II: (9 hours)**

2.1 Lamarck; Darwin concept of variation, adaptation, natural selection. (K1, K2, K3)

2.2 Origin of basic biomolecule; Abiotic synthesis of organic monomers and polymers (K1, K2, K3)

2.3 Concept of neutral evolution, molecular divergence and molecular clock (K1, K2, K3, K4)

2.4 Population genetics -Populations, gene pool, gene frequency, Hardy-Weinberg Law (K1, K2, K3, K4, K5, K6)

2.5 Adaptive radiation, Isolating mechanisms, Speciation, Allopatricity and Sympatricity (K1, K2, K3, K4, K5, K6)

2.6 Convergent evolution, Sexual selection, Co-evolution (K1, K2, K3, K4)

**Unit III: (9 hours)**

3.1 Production of gametes (K1, K2, K3)

3.2 Cell surface molecules in sperm-egg recognition in animals (K1, K2, K3, K4, K5, K6)

3.3 Embryo sac development (K1, K2, K3, K4)

3.4 Double fertilization in plants (K1, K2, K3, K4)

3.5 Mammalian cleavage, gastrulation (K1, K2, K3, K4)

3.6 Programmed cell death (K1, K2, K3, K4, K5, K6)

**Unit IV: (9 hours)**

4.1 Organization of shoot and root apical meristem (K1, K2, K3, K4)

4.2 Shoot and root development (K1, K2, K3, K4, K5, K6)

4.3 Leaf development and phyllotaxy (K1, K2, K3, K4, K5, K6)

4.4 Transition to flowering, floral meristems (K2, K3)

4.5 Floral development in Arabidopsis (K3, K4)

4.6 Antirrhinum (K1, K2, K3, K4)

**Unit V: (9 hours)**

5.1 Linkage maps, mapping with molecular markers (K1, K2, K3, K4, K5, K6)

5.2 Mapping by using somatic cell hybrids, development of mapping population in plants. (K1, K2, K3, K4, K5, K6)

5.3 Pedigree analysis (K1, K2, K3)

5.4 LOD score for linkage testing (K1, K2, K3)

5.5 Karyotypes. Polygenic inheritance, heritability and its measurements (K1, K2, K3, K4)

5.6 QTL mapping (K1, K2, K3)

**Textbooks:**

1. David C- Advanced Molecular Biology, Delve Publishing LLC, 2015.
2. William H. Elliot & Daphne C. Elliott - Biochemistry and Molecular biology, Oxford University Press, 2018.

**Reference Books:**

1. Gilbert S.F - Developmental Biology-Sinacer Associates Inc, Massachusetts–11<sup>th</sup> edition, 2016
2. Balinsky B.I - An Introduction to Embryology - W.B. Saunders Publishing Company - 5<sup>th</sup> edition, 2014.
3. Ridley Mark- Evolution-John Wiley and Sons Ltd, 2007.
4. Charles J.Krebs. Ecology-Pearson Publication, 6<sup>th</sup> edition, 2016.
5. Hugh Fletcher- Instant notes in genetics - Verlag publishers, 2012.

**Open Educational Resources (OER):**

1. <https://youtu.be/ZeATszO-6e0>
2. <https://youtu.be/7ww5T7hCdn4>
3. <https://youtu.be/fN1H2VnHUs>
4. <https://youtu.be/5e9RcEGbvm4>
5. <https://youtu.be/f2dvh0YNDwM>

**SEMESTER II**  
**PEBCD20 - ELECTIVE II B: TOXICOLOGY**

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / II	PEBCD20	Toxicology	Theory	Elective II B	3	3	40+60=100

**Objective:**

The course gives a detailed understanding and identification of toxic substances, dose-response, tests conducted and its impact on cellular activities.

**Course Outcomes (CO)**

On completion of the course, the students will be able to,

1. Outline the scope and factors influencing toxicology
2. Explain the clinical and laboratory findings in the treatment of acute toxic exposures
3. Assess various methods of toxicity testing
4. Discuss the effects of toxic substances on molecular and cellular levels
5. Use the knowledge of air pollutants in the assessment of occupational hazards

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	M	M	H	H
CO 2	L	H	H	H	M	M
CO 3	M	H	L	M	H	H
CO 4	L	M	M	L	M	L
CO 5	H	H	L	M	H	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	H	M	H	H
CO 2	L	H	M	H	M	M
CO 3	H	M	H	L	H	M
CO 4	M	L	M	M	M	H
CO 5	M	H	L	H	L	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit-I:**

**(9 hours)**

- 1.1 Eco-toxicology and its environment significance toxic effects (K1, K2, K3, K4)
- 1.2 Basis for general classification & nature, dose - response relationship (K1, K2, K3)
- 1.3 Synergism and Antagonism (K1, K2)
- 1.4 Determination of ED<sub>50</sub> & LD<sub>50</sub> (K1, K2, K3, K4, K5 K6)

- 1.5 Acute and chronic exposures (K1, K2, K3, K4, K5 K6)
- 1.6 Factors influencing toxicity. Pharmacodynamics & Chemo dynamics (K1, K2, K3, K4)

**Unit-II: (9 hours)**

- 2.1Regulators guidelines, mammalian systems affected & the clinical signs of systemic toxicity (K1, K2, K3, K4)
- 2.2 Factors affecting acute toxicity studies (K1, K2, K3, K4)
- 2.3 Biochemical basis of toxicity, Mechanism of toxicity: disturbance of excitable membrane function altered calcium homeostasis. (K1, K2, K3, K4, K5, K6)
- 2.4 Covalent binding to cellular macromolecules (K1, K2, K3)
- 2.5 Genotoxicity (K1, K2)
- 2.6 Tissue specific toxicity (K2, K3)

**Unit-III: (9 hours)**

- 3.1 Test Protocol, Genetic Toxicity Testing & Mutagenesis Assays: Invivo test systems (K1, K2, K3)
- 3.2 Bacterial Mutation Tests: Reversion Tests, Ames test, Fluctuation Tests & Eukaryote Mutation Tests (K1, K2, K4)
- 3.3 In Vivo Mammalian Mutation Tests – host mediated assay & dominant lethal test (K2, K3, K4, K5, K6)
- 3.4 Use of drosophila in toxicity testing (K3, K4, K5, K6)
- 3.5 DNA repair assays. Chromosome damage test (K3, K4, K5, K6)
- 3.6 Toxicological Evaluation of Recombinant DNA –Derived Proteins (K2, K3, K4)

**Unit-IV: (9 hours)**

- 4.1 Toxicology of food additives (K1, K2, K3)
- 4.2 Metal toxicity: Toxicology of Arsenic, Mercury, Lead and Cadmium (K2, K3)
- 4.3 Environmental Factors Affecting Metal Toxicity- Effect of Light, Temperature & P<sup>H</sup> (K1, K2)
- 4.4 Diagnosis of toxic changes in liver and kidneys (K3, K4, K5, K6)
- 4.5 Metabolism of Haloalkanes (K2, K3)
- 4.6 Haloalkenes & Paracetamol with their toxic effects on tissues (K2, K3, K4, K5, K6)

**Unit-V:****(9 hours)**

- 5.1 Air pollution & ozone (K2, K3, K4)
- 5.2 Air pollution due to chlorofluorocarbons (CFCS) and asbestos (K1, K2, K3, K4)
- 5.3 Occupational toxicology and assessment of occupational hazards: industrial effluent toxicology & environmental health (K2, K3, K4, K5, K6)
- 5.4 An overview of regulatory agencies: responsibilities of regulatory agencies (K3, K4, K5)
- 5.5 Management of toxicological risks (K3, K4, K5, K6)
- 5.6 Regulatory approaches. Regulatory systems and organizations (K3, K4, K5, K6)

**Text Books:**

1. G. Tyler Miller and Scott E. Spoolman - Environmental Science - Cengage learning - 15<sup>th</sup> edition, 2016
2. George Tyler Miller, Jr. and Scott Spoolman - Living in the Environment – Principles, Connections and Solutions, Brooks/Cole, USA - 17<sup>th</sup> edition, 2012.

**Reference Books:**

1. Casarett and Doull's – Toxicology - Mc Graw Hill Education – 9<sup>th</sup> edition, 2013
2. Raymond D and Marie M - Industrial Toxicology - Wiley Publications – 6<sup>th</sup> Ed, 2015
3. Hayes A W-Principles and methods of Toxicology- CRC press New York, 6<sup>th</sup> Ed, 2014
4. Stepham M and Robert C –Principles of Toxicology - Wiley-Interscience – 3<sup>rd</sup> Ed, 2015
5. Anil Agarwal - Textbook of Forensic Medicine and Toxicology - Avichal Publishing Company - 1<sup>st</sup> edition, 2017

**Open Educational Resources (OER):**

1. <https://youtu.be/eIZr7M-kt2s>
2. <https://youtu.be/YnsN1LozlEc>
3. <https://youtu.be/v4jmPpTcdxQ>
4. [https://youtu.be/dBcS\\_-WrTIE](https://youtu.be/dBcS_-WrTIE)
5. <https://youtu.be/hYgma4mYM0w>

**SEMESTER-I & II**  
**PCBCG20 – MAIN PRACTICAL - I**  
 [Biomolecules, Cell Dynamics, Human Physiology and Nutrition]

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I/ I & II	PCBCG20	Main Practical I	Practical	Core	5	4	40+60 = 100

**Objective:**

To help students to expertise in the Biomolecules, Cell Dynamics and biochemical techniques.

**Course Outcome (CO):**

On completion of the course, the students will be able to,

1. Discuss qualitative and quantitative analysis of various biomolecules
2. Explain the isolation of biomolecules from biological samples
3. Apply the practical knowledge to determine hemoglobin, clotting time and prothrombin time

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	M	M	H	M	M	H
CO 2	H	L	M	H	L	L
CO 3	H	M	M	M	H	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	M	M	H	M	M	H
CO 2	L	H	H	M	H	L
CO 3	M	M	L	H	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Biomolecules**

1. Qualitative Analysis of Carbohydrates, Amino acids (Confirmation by paper chromatography) and Fats.
2. Extraction and Quantitative Analysis by UV spectrophotometer
  - a) Protein from egg
  - b) Casein from Milk
  - c) Vitamin C from Lemon

### **Cell dynamics**

1. Fractionation of cell organelles from liver and plant tissues.
  - a) Isolation and estimation of RNA.
  - b) Isolation and estimation of DNA.
2. Preparation of Cytological slides for Mitosis using Root tips.
3. Preparation of Cytological slides for Meiosis-I using Flower buds.
4. Identification of different stages of Mitosis and Meiosis.
5. Isolation of cell organelles.
6. Isolation of Chloroplast.

### **Human Physiology and Nutrition**

1. Analysis of Human Blood pressure.
2. Collection and Preservation of Blood.
3. Enumeration of RBC and WBC and platelet.
4. Blood group typing.
5. Differential WBC count.
6. Determination of hemoglobin content.
7. Determination of clotting time and prothrombin time.
8. Determination of ESR.

### **Reference Books:**

1. Jayaraman J - Manuals in Biochemistry - 4th Ed - New Age International Publishers,2011
2. Varley and Alan H Gowen lock - Practical Biochemistry -6th Ed - CBS Publishers,2002
3. David T Plummer - Practical Biochemistry - 3rd Ed - McGraw Hill Publishers, 2005
4. Sawhney SK and Randhir Singh - Introductory Practical Biochemistry - 2nd Ed- Narosa Publishers,2001
5. Praful B Godkar - Text book of Medical Laboratory Technology- 3rd Ed- Volume I &II, Bhalani Publishing House,2014

## SEMESTER-I & II

### PCBCH20 – MAIN PRACTICAL – II

[Analytical Biochemistry, Enzymology, Intermediary Metabolism]

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I/ I & II	PCBCH20	Main Practical - II	Practical	Core	5	4	40+60 =100

#### Objective:

To learn about the analytical techniques and enzymology experiments.

#### Course Outcomes (CO)

On completion of the course, the students will be able to,

1. Identify and purify biomolecules in a mixture by chromatographic technique
2. Asses the optimum pH and optimum temperature of enzymes
3. Explain the basic principle involved in intermediary metabolism

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	H	M	M
CO 3	H	H	L	H	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	M	M	M
CO 3	H	H	H	H	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Analytical biochemistry:

1. Determination of pKa value using Titration curve.
2. Titration of a weak acid.
3. Preparation of buffers.
4. Verification of Beer-Lambert's law and determination of absorption coefficients.
5. Paper chromatography – Separation of amino acids and carbohydrates in a mixture.
6. Thin layer chromatography – Lipids.
7. Column chromatography -Pigments.
8. Electrophoresis.

## **Enzymology**

1. Subcellular fractionation of organelles from liver cells and identification by marker enzyme – LDH.
2. Isolation of acid phosphatase from potato.
  - a. Determination of optimum pH.
  - b. Determination of optimum temperature.
  - c. Effect of substrate concentration on acid phosphatase activity.
  - d. Inhibition of acid phosphatase activity.
3. Assay of clinically important enzymes.
  - a. Assay of serum/tissue alkaline phosphatase activity.
  - b. Assay of serum acid phosphatase activity.
  - c. Assay of serum creatinine phosphokinase activity.
  - d. Assay serum alanine aminotransferase activity / SGPT.
  - e. Assay of serum aspartate aminotransferase activity / SGOT.
4. Immobilization studies:  
Preparation of urease entrapped in alginate beads and determination of percent entrapment.

## **Intermediary metabolism**

1. Measurement of Oxygen from mitochondria.
2. Quantification of NAD<sup>+</sup>/NADP<sup>+</sup> using UV visible method.

## **Reference Books:**

1. Jayaraman J - Manuals in Biochemistry - 4th Ed - New Age International Publishers,2011
2. Varley and Alan H Gowen lock - Practical Biochemistry -6th Ed - CBS Publishers,2002
3. David T Plummer - Practical Biochemistry - 3rd Ed - McGraw Hill Publishers, 2005
4. Sawhney SK and Randhir Singh - Introductory Practical Biochemistry - 2nd Ed- Narosa Publishers,2001
5. Praful B Godkar - Text book of Medical Laboratory Technology- 3rd Ed- Volume I &II,Bhalani Publishing House,2014

***\*ONE WEEK HANDS ON TRAINING IN ANY DEPARTMENT IN CMC, VELLORE***

## SEMESTER – III

### PCBCI20 - ADVANCED ENDOCRINOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	PCBCI20	Advanced Endocrinology	Theory	Core	6	5	40+60=100

#### Objective:

The course describes in detail about the role of endocrine glands, their secretion, its metabolic effect on target cells involving various signaling pathways and signal chain proteins.

#### Course Outcome (CO)

On completion of the course, the students will be able to

1. Identify the structure and functions of endocrine glands and hormones
2. Demonstrate the mechanisms of hormonal action and the clinical disorders of hormones
3. Examine the symptoms of the patients and relate it to hormones
4. Identify the difference in the mechanism of cell to cell communication
5. Explain the differences between male and female gonads

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	H
CO 2	M	H	M	M	H	L
CO 3	M	L	M	L	M	M
CO 4	H	M	H	M	H	L
CO 5	M	L	M	H	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	H	H	M	M
CO 2	L	L	H	M	H	L
CO 3	M	H	M	L	H	M
CO 4	H	M	H	M	L	H
CO 5	M	H	L	H	M	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(18 Hours)

- 1.1 Glands - Types of glands- Hormones, Effector cell, target cell - Definition, Hormone target relationship - General features and functions of Endocrine system (K2, K3, K4)
- 1.2 Classification - based on Solubility, types of receptors, mechanism of action (K1, K2, K3, K4)

- 1.3 Steroid hormones - Salient features, Biosynthesis, Secretion, Storage, Transport, Mechanism of action (K3, K4, K5, K6)
- 1.4 Protein hormones - Salient features, Biosynthesis, Secretion, Storage, Transport, Mechanism of action – Amino acid derived hormones (K3, K4, K5, K6)
- 1.5 Receptors – Structure: Extracellular and Intracellular, Types: Intrinsic and Extrinsic, Domains: Extracellular domains, Transmembrane domains and Intracellular domains - Regulation of receptor number (K2, K3, K4, K5, K6)
- 1.6 Feedback mechanisms (K1, K2, K3, K4)

**Unit II: (18 Hours)**

- 2.1 Signal transduction - Definitions of signals, ligands and receptors, endocrine, paracrine and autocrine signaling (K1, K2, K3)
- 2.2 Receptors and signaling pathways – cell surface receptors, ion channels (K2, K3, K4)
- 2.3 G-protein coupled receptors, receptor kinases (tyr, ser/thr) (K1, K2, K3, K4)
- 2.4 Signal transduction through cytoplasmic and nuclear receptors (K3, K4, K5, K6)
- 2.5 The Ras-raf MAP kinase cascade, second messengers – cyclic nucleotides, lipids and calcium ions (K2, K3, K4, K5, K6)
- 2.6 Crosstalk in signaling pathways (K2, K3, K4, K5, K6)

**Unit-III: (18 Hours)**

- 3.1 Hypothalamus -Structure (K1, K2, K3)
- 3.2 Hypothalamic releasing factors (K1, K2, K3, K4)
- 3.3 Anterior pituitary gland: Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Biological functions (K3, K4, K5, K6)
- 3.4 Posterior pituitary gland: Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Biological functions - Hypothalamus and Pituitary Gland disorders -Etiology and Clinical features (K3, K4, K5, K6)
- 3.5 T<sub>3</sub> and T<sub>4</sub> - Biosynthesis, Secretion, Storage, Transport, Mechanism of action, Biological functions and disorders (K1, K2, K3, K4, K5, K6)
- 3.6 Calcitonin - Biosynthesis, Secretion, Storage, Transport, Mechanism of action, Biological functions and disorders (K3, K4, K5, K6)

**Unit-IV: (18 Hours)**

- 4.1 Parathyroid hormones - Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Biological functions and disorders (K3, K4, K5, K6)
- 4.2 Pancreas: Structure - Hormone secreted by Pancreas (K1, K2, K3, K4)
- 4.3 Pancreatic Hormones Biosynthesis, Secretion, Storage, Transport, Mechanism of action (K2, K3, K5, K6)
- 4.4 Pancreatic Hormones - Biological functions (K1, K2, K3, K4)
- 4.5 Pancreatic Hormones Disorder – Etiology and Clinical features (K1, K2, K3, K4)
- 4.6 Gastro Intestinal hormones (K1, K2, K3, K4)

**Unit-V:****(18 Hours)**

- 5.1 Adrenal Glands: Anatomy (K2, K3, K4)
- 5.2 Adrenal hormones - Biosynthesis, Secretion, Storage, Transport, Mechanism of action and Biological actions of Adrenal Hormones (K3, K4, K5, K6)
- 5.3 Adrenal disorder – Etiology and Clinical features (K1, K2, K3, K4)
- 5.4 Male Gonadal Hormones: Biosynthesis, Secretion, Storage, Transport, Mechanism of action - Biological actions (K3, K4, K5, K6)
- 5.5 Female Gonadal Hormones: Biosynthesis, Secretion, Storage, Transport, Mechanism of action - Biological actions (K3, K4, K5, K6)
- 5.6 Neurohormones (K1, K2, K3, K4)

**Text Books:**

1. Prakash S Lohar- Endocrinology- Hormones and Human Health- MJP Publishers,2005
2. White, Handler Smith - Mammalian Biochemistry-McGraw Hill-7<sup>th</sup> Edition,2008

**Reference Books:**

1. Charles G.D. Brook and Nicholas J.Marshall- Essential Endocrinology-New Age International Publishers- 4<sup>th</sup> Edition,2006
2. Franklyn F. Bolander- Molecular Endocrinology-Academic Press-Elsevier Publication-3<sup>rd</sup> Edition,2006
3. Maurice Goodman H- Basic Medical Endocrinology- Elsevier Publication-3<sup>rd</sup> Edition,2006
4. Devlin, Wiley-Liss- Textbook of Biochemistry with clinical correlation -6<sup>th</sup> Edition,2005
5. Wilson and Foster-Textbook of Endocrinology -W.B. Saunders Publishers-2<sup>nd</sup> Edition,2016
6. Antonino Belfiore and Derek LeRoith- Principles of Endocrinology and Hormone action. Springer publications- 2018.

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=-1pmrbfYYEE>
2. <https://www.youtube.com/watch?v=PzA5Z3DXfrQ>
3. <https://www.youtube.com/watch?v=uCjpGlnCjeA>
4. <https://www.youtube.com/watch?v=aHhoUyU0ysQ>
5. <https://www.youtube.com/watch?v=431tLBZ7d1o>

**SEMESTER – III**  
**PCBCJ20 - ADVANCED IMMUNOLOGY**

Year/Sem	Course Code	Title Of The Course	Course Type	Course Category	H/W	Credits	Marks
II / III	PCBCJ20	Advanced Immunology	Theory	Core	6	5	40+60=100

**Objectives:**

To help the students to understand the components of immune system and it's functioning.

**Course Outcomes (CO)**

On completion of the course, the students will be able to;

1. Identify various mechanisms that regulate immune response
2. Compare and contrast innate and adaptive immunity
3. Outline the cell types and organ present in the immune response
4. Discuss the reason for different vaccination
5. Communicate the adverse effect of immunodeficiency disorder

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	M
CO 2	H	H	H	M	H	M
CO 3	M	H	M	H	H	M
CO 4	H	M	H	M	H	M
CO 5	H	H	H	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(18 Hours)**

- 1.1 Lymphoid system-Definition, Central lymphoid organs-Thymus, Bone marrow (K1, K2, K3, K4, K5, K6)
- 1.2 Peripheral lymphoid organs-Lymph node, Spleen & MALT ( K1, K2, K3, K4, K5, K6)
- 1.3 Cells involved in immune system-Lymphocytes, Mononuclear phagocytes, Granulocytes, Mast cells, NK cells (K1, K2, K3, K4, K5, K6)

- 1.4 Antigen, Haptens, adjuvants, antigenicity, Epitopes (K1, K2, K3, K4, K5, K6)
- 1.5 Immunoglobulins - basic structure, classification & functions, allotypes and idiotypes.  
Theories of antibody formation- side chain (K1, K2, K3, K4, K5, K6)
- 1.6 Clonal selection theory (K1, K2, K3, K4, K5, K6)

**Unit II: (18 Hours)**

- 2.1 Immunity: Types of immunity - innate and acquired immunity (K1, K2, K3, K4, K5, K6)
- 2.2 Antitoxic, antibacterial and antiviral immunity (K1, K2, K3, K4, K5, K6)
- 2.3 Humoral and cell mediated immunity (K1, K2, K3, K4, K5, K6)
- 2.4 Antigen recognition - T cell and B cell receptor complexes, antigen processing and presentation (K1, K2, K3, K4, K5, K6)
- 2.5 Interaction of T and B cells, cytokines. Immunological memory (K1, K2, K3, K4, K5, K6)
- 2.6 Cytotoxicity - immunotolerance, immunosuppression (K1, K2, K3, K4, K5, K6)

**Unit III: (18 Hours)**

- 3.1 Complement system -Nomenclature, activation of complement –classical & alternative pathway (K1, K2, K3, K4, K5, K6)
- 3.2 Complement fixation test (K1, K2, K3, K4, K5, K6)
- 3.3 Immunological techniques- Immunoprecipitation, RIA, ELISA (K1, K2, K3, K4, K5, K6)
- 3.4 Avidin-biotin mediated assay (K1, K2, K3, K4, K5, K6)
- 3.5 Immunohistochemistry and immuno electrophoresis (K1, K2, K3, K4, K5, K6)
- 3.6 Immunoblotting (K1, K2, K3, K4, K5, K6)

**Unit IV: (18 Hours)**

- 4.1 Vaccines - killed, attenuated organisms, toxoids, recombinant vector vaccines (K1, K2, K3, K4, K5, K6)
- 4.2 Subunit vaccines, anti-idiotypic vaccines (K1, K2, K3, K4, K5, K6)
- 4.3 MHC complex – MHC genes - HLA genes, class I and II antigens-Structure and function (K1, K2, K3, K4, K5, K6)
- 4.4 Histocompatibility testing -cross matching (K1, K2, K3, K4, K5, K6)
- 4.5 Transplantation – types (K1, K2, K3, K4, K5, K6)
- 4.6 Genetics of transplantation - graft versus host reactions (K1, K2, K3, K4, K5, K6)

**Unit V: (18 Hours)**

- 5.1 Hypersensitivity - Definition, classification and factors influencing hypersensitivity (K1, K2, K3, K4, K5, K6)
- 5.2 Type I-hypersensitivity-mechanism (K1, K2, K3, K4, K5, K6)
- 5.3 Type II, III, IV and V hypersensitivity-mechanism, diagnosis and treatment (K1, K2, K3, K4, K5, K6)
- 5.4 Immunodeficiency disorders - B cell deficiencies (K1, K2, K3, K4, K5, K6)
- 5.5 Immunodeficiency disorders - T cell deficiencies (K1, K2, K3, K4, K5, K6)
- 5.6 AIDS, COVID -pathogenesis, diagnosis & Treatment (K1, K2, K3, K4, K5, K6)

**Text Books:**

1. Dulsi Fathima & Arumugam-Immunology- Saras Publications- 4<sup>th</sup> Edition, 2014
2. Ivo Roitt- Essential Immunology -Blackwell Publishing-13<sup>th</sup> Edition, 2017

**Reference Books:**

1. Abul K. Abbas, Andrew Lichtman-Cellular and Molecular Immunology-Saunders Publishers -9<sup>th</sup> Edition, 2017
2. Kuby J. – Immunology-W H Freeman Company, New York- 7<sup>th</sup> Edition-2013.
3. Tizard L R –Immunology-Saunders Publishers-13<sup>th</sup> Edition, 2017
4. Frank C. Hay, Olwyn M. R. Westwood, Paul N. Nelson, and Leslie Hudson-Practical Immunology -Blackwell Publishing, Incorporated- 4<sup>th</sup> Edition, 2008
5. D. M. Weir- Immunological Techniques -13<sup>th</sup> Edition, 2002

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=O-r7FFkiItk>
2. <https://www.youtube.com/watch?v=sYjtMP67vyk>
3. <https://www.youtube.com/watch?v=YJ0-qQslqqQ>
4. <https://www.youtube.com/watch?v=mH8IoSuh64o>
5. <https://www.youtube.com/watch?v=uW96-mBFGag>

## SEMESTER – III

### PCBCK20 - ADVANCED BIOTECHNOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	PCBCK20	Advanced Biotechnology	Theory	Core	5	4	40+60=100

#### Objective:

To learn how to apply the knowledge of genetic engineering in problem solving and in practice.

#### Course Outcome (CO)

On completion of the course, the students will be able to;

1. Illustrate the tools and strategies used in genetic engineering
2. Apply the knowledge of genetic engineering in problem solving and in practice
3. Categorize how plant and animal cells are cultured and genetically manipulated in laboratory
4. Make use of the various steps in the development of a biotechnology derived products
5. Report the applications of genetic engineering technique in basic and applied experimental biology

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	H	M	M
CO 3	H	H	M	L	M	L
CO 4	H	H	H	H	M	M
CO 5	H	M	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	H	M
CO 2	H	H	H	H	M	M
CO 3	H	H	H	H	M	M
CO 4	H	H	H	L	M	L
CO 5	H	H	M	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

**(15 Hours)**

- 1.1 Basic principles – Steps involved - Enzymes used in genetic engineering (K1, K2, K3)
- 1.2 Restriction enzymes: Types and target sites (K1, K2, K3)
- 1.3 Cutting and joining of DNA molecules - linkers and adaptors - Homopolymers (K1, K2, K3)

- 1.4 Cloning vehicles and their properties: Natural and Based plasmids (pBR322)  
(K1, K2, K3)
- 1.5 Cosmid vectors (K1, K2, K3, K5)
- 1.6 Shuttle vectors. (K1, K2, K3, K5)

**Unit II: (15 Hours)**

- 2.1 DNA library: cDNA and Genomic libraries (K1, K2, K3, K5)
- 2.2 Recombinant selection and screening methods - Expression of cloned genes - Problems and solutions (K1, K2, K3)
- 2.3 DNA sequencing strategies - Sanger's and Maxam - Gilbert's methods (K1, K2, K3, K4)
- 2.4 Applications of PCR and DNA hybridization (K1, K2, K3, K5)
- 2.5 Southern and Northern blotting (K1, K2, K3, K4, K5)
- 2.6 Western blotting. (K1, K2, K3, K4, K5)

**Unit III: (15 Hours)**

- 3.1 Culturing explants and haploids - Protoplasts fusion and Embryoids (K1, K2, K3, K4, K5, K6)
- 3.2 Methods of gene transfer to plants, animals and bacteria- Transfection, Electroporation, shotgun and others (K1, K2, K3, K4)
- 3.3 Transgenic plants, GM foods and biopesticides, gene knockouts (K1, K2, K3, K4)
- 3.4 Transgenic animals, animal pharming and xenografting (K1, K2, K3, K4, K5)
- 3.5 Biodegradation, stimulation and its applications (K1, K2, K3, K4, K5)
- 3.6 Bioleaching. (K1, K2, K3)

**Unit IV: (15 Hours)**

- 4.1 Industrial biotechnology – fermentors (K1, K2, K3)
- 4.2 Ethanol and Citric acid production: Principle, types, product recovery and purification (K1, K2, K3, K4)
- 4.3 Vitamin B<sub>12</sub> and Streptomycin production: Principle, types, product recovery and purification (K1, K2, K3, K4)
- 4.4 Enzyme biotechnology-production and uses of industrially important enzymes such as protease (K1, K2, K3, K4)
- 4.5 Immobilization of enzymes and their applications (K1, K2, K3, K4)
- 4.6 Waste treatment, bioenergy and biogas production. (K1, K2, K3, K4)

**Unit V: (15 Hours)**

- 5.1 Gene therapy (somatic): Principle and approaches. (K1, K2, K3, K4)
- 5.2 Potential hazards - Biological weapons - Biosafety of GM foods and GMOs - substantial equivalence and safety testing - Gene drain - Tangled genes (K1, K2, K3)
- 5.3 Human genome research – the objectives and approaches, genomics and genome prospecting - the controversies (K1, K2, K3, K4)

- 5.4 Issues of biotechnology-social and scientific – technology protecting systems and the terminator (K1, K2, K3, K4)
- 5.5 IPR: concepts and conditions (K1, K2, K3)
- 5.6 Patenting of genes, cells and life forms - evaluation of life patenting. (K1, K2, K3, K5, K6)

**Text Books:**

1. William J. Thieman, Michael A. Palladino - Introduction to Biotechnology –Pearson New international Edition, 2013
2. Bourgaise Jewell, Buiser– Biotechnology - Pearson Education – 2<sup>nd</sup> Edition, 2004

**Reference Books:**

1. R.C. Dubey - A Text book of Biotechnology - S. Chand Publishing - 5<sup>th</sup> edition
2. Lewin B - Genes – VIII - Pearson - 2004
3. Glick & Pasternak - Molecular Biotechnology - 4<sup>th</sup> Edition, 2010
4. T.A. Brown-Gene Cloning & DNA Analysis–an introduction-6<sup>th</sup> Edition Wiley-Blackwell
5. U. Satyanarayana - Biotechnology – 12<sup>th</sup> Edition, 2019

**Open Educational Resources (OER):**

1. [https://www.youtube.com/watch?v=1lqQn3\\_PvMs](https://www.youtube.com/watch?v=1lqQn3_PvMs)
2. [https://youtu.be/Ll\\_7z4YS2Ak](https://youtu.be/Ll_7z4YS2Ak)
3. <https://youtu.be/aSb5PNwrRx0>
4. <https://www.slideshare.net/mobile/DineshS50/citric-acid-production-74641179>
5. <https://youtu.be/-hryHoTIHak>

**SEMESTER – III**  
**PEBCE20 - ELECTIVE III A: MICROBIOLOGY**

<b>Year/ Sem</b> II / III	<b>Course Code</b> PEBCE20	<b>Title of the Course</b> Microbiology	<b>Course Type</b> Theory	<b>Course Category</b> Elective III A	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> <b>100</b> 40+60=100
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**Objective:**

To understand the importance of applications of microorganisms.

**Course Outcome (CO)**

On completion of the course, the students will be able to;

1. Recall the taxonomy, morphological features and division process of microbes
2. Outline the microbial growth and its metabolism
3. Apply the microbial culture technique
4. Gain knowledge on the replication processes in microbes
5. Identify the various infectious diseases, its causative agents and antimicrobial drugs

<b>CO / PO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>
<b>CO 1</b>	H	H	M	H	H	L
<b>CO 2</b>	H	L	M	H	M	L
<b>CO 3</b>	H	H	H	H	H	M
<b>CO 4</b>	H	H	H	M	L	M
<b>CO 5</b>	H	H	H	L	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

<b>CO / PSO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>CO 1</b>	H	M	M	M	H	M
<b>CO 2</b>	H	M	M	M	M	M
<b>CO 3</b>	H	H	M	H	H	L
<b>CO 4</b>	H	H	M	M	M	M
<b>CO 5</b>	H	H	H	H	H	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:**

**(9 Hours)**

- 1.1 Morphology and Ultrastructure of bacteria, fungi, algae and protozoa. (K1, K2)
- 1.2 Classification of microbes, molecular taxonomy, cell walls of eubacteria – peptidoglycan and related molecules (K1, K2)
- 1.3 Structure and synthesis of cell wall and cell membrane of gram – positive and negative bacteria (K1, K3)
- 1.4 Flagella and motility. Cell inclusion bodies. (K1, K2)

- 1.5 Blue and green bacteria. Budding and appendaged bacteria, spirilla, spirochaetes, gliding and sheathed bacteria, pseudomonas, lactic and propionic acid bacteria. (K1, K2, K3)
- 1.6 Endospore forming rods and cocci, myobacteria, rickettsia and mycoplasma. Archaeobacteria (K1, K2, K3)

**Unit II: (9 Hours)**

- 2.1 Microbial growth – Definition. Mathematical expression of growth, growth curve, measurement of growth and factors affecting growth. (K1, K2, K3)
- 2.2 Microbial metabolism – Overview, photosynthesis in microbes. Role of chlorophylls, carotenoids and phycobilins, Calvin cycle. (K1, K2, K3, K4)
- 2.3 Chemolithotrophy: hydrogen ion – nitrite oxidizing bacteria: nitrate and sulfate reduction: methanogenesis and acetogenesis (K1, K2, K3)
- 2.4 Fermentations – diversity, syntrophy – role of anoxic decompositions (K1, K2, K3)
- 2.5 Nitrogen metabolism, nitrogen fixation (K1, K2)
- 2.6 Hydrocarbon transformation (K1, K2, K4)

**Unit III: (9 Hours)**

- 3.1 Methods in microbial identification. Pure culture techniques (K1, K2, K3, K4)
- 3.2 Theory and practice of sterilization (K2, K2, K3, K4)
- 3.3 Principles of microbial nutrition (K1, K2)
- 3.4 Construction of culture media (K1, K2, K3, K4)
- 3.5 Enrichment culture techniques for isolation of hemoautotrophs (K1, K2, K3, K4)
- 3.6 Chemoheterotrophs and photosynthetic microbes. (K1, K2, K3, K4)

**Unit IV: (9 Hours)**

- 4.1 Bacteria, plant, animal and tumour viruses (K1, K2)
- 4.2 Classification and structure of viruses. Lytic cycle and lysogeny (K1, K2)
- 4.3 DNA viruses: positive and negative strand (K1, K2)
- 4.4 Double stranded RNA viruses (K1, K2, K3)
- 4.5 Replication: example of Herpes, Adenoviruses (K1, K2)
- 4.6 Replication: example Retrovirus, Viroids and Prions (K1, K2)

**Unit V: (9 Hours)**

- 5.1 Disease reservoirs; Epidemiological terminologies. Infectious disease transmissions. Respiratory infections caused by bacteria and viruses (K1, K2, K3)
- 5.2 Tuberculosis, sexually transmitted diseases including AIDS; Vector borne diseases (K1, K2, K3, K4)
- 5.3 Water borne diseases, Public health and water quality. (K1, K2, K5)
- 5.4 Pathogenic fungi (K1, K2, K3, K4)
- 5.5 Antimicrobial agents, Antibiotics. Penicillin and Cephalosporins, Broad spectrum antibiotics. Antibiotics from Prokaryotes (K1, K2, K3, K4)
- 5.6 Antifungal antibiotics – mode of action, Resistance to antibiotics. (K1, K2, K3, K4)

**Text Books:**

1. Michael J Pelczar, E.C.S Chan and Noel R Krieg Microbiology- McGraw Hill, 5<sup>th</sup> Edition, 2001
2. Ananthanarayan and Paniker- Textbook of Microbiology- Universities Press, 10<sup>th</sup> Edition, 2002.

**Reference Books:**

1. Jawetz, Melnick and Adelberg- Medical Microbiology-Jaypee Medical- 2015.
2. Patrick R Murray- Basic Medical Microbiology- Elsevier, 2019.
3. Robert W Bauman- Microbiology with diseases by Taxonomy- Pearson Publication, 2012.
4. Prescott. Microbiology- McGraw Hill Education, 9<sup>th</sup> Edition, 2013.
5. Jacquelyn G Black-Microbiology- International Student Version, 8<sup>th</sup> Edition, 2012.

**Open Educational Resources (OER)**

1. <https://youtu.be/ei6Z7orCpPk>
2. <https://youtu.be/NYMTeqpr6JI>
3. <https://youtu.be/J5Nz4cQJ2u8>
4. <https://youtu.be/fH1zS7hlW54>
5. <https://youtu.be/202hkf43HXQ>

### SEMESTER III

#### PEBCF20 - ELECTIVE III B: RESEARCH METHODOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II/ III	PEBCF20	Research Methodology	Theory	Elective III B	3	3	40+60=100

#### Objective:

To address the issues inherent in selecting a research problem and discuss the techniques and tools to be employed in completing a research project.

#### Course Outcome (CO):

On completion of the course, the students will be able to;

1. Design the research work
2. Gain an idea on the role of biostatistics in research
3. Understand the significance of internet in research
4. Develop the understanding on database management system
5. Practice the concepts of animal studies and CPCSEA guidelines in research

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	M	L
CO 2	H	H	H	M	M	M
CO 3	H	H	M	H	H	M
CO 4	H	H	H	M	M	L
CO 5	H	H	M	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	H	H	M	H
CO 2	H	H	H	M	M	M
CO 3	H	H	M	M	M	M
CO 4	H	H	M	M	M	L
CO 5	H	H	M	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(9 Hours)

- 1.1 Scientific research & writing - Importance and need for research. (K1, K2, K3, K4)
- 1.2 Ethics and scientific research. Formulation of hypothesis. (K1, K2, K3, K4)
- 1.3 Types and characteristic designing a research work. (K1, K2, K3, K4, K6)

- 1.4 Scientific writing - Characteristics - Logical format for writing thesis and papers. (K1, K2, K3, K4, K6)
- 1.5 Essential features of abstract, introduction, review of literature, materials and methods, and discussion. (K1, K2, K3, K4, K6)
- 1.6 Effective illustration - tables and figures. Reference styles - Harvard and Vancouver systems. (K1, K2, K3)

**Unit II: (9 Hours)**

- 2.1 Biostatistics - Collection and classification of data (K1, K2, K3, K4, K6)
- 2.2 Diagrammatic and graphic representation of data measurement of central tendency (K1, K2, K3, K4, K5, K6)
- 2.3 Standard deviation - normal distribution (K1, K2, K3)
- 2.4 Test of significance based on large samples - small samples - Student t test (K1, K2)
- 2.5 Correlation and regression (K1, K2)
- 2.6 Chi square test for independence of attributes - ANOVA. (K1, K2, K3)

**Unit III: (9 Hours)**

- 3.1 Bioinformatics - Introduction to bioinformatics (K1, K2, K3)
- 3.2 Scope of bioinformatics (K1, K2, K3, K4)
- 3.3 Role of computers in biology (K1, K2)
- 3.4 Internet - The World Wide Web. (K1, K2, K3)
- 3.5 Useful search engines - Boolean searching, search engine algorithms. (K1, K2, K3)
- 3.6 Finding scientific articles – PubMed, Science direct. (K1, K2, K3)

**Unit IV: (9 Hours)**

- 4.1 Databases - Data base concepts - database, database system, database management systems - hierarchical, relational and network, database security. (K1, K2, K3, K4)
- 4.2 Biological databases - types, sequence and structure. (K1, K2)
- 4.3 Data submission (K1, K2)
- 4.4 Data retrieval. (K1, K2)
- 4.5 Searching sequence databases - sequence similarity searches, amino acid substitution matrices. (K1, K2, K3, K4, K6)
- 4.6 Database search - FASTA and BLAST, CLUSTAL. (K1, K2, K3, K6)

**Unit V: (9 Hours)**

- 5.1 Bioethics. (K1, K2)
- 5.2 Ethics in animal experimentation. CPCSEA guidelines - Animal care and technical personnel environment, animal husbandry, feed, bedding, water, sanitation and cleanliness, waste disposal, anesthesia and euthanasia. (K1, K2, K3, K6)
- 5.3 Composition of (Human) institutional Ethical Committee (IEC) - General ethical issues. (K1, K2, K3)
- 5.4 Specific principles for chemical evaluation of drugs, herbal remedies and human genetics research (K1, K2, K3)
- 5.5 Ethics in food and drug safety. (K1, K2, K3)

5.6 Environmental release of microorganisms and genetically engineered organisms. Ethical issues in human gene therapy and human cloning. (K1, K2)

**Text Books:**

1. C R Kothari -Research Methodology- Methods and Techniques, 4<sup>th</sup> Edition., 2019.
2. Ranjit Kumar -Research methodology- Pearson education, 2005.

**Reference Books:**

1. Bryan Bergeron MD- Bioinformatics Computing- Prentice-Hall of India Pvt.Ltd, 2012.
2. Bergeron BP- Bioinformatics Computing- Printice Hall, 1st Edition, 2002.
3. John M Lachin-Biostatistical Methods- Wiley interscience, 1<sup>st</sup> Edition, 2000.
4. Ethical guidelines for biomedical research on human subjects. ICMR, New Delhi, 2000.
5. Sundar Rao, Jesudian Richard -An Introduction to Biostatistics, 5<sup>th</sup> Edition, 2012.

**Open Educational Resources (OER)**

1. <https://youtu.be/3FE5ldiIp6A>
2. <https://youtu.be/Coe0N2xb8kk>
3. [https://youtu.be/Nx\\_E4Z4y8uQ](https://youtu.be/Nx_E4Z4y8uQ)
4. <https://youtu.be/Ap3rUxB4k9Q>
5. <https://youtu.be/kAxTbc6nsFs>

## SEMESTER IV

### PCBCL20 MOLECULAR BIOLOGY

<b>Year/ Sem</b> II / IV	<b>Course Code</b> PCBCL20	<b>Title of the Course</b> Molecular Biology	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60=100
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#### Objective:

The course will enable the student to learn the molecular events occurring in gene and its application in field of biomedical and genetic research.

#### Course Outcome (CO)

On completion of the course, the students will be able to;

1. Demonstrate the nature and role of Gene in life activity
2. Describe the blueprint of life and its functions
3. Outline the mechanism of Replication
4. Outline the role of Transcription
5. Demonstrate the features of Genetic code and mechanism of Translation

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	M	H	H	M	M	M
CO 2	H	L	M	H	H	H
CO 3	L	M	M	L	H	M
CO 4	M	M	H	H	M	L
CO 5	H	H	H	H	M	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	M	H	H	L	M	M
CO 2	H	L	M	H	H	H
CO 3	M	H	H	M	H	M
CO 4	L	M	H	M	L	H
CO 5	H	H	L	H	M	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(18 Hours)

- 1.1 Gene arrangements in prokaryotes and eukaryotes (K2, K3, K4, K5)
- 1.2 Gene structure in eukaryotic organisms, introns, exons, pseudogenes, and gene clusters, spacers, repetitive sequences (K1, K2, K3, K4)
- 1.3 Single and multiple copy genes in eukaryotes, eg – Histones, Alu, copia, satellite.  
Mapping of human genes – techniques used, assignment of important genes (K2, K3, K4, K5)

- 1.4 Gene regulatory mechanisms and cell memory- structure of chromatin - nucleosomes and higher orders of organization (K2, K3, K4, K5, K6)
- 1.5 Chromosome and genes, chromosomal replication, genetic mapping of chromosomes, chromosome banding (K2, K3, K4, K5, K6)
- 1.6 Transposition in human chromosome and chromosomal abnormalities (K1, K2, K3, K4)

**Unit II:** **(18 Hours)**

- 2.1 DNA replication in prokaryotes (K3, K4, K5, K6)
- 2.2 DNA replication in Eukaryotes (K3, K4, K5, K6)
- 2.3 Inhibitors of prokaryotic replication (K1, K2, K3, K4)
- 2.4 Inhibitors of Eukaryotic replication (K2, K3, K4)
- 2.5 Replication in RNA virus (K2, K3, K4)
- 2.6 Plasmid replication (x174, nl3 A. DNA) (K1, K2, K3)

**Unit III:** **(18 Hours)**

- 3.1 Prokaryotic Transcription- Promoters, foot-printing experiment, DNA - dependent RNA polymerase -Role of Pribnowbox (K2, K3, K4)
- 3.2 Prokaryotic transcription – mechanism in prokaryotes (K3, K4, K5, K6)
- 3.3 Eukaryotic transcription (K3, K4, K5, K6)
- 3.4 Post-transcriptional modifications of eukaryotic RNAs, RNA splicing, introns and splicing reactions (K1, K2, K3, K4)
- 3.5 Self-splicing introns - group I and group II, exons, spacer sequences, enhancers (K1, K2, K3, K4)
- 3.6 Reverse transcriptase, retroviruses (K1, K2, K3, K4)

**Unit IV:** **(18 Hours)**

- 4.1 Genetic code: Salient features (K1, K2, K3, K4)
- 4.2 Wobble mechanism and its significance (K1, K2, K3, K4)
- 4.3 Prokaryotic protein biosynthesis (K3, K4, K5, K6)
- 4.4 Eukaryotic protein biosynthesis (K3, K4, K5, K6)
- 4.5 Inhibitors of protein synthesis (K1, K2, K3, K4)
- 4.6 Post-translational modifications in prokaryotes and eukaryotes (K1, K2, K3, K4)

**Unit V:** **(18 Hours)**

- 5.1 DNA repair – types (K1, K2, K3, K4)
- 5.2 Regulation of gene expression in prokaryotes: Operon concept- lac operon (K3, K4, K5, K6)
- 5.3 An overview of Genomics - Structural genomics (K1, K2, K3, K4)
- 5.4 Functional genomics (K3, K4, K5, K6)
- 5.5 An overview of Proteomics (K1, K2, K3, K4)
- 5.6 Human Genome Project, chromosome maps – DNA micro arrays (K1, K2, K3, K4)

**Text Books:**

1. Lehninger, David Nelson and M. Chael M. Cox - Principles of Biochemistry-W.H Freeman and Company Ltd- 4<sup>th</sup> Edition,2005
2. David Friefelder - Molecular Biology- Narosa Publishing House-2<sup>nd</sup> Edition,2005.

**Reference Books:**

1. Lodish, Darnell and Baltimore - Molecular Cell Biology-W.H. Freeman & Company-4<sup>th</sup> Edition,2000
2. T. A. Brown. Gene Cloning and DNA analysis- An introduction. John Wiley Publications - 7 edition, 2016.
3. Gerald Karp, Janet Iwasa, Wallace Marshall. Cell and Molecular Biology, Wiley Publications - 9th edition, 2019.
4. Jocelyn E. Krebs, Elliott S. Goldstein and Stephen T. Kilpatrick. Genes XII. Jones and Barlett Publisher - 12th edition, 2017.
5. Rajeev Tyagi. Genetics, Genomics, Proteomics & Bioinformatics. Manglam Publishers & Distributors, 2012.

**Open Educational Resources (OER);**

1. <https://www.youtube.com/watch?v=3wTAEfjo20c>
2. <https://www.youtube.com/watch?v=Dc21ml8-PI>
3. [https://www.youtube.com/watch?v=exJDso2\\_yRQ](https://www.youtube.com/watch?v=exJDso2_yRQ)
4. [https://www.youtube.com/watch?v=fp9x6TZ\\_zEY](https://www.youtube.com/watch?v=fp9x6TZ_zEY)
5. <https://www.youtube.com/watch?v=5paHhTq87Ak>

## SEMESTER IV

### PCBCM20 - ADVANCED CLINICAL BIOCHEMISTRY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	PCBCM20	Advanced Clinical Biochemistry	Theory	Core	6	5	40+60=100

#### Objectives:

To gain concepts of assessing the human physiology using biological fluid.

#### Course Outcome (CO)

On completion of the course, the students will be able to;

1. Apply the process of collection, preservation and storage of blood
2. Communicate the disorders of carbohydrate metabolism
3. Outline the significance of proteins and nucleic acid
4. Compare the liver and renal disorders
5. Discuss the role of diagnostic enzymes

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	M	H	H	H	M	H
CO 2	H	H	H	M	H	H
CO 3	H	M	H	M	H	M
CO 4	M	M	H	M	H	H
CO 5	H	H	M	H	M	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	H	M	M
CO 2	H	M	H	M	M	H
CO 3	H	M	H	M	M	H
CO 4	H	M	H	M	M	H
CO 5	H	H	M	H	H	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(18 Hours)

- 1.1 Specimen collection and analysis: Concepts of accuracy, precision, reproducibility, reliability in quality control (K2, K3, K4)
- 1.2 Collection of blood – vein puncture, skin puncture, arterial puncture and anticoagulants (K3, K4, K5)
- 1.3 Collection of urine, preservatives (K1, K2, K4).

- 1.4 CSF & Amniotic fluid – composition & collection (K2, K3, K4)
- 1.5 Sickle cell anemia (K2, K3, K4)
- 1.6 Hemoglobinopathies & Thalassemia (K2, K3, K4)

**Unit II: (18 Hours)**

- 2.1 Disorders of carbohydrate metabolism – Diabetes mellitus-classification, Metabolic complications (K2, K3, K4)
- 2.2 Glucose tolerance test and hypoglycemic agents (K2, K3)
- 2.3 Glycogen storage diseases (K2, K3, K4)
- 2.4 Galactosemia (K2, K3)
- 2.5 Atherosclerosis and Hypercholesterolemic agents (K2, K3, K4)
- 2.6 TaySach's disease, Niemann Pick disease, and Gangliosidosis (K1, K2, K3, K4)

**Unit III: (18 Hours)**

- 3.1 Disorders of protein metabolism- Clinical significance of non-protein nitrogenous substances in blood-urea, uric acid & creatinine (K2, K3, K4)
- 3.2 Plasma protein abnormalities- agammaglobulinemia, proteinuria (K2, K3, K4)
- 3.3 Multiple myeloma, Phenylketonuria, tyrosinosis (K2, K3, K4)
- 3.4 Plasma protein abnormalities- alkaptonuria, maple syrup urine disease (K1, K2, K3, K4)
- 3.5 Hartnup disease, albinism and homocystinuria (K2, K3, K4)
- 3.6 Disorders of nucleic acid metabolism-Gout, xanthinuria (K2, K3, K4)

**Unit IV: (18 Hours)**

- 4.1 Liver function test based on abnormalities of bile pigment metabolism, CHO, detoxification & excretory function of liver (K1, K2, K3, K4)
- 4.2 Liver Diseases-Hepatitis, Cirrhosis, Jaundice (K1, K2, K3, K4)
- 4.3 Gastric function test – Tube analysis and Tubeless analysis (K2, K3, K4)
- 4.4 Renal function tests-Urea, creatinine, inulin clearance (K1, K2, K3, K4)
- 4.5 Renal Diseases-Renal failure, Renal calculi - Glomerulonephritis - Nephrotic syndrome (K2, K3, K4)
- 4.6 Diagnosis of Hormone disorder: Thyroid test, Insulin stimulation test, C- peptide assay (K1, K2, K3, K4)

**Unit V: (18 Hours)**

- 5.1 Diagnostic enzymes-clinical significance of Aspartate transaminase, Alanine transaminase (K2, K3, K4)
- 5.2 Diagnostic enzymes-clinical significance of Creatine kinase, Lactate dehydrogenase (K2, K3, K4)
- 5.3 Diagnostic enzymes-clinical significance of Alkaline phosphatase, gamma glutamyl transpeptidase (K2, K3, K4)
- 5.4 Cancer-Etiology, morphological changes in tumor cells (K2, K3, K4)
- 5.5 Tumour markers-AFP, CEA & HCG and Carcinogenic agents (K1, K2, K3, K4)
- 5.6 Role of free radicals in health & diseases (K2, K3, K4)

**Text Book:**

1. Carl A Burtis, Edward R Ashwood and Tietz- Fundamentals of Clinical Chemistry- Harcourt Private Limited, New Delhi-5<sup>th</sup> Edition,2001
2. Nandha Maheshwari-Clinical Biochemistry-Jaypee Medical Publishe-2<sup>nd</sup> Edition,2017

**Reference Books:**

1. Davidson and Henry - Clinical Diagnosis by Laboratory Methods-19<sup>th</sup> Edition, 2005
2. Dr. M. N. Chatterjea and Rana Shinde - Textbook of Medical Biochemistry-Jaypee Brothers Medicinal Publishers Ltd, New Delhi- 6<sup>th</sup> Edition ,2005
3. Philip D. Mayne - Clinical Chemistry in Diagnosis and Treatment- ELST Publishers-6<sup>th</sup> Edition,2009
4. T.M. Devlin -Text book of Biochemistry with clinical correlation - J. Wiley and Sons publishers-7<sup>th</sup> Edition,2010
5. Lawrence A. Kaplan, Amadeo J. Perce and Steven C. Kazmierczak – Clinical Chemistry- Elsevier-5<sup>th</sup> Edition,2009

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=yVRj7CWFj9A>
2. <https://www.youtube.com/watch?v=LuVcPNF5S1g>
3. <https://www.youtube.com/watch?v=UZFOdUP4UTY>
4. [https://www.youtube.com/watch?v=mUF\\_VglpmMc](https://www.youtube.com/watch?v=mUF_VglpmMc)
5. <https://www.youtube.com/watch?v=Nz2YGL4NWEE>

## SEMESTER - IV

### PEBCG20 ELECTIVE – IV A: PLANT BIOCHEMISTRY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	PEBCG20	Plant Biochemistry	Theory	Elective – IV A	3	3	40+60=100

#### Objective:

To help the students to understand the plant metabolites and their application in the field of medicine.

#### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Identify various natural and artificial ways to propagate plants
2. Discuss the function and composition of different plant structures
3. Describe the processes of germination and plant growth
4. Explain the role of plant growth regulators and plant tissue culture
5. Perform the calculations to predict expected plants by experiments

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	M
CO 2	H	H	H	M	H	M
CO 3	M	H	M	H	H	M
CO 4	H	M	H	M	H	M
CO 5	H	H	H	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

(9 Hours)

- 1.1 Photosynthetic Pigment, Light reaction (K2, K3, K4)
- 1.2 Dark reactions of photosynthesis (K2, K3, K4)
- 1.3 Proton gradient and ATP synthesis of chloroplast (K2, K3, K4)
- 1.4 Regulation of photosynthesis - Mode of action of DCMU (K1, K2, K3, K4)
- 1.5 Bacterio rhodopsin, CAM metabolism, RUBISCO (K2, K3, K4)
- 1.6 Regulation of photorespiration and crop productivity (K2, K3, K4)

**Unit II: (9 Hours)**

- 2.1 Nitrogen cycle Disotropes biochemistry of Symbiotic and Nonsymbiotic nitrogen fixation (K2, K3, K4)
- 2.2 Assimilation of ammonium, carbon- nitrogen ratio (K1, K2, K3, K4)
- 2.3 Uride metabolism, Nitrate metabolism, Genetics of nitrogen fixation, Genetic manipulation of Nif genes (K2, K3, K4)
- 2.4 Biosynthesis, Mode of action, transport, distribution and physiological effect of Auxin, Gibberellin, Cytokinin (K2, K3, K4)
- 2.5 Biosynthesis, Mode of action, transport, distribution and physiological effect of Abscisic acid (ABA) (K2, K3, K4)
- 2.6 Biosynthesis, Mode of action, transport, distribution and physiological effect of Ethylene (K2, K3, K4)

**Unit III: (9 Hours)**

- 3.1 Biochemistry of plant disease, defense mechanism of plants (K3, K4)
- 3.2 Biosynthesis, distribution and biological functions of industrially important secondary metabolite (K2, K3, K4)
- 3.3 Principles of plant diseases control (K2, K3)
- 3.4 Methods in phytochemicals: Extraction, fractionation and characterization (K2, K3, K4)
- 3.5 General properties of plant proteinase inhibitor (K3, K4)
- 3.6 Proteinase inhibitors-serine proteinase, acid proteinase and metalloproteinase (K2, K3, K4)

**Unit IV: (9 Hours)**

- 4.1 Water relations of plant, Mechanism of water absorption (K2, K3)
- 4.2 Aquaporin Symplast - Apoplast concept (K2, K3)
- 4.3 Ascent of sap (K2, K3)
- 4.4 Source and sink relationship, Translocation of Inorganic and Organic substances, Bud and Seed dormancy (K2, K3)
- 4.5 Senescence and Stress response in plant (K2, K3, K4)
- 4.6 Phytochromes- Properties, Photochemical, Transformation, Mode of action and physiological effect (K2, K3, K4)

**Unit V: (9 Hours)**

- 5.1 DNA polymorphism – Importance of RFLP and RAPD in plant breeding management (K2, K3, K4)
- 5.2 Aspects of plant genetic engineering. Tacking, Mapping and Cloning of plant genes, Selectable markers (K2, K3)
- 5.3 Reporter genes and promoters used in plant vectors. Ti plasmids and Crown gall tumor (K2, K3, K4)
- 5.4 Genetic engineering of plant for disease resistance, Cytoplasmic Male Sterility, Edible oil, Biodegradable plastics (K2, K3)
- 5.5 Delay of fruits ripening -Methods (K2, K3)
- 5.6 Application of plant tissue culture (K2, K3, K4)

**Text Books:**

1. T.W. Goodwin- Introduction to Plant Biochemistry -Pergamon Press- 2<sup>nd</sup> Edition,2005.
2. P.J. Lea, L.L. Castle and Lea-Plant Biochemistry and Molecular Biology- John Wiley & Sons- 2<sup>nd</sup> Editon-2000

**Reference Books:**

1. R.K. Sinha- Modern Plant Physiology- Narosa Publishing House -2<sup>nd</sup> Editon,2004.
2. M.J. Pelczar, E.C.S. Chan and N.R. Kreig, Microbiology Tata McGraw Hill Publishing Co. 7<sup>th</sup> Edition,2013
3. L.M. Prescott, J.P. Harley and D.A. Klein, Microbiology-McGraw Hill Publishers- 6<sup>th</sup> Edition,2004
4. B.D. Davis, R. Dulbecco, H.N. Eisen and H.S. Ginsberg-Microbiology-3<sup>rd</sup> Edition,2008
5. P. M. Dey and J. R. Hardorne- Plant Biochemistry-Elsevier Science,1<sup>st</sup> Edition -2013

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=VYIsLPwMzFo>
2. <https://www.youtube.com/watch?v=tCrgTV20BD4>
3. [https://www.youtube.com/watch?v=\\_Cbv4MecfA4](https://www.youtube.com/watch?v=_Cbv4MecfA4)
4. [https://www.youtube.com/watch?v=tIy9ZXP\\_oz8](https://www.youtube.com/watch?v=tIy9ZXP_oz8)
5. <https://www.youtube.com/watch?v=AUiP9eH-0NI>

## SEMESTER IV

### PEBCH20 ELECTIVE IV- B: HERBAL THERAPY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	PEBCH20	Herbal Therapy	Theory	Elective IV B	3	3	40+60=100

#### Objective:

To help students to understand the concepts in pharmacognosy and the role of medicinal plants.

#### Course Outcome (CO)

On completion of the course, the students will be able to;

1. Describe the concepts of Pharmacognosy
2. Explain the classification of medicinal plants
3. Outline the different parts of plant
4. Predict the Herbal medicines for Human ailments
5. Apply the knowledge on the important metabolic pathways in plants

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	M
CO 2	H	H	H	M	H	M
CO 3	M	H	M	H	H	M
CO 4	H	M	H	M	H	M
CO 5	H	H	H	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit I:** (9 Hours)

- 1.1 Pharmacognosy - Definition and history (K1, K2, K3)
- 1.2 Indian systems of medicine - Siddha, Ayurveda, and Unani systems (K2, K3, K4)
- 1.3 Taxonomy of locally available medicinal plants (Tulsi, Aloe vera, Neem), their chemical constituents and medicinal uses (K2, K3, K4)
- 1.4 Classification of Crude drugs (K2, K3)
- 1.5 Chemistry of Drugs - Future of pharmacognosy (K2, K3)
- 1.6 Quality control of drugs of natural origin (K2, K3, K4)

**Unit II:** (9 Hours)

- 2.1 Classification of medicinal plants - Vernacular name and family (K2, K3)
- 2.2 Geographical source, cultivation, collection, and processing of crude drugs (K1, K2, K3, K4)
- 2.3 Morphological, histological studies and chemical constituents of crude drugs (K2, K3, K4)
- 2.4 Therapeutic and other pharmaceutical uses of underground stem – ginger and Alpinia (K2, K3, K4)
- 2.5 Therapeutic and other pharmaceutical uses of Roots - Rauwolfia – Belladonna (K2, K3, K4)
- 2.6 Therapeutic and other pharmaceutical uses of Aerial parts - Bark – Cinchona (K2, K3, K4)

**Unit III:** (9 Hours)

- 3.1 Leaves - Adathoda, Eucalyptus - Flower - Clove fruits seeds (K1, K2, K3, K4)
- 3.2 Nux vomica, Nutmegs and Gooseberry (K2, K3)
- 3.3 Unorganized drugs - Gum, Acacia and Resin (K2, K3, K4)
- 3.4 Turpentine, fixed oil and castor oil. (K2, K3)
- 3.5 Propagation of medicinal plants – Micropropagation (K2, K3, K4)
- 3.6 Macro propagation conservation of rare medicinal plants (K2, K3)

**Unit IV:** (9 Hours)

- 4.1 Herbal medicines for Human ailments (K2, K3, K4)
- 4.2 Drugs Acting on Cardiac Diseases, Cerebral Diseases, Nasal disease (K2, K3, K4)
- 4.3 Depressants. - Stimulants - Respiration and Drugs (K2, K3)
- 4.4 Urogenital system and drugs - Psychoactive plants (K2, K3)
- 4.5 Preparation of herbal infusion (K2, K3)
- 4.6 Toxicity in herbal drugs and their interactions (K2, K3)

**Unit V:** (9 Hours)

- 5.1 Role of biotechnology in medicinal plants banks (K2, K3)
- 5.2 Cultivation of medicinal and aromatic plants (K2, K3, K4)
- 5.3 Drug adulteration - methods of Drug evaluation (K2, K3).
- 5.4 Herbal food - Food processing - packaging (K2, K3)
- 5.5 Herbal sale and Export of medicinal plants (K2, K3, K4)
- 5.6 Marketing, Intellectual property rights and Export laws (K2, K3, K4)

**Text Books:**

1. T.W. Goodwin-Introduction to Plant Biochemistry- Pergamon Publishers-3<sup>rd</sup> Edition,2007
2. Kumar N.C-An Introduction to Medical Botany and Pharmacognosy- 3<sup>rd</sup> Edition,2005

**Reference Books:**

1. George Edward Trease and W.C. Evans – Pharmacognosy-English Language Books Society, Baelliere Tindall- 12<sup>th</sup> Edition,2008
2. Handa, S.S. and Kapoor V.K-Pharmacognosy -Vallabh Prakashan Publishers, 2<sup>nd</sup> Edition-2004
3. Jain, S.K - Indian Medicinal plants- National book trust -4<sup>th</sup> Edition,2004
4. Kokate, C.K, Durohit, A.P and Gokhale, S.R- Pharmacognosy - Nirali Prakasham Publishers, Pune-12<sup>th</sup> Edition-2011
5. Wallis, T.E-Text book of pharmacognosy- CBS publishers and distributors, New Delhi-5<sup>th</sup> Edition,2008

**Open Educational Resource (OER):**

1. <https://www.youtube.com/watch?v=rde0RSFNuu8>
2. <https://www.youtube.com/watch?v=QPQ9sZuiOb8>
3. <https://www.youtube.com/watch?v=5p4NOvF5EX4>
4. <https://www.youtube.com/watch?v=dOlkogaWF3M>
5. <https://www.youtube.com/watch?v=fhkvXf5t9lo>

**SEMESTER-III & IV**  
**PCBCN20 – MAIN PRACTICAL – III**  
 [Endocrinology, Immunotechniques, Biotechnology]

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II/ III & IV	PCBCN20	Main Practical - III	Practical	Core	5	4	40+60 =100

**Objective:**

The course is aimed to enable the student interpret hormonal imbalance and clinical conditions and also to provide in-depth practical knowledge and skill in performing immune-techniques and cell culture techniques.

**Course Outcome (CO)**

On completion of the course, the students will be able to,

1. Analyse the prevalence and impact of endocrine hormone in regulating health
2. Use the practical skill for diagnosing immunological reaction in relation to disease condition
3. Apply tissue culture technique and fermentation process for various applications

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	L	M	H
CO 2	L	H	H	H	H	L
CO 3	H	H	L	H	M	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	1	2	3	4	5	6
CO 2	H	H	M	H	M	M
CO 3	H	L	H	L	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Endocrinology**

Case Studies (Identification of diseases based on patient history)

**Immunotechniques:**

1. Blood film preparation and identification of cells.
2. Demonstration of immuno reaction
  - Blood group

- Widal test
  - Pregnancy test
  - Coombs test
  - ELISA
  - Antigen antibody reaction
  - Ouchterlony double diffusion, Immunoelectrophoretic, Immunoblotting, Immunostaining, Immunofluorescent
3. Antibody sensitivity test
  4. Measurement of antibodies - Serial dilution
  5. Determination MIC

### **Biotechnology**

1. Preparation of Culture media & Reagents - Media composition, Nutrition, Hormones. Tissue Culture – Callus culture, Cell suspension.
2. Organ Micro-culture - Shoot tip, excised root, Leaf culture Plant micro-propagation – micro-culture of plants.
3. Basic sterilization techniques required for Media preparation & Cytological techniques Preparation of Slides.
4. Staining of Slides.
5. Image analysis & Karyotyping.
6. Preparation of alcohol using fermentation process.

### **Reference Books:**

1. Shirlyn B McKenzie- Clinical Laboratory Haematology- Pearson Publication, 2009
2. Hrudayanath Thatol, Supriya Dash, Swagat Kumar Das- Practical Biotechnology: Principles and Protocols- I K International Publishing House Pvt, 2017.
3. Robert H Smith. Plant tissue Culture- Techniques and Experiments- Academic Press, 3<sup>rd</sup> Edition, 2012.
4. Ivan Roitt, Jonathan Brostoff, David Male, David Roth- Immunology-Mosby Publication. 7<sup>th</sup> Edition, 2006
5. Charles GD Brook and Nicholas J Marshall- Essential Endocrinology - New Age International Publishers, 4th Edition, 2006

***\*ONE WEEK HANDS ON TRAINING IN ANY INDUSTRY***

**SEMESTER-III & IV**  
**PCBCO20 - MAIN PRACTICAL IV**

[Molecular Biology, Clinical Biochemistry]

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credit	Marks 100
II/ III & IV	PCBCO20	Main Practical - IV	Practical	Core	5	4	40+60 = 100

**Objective:**

To help students to expertise in the molecular biology and clinical biochemistry techniques.

**Course Outcome (CO):**

1. Apply the molecular tools and techniques for extracting and separating DNA
2. Utilize practical knowledge and skill for diagnosing various diseases using biochemical analysis in blood specimen
3. Demonstrate various pathological conditions related to abnormal constituents in urine

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	H	H	H	H
CO 2	H	H	H	H	M	H
CO 3	H	H	H	H	H	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Molecular Biology**

1. Southern and Western blotting.
2. Restriction digestion of DNA.
3. Separation of RE –digested fragments by Gel Electrophoresis.
4. Isolation of plasmid.
5. Restriction Mapping of a Plasmid.
6. Polymerase Chain Reaction.
7. Extraction of genomic DNA and electrophoresis in agarose gel.
8. Determination of molecular size of DNA.

## **Clinical Biochemistry**

### **A. Biochemical Analysis Of Blood**

1. Estimation of blood Glucose by O-toluidine method.
2. Estimation of serum Proteins by Bradford's Method.
3. Estimation of A.G. ratio in serum.
4. Estimation of blood Urea by DAM method.
5. Estimation of serum Uric acid by Phosphotungstate method.
6. Estimation of serum Creatinine by alkaline picrate method.
7. Estimation of serum Creatine.
8. Estimation of serum Triglycerides.
9. Estimation of serum Cholesterol by Zak and Boyle method.
10. Estimation of serum Phospholipids.
11. Estimation of serum Bilirubin by Jendrassik and Crof method.
12. Estimation of LDL and HDL.

### **B. Urine Analysis**

1. Qualitative analysis of normal and pathological constituents in urine.

## **Reference Books:**

1. Jyoti Saxena, Manita Baunthiyal, Indu Ravi-Laboratory Manual of Microbiology, Biochemistry and Molecular Biology-Scientific Publication, 2012
2. Sunheimer, Graves and Stockwin. Clinical Laboratory Urinalysis. Pearson Prentice Hall Publication, 2014
3. Varley, Alan H Gowen lock - Practical Biochemistry – 6<sup>th</sup> Edition - CBS Publishers, 2002
4. David T Plummer - Practical Biochemistry- 3<sup>rd</sup> Edition - McGraw Hill Publishers, 2005
5. Jayaraman J - Manuals in Biochemistry - New Age International Publishers, 2001

***INDUSTRIAL STUDY TOUR (HOSPITAL / RESEARCH INSTITUTE / INDUSTRY  
ONE VISIT PER YEAR)***

### INDEPENDENT ELECTIVE I A: ORGANIC FARMING

Year/ Sem I / I	Course Code PIBCA20	Title of the Course Organic Farming	Course Type Theory	Course Category Independent elective	H/W	Credits	Marks
					-	2	40+60=100

**Objective:**

To help students to understand the concepts and importance of organic farming and use it as a source of income generation.

**Course Outcomes (CO)**

On completion of the course, the students will be able to;

1. Analyze the importance of organic farming
2. Apply the concept of organic farming
3. Relate the importance of plant protection
4. Use the organic methods for plant cultivation
5. Plan the concept of income generation through organic farming and terrace gardening

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	M
CO 2	H	L	H	M	H	M
CO 3	M	H	M	L	H	M
CO 4	L	M	H	M	H	M
CO 5	H	H	H	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	L	H	M
CO 3	H	L	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	L	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

**Unit-I**

- 1.1 Introduction: Farming, basic concepts, principles and development of organic farming. (K1, K2)
- 1.2 Scope of organic farming Sustainable agriculture (K1, K2)
- 1.3 Needs for organic farming, types of organic farming (K1, K2)
- 1.4 Requirement of organic farming (K1, K2)
- 1.5 Conventional and organic farming (K1, K2, K3)
- 1.6 Components of organic farming (K1, K2)

## **Unit -II**

- 2.1 Organic farming system (K1, K2, K3)
- 2.2 Green manuring (K1, K2)
- 2.3 Types and stages of composting- vermicomposting, composite quality and marketing (K1, K2, K3, K4, K5)
- 2.4 Preparation of organic manure- Bulky organic manure and concentrated organic manure (K1, K2, K3)
- 2.5 Biofertilizers: Preparation, applications, advantages and disadvantages (K1, K2)
- 2.6 Soil tillage, land preparation and mulching (K1, K2, K3)

## **Unit -III**

- 3.1 Plant protection methods- Biopesticides- Formulation- granules, fumigants spray (K1, K2, K3, K6)
- 3.2 Preparation of pesticides from Chrysanthemum, Neem, Tobacco (K1, K2, K3, K4)
- 3.3 Advantages of biopesticides (K1, K2)
- 3.4 Weed management (K1, K2, K3)
- 3.5 Biocontrol agents (K1, K2, K3)
- 3.6 Plant natural predators (K1, K2)

## **Unit-IV**

- 4.1 Organic crop production methods- Rice, Coconut (K1, K2, K4, K5)
- 4.2 Organic crop production methods- Mango, Banana (K1, K2, K4, K5)
- 4.3 Organic crop production methods - Ginger (K1, K2, K4, K5)
- 4.4 Organic crop production methods -Pepper, Cardamom (K1, K2, K4, K5)
- 4.5 Organic crop production methods Medicinal plants- Tulsi (K1, K2, K4)
- 4.6 Livestock components in organic farming (K1, K2)

## **Unit-V**

- 5.1 Quality analysis of organic food (K1, K2)
- 5.2 Organic food and health benefits. (K1, K2)
- 5.3 Farm economy-cost of production system marketing. (K1, K2, K3, K4)
- 5.4 Income generation farming: Terrace farming. (K1, K2, K3, K4)
- 5.5 Income generation farming: Mushroom cultivation. (K1, K2, K3, K4)
- 5.6 Organic standard, organic certification process (K1, K2)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create]**

### **Recommended Reading:**

1. SR Reddy. Principles of organic farming. Kalyani publications, 2017
2. Dr. Ranjan Kumar Biswas. Organic Farming in India. N D publisher, 2014
3. Mamta Bansal. Basic of Organic farming. CBS Publishers and Distributors Pvt Ltd, 2017
4. Kolay A.K. Manures and Fertilizers. Atlantic Publisher, 2008
5. RK Sharma. Agriculture at a glance. 20<sup>th</sup> revised and enlarged edition, 2018
6. Chaeles L Mohler, Sue Ellen Johnson. Crop rotation on organic farms. NRAES Publisher, 1<sup>st</sup> Edition, 2009

### **Open Educational Resources (OER)**

1. <https://youtu.be/RFBPStyE9l0>
2. <https://youtu.be/U1DyKn3lYVvk>
3. <https://youtu.be/TQEEaA7lJvIQ>
4. <https://youtu.be/n1VFLGp1xL8>
5. <https://youtu.be/V-SDjdTB1nw>

## INDEPENDENT ELECTIVE I B: FOOD PRESERVATION

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / I	PIBCB20	Food Preservation	Theory	Independent elective	-	2	40+60=100

### Objective:

To enable students to understand the concepts of food preservation and methods involved

### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Outline the role of microbes in food spoilage and methods adopted to overcome microbial food spoilage
2. Apply the general methods for preserving fruits and vegetables
3. Find the methods of food preservation
4. Explain the methods for identifying food spoilage
5. Use the methods for preserving non-vegetarian foods/ meat products

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

### Unit-I

1.1 Types of spoilage in perishables and Nonperishable - Food classification based on spoilage and shelf life (K1, K2, K3)

1.2 Spoilage of by products and factors affecting quality - Storage changes that take place in the food spoiled (K1, K2, K3, K4)

1.3 Preservation of spoilage, storage conditions (K1, K2, K3, K4)

1.4 Types of spoilage in canned food-Definition of canning, steps in the process of canning from Field (K1, K2, K3, K4)

1.5 Types of spoilage in canned food and prevention (K1, K2, K3)

1.6 Causes of spoilage, remedial measures to be taken General spoilage of foods (K1, K2, K3)

## **Unit-II**

2.1 Fruits and vegetable drying/dehydration- General methods of fruits & vegetable drying/dehydration, sun drying, mechanical drying (K1, K2, K3, K4, K5)

2.2 Types of dryers (K1, K2)

2.3 Characteristics of dried fruits and vegetables (K1, K2)

2.4 General process of fruit and vegetable drying (K1, K2)

2.5 Specialized drying operations in fruits and vegetables (K1, K2)

2.6 Pickles: Principle of pickle production-different types of pickles from fruits and vegetables. (K1, K2)

## **Unit-III**

3.1 Method of techniques of proper packaging of finished products &proper storing in cold storages &refrigerator-selection of suitable packaging material (K1, K2, K3, K4, K5)

3.2 Packaging and storage for bakery items- Transportation & marketing (K1, K2, K3)

3.3 Method of techniques of proper packaging of finished products &proper storing in cold storages &refrigerator-selection of suitable packaging material (K1, K2, K3, K4)

3.4 Packaging and storage for company items (K1, K2)

3.5 Transportation & marketing - Food safety like HACCP, ISO 22000, FSSAI (K1, K2)

3.6 Importance of Personal hygiene (K1, K2)

## **Unit-IV**

4.1 Identification of spoilage in fresh fruits and vegetables, application of remedial measures to prevent them (K1, K2, K4, K6)

4.2 Identification of spoilage in preserved fruit and Vegetables and remedial measures (K1, K2, K3, K4)

4.3 Identification of spoilage in food – bacteria, Yeast and Mold – remedial measures. (K1, K2, K3, K4)

4.4 Identification of spoilage in milk and Milk products. (K1, K2, K3, K4)

4.5 Identification of spoilage in food by insects – Identification of insects. (K1, K2, K3, K4)

4.6 Identification of food adulteration and Adulterated food. (K1, K2, K3, K4)

## **Unit-V**

- 5.1 Fleshy and sea food processing- Meat, Fish (K1, K2, K3, K4)
- 5.2 Fleshy and sea food processing- Poultry (K1, K2, K3, K4)
- 5.3 Fleshy and sea food processing-Egg (K1, K2, K3, K4)
- 5.4 Pre-Processing, processing and preservation- Smoking, Canning, drying (K1, K2, K3, K4)
- 5.5 Cooling, Dielectric Ohmic and infra-red heating (K1, K2)
- 5.6 Nutritional losses during processing and storage (K1, K2)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create]**

### **Recommended Reading:**

1. Siva Sankar, Food Processing and Preservation, Prentice hall of India Pvt Ltd, New Delhi. 3<sup>rd</sup> Printing, 2005
2. Panda H. The Complete Book on Fruits, Vegetables and Food Processing. NIIR Project Consultancy Service, 2013.
3. B. Srilakshmi. Food Science, New Age Publishers,2002
4. Meyer and Lillian Hoagland. Food Chemistry, New Age publication,2004
5. Bawa. A.S, Raju P.S, Chauhan O.P. Food Science. New India Publishing agency, 2013
6. Frazier WC and Westhoff DC. Food Microbiology, TMH Publication, New Delhi, 2004
7. Subbulakshmi and shoha A Udipi. Food Processing and Preservation. New Age International Publishers. New Age Publishers. 2006

### **Open Educational Resources (OER):**

1. <https://youtu.be/cNvIdbH0IaI>
2. <https://youtu.be/k-KHRJkVaGI>
3. <https://youtu.be/zh7CACofsio>
4. <https://youtu.be/pa32TWO5ucY>
5. <https://youtu.be/4-MBJwNgOak>

## INDEPENDENT ELECTIVE II A: HORTICULTURE

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / II	PIBCC20	Horticulture	Theory	Independent elective - III	-	2	40+60=100

### Objective:

To emphasis on the significance and concepts of horticulture and the techniques involved.

### Course Outcomes (CO)

On completion of the course, the students will be able to;

1. Recall the significance of horticulture
2. Outline the impact of soil nature on horticulture
3. Apply the concept of hybrid to enhance yield
4. Gain knowledge on cropping techniques and harvesting methods
5. Identify the role of gardening in common places

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	H	M	H	H	H	M
CO 3	H	H	M	M	L	M
CO 4	H	M	M	M	L	M
CO 5	H	H	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

### Unit-I

- 1.1 Horticulture – Definition, scope and importance, Division and classification of horticultural crops (K1, K2, K3, K4)
- 1.2 Propagation – definition, methods, seed propagation, vegetative propagation, micro propagation (K1, K2, K3, K5)
- 1.3 Planting systems – Protected cultivation (K1, K2)
- 1.4 Irrigation systems - Weed management – nutrient application methods in horticultural crops – crop regulation (K1, K2, K3, K5)
- 1.5 Maturity indices – harvesting methods, pre cooling – packaging (K1, K2, K3)
- 1.6 Storage of horticultural crops. (K1, K2, K3)

## **Unit-II**

- 2.1 Soil – definition – components – pedology –Edaphology. (K1, K2, K3)
- 2.2 Physical properties of soil – Color, Texture, structure, Bulk density, Particle density, Pore space; soil water, soil air, soil temperature and their significance in crop production. (K1, K2, K3, K4)
- 2.3 Soil chemical properties – Soil reaction, EC and CEC. Soil Organic Matter and its importance on soil properties – Essential nutrients for crop plants - Major, secondary and micro nutrients -Soils of Tamil Nadu. (K1, K2, K3, K4, K5)
- 2.4 Types – Straight, Complex, Compound, Mixed, Fortified and chelated fertilizers and their reactions in soil. (K1, K2, K3, K4, K5)
- 2.5 Techniques to enhance fertilizer use efficiently. (K1, K2, K3, K4, K5)
- 2.6 Soil fertility – INM and IPNS – Problem soils – acid, saline and alkaline soils- their formation, reclamation and management. (K1, K2, K3)

## **Unit-III**

- 3.1 Morphology and general anatomy of medicinally important plant parts: Roots, Stem and its modifications, Barks, Leaves, Flowers, Fruits, Seeds. (K1, K2)
- 3.2 Study of some medicinally important families (diagnostic features with examples of species of medicinal use): Paparveraceae, Rutaceae (K1, K2)
- 3.3 Study of some medicinally important families (diagnostic features with examples of species of medicinal use): Rubiaceae, Asteraceae, Solanaceae, Scrophulariaceae (K1, K2)
- 3.4 Study of some medicinally important families (diagnostic features with examples of species of medicinal use): Lamiaceae, Liliaceae, Fabaceae, Apiaceae (K1, K2)
- 3.5 Cultivation methods, Herbal pesticides, Harvesting and Storage. (K1, K2)
- 3.6 Marketing and general aspects of export of medicinally important plants (K1, K2)

## **Unit-IV**

- 4.1 Dry land horticulture – Importance, scope and distribution- Crops suitable for dry land systems – Important varieties, climate and soil requirements, commercial propagation methods (K1, K2)
- 4.2 Spacing and planting patterns - Cropping systems and intercropping – mulching - Soil and moisture conservation methods (K1, K2)
- 4.3 Anti transparent – Management of nutrients, water, weeds and problem soils (K1, K2)
- 4.4 Regulation of cropping – training and pruning methods - top working and rejuvenation (K1, K2)
- 4.5 Use of plant growth regulators (K1, K2)
- 4.6 Post harvest handling – Economics of production. (K1, K2)

## **Unit-V**

- 5.1 Scope and importance of ornamental gardening and landscaping –principles – formal and informal garden (K1, K2, K3)
- 5.2 Styles of garden - Features of garden - Garden components and adornments – plant Components - non plant components - garden walls, fencing, steps, garden drives and paths– sunken garden, roof garden, rockeries. (K1, K2, K3)
- 5.3 Operations in planting and maintenance of public garden, institutional garden, Industrial

garden, residential complex garden (K1, K2, K3)

5.4 Operations in landscape maintenance for high ways, bus terminus, airports, city roads and IT parks. (K1, K2)

5.5 Lawn – types of lawn grasses – criteria for selection- methods of lawn establishment – operation and maintenance – problems and remedial management (K1, K2, K3)

5.6 Flower arrangements and dry flowers – suitable plant (K1, K2)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create]**

**Recommended Reading:**

1. Kaushal Kumar Mishra and Rajesh Kumar. Fundamentals of Horticulture. Biotech Books, 2014
2. Prasad. Principles of Horticulture. AGROBIOS publisher, 2<sup>nd</sup> Edition, 2012
3. Ivan A Ross. Medicinal Plants of the World. Humana Publication, 5<sup>th</sup> Edition, 2005
4. Jitendra Singh. Fundamental to Horticulture. Kalyani Publisher, 2014.
5. Charles Adams, Mike Early, Jane Brook and Katherine Bamford. Principles of Horticulture. Routledge Publication, 2014
6. Kumar N. Introduction to Horticulture, Oxford and IBH Publication, New Delhi, 2011
7. Robert E White. Principles and Practice of Soil Science: The soil as a Natural Resource. Blackwell publishing, 4<sup>th</sup> Edition, 2005

**Open Educational Resources (OER):**

1. <https://youtu.be/RTR2RgMbJ-g>
2. <https://youtu.be/MUCk9FqjCBc>
3. <https://youtu.be/AAy5Z4zjgMU>
4. <https://youtu.be/iqOQTVGoLuI>
5. <https://youtu.be/K8a1RkIeick>

## INDEPENDENT ELECTIVE II B: CANCER BIOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / II	PIBCD20	Cancer Biology	Theory	Independent elective - IV	-	2	40+60=100

### Objectives:

To help students to understand the biology, diagnosis and treatment involved in cancer.

### Course Outcomes (CO):

On completion of the course, the students will be able to,

1. Describe the latest techniques in the diagnosis and treatment of cancer
2. Asses the contribution of environmental and genetic factors to cancer causation
3. Use inductive and deductive reasoning to evaluate the biological mechanisms that lead to the induction of cancer
4. Discuss the principle, clinical significance and cascade of metastasis
5. Examine the basic concepts of clinical research in oncology

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	M
CO 2	M	L	H	M	H	M
CO 3	M	H	M	H	H	L
CO 4	L	M	H	M	H	M
CO 5	H	H	H	H	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	H	M	M	L	H
CO 2	M	M	H	L	H	M
CO 3	H	L	M	H	L	M
CO 4	H	M	M	M	L	M
CO 5	L	M	M	M	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

### Unit I:

- 1.1 Introduction to Cancer Biology (K1, K2)
- 1.2 Different forms of cancers (K2, K3)
- 1.3 Cancer screening and early detection (K1, K2, K3)
- 1.4 Detection using biochemical assays (K2, K3)
- 1.5 Tumor markers (K1, K3)
- 1.6 Molecular tools for early diagnosis of cancer (K2, K3)

### Unit II:

- 2.1 Theory of Carcinogenesis (K1, K2)
- 2.2 Chemical carcinogenesis (K3)
- 2.3 Principles of physical carcinogenesis (K2, K3)
- 2.4 X-ray radiation (K3)

- 2.5 Mechanisms of radiation carcinogenesis (K1, K2, K3)
- 2.6 Diet and cancer (K2, K3)

**Unit III:**

- 3.1 Signal targets and cancer (K1, K2)
- 3.2 Activation of kinases; Oncogenes, identification of oncogenes, retroviruses and oncogenes (K2, K3)
- 3.3 Detection of oncogenes, Oncogenes/proto oncogene activity (K1, K2)
- 3.4 Growth factors related to transformation, Telomerases (K1, K2, K3)
- 3.5 Tumor suppressor genes (K1, K2)
- 3.6 Modulation of cell cycle in cancer (K2, K3)

**Unit IV:**

- 4.1 Principles of cancer metastasis (K1, K2)
- 4.2 Clinical significances of invasion (K2, K3)
- 4.3 Metastatic cascade (K1, K2)
- 4.4 Basement membrane disruption (K1, K2, K3)
- 4.5 Proteinases (K1)
- 4.6 Tumor cell invasion (K1, K2)

**Unit V:**

- 5.1 Different forms of therapy, chemotherapy, radiation therapy (K1, K2)
- 5.2 Detection of cancers (K1, K2)
- 5.3 Prediction of aggressiveness of cancer (K2, K3)
- 5.4 Advances in cancer detection (K3)
- 5.5 Use of signal targets towards therapy of cancer (K1, K2, K3)
- 5.6 Gene therapy (K1, K3)

**Recommended Reading:**

1. Robert A. Weinberg - The Biology of Cancer - W. W. Norton & Compan - 2<sup>nd</sup> edition 2013
2. Robin Hesketh -Introduction to cancer Biology - Cambridge University Press - 1<sup>st</sup> edition - 2103
3. Lauren Pecorino - Molecular Biology of Cancer - Oxford University Press - 3<sup>rd</sup> edition - 2012
4. Dunmock N.J and Primrose S.B - Introduction to Modern Virology - John Wiley & Sons – 6<sup>th</sup> Revised edition, 2006
5. David P Clark and Nanette J Pazdernik – Biotechnology: Applying genetic revolution - Academic Cell – 1<sup>st</sup> edition, 2010
6. Eric Sikorski, George Plopper - Lewin’s Cells - Jones & Bartlett Learning, LLC – 3<sup>rd</sup> edition, 2013

**Open Educational Resources (OER):**

1. <https://youtu.be/MqW3uUCj0-A>
2. <https://youtu.be/w4w2VTQqyMM>
3. [https://youtu.be/C-Njz\\_iSvLI](https://youtu.be/C-Njz_iSvLI)
4. <https://youtu.be/8LhQllh46yI>
5. <https://youtu.be/aO4-KFEz8NE>

## INDEPENDENT ELECTIVE III A: NANOBIO TECHNOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	PIBCE20	Nanobiotechnology	Theory	Independent elective - V	-	2	40+60=100

### Objective:

The course aims to provide an interdisciplinary knowledge on Nano materials and their applications in biosciences.

### Course Outcome (CO)

On completion of the course, the students will be able to;

1. Apply the essential role of Nanoscience
2. Outline the prospective of Nano biology and Nano sensors
3. Discuss the Nanoparticle drug base delivery systems
4. Create knowledge to develop Nanomaterials
5. Identify the role of plants in Nanoparticle synthesis

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	M	M	L	H	M	M
CO 2	M	H	M	L	H	H
CO 3	L	L	M	H	H	L
CO 4	H	M	H	M	M	H
CO 5	H	L	M	H	M	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	L	H	M	L
CO 2	L	H	H	M	L	M
CO 3	M	L	M	H	L	M
CO 4	H	M	L	M	H	L
CO 5	H	L	H	H	M	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

### Unit I:

- 1.1 Introduction to Biocompatibility (K2, K3, K4)
- 1.2 Antibacterial Activity-Principles and Applications (K2, K3, K4)
- 1.3 Biomaterial Nano Circuitry-Protein based Nano circuitry (K3, K4)
- 1.4 Neurons for network formation of DNA (K2, K4)
- 1.5 Nanostructures for mechanics and DNA based computation (K3, K4)
- 1.6 DNA based Nano mechanical devices- Applications (K2, K3)

**Unit II:**

- 2.1 Interaction between Biomolecules and Nanoparticle surface (K3, K4)
- 2.2 Different types of inorganic material used for the synthesis of Hybrid Nano-bio assemblies (K2, K3, K4)
- 2.3 Analytical applications of Nano in Biology and Nano probes (K3, K4)
- 2.4 A new methodology in medical diagnostics and biotechnology (K4)
- 2.5 Current status of Nano biotechnology (K3, K4)
- 2.6 Future prospective of Nano biology and Nano sensors (K2, K3, K4)

**Unit III:**

- 3.1 Development of Nano medicines and Nano systems (K3, K4)
- 3.2 Protocols for Nano drug administration (K3, K5)
- 3.3 Materials used in diagnostics and therapeutic applications of nanotechnology (K3, K4)
- 3.4 Molecular Nano mechanics (K3, K4)
- 3.5 Molecular devices in Nanotribology (K2, K3, K4)
- 3.6 Applications of Nanotribology (K3, K4)

**Unit IV:**

- 4.1 Molecular and cellular biology applications (K2, K3, K4)
- 4.2 2-D electrophoresis (K2, K3)
- 4.3 Mass spectrophotometer of proteins (K3, K4)
- 4.4 Protein Microarrays -Fabrication-Fluorescence detection (K2, K3)
- 4.5 Binding assays and Immunosensors (K3, K4)
- 4.6 Integrated Nano biotechnology systems (K2, K3, K4)

**Unit V:**

- 5.1 Use of Bacteria, Fungi in Nanoparticle synthesis (K3, K4)
- 5.2 Actinomycetes for Nanoparticle synthesis (K3, K4)
- 5.3 Magneto tactic Bacteria for Natural synthesis of Magnetic Nanoparticles (K2, K3, K4)
- 5.4 Viruses as components for the formation of Nanostructured Materials (K4)
- 5.5 Process and applications of Nanostructured materials (K3, K4)
- 5.6 Role of plants in Nanoparticle synthesis (K2, K3, K4)

**]Recommended Reading:**

1. G. Cao-Nanostructure and Nanomaterial's Synthesis, Properties and Applications-Imperial College Press- 2<sup>nd</sup> Edition,2011
2. G. J. Leggett, R. A .L. Jones-Bio nanotechnology in Nano scale and technology- John Willey &Sons- 3<sup>rd</sup> Edition,2015
3. D.S. Goodsell- Bionanotechnology-John Willey and Sons- 3<sup>rd</sup> Edition,2005
4. 2. H.S. Nalw- Encyclopedia of Nanoscience and Nanotechnology- American scientific publishers- 4<sup>th</sup> Edition, 2004.
5. Robert. A. Freitas-Nano medicine, Vol-II Biocompatibility-CRC Pres-3<sup>rd</sup> Edition, 2003
6. Massimiliano Diventra, Introduction to Nanoscale Science and Technology- 2007
7. Sergey Edward Lyshhevski-Nanoscience and Nanotechnology 4<sup>th</sup> Edition,2005

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=irGJ6dmcZfI>
2. <https://www.youtube.com/watch?v=uUDWK4MGcr0>
3. <https://www.youtube.com/watch?v=aFU5Qx-cLu8>
4. <https://www.youtube.com/watch?v=3wFh0z7so8w>
5. <https://www.youtube.com/watch?v=EvqAmrIkV1s>

### INDEPENDENT ELECTIVE III B: STEM CELL TECHNOLOGY

Year/ Sem II/III	Course Code	Title of the Course Stem Cell Technology	Course Type Theory	Course Category Independent elective	H/W	Credits	Marks 100 40+60=100
	PIBCF20				-	2	

#### Objectives:

The course gives in depth knowledge on stem cell biology, regulation of stem cell differentiation, tools to study and its utilization in treating various disorders

#### Course Outcomes (CO):

On completion of the course, the students will be able to;

1. Relate the importance of stem cell therapy
2. Apply the concept of stem cell development
3. Analyze the importance of ethics in stem cell and gene therapy
4. Use hematopoietic stem cells in treating blood related disorders and diseases
5. Identify the importance of various stem cells in therapeutic applications

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	H	H	M	H
CO 2	M	H	L	M	M	H
CO 3	M	M	M	H	H	M
CO 4	L	M	L	M	L	M
CO 5	L	H	M	M	L	L
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	H	H	M	H
CO 2	M	L	M	M	M	H
CO 3	L	M	M	H	H	L
CO 4	H	H	L	H	L	M
CO 5	L	H	M	M	H	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

#### Unit I:

- 1.1 Stem cell- Introduction, definition, properties of stem cell -self renewal, clonality and plasticity (K1, K2)
- 1.2 Proliferation, culture of stem cells (K1, K2)
- 1.3 Classification of stem cell (K1, K2)
- 1.4 Sources of stem cell-Fetus and various adult tissues (K1, K2)
- 1.5 Advantages of stem cell, medical applications of stem cells (K1, K2)
- 1.6 Cryopreservation of stem cells – Conventional slow- freezing method and Vitrification method. (K1, K2, K3)

## **Unit II:**

- 2.1 Stem cell and their development potentials. (K1, K2)
- 2.2 Xenofree derivation of stem cells- Alternative feeder cells and feeder free culture. (K1, K2)
- 2.3. Blastocyst culture- Various stages of embryonic development. In vitro fertilization. (K1, K2, K3)
- 2.4 In vivo and invitro differentiation of stem cells. (K1, K2, K3)
- 2.5 Pluripotent nature of stem cell- Extrinsic and intrinsic factors, Karyotyping. (K1, K2, k3, K4)
- 2.6 Expression of cell surface markers. (K1, K2, K3, K4)

## **Unit III:**

- 3.1 Gene Therapy: Introduction, History and evolution of Gene therapy, optimal disease targets. (K1, K2)
- 3.2 Failures and successes with gene therapy and future prospects. (K1, K2)
- 3.3 Genetic Perspectives for Gene Therapy, Gene Delivery methods: Viral vectors and Non-viral Vectors (K1, K2)
- 3.4 Therapeutic cloning strategies, derivation and propagation of human embryonic stem cells. (K1, K2, K3)
- 3.5 Reproductive cloning by SCNT. Use of SCNT. Limitations of cloning – Hurdles to improve the efficiency of therapeutic cloning. (K1, K2, K5)
- 3.6 Stem cell research and ethics – translational medicine ethics. (K1, K2, K3)

## **Unit IV:**

- 4.1 Hematopoietic stem cells (HSC) - Basics, Development and Regulation of HSC. (K1, K2)
- 4.2 Clinical Application of HSC – Gene Therapy – using haematopoietic stem cells HSC for Leukemia. (K1, K2)
- 4.3 Mesenchymal stem cells (MSC) - Differentiation and Identification. (K1, K2, K3)
- 4.4 Characteristics of mesenchymal stem cells. (K1, K2)
- 4.5 Clinical applications of stem cells. Stem cells and regenerative medicine. (K1, K2)
- 4.6 Ips –induced pluripotent stem cells. (K1, K2)

## **Unit V:**

- 5.1 Skeletal Muscle Stem Cells – Development and functions. (K1, K2)
- 5.2 Liver stem cells – Organization and functions. Tumor stem cells – Basics differences and Similarities of cancer stem cells and stem cells. (K1, K2)
- 5.3 Cancer stem cell signaling – NOTCH pathway. (K1, K2)
- 5.4 Canonical Wnt signaling pathways in hematopoietic stem cells. (K1, K2, K5)
- 5.5 Stem cell therapies in animal models. (K1, K2)
- 5.6 Mammary stem cells – intestinal stem cells -keratinocyte stem cells of cornea (K1, K2)

## **Textbooks:**

- 1.Prasad.S. Koka-Stem cell Research-Nova Science Publishers, 2004
- 2.Nandhini G-Stem cells-Jaypee Brothers Medical Publishers, 2011

**References:**

1. Robert Lanza-Essential of Stem cells Biology-2<sup>nd</sup> Edition, 2009
2. Mehmet.R. Topcul-Stem cells in cell therapy and Regenerative medicine-OMICS international publications, 2018
3. Christine Mummery-Stem Cells-Academic press-2<sup>nd</sup> Edition, 2014
4. Jonathan M..W.Slack-The science of stem cells-John Willey & Sons, 2017
5. Nibedita Lenka-Pluripotent Stem cells-BOD publishers, 2013

**Open Educational Resources (OER)**

1. <https://youtu.be/IuLGOhGjFCA>
2. <https://youtu.be/h3QDqsM1ZFM>
3. <https://youtu.be/SE7Fi8jM8ho>
4. <https://youtu.be/fR661sBqINM>
5. <https://youtu.be/ZamfqFfcnEI>

## INDEPENDENT ELECTIVE IV A: PSYCHOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	PIBCG20	Psychology	Theory	Independent elective	-	2	40+60=100

### Objectives:

The course is aimed to enhance the psychological skills for the students to acquire factual knowledge and ability to conceptualize and apply in their life.

### Course Outcome (CO)

1. Apply the principles of psychology in day-to-day life for a better understanding of oneself and others.
2. Compare and Contrast the biological basis of memory and forgetting.
3. Describe Language acquisition and the role Language plays in Communication and Thought.
4. Recognize the importance of Learning and Motivation.
5. Critically evaluate the fundamental processes underlying human behavior.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	M	M	L	M	M
CO 2	H	M	L	M	H	L
CO 3	M	H	M	M	H	M
CO 4	M	H	M	L	M	L
CO 5	H	H	L	H	H	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	H	M	M	L	H	M
CO 2	H	L	L	M	H	L
CO 3	H	H	M	M	H	L
CO 4	H	H	M	H	H	H
CO 5	H	H	L	H	H	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

### Unit I:

- 1.1 Psychology - Definition and Origin (K2)
- 1.2 Nature and Scope of Psychology (K2)
- 1.3 Psychology as a Science (K2)
- 1.4 Specialties in Psychology (K2)
- 1.5 Perspectives in Psychology (K2)
- 1.6 Goals of Psychology (K2)

### Unit II:

- 2.1 Methods of assessment in Psychology – Questionnaire (K2, K3, K4, K6)
- 2.2 Memory – Stages in memory (K2, K3)
- 2.3 The modal model of memory (K2, K3)

- 2.4 Forgetting – Types (K2)
- 2.5 Common causes of forgetfulness (K2)
- 2.6 Memory disorder (K2)

### **Unit III:**

- 3.1 Basic elements of thought (K2, K3)
- 3.2 Types of Concept and Concept formation (K2)
- 3.3 Reasoning – Types, Decision making and problem solving (K2, K3)
- 3.4 Creative thinking – Nature and Characteristics (K2, K3)
- 3.5 Artificial Intelligence (K2, K3)
- 3.6 Language – Nature and Development of Language (K2, K3, K4, K5)

### **Unit IV:**

- 4.1 Learning – Nature (K2, K3)
- 4.2 Classical Conditioning – Principle and Applications (K2, K3, K4, K5)
- 4.3 Operant Conditioning – Principle and Applications (K2, K3, K4, K5)
- 4.4 Biological factors in Learning (K2, K3)
- 4.5 Basic Concepts of Motivation (K2, K3)
- 4.6 Indicators of Motivation (K2, K3)

### **Unit V:**

- 5.1 Emotion – Components of Emotion. (K2, K3)
- 5.2 Characteristics and Functions of Emotion (K2, K3, K5)
- 5.3 Physiology of Emotion – Expression and Control (K2, K3, K5)
- 5.4 Personality – Definition – Types (K1, K2, K3)
- 5.5 Assessment of Personality (K2, K3, K4)
- 5.6 States of Consciousness (K2)

**[Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create]**

### **Recommended Reading:**

1. Baron .R.A - Psychology - Pearson
2. Lahey .B. B - Psychology: An Introduction - Tata Mc Graw Hill – 10<sup>th</sup> Edition, 2008
3. Feldman .R. S - Understanding Psychology - Tata Mc Graw Hill– 14<sup>th</sup> Edition, 2019
4. Bootzin, R. R., Bower, G. H., Crocker, J., & Hall, E - Psychology Today: An Introduction - Mc Graw Hill.
5. Balachandran, M - Psychology for Nursing Students - Maanas
6. Parameshwaran, E. G. & Beena, C - An Invitation to Psychology – 1<sup>st</sup> Edition, 2016 - Neelkamal.

### **Open Educational Resources (OER)**

1. <https://youtu.be/H3BGRuqRceU>
2. <https://youtu.be/yuZAUJbjgLU>
3. <https://youtu.be/Z8Duz6MzB1U>
4. <https://youtu.be/H6LEcM0E0io>
5. <https://youtu.be/NXcWZnQPuXw>

## INDEPENDENT ELECTIVE IV B: ENTREPRENEURIAL BIOCHEMISTRY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	PIBCH20	Entrepreneurial Biochemistry	Theory	Independent elective	-	2	40+60=100

### Objectives:

The course provides detailed knowledge on ideas, opportunities and components necessary for bio-entrepreneurship.

### Course Outcome (CO):

On completion of the course, the students will be able to;

1. Describe the dynamic role of entrepreneurship and small business.
2. Identify and implement the role of entrepreneur towards society.
3. Create and explain innovative business ideas and market opportunities.
4. Generate bio-entrepreneurship and describe its components and forms.
5. Develop and validate skills needed to run a business successfully.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
CO 1	H	L	M	H	H	M
CO 2	H	M	L	L	H	H
CO 3	M	H	M	H	M	L
CO 4	L	M	H	M	L	M
CO 5	M	L	M	H	L	M
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

CO / PSO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO 1	L	M	M	H	H	L
CO 2	H	H	H	L	M	H
CO 3	M	M	L	M	H	M
CO 4	H	H	H	M	L	L
CO 5	L	L	M	H	L	H
<b>H- High (3), M-Medium (2), L-Low (1)</b>						

### Unit I:

- 1.1 Entrepreneurship - concept - Need and importance (K1, K2, K3)
- 1.2 Entrepreneurship in economic growth (K1, K2, K3)
- 1.3 Factors affecting Entrepreneurship (K1, K2, K4)
- 1.4 Entrepreneurship journey: Self assessment of Qualities, Skills, Resources and Dreams (K1, K2, K3, K4, K5)
- 1.5 Entrepreneurial values- attitudes and motivation (K1, K2, K3, K4)
- 1.6 Challenges faced by women in entrepreneurship. (K2, K4)

**Unit II:**

- 2.1 Difference between Entrepreneur and Intrapreneur. (K1, K2)
- 2.2 Social Entrepreneurship – Concept and Importance (K2, K3, K4, K6)
- 2.3 Role of society and family in the growth of an entrepreneur (K2, K3, K4)
- 2.4 Role of technology / social media in creating new support structure for promoting entrepreneurship (K1, K2, K3, K4)
- 2.5 Feasibility study and Opportunity assessment - Managerial and Locational feasibility (K2, K3, K4, K5)
- 2.6 Market: Traditional and E-commerce concept. (K1, K2, K3, K4, K5, K6)

**Unit III:**

- 3.1 Business plan preparation and Execution (K1, K2, K3, K4, K6)
- 3.2 Content of a Business plan – Project Report (K1, K2, K3, K4)
- 3.3 Role of the medical laboratory technician (K1, K2, K3)
- 3.4 Introduction to Hematology (K1, K2, K3)
- 3.5 Introduction to Clinical Pathology (K1, K2, K3)
- 3.6 Introduction to Histopathology (K1, K2, K3)

**Unit IV:**

- 4.1 Agri-clinic – Hybrid seeds: overview (K1, K2, K3)
- 4.2 Vermi compost -Biopesticide manufacturing: overview (K1, K2, K3)
- 4.3 Horticulture Crops: overview (K1, K2, K3)
- 4.4 Food processing: overview (K1, K2, K3)
- 4.5 Value addition of food products (K1, K2, K3)
- 4.6 Livestock production–Sericulture: overview (K1, K2, K3)

**Unit V:**

- 5.1 Risk factor - Types of Business risk (K1, K2, K3)
- 5.2 Financial planning (K1, K2, K3, K4)
- 5.3 Developing Marketing Strategies – Franchising, Trade mark registration – Patent registration (K1, K2, K3, K6)
- 5.4 Entrepreneurship support Institution and Schemes – MSME – NABARD – KVIC – DIC, NSIC, Support to Training and Employment Programme for Women (STEP) (K1, K2, K3)
- 5.5 Biotechnology Industry Research Assistance Council (BIARC) Start up India - Make in India. (K1, K2, K3)
- 5.6 Success stories of Entrepreneurs. (K1, K2)

**Recommended Reading:**

1. Bygrave W., & Zacharakis, A –Entrepreneurship - Wiley - 4<sup>th</sup> Edition, 2017
2. Donald F. Kuratko -Entrepreneurship – Theory, Process and Practice - Cengage learning - 9<sup>th</sup> Edition, 2014
3. Khanka S.S - Entrepreneurial Development - Margham Publication - 1<sup>st</sup> Edition, 2016
4. Rajeev Roy - Entrepreneurship - Oxford University Press - 2<sup>nd</sup> Edition, 2011
5. Hisrich RD, Peters MP - Entrepreneurship –Tata McGraw – Hill - 8<sup>th</sup> Edition, 2013

6. Eric, Reis The startup way: How Entrepreneurial Management Transform Culture and Devices growth, 2017

**Open Educational Resources (OER)**

1. <https://www.investopedia.com/terms/e/entrepreneur.asp>
2. <https://youtu.be/1ecKK3S8DOE>
3. <https://youtu.be/Fqch5OrUPvA>
4. [https://youtu.be/rDMD\\_tH8IFI](https://youtu.be/rDMD_tH8IFI)
5. <https://msme.gov.in/all-schemes>
6. [www.businessmanagementideas.com](http://www.businessmanagementideas.com)

# Department of Microbiology (PG)

## SYLLABUS AND REGULATIONS

Under

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)*

**Gandhi Nagar, Vellore-632 006.**

**AUXILIUM COLLEGE (Autonomous)**(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)**Gandhi Nagar, Vellore – 632006****OUTCOME BASED EDUCATION****M.Sc. MICROBIOLOGY****(Effective for the students admitted from the academic year 2020-2021)****LIST OF COURSES****Structure of the Course and the Scheme of Examinations**

SEM	Code	Title of the Paper	Hrs/ week	Exam hours		Credits	Max.Marks		
				Th	Pr		CIA	SEM	TOT
<b>I</b>	PCMBA20	General Microbiology	6	3	-	5	40	60	100
	PCMBB20	Food, Agriculture and Environmental Microbiology	6	3	-	5	40	60	100
	PCMBC20	Immunology and Immunotechnology	5	3	-	5	40	60	100
	PCMBG20	Practical-I: Main practical - I	5	-	-	-	-	-	-
	PCMBH20	Practical -II: Main practical -II	5	-	-	-	-	-	-
	PEMBA20	Elective -I A:Petroleum Microbiology	3	3	-	3	40	60	100
	PEMBB20	Elective -I B:Economic Microbiology							
	PIMBA20	IEC-I: Public Health Microbiology	-	-	-	2 Addn	40 Addn	60 Addn	100 Addn
	PIMBB20	IEC-II: Animal Tissue culture							
<b>TOTAL</b>						<b>18</b>	<b>160</b>	<b>240</b>	<b>400</b>

SEM	Code	Title of the Paper	Hrs/ week	Exam hours		Credits	Max.Marks		
				Th	Pr		CIA	SEM	TOT
<b>II</b>	PCMBF20	Medical Microbiology	5	3	-	5	40	60	100
	PCMBG20	Microbial Physiology and Biomolecules	5	3	-	4	40	60	100
	PCMBH20	Industrial and Pharmaceutical Microbiology	5	3	-	4	40	60	100

	PCMBG20	Main practical –I: Applied Microbiology and Immunology	5	-	6 hr/day 2days	5	40	60	100
	PCMBH20	Main practical –II : Medical Microbiology	5	-	6 hr/day 2days	5	40	60	100
	PEMBC20	Elective-II A: Biological Techniques	3	3	-	3	40	60	100
	PEMBD20	Elective II- B: Human Anatomy and Physiology							
	PNHRA20	Human Rights (compulsory)	2	3	-	2	40	60	100
	PIMBC20	IEC-III: Haematology and Blood banking	-	-	-	2 Addn	40 Addn	60 Addn	100 Addn
	PIMBD20	IEC-IV: Forensic Science							
<b>TOTAL</b>						<b>28</b>	<b>280</b>	<b>420</b>	<b>700</b>
<b>III</b>	PCMBI20	Molecular Biology and Microbial Genetics	6	3	-	4	40	60	100
	PCMBJ20	Advanced Microbiology	6	3	-	4	40	60	100
	PCMBK20	Research Methodology	5	3	-	4	40	60	100
	PCMBN20	Practical III:Main practical –III	5	-	-	-	-	-	-
	PCMBO20	Practical IV: Main practical -IV	5	-	-	-	-	-	-
	PEMBE20	Elective III A: Bioinoculant Technology	3	3	-	3	40	60	100
	PEMBF20	Elective III B:Fungal biotechnology and Bioprospecting							
	PGTRA20	Teaching And Research Aptitude	-	3	-	3	40	60	100
	PIMBE20	IEC-V: Entrepreneurship and Management in Microbial Technology	-	-	-	2 Addn	40 Addn	60 Addn	100 Addn
	PIMBF20	IEP-VI: Cyanobacteriology							
<b>TOTAL</b>						<b>18</b>	<b>160</b>	<b>240</b>	<b>400</b>
<b>IV</b>	PCMBL20	Microbial Gene Technology	6	3	-	4	40	60	100
	PCMBM20	Bioethics and Biosafety	6	3	-	4	40	60	100
	PCMBN20	Main practical –III: Genetic Engineering	5	-	6 hr/day 2days	5	40	60	100
	PCMBO20	Main practical –IV : Textile and Cosmetic Microbiology	5	-	6 hr/day 2days	5	40	60	100
	PEMBG20	Elective IV-A: Taxonomy	3	3		3	40	60	100

		and Microbial Biodiversity							
	PEMBH20	Elective IV-B: Microbial Nanotechnology							
	PCMBP20	Project Dissertation with Viva- voce	5	-	-	5	50	150	200
<b>TOTAL</b>						<b>26</b>	<b>250</b>	<b>450</b>	<b>700</b>
<b>GRAND TOTAL</b>						<b>90</b>			<b>2200</b>

### **PROGRAMME OUTCOMES (PO)**

On completion of the PG Programme, students will be able to:

- PO1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.
- PO2:** Assimilate and apply principles and concepts towards skill development and employability.
- PO3:** Apply critical and scientific approaches to address problems and find solutions.
- PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.
- PO5:** Integrate issues of social relevance in the field of study.
- PO6:** Persist in life-long learning for personal and societal progress.

### **PROGRAMME SPECIFIC OUTCOMES (PSO):**

On completion of the PG Programme in Microbiology, students will be able to;

- PSO1:** Attain an in-depth knowledge in the anatomy and physiology of a repertoire of microorganisms with its beneficial and harmful associations.
- PSO2:** Demonstrate practical skills in the use of tools, technologies and methods common to microbiology, and apply the scientific method and hypothesis testing in the design and execution of experiments.
- PSO3:** Develop ability to independently carry out a complete scientific work process with research ethics, including the understanding of theoretical background, hypothesis generation, collection and analysis of data, and interpretation and presentation of results.
- PSO4:** Acquaint a broader knowledge in the concepts of Taxonomy, molecular biology, immunology, food, environment and agricultural microbiology, nanotechnology, forensic science and genetic engineering.
- PSO5:** Incorporate effective career with marketing, project management, business development or venture capital within the biotech, pharmaceutical, medical technology or related fields.
- PSO6:** Compete in state/national level competitive exams to pursue higher study with an understanding that education is life-long process for personal and societal progress.

<b>PSO/PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>PSO1</b>	H	M	M	H	L	M
<b>PSO2</b>	H	H	H	H	L	M
<b>PSO3</b>	H	M	H	H	M	L
<b>PSO4</b>	H	M	M	H	L	H
<b>PSO5</b>	H	H	L	M	M	H
<b>PSO6</b>	H	H	H	H	H	H

**H – HIGH (3)**

**M – MODERATE (2)**

**L – LOW (1)**

## SEMESTER – I

### PCMBA20 - GENERAL MICROBIOLOGY

<b>Year I SEM: I</b>	<b>Course Code</b> PCMBA20	<b>Title Of The Course</b> General Microbiology	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objective:

To provide an in depth knowledge on the fundamentals of Microbiology, microscopy and anatomy cum physiology of bacteria, fungi, algae, protozoa, virus

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline history and recent developments in the field of Microbiology.

**CO2:** Demonstrate and utilize working of different laboratory instruments.

**CO3:** Acquire knowledge on the sample preparation and perform various staining techniques.

**CO4:** Discuss important taxonomical aspects of bacteria, fungi, algae and virus.

**CO5:** Compile bacterial anatomy and physiology and structural properties of algae and fungi.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	H	L	M
CO2	H	H	L	M	L	H
CO3	H	H	H	H	M	H
CO4	H	M	L	H	L	H
CO5	H	L	M	H	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	L	M	L	M
CO2	H	H	H	M	M	M
CO3	H	H	L	M	L	M
CO4	H	M	M	H	L	M
CO5	H	M	M	H	L	M

**H – High (3), M – Moderate (2), L – Low (1)**

#### COURSE SYLLABUS

##### UNIT-I: History and Recent Developments.

(10 hours)

- 1.1 Discovery of Microbial world. (K1,K2)
- 1.2 Controversy over spontaneous generation.(K1,K2)
- 1.3 Evolutions of Microbiology with its recent developments in Medicine.(K1,K2,K3)
- 1.4 Role of Microbes in transformation of organic matter. (K1,K2,K3,K4)
- 1.5 Role of microbes in causing diseases. (K1,K2)
- 1.6 Modern trends in microbial taxonomy. (K2,K3,K4,K5)

**UNIT-II: Instrumentation and Staining Methods.****(20 hours)**

- 2.1 Microscopy - Its principles and applications. Simple - Compound, Dark field, phase contrast, Fluorescent and confocal. (K1,K2,K3)
- 2.2 Electron Microscopes - SEM, TEM. (K1,K2,K3)
- 2.3 Principles, Operation and maintenance of autoclaves, Ovens, Centrifuges - refrigerated & ultra-speed. (K1,K2,K3)
- 2.4 Calorimeters, spectrophotometers, lyophilizers, deep freezer. . (K1,K2,K3)
- 2.5 Staining methods - Gram, Acid Fast, spore, metachromatic granules, capsule and flagella.(K1,K2,K3)
- 2.6 Sterilization and disinfection methods and their quality control. . (K1,K2,K3)

**UNIT-III: Classification of Bacteria and Virus.****(15 hours)**

- 3.1 Classification of bacteria and salient features according to Bergey's manual of determinative Bacteriology. (K1,K2,K3,K4)
- 3.2 Microbial diversity in different ecosystems. (K1,K2)
- 3.3 Halophiles, mesophiles, thermophiles.(K1,K2)
- 3.4 Acidophiles Alkalophiles, barophiles and other extremophiles. .(K1,K2)
- 3.5 Structure and function of viruses. .(K1,K2)
- 3.6 Classification of viruses - replication of viruses – bacteriophages. (K1,K2)

**UNIT-IV: Bacterial Anatomy and Physiology.****(15 hours)**

- 4.1 Bacterial morphology, structure and characterization - cellular components of bacteria. (K1,K2)
- 4.2 Sporulation and its mechanics. (K1,K2)
- 4.3 Growth and nutrition - Nutritional requirements - Autotrophs, heterotrophs - enrichment culture. (K1,K2, K3,K4)
- 4.4 Growth curve - Kinetics of Growth - Mathematical expression of exponential growth phase. (K1,K2, K3,K4)
- 4.5 Measurement of growth and growth yields - Batch Culture - Synchronous growth. (K1,K2, K3,K4)
- 4.6 Techniques of pure culture. (K2, K3,K4)

**UNIT-V: Structure and Reproduction of Algae and Fungi.****(15)**

- 5.1 Classification of fungi according to Alexopoulos and Mims. (K1,K2)
- 5.2 Cell structure, specialized somatic structure. (K1,K2)
- 5.3 Life cycles and reproduction of fungi - Asexual, sexual and parasexual cycle. (K1,K2)
- 5.4 Mechanisms of growth in Fungi, Measurement and kinetics of growth, nutritional and environmental requirements; Prevention of fungal growth. (K1, K2, K3)
- 5.5 Structure and reproduction of *Spirogyra*, *Euglena*, *Exuviaella*, (K1,K2)
- 5.6 Structure and reproduction of *Diatoms*, *Sargassam* and *Porphyra*. (K1,K2)

## **TEXT BOOKS:**

1. Pelczar Jr .M.J., Chan E.C.S and Kreig, N.R (2006). Microbiology. 6<sup>th</sup> Edition, Mc Graw Hill Inc., Newyork.
2. Lansing M. Prescott, John P. Harley, Donald Klein. (2011) .Microbiology. 8<sup>th</sup> Edition, McGraw Hill Inc., New York.

## **REFERENCE BOOKS:**

1. Dubey R.C and Maheswari D.K (2012). A Text of Microbiology. Revised edition, S.Chand & Company Ltd., New Delhi.
2. Geeta Sumbali and Mehrotra R.S (2009). Principles of Microbiology. 1<sup>st</sup> edition, Tata McGraw Hill P. Ltd., New Delhi.
3. Robert F. Boyd (2000). General Microbiology. 2<sup>nd</sup> Edition, Times Mirror / Moshy College publishing, Virginia.
4. Salle, AJ (2010). Fundamentals & Principles of Bacteriology. 9<sup>th</sup> edition. Tata McGraw-Hill, New Delhi.
5. Purohit SS (2010). Microbiology - Fundamentals and Applications. Student Edition Publishers, Jodhpur.
6. Alexopoulos C J and C W. Mims. (1993). Introductory Mycology. 3<sup>rd</sup>edition. WileyEastern Ltd, New Delhi.
7. Mehrotra RS and Aneja KR (2006). An Introduction to Mycology. 1<sup>st</sup> edition, New age international publishers, Chennai.
8. Bajpai P.K (2010). Biological Instrumentation and Methodology. Revised edition, S.Chand& Co.Ltd., New Delhi.
9. John G Webster (2004). Bioinstrumentation. Student edition. John Wiley and Sons, Ltd., New Delhi.

## **OER:**

### E-books

1. [www.gutenberg.org](http://www.gutenberg.org)
2. [www.free-ebooks.net](http://www.free-ebooks.net)
3. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)

### Video lessons

1. [www.learnerstv.com](http://www.learnerstv.com)
2. [www.webcast.berkeley.edu](http://www.webcast.berkeley.edu)
3. [www.cosmolearning.org](http://www.cosmolearning.org)

**PCMBB20: FOOD, AGRICULTURE AND ENVIRONMENTAL  
MICROBIOLOGY**

<b>Year: I SEM: I</b>	<b>Course Code</b> PCMBB20	<b>Title of The Course</b> Food, Agriculture and Environmental Microbiology	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Objective:**

To make the students familiarize on Food, Agriculture and Environmental aspects of Microbiology.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Analyse the principles in food preservation.

**CO2:** Communicate diseases associated with food.

**CO3:** Discuss the role of microorganisms in soil and microbial interaction.

**CO4:** Utilize the knowledge on biogeochemical cycles to produce biofertilizers.

**CO5:** Assess information about microbiological quality of air and water.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	M	L	H	M
<b>CO2</b>	H	L	L	M	L	H
<b>CO3</b>	H	H	M	H	L	H
<b>CO4</b>	H	L	L	M	M	H
<b>CO5</b>	H	H	M	H	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	M	L	H	M
<b>CO2</b>	H	M	M	L	L	H
<b>CO3</b>	H	H	M	H	L	H
<b>CO4</b>	H	L	L	L	M	H
<b>CO5</b>	H	H	M	H	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

**COURSE SYLLABUS**

**UNIT-I: Food Microbiology.**

**(15 hours)**

1.1 Importance of studying Food microbiology- Primary sources of microorganisms in foods. (K1,K2)

1.2 Factors influencing microbial growth in foods - extrinsic and intrinsic.(K1,K2)

1.3 Principles of food preservation - preservation methods - irradiation - drying, heat processing, chilling and freezing, high pressure, modification of atmosphere and chemical preservatives. (K1,K2,K3,K4)

- 1.4 Nutritional value of fermented foods. (K2,K3,K4,K5,K6)
- 1.5 SCP and their uses. (K1,K2,K3)
- 1.6 Contamination, preservation and spoilage of fruits, vegetables, meat and poultry products. (K1,K2,K3)

**UNIT-II: Dairy Microbiology. (15 hours)**

- 2.1 Microbiology of fermented milk - Starter lactic cultures (K1,K2)
- 2.2 Fermented milk products (cheese, yoghurt, acidophilus milk, kefir, kumis). (K1,K2,K3)
- 2.3 Food sanitation in food manufacture and in the retail trade. (K1,K2,K3)
- 2.4 (HACCP) - Food control agencies and its regulations. (K1,K2,K3)
- 2.5 Food borne disease.(K1,K2)
- 2.6 Milk borne diseases. (K1,K2)

**UNIT-III: Soil Microbiology. (15 hours)**

- 3.1 Distribution of soil microorganisms in soil. (K1,K2)
- 3.2 Factors influencing the soil microflora. (K1,K2)
- 3.3 Role of microorganisms in soil fertility. (K1,K2)
- 3.4 Interactions among microorganisms, mutualisms, commensalism, competition, amensalism, parasitism, predation. (K1,K2)
- 3.5 Interactions between microbes and plants - rhizosphere, phyllosphere. (K1,K2)
- 3.6 Mycorrhizae, root nodule bacteria. (K1,K2,K3,K4)

**UNIT-IV: Biogeochemical cycle and Biofertilizers. (15 hours)**

- 4.1 Biogeochemical - carbon cycle - role of microbes in carbon cycle.(K1,K2)
- 4.2 Nitrogen cycle - mechanism of biological nitrogen fixation - ammonification - nitrification - denitrification and microorganisms involved in such processes. (K1,K2)
- 4.3 Phosphorous cycle. (K1,K2)
- 4.4 Sulphur cycle. (K1,K2)
- 4.5 Biofertilizer for sustainable agriculture *Rhizobium, Azospirillum, Azotobacter*.(K1,K2,K3,K4)
- 4.6 *Azolla*, BGA -mass production methods - applications methods and crop response of biofertilizers.( K1,K2,K3,K4)

**UNIT-V: Aero Microbiology and Aquatic Microbiology. (15 hours)**

- 5.1 Droplet, Droplet nuclei and Aerosol. (K1,K2)
- 5.2 Assessment of air quality. (K2,K3,K4)
- 5.3 Airborne diseases, their symptoms and preventive measures, water borne disease.(K1,K2)
- 5.4 Types of water – Assessment of microbiological quality of water.(K2,K3,K4)
- 5.5 Treatment of municipal water (K4,K5)

5.6 Types of wastes, characterization of solid and liquid waste. Sewage treatment-composting. (K3,K4,K5)

**TEXT BOOKS:**

1. Frazier W.C. and West Hoff D.C (2008). Food Microbiology. 4<sup>th</sup> edition. Mc Graw Hill, New York.
2. Joseph C. Daniel (1999). Environmental aspects of Microbiology. 1<sup>st</sup> edition, Bright Sun publications, Chennai.
3. Subba Rao NS (2004). Soil Microbiology. 4<sup>th</sup> edition, Oxford and BH Publishing Co.Pvt. Ltd., New Delhi.

**REFERENCE BOOKS:**

1. Adam M.R. and Moss M.O (2004). Food Microbiology. 2<sup>nd</sup> edition, New international pvt. Ltd., publishers.UK.
2. Banwart G. J (2004). Basic Food Microbiology. 2<sup>nd</sup> edition, CBS Publishers and Distributors, New Delhi.
3. James M. Jay (2003). Modern Food Microbiology. 4<sup>th</sup> edition, CBS Publishers, New Delhi.
4. Vijaya Ramesh K (2004). Environmental Microbiology. 1<sup>st</sup> edition, MJP publishers. Chennai.
5. Singh D.P and Dwivedi S.K (2005). Environmental Microbiology and Biotechnology. 1<sup>st</sup> edition, New Age International (P) Ltd., New Delhi.
6. Mishra RR (2004). Soil Microbiology. 1<sup>st</sup> edition, CBS Publishers and distributors, New Delhi.
7. Rangaswami G and Mahadevan A (2002). Disease of Crop Plants in India. 4<sup>th</sup> edition, PHI Learning (P) Ltd., New Delhi.
8. Atlas R.M. and Bartha R (1992). Microbial Ecology, Fundamental and Application, 3<sup>rd</sup> edition, Bengamin and Cummings. United States.

**OER:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## PCMBC20: IMMUNOLOGY AND IMMUNOTECHNOLOGY

<b>Year:</b> <b>I</b>	<b>Course Code</b> PCMBC20	<b>Title Of The Course</b> Immunology and Immunotechnology	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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### Course Objective:

To provide in depth knowledge on immune cells, immune system- its function and hybridoma technology

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the types of immune response and discuss the role of lymphoid organs in immunity.

**CO2:** Compile immunoglobulins and antigens.

**CO3:** Communicate the importance of MHC in organ transplantation.

**CO4:** Analyse the allergic responses by the immune system leading to hypersensitive conditions and auto immune disorders.

**CO5:** Plan immunization schedule.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	L	M	M	H	H
CO2	H	L	H	L	M	H
CO3	H	L	H	L	M	H
CO4	H	L	M	M	H	H
CO5	H	M	M	L	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	H	M	H	H
CO2	H	L	H	M	M	H
CO3	H	L	H	L	M	H
CO4	H	L	H	M	H	H
CO5	H	M	H	L	M	H

**H – High (3), M – Moderate (2), L – Low (1)**

## COURSE SYLLABUS

### UNIT-I: Immunity and Lymphoid Organs.

**(15 hours)**

- 1.1 Introduction: Infection, immunity, types of immunity - innate and adaptive. (K1,K2)
- 1.2 Phagocytosis and extracellular killing, immunity to specific infection. (K1,K2)
- 1.3 Milestones in immunology - evolution of immunology. (K1,K2)
- 1.4 Immune Systems: Anatomy of the lympho - reticular system, primary lymphoid organs - bone marrow & thymus. (K1,K2)

- 1.5 Secondary lymphoid tissues - spleen, lymph nodes & gut associated lymphoid tissue. (K1,K2)
- 1.6 Immuno reactive cells - T and B lymphocytes, macrophages, granulocyte and NK cells. (K1,K2)

**UNIT-II: Antigens and Major Histocompatibility Complex. (15 hours)**

- 2.1 Antigens and Immunogenicity: Terminologies and definitions - antigen, immunogen, haptens, superantigens, tolerogen, epitope, paratope and antigenic determinants. (K1,K2)
- 2.2 Features associated with antigenicity and immunogenicity. (K1,K2)
- 2.3 Basis of antigen specificity. (K1,K2)
- 2.4 Antigen receptors: Cell surface proteins of Major Histocompatibility Complex (MHC): types, - class I, II and III distribution and function. (K1,K2)
- 2.5 MHC in relation to transplantation and HLA typing. (K1,K2)
- 2.6 T cell receptor complex (TCR). (K1,K2)

**UNIT-III: Immunoglobulin and Complement System. (15 hours)**

- 3.1 Antibodies - B cell receptors. Three dimensional structure of immunoglobulin molecule. (K1,K2)
- 3.2 Types of immunoglobulins. Biological and chemical properties of immunoglobulin. (K1,K2)
- 3.3 Antigen, antibody attraction - forces, affinity, avidity and specificity. (K1,K2,K3,K4,K5,K6)
- 3.4 Antibody synthesis and diversity - genetic basis. (K1,K2,K3)
- 3.5 Monoclonal and polyclonal antibody production - Hybridoma technology. (K1,K2,K3,K4)
- 3.6 Complement system: Basics of complement protein - different pathways of complement activation - the pathway of membrane attack (common pathway), classical and alternate. (K1,K2)

**UNIT-IV: Hypersensitivity. (15 hours)**

- 4.1 Acquired immune response. (K1,K2)
- 4.2 Humoral immune response - various phases of humoral immune response. (K1,K2)
- 4.3 Cell mediated immune response. (K1,K2)
- 4.4 Immune regulation - various events in induction of immune response. (K1,K2)
- 4.5 Hypersensitivity- Type I to IV (K1,K2)
- 4.6 Means of immunosuppression - physical, chemical and biological. (K1,K2,K3)

**UNIT-V: Vaccines and Autoimmune Diseases. (15 hours)**

- 5.1 Vaccines – Live attenuated and killed inactivated vaccine. (K1,K2)
- 5.2 rDNA vaccine, synthetic peptide vaccine, Plasma derived vaccine, anti - idiotypic vaccine and DNA vaccine. (K1,K2,K3,K4,K5,K6)
- 5.3 Active immunization - vaccines & toxoids – bacterial and viral. (K1,K2,K3,K4)
- 5.4 Immunization Schedule.(K1,K2,K3)
- 5.5 Passive immunization - antitoxins, immunoglobulin, specific immunoglobulin, hyper immune gamma globulin. (K1,K2,K3,K4)

## 5.6 Autoimmune diseases. (K1,K2)

### **TEXT BOOKS:**

1. Kuby J Richard A. Goldsby, Thomas J. Kindt (2006). Immunology. 6<sup>th</sup> edition, W.H. Freeman and company, New York.
2. Richard M.Hyde (2011). Immunology. 3<sup>rd</sup> edition, Williams & Wilkins, *Philadelphia*.

### **REFERENCE BOOKS:**

1. Bashir S.F (2011). Text Book of Immunology. 1<sup>st</sup> edition, PHI Learning Private limited, New Delhi.
2. Ananthanarayan R & Paniker C.K.J (2013). Text Book of Microbiology, 9th edition, Universities Press, Hyderabad
3. Tizard K (1995). Immunology. An Introduction. 1<sup>st</sup> edition, Saunders college publishing, Philadelphia.
4. Donal M. Weir, John Steward. (1993). Immunology. 7<sup>th</sup> edition. ELBS, London
5. Janeway Travers. (1997). Immuno biology - The immuno system in health and Disease. 3rd edition Current Biology Ltd., London, New York.
6. Clark WR (1991). The experimental foundations of modern immunology, 2<sup>nd</sup> edition. John Wiley and Sons Inc. New York.

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2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## PEMBA20 - ELECTIVE I A: PETROLEUM MICROBIOLOGY

<b>Year: I</b>	<b>Course Code</b> PEMBA20	<b>Title Of The Course</b> Petroleum Microbiology	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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### Course Objective:

To provide in depth knowledge about the microbial communities residing in the oil reservoirs and other hydrocarbon resource environments.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the importance of petroleum Microbiology and predict the impact of the microbial communities in various petroleum fields.

**CO2:** Design the microbial solutions to the microbiology related problems in the petroleum industry.

**CO3:** Discuss solutions to enhance production of oil/energy by applying concepts of production related petroleum microbiology.

**CO4:** Utilize biotechnological aspects in remediation of oil spills.

**CO5:** Use apparatus for the detection of living microbial contaminants in petroleum products.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	H	H
CO2	H	M	M	L	H	H
CO3	M	H	H	L	H	H
CO4	H	H	H	H	H	H
CO5	M	H	H	L	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	L	M	H	H
CO2	H	L	M	L	M	H
CO3	M	H	M	L	H	H
CO4	H	M	H	H	H	H
CO5	M	H	H	L	M	H

**H – High (3), M – Moderate (2), L – Low (1)**

### COURSE SYLLABUS:

#### Unit-I: Microbiology of Oil Fields.

(10 hours)

1.1 Introduction to oil fields, formation of oil reservoirs, oil production. (K1,K2)

1.2 Indigenous microbial communities in oil fields. (K1,K2)

- 1.3 Microbiology and molecular biology of sulfate-reducing bacteria. (K1,K2)
- 1.4 Hyperthermophilic archae in oil fields.(K1,K2)
- 1.5 Methanogenic archaea in oil fields. (K1,K2)
- 1.6 Fermentative, iron-reducing and nitrate-reducing microorganisms. (K1,K2)

**UNIT–II: Detrimental Effects of Bacterial Activity. (8 hours)**

- 2.1 Biodegradation of petroleum in subsurface geological reservoirs. (K1,K2)
- 2.2 Introduction to oil Reservoir souring. (K1,K2)
- 2.3 Mechanism and prevention of reservoir souring. (K1,K2,K3)
- 2.4 Microbial control of hydrogen sulfide production in oil reservoirs. (K1,K2,K3)
- 2.5 Microbial corrosion in the oil industry. (K1,K2)
- 2.6 Biofouling in the oil industry. (K1,K2)

**UNIT–III: Application of Biotechnology in Oil Production. (9 hours)**

- 3.1 Intoduction to application of Biotechnology in oil production. (K1,K2)
- 3.2 Microbially enhanced oil recovery. (K1,K2,K3)
- 3.3 Past present and future biotechnological upgrading of petroleum. (K1,K2)
- 3.4 Diversity in oil production. (K1,K2,K3)
- 3.5 Function of alkane oxygenases (K1,K2)
- 3.6 Biocatalytic applications of alkane oxygenases, (K1,K2,K3)

**UNIT–IV: Microremediation of Oil Spills and Oil Resources. (9 hours)**

- 4.1 Introduction to Microremediation. (K1,K2)
- 4.2 Marine oil spill bioremediation. (K1,K2,K3)
- 4.3 Metabolic indicators of anaerobic hydrocarbon biodegradation in petroleum-laden environments. (K1,K2,K3,K4)
- 4.4 Unconventional gas and oil resources- shale gas. (K1,K2,K3)
- 4.5 Unconventional oil resources- oil sands. (K1,K2,K3)
- 4.6 Coal bed methane (CBM). (K1,K2,K3)

**UNIT–V: Geo Microbiological Exploration of Petroleum Products. (9 hours)**

- 5.1 Introduction to GeoMicrobial Exploration of Petroleum products. (K1,K2)
- 5.2 Impact and Significance of GeoMicrobial Exploration of Petroleum products. (K1,K2)
- 5.3 Apparatus for the detection of living microbial contaminants in petroleum products. (K1,K2)
- 5.4 Microbiological Exploration for Petroleum Deposits. (K1,K2,K3,K4)
- 5.5 Geomicrobiological methods of ore exploration. (K1,K2,K3,K4)

## 5.6 Geomicrobiological methods Petroleum exploration. (K1,K2,K3,K4)

### **REFERENCE BOOKS:**

1. Bernard Ollivier, Mitchel Magot (2005). Petroleum Microbiology, ASM Press.
2. Corinne Whitby, Torban Lund Skovhus (2011). Applied Microbiology and molecular biology in oil field systems, Springer.
3. Larry L. Barton, W. Allan Hamilton (2007). Sulphate-Reducing Bacteria: Environmental and Engineered Systems, Cambridge University Press.

### **OER:**

1. <http://www.ecomii.com/science/encyclopedia/petroleum-microbiology/>
2. <http://lizinan.wordpress.com/2010/06/24/microbial-enhanced-oil-recovery/>
3. <http://www.metamicrobe.com/petroleum-microbiology/>

## PEMBB20 - ELECTIVE I B: ECONOMIC MICROBIOLOGY

<b>Year:</b> <b>I</b>	<b>Course Code</b> PEMBB20	<b>Title Of The Course</b> Economic Microbiology	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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### Course Objective:

To introduce entrepreneurial skills among students to become entrepreneurs and can decide to make the idea reality.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Utilize microorganisms as biofertilizers and for vermicomposting.

**CO2:** Analyse microbial cells as fermented products.

**CO3:** Use yeast in and as food and feed.

**CO4:** Demonstrate mushroom cultivation and its storage.

**CO5:** Discuss biotechnological applications of microalgae.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	M	L	M	M	H
CO3	H	M	L	M	M	H
CO4	H	M	H	H	H	H
CO5	H	L	M	L	H	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	M	L	M	L	H
CO3	H	M	L	M	L	H
CO4	H	M	H	H	L	H
CO5	H	L	M	L	H	H

H – High (3), M – Moderate (2), L – Low (1)

### COURSE SYLLABUS

#### UNIT-I: Microbes in Agriculture.

(8 hours)

- 1.1 Production and application of biofertilizers - *Rhizobium*, *Azospirillum*, *Azotobacter*. (K1,K2,K3,K4)
- 1.2 *Azolla* - *Anabaena*, BGA. (K1,K2,K3,K4)
- 1.3 Phosphate solubilizing – phosphobacterium and Mycorrhiza. (K1,K2,K3,K4)
- 1.4 Bacterial Biopesticides. (K1,K2,K3,K4)
- 1.5 Fungal Biopesticides. (K1,K2,K3,K4)
- 1.6 Role of microorganisms in vermicomposting. (K1,K2,K3,K4)

**UNIT–II: Microbes in Industries.****(10 hours)**

- 2.1 Fermented beverages: wine, beer, whisky, brandy – health benefits and disadvantages. (K1,K2,K3,K4)
- 2.2 Organic acids- Citric acid, acetic acid. (K1,K2,K3,K4)
- 2.3 Organic solvents- Acetone, butanol, ethanol. (K1,K2,K3,K4)
- 2.4 Fermented foods- cheese, yoghurt, sauerkraut, bread, sweeteners, flavor enhancers. (K1,K2,K3,K4)
- 2.5 Traditional fermented foods- Dhokla, Appam, Churpa/Churpi, fermented bamboo shoot. (K1,K2,K3,K4,K5,K6)
- 2.6 Oriental fermented foods- soya sauce, koji & miso(K1,K2,K3,K4).

**UNIT–III: Yeast Production.****(9 hours)**

- 3.1 Bottom and Top yeast- Baker's yeast. (K1,K2)
- 3.2 Food and feed yeasts. (K1,K2)
- 3.3 Alcohol yeasts. (K1,K2)
- 3.4 SCP: *Saccharomyces cerevisiae*, *Pichia pastoris*. (K1,K2)
- 3.5 *Candida utilis* and *Geotrichum candidum*. (K1,K2)
- 3.6 Other yeast products. (K1,K2)

**UNIT–IV: Mushroom Cultivation.****(9 hours)**

- 4.1 Button mushroom (*Agaricus bisporus*) – composting, spawning (K1,K2,K3,K4,K6)
- 4.2 Button mushroom (*Agaricus bisporus*) – cropping, harvesting and marketing. (K1,K2,K3,K4,K6)
- 4.3 Oyster mushroom (*Pleurotus* sps.), - composting, spawning (K1,K2,K3,K4,K6)
- 4.4 Oyster mushroom (*Pleurotus* sps.), - cropping, harvesting and marketing (K1,K2,K3,K4,K6)
- 4.5 Paddy straw mushroom (*Volvariella volvacea*) – composting, spawning. (K1,K2,K3,K4,K6)
- 4.6 Paddy straw mushroom (*Volvariella volvacea*). cropping, harvesting and marketing. (K1,K2,K3,K4,K6)

**UNIT–V: Microalgal Technology.****(9 hours)**

- 5.1 Cultivation methods of Spirulina (K1,K2,K3,K4,K6)
- 5.2 Biotechnological potentials of microalgae- food and feed. (K1,K2)
- 5.3 Fuel production from microalgae- Methane and Hydrocarbon. (K1,K2,K3,K4)
- 5.4 Pharmaceutically valuable compounds from microalgae (K1,K2,K3,K4)
- 5.5 Food and nutraceuticals of Algae: Cyanophyta, Rhodophyta, Heterokontophyta, Chlorophyta. (K1,K2,K3,K4)
- 5.6 Polysaccharides (Agar Agar, Carageenan and Alginic acid). (K1,K2,K3)

**TEXT BOOKS:**

1. Dubey R.C (2005). A Text of Biotechnology. Multicolour Illustrative edition, S.Chand and Company Ltd., New Delhi.
2. Subba Rao NS (2004). Soil Microbiology. 4<sup>th</sup> edition, Oxford and BH Publishing Co.Pvt. Ltd., New Delhi.
3. Patel A.H (2001). Industrial Microbiology. 3<sup>rd</sup> edition, Mac Millan India Ltd, Chennai.
4. Ismail S.A (2005). The Earthworm Book, 2<sup>nd</sup> revised edition. Other India Press, Goa, India.
5. Vijaya Ramesh K (2007). Food Microbiology. 1<sup>st</sup> edition, MJP Publishers, Chennai.

**REFERENCE BOOKS:**

1. Casida J.E (1986). Industrial Microbiology, 1<sup>st</sup> edition. Wiley Eastern publishers.UK.
2. Frazier W.C. and West Hoff D.C (2008). Food Microbiology. 4<sup>th</sup> edition. Mc Graw Hill, New York.
3. Suman B.C and Sharma V.P (2005) Mushroom Cultivation, Processing and Uses. 1<sup>st</sup> edition, Agribios (India) Publishers, Jodhpur.
4. Lansing M. Prescott, John P. Harley., Donald A. Klein (2011) .Microbiology.8<sup>th</sup> edition. McGraw Hill Inc., New York.
5. McCandless, E.L. 1981. Polysaccharides of seaweeds. In The Biology of seaweeds, ed. C.S. Lobban and M.J. Wynne, pp. 559-88. Blackwell, Oxford.
6. Melanie N. Johansen. 2011. Microalgae\_ Biotechnology, Microbiology and Energy (Marine Biology) --Nova Science Pub Inc
7. Tridevi, P. C. 2001. Algal Biotechnology. Point Publisher, Jaipur, India

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2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## SEMESTER II

### PCMBD20: MEDICAL MICROBIOLOGY

<b>Year:</b> <b>I</b>	<b>Course Code</b> PCMBD20	<b>Title Of The Course</b> Medical Microbiology	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
<b>SEM:</b> <b>II</b>							

#### Course Objective:

To provide an in depth understanding of the pathogenic mechanism of microorganisms, the diseases caused, its laboratory diagnosis and control measures.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the basics of Medical Microbiology and describe the mode of transmission of various pathogens.

**CO2:** Select methods to identify the causative agents for clinical diagnosis.

**CO3:** Analyse pathogenic microorganism of bacteria and its mechanism of pathogenesis.

**CO4:** Discuss on pathogenic fungi and parasites.

**CO5:** Compile virus structure, multiplication, classification and medical importance.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	M	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	M	M	H
CO4	H	L	L	L	M	H
CO5	H	M	L	L	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	M	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	M	M	H
CO4	H	L	L	L	M	H
CO5	H	M	L	L	M	H

**H – High (3), M – Moderate (2), L – Low (1)**

#### COURSE SYLLABUS

##### UNIT-I: Introduction to Medical Microbiology. (10 hours)

1.1 Basics in Medical microbiology - Infectious diseases overview. (K1,K2)

1.2 Medically important microbes. (K1,K2)

1.3 Microbial diseases - sources, route of transmission. (K1,K2)

1.4 Pathogenesis - adhesion, invasion, host cell damage, release of pathogens. (K1,K2)

1.5 Microbial virulence and virulence factors - Signs and symptoms of microbial diseases. (K1,K2)

1.6 Treatment, Prevention and control of microbial infections. (K1,K2,K3)

**UNIT-II: Diagnostic Microbiology. (10 hours)**

2.1 Diagnosis of microbial diseases – Collection and transport of clinical specimens. (K2,K3,K4,K5)

2.2 Preliminary processing of clinical samples- identification and cultural characteristics. (K2,K3,K4,K5)

2.3 Detection of Biochemical properties of pathogens. (K2,K3,K4,K5)

2.4 Immunodiagnosis. (K2,K3,K4,K5)

2.5 Molecular diagnosis of microbial diseases. (K2,K3,K4,K5)

2.6 Modern methods of microbial diagnosis. (K2,K3,K4,K5)

**UNIT-III: Medical Bacteriology. (20 hours)**

3.1 Bacteriology - Characteristics, classification, pathogenesis, pathology, diagnosis, treatment, prevention and control of diseases caused by *Staphylococci*, *Streptococci*. (K1,K2,K3,K4)

3.2 *Neisseria*, *Bacillus*, *Clostridium*. (K1,K2,K3,K4)

3.3 *Corynebacterium* and *Mycobacteria*. (K1,K2,K3,K4)

3.4 Members of Family Enterobacteriaceae., (K1,K2,K3,K4)

3.5 *Vibrio*, *Pseudomonas*. (K1,K2,K3,K4)

3.6 Spirochaetes, Rickettsiae and Chlamydiae. (K1,K2,K3,K4)

**UNIT-IV: Medical Mycology and Parasitology. (20 hours)**

4.1 Mycology - Human mycotic infections caused by Dermatophytes (K1,K2)

4.2 *Histoplasma*, *Cryptococcus*, *Candida*, (K1,K2)

4.3 Mycotic Mycetoma - Mycotoxins. (K1,K2)

4.4 Parasitology - Medical importance of *Entamoeba*, *Giardia*, *Lieshmania*, (K1,K2)

4.5 *Plasmodium*, *Taenia*, *Ascaris*, *Wucherhiria*. (K1,K2)

4.6 Laboratory techniques used in the diagnosis of fungal and parasitic diseases. (K1,K2,K3,K4)

**UNIT-V: Virology. (15 hours)**

5.1 Viruses – Structure, multiplication, classification and medical importance of DNA viruses – Adeno, Pox. (K1,K2)

5.2 Herpes, Hepatitis Virus. (K1,K2)

5.3 RNA viruses - Picorna, Orthomyxo, Paramyxo. (K1,K2)

5.4 Virus causing SARS, MERS and SARS-CoV2 (K1,K2)

5.5 Oncogenic Viruses (Papilloma and Polyoma), (K1,K2)

5.6 Rhabdo and HIV virus(K1,K2)

**TEXT BOOKS:**

1. Ananthanarayan R & Paniker C.K.J. (2013). Text Book of Microbiology, 9<sup>th</sup> edition, Universities Press, Hyderabad.
2. Jawetz, Melnick, &Adelberg's. (2013). Medical Microbiology. 26<sup>th</sup> edition. McGraw-Hill, New York.
3. Mehrotra RS and Aneja KR (2006). An Introduction to Mycology. 1<sup>st</sup> edition, New age international publishers, Chennai.

4. Subhash Chandra Parija (2013). Text book of Medical Parasitology. 4<sup>th</sup> edition, All India Publishers and Distributors (Medical Books Publishers), New Delhi.
5. Dimmok N.J and Primrose S.B (1994). Introduction to modern virology 4<sup>th</sup> edition, Blackwell scientific company publications, United States.

#### **REFERENCE BOOKS:**

1. Tille P. Bailey and Scott (2013). Diagnostic Microbiology, 13<sup>th</sup> edition, Mosby Publishers, United States.
2. Satish Gupte (2005). The Short Textbook of Medical Microbiology. 8<sup>th</sup> edition, Jaypee Brothers, Medical publishers (P) Ltd., New Delhi.
3. Monica Cheesbrough (2003). District Laboratory Practice in Tropical Countries. Part 1 & 2, Cambridge University Press.
4. Jagdish Chander (1996). A text book of Medical Mycology. 1<sup>st</sup> edition. Interprint, New Delhi.
5. Chatterjee K.D (2016). Parasitology, Protozoology & Helminthology. 13<sup>th</sup> edition. Joe media Publishers. Calcutta.

#### **OER:**

1. <http://www.gutenberg.org/>
2. <http://www.free-ebooks.net/>
3. <http://www.bookrix.com>
4. <http://www.e-booksdirectory.com/>
5. <http://bookboon.com/>
6. <http://www.freebooks.com/ebooks/>

## PCMBE20 - MICROBIAL PHYSIOLOGY AND BIOMOLECULES

<b>Year:</b> <b>I</b> <b>SEM:</b> <b>II</b>	<b>Course Code</b> PCMBE20	<b>Title Of The Course</b> Microbial physiology and Biomolecules	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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### Course Objective:

To provide an in depth understanding on the concepts of microbial metabolism, growth and energy generation and the role of biomolecules in biological system.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Explain microbial metabolism, growth and energy generation.

**CO2:** Analyse microbial physiology, different classes of antimicrobial agents and their mode of action.

**CO3:** Evaluate the properties of carbohydrates in metabolism.

**CO4:** Compile the process involved in synthesis of nucleic acid.

**CO5:** Outline the steps involved in post transcriptional and translational modification

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	L	L	L	H	L	H
CO2	L	M	M	H	L	H
CO3	L	M	M	H	L	H
CO4	L	M	M	H	L	H
CO5	L	M	M	H	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	M	M	L	H
CO2	H	L	M	M	L	H
CO3	H	L	M	M	L	H
CO4	H	L	M	M	L	H
CO5	H	L	M	M	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

### COURSE SYLLABUS

#### UNIT-I: Basic Concepts of Metabolism.

**(15 hours)**

1.1 Carbohydrate metabolism - Glycolysis – HMD. (K1,K2)

1.2 TCA & ED and other pathways. (K1,K2)

1.3 Aerobic and anaerobic respirations - Generation of energy - substrate level and oxidation phosphorylation - Electron transport chain.

- 1.4 Proteins - primary, secondary, tertiary and quaternary structures. (K1,K2)
- 1.5 Enzymes nomenclatures, classification and general properties - factors affecting enzyme synthesis and activities - Allosteric enzymes. (K1,K2)
- 1.6 Photosynthesis - cyclic and non -cyclic photophosphorylation. (K1,K2)

**UNIT-II: Microbial Pathogenicity and Antimicrobial Resistance. (15 hours)**

- 2.1 Microbial pathogenicity - Toxins - Characterization - Mechanisms of action. (K1,K2)
- 2.2 Antimicrobial chemotherapy, antibiotics and its classification. (K1,K2)
- 2.3 Mode of action of antibiotics. (K1,K2)
- 2.4 Antimicrobial resistance. (K1,K2)
- 2.5 Tests for sensitivity to antimicrobial agents – Kirby Bauer and MIC (K1,K2,K3,K4,K5)
- 2.6 Metabolic pathways and metabolic control mechanisms. (K1, K2)

**UNIT-III: Carbohydrates and Nucleic Acids. (15 hours)**

- 3.1 Brief idea about classification, structure and properties of carbohydrates. (K1,K2)
- 3.2 Nucleic acids - DNA and RNA - their topology and functions. (K1,K2)
- 3.3 Brief idea about artificial Nucleic acid - PNA. (K1,K2)
- 3.4 DNA Replication mechanisms and types. (K1,K2)
- 3.5 Chromosome organization in microbes. (K1,K2)
- 3.6 DNA repair - mechanism of excision repair, SOS repair and mismatch repair. (K1,K2)

**UNIT-IV: RNA Synthesis. (15 hours)**

- 4.1 Process of transcription - initiation, elongation and termination. (K1,K2)
- 4.2 Synthesis of mRNA in prokaryotes. (K1,K2)
- 4.3 Synthesis of mRNA in eukaryotes. (K1,K2)
- 4.4 Synthesis of rRNA. (K1,K2)
- 4.5 Synthesis of tRNA. (K1,K2)
- 4.6 RNA processing - capping and polyadenylation. (K1,K2)

**UNIT-V: Synthesis of Proteins. (15 hours)**

- 5.1 Post transcriptional modification. (K1,K2)
- 5.2 Post translational modification. (K1,K2)
- 5.3 Protein Synthesis. (K1,K2)
- 5.4 Genetic code. (K1,K2)
- 5.5 Process of translation - initiation, elongation and termination. (K1,K2)
- 5.6 Signal sequences and protein transport. (K1,K2)

**TEXT BOOKS:**

1. Lansing M. Prescott, Harley J. P and Klein D.A (2005). Microbiology. 6<sup>th</sup> edition, International edition, McGraw Hill. New York.
2. Nelson D.L. and Cox, M.M. (2001). Lehninger Principles of Biochemistry, 3rd edition, Mac Millan Eworth Publishers.London.
3. Freifelder D. (1996). Molecular Biology, 2<sup>nd</sup> edition. Narosa Publishing House. New Delhi.

**REFERENCE BOOKS:**

1. Campbell MK (1999). Biochemistry, 3rd edition, Saunders College Publishing / Harcourt Brace College Publishers.
2. Moat G, John W. Foster and Michael P. Spector (2002). Microbial physiology, 4<sup>th</sup> edition, A John Wiley sons, Inc. publication. New Delhi.
3. David white (2011).The physiology and biochemistry of prokaryotes. 4<sup>th</sup> edition, Oxford university press, UK
4. Freidberg EC, Walker GC, Siede W. (1995). DNA Repair and Mutagenesis, ASM Press. USA
5. Lewin, B. (2000) Genes VII. 2<sup>nd</sup> edition. Oxford University Press. London
6. Voet D. and Voet J (1995) Biochemistry, 2<sup>nd</sup> edition, John Wiley and Sons Inc. London.

**OER:**

1. <http://www.gutenberg.org/>
2. <http://www.free-ebooks.net/>
3. <http://www.bookrix.com>
4. <http://www.e-booksdirectory.com/>
5. <http://bookboon.com/>
6. <http://www.freebooks.com/ebooks/>

## PCMBF20: INDUSTRIAL AND PHARMACEUTICAL MICROBIOLOGY

<b>Year:</b> <b>I</b> <b>SEM:</b> <b>II</b>	<b>Course Code</b> PCMBF20	<b>Title Of The Course</b> Industrial and pharmaceutical Microbiology	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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### Course Objective:

To provide an in depth understanding about industrially important organisms, strain improvement and production of major products.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the importance of production strain in industries.

**CO2:** Discuss on fermentors and fermentation process.

**CO3:** Describe the upstream and downstream processing.

**CO4:** Analyse the steps involved in vaccine, toxoid and antisera production and evaluate the standardization of antiseptics and disinfectants..

**CO5:** Assess good practice and regulation involved in utilizing microbial product for pharmaceutical applications.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	M	M	L	H	H
CO3	H	M	M	L	H	H
CO4	H	M	M	L	H	H
CO5	H	H	H	L	H	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	M	M	H	H	H
CO3	H	M	M	H	H	H
CO4	H	M	M	H	H	H
CO5	H	H	H	H	H	H

**H – High (3), M – Moderate (2), L – Low (1)**

## COURSE SYLLABUS

### UNIT- I: Introduction to Fermentation.

**(9 hours)**

- 1.1 Introduction to fermentation – the range of fermentation process. (K1,K2)
- 1.2 The chronological development of the fermentation industry. (K1,K2)
- 1.3 The component parts of a fermentation process. (K1,K2)
- 1.4 Isolation of Industrially important organisms. (K1,K2,K3,K4)
- 1.5 Preservation of industrially important organisms. (K1,K2,K3,K4)
- 1.6 Strain improvement of industrially important microorganisms. (K1,K2,K3,K4, K5)

**UNIT-II: Fermentors and Development of Inoculum.****(9 hours)**

- 2.1 Development of inoculum - Scale up (Pilot study). (K1,K2)
- 2.2 Upstream processing – media for industrial fermentation – formulation – sterilization – Microbial growth kinetics. (K1,K2,K3,K4)
- 2.3 Fermentation – types. (K1,K2)
- 2.4 Downstream processing. (K1,K2)
- 2.5 Fermentor/ Bioreactors – Parts and Design. (K1,K2)
- 2.6 Types of Bioreactors – Instrumentation and control.(K1,K2,K3)

**UNIT- III: Microbial Productions.****(12 hours)**

- 3.1 Production of Organic acids (Citric acid, Acetic acid). (K1,K2,K3)
- 3.2 Production of Amino acids (L - Glutamic acid , L - Lysine). (K1,K2,K3)
- 3.3 Production of Antibiotics (Penicillin, Streptomycin, Tetracyclines). (K1,K2,K3)
- 3.4 Production of Enzymes (Amylases, Proteases and Pectinases). (K1,K2,K3)
- 3.5 Production of vitamins (B12, B2 and C). (K1,K2,K3)
- 3.6 Production of alcoholic beverages (wine and beer). (K1,K2,K3)

**UNIT- IV: Vaccine Production and Pharmaceutical Standardisation. (8 hours)**

- 4.1 Production of different types of vaccines. (K1,K2,K3)
- 4.2 Toxoid, antisera production and their standardization. (K1,K2,K3)
- 4.3 Preparation of Antiseptics and their uses. (K1,K2,K3)
- 4.4 Preparation of disinfectants and their standardization. (K1,K2,K3)
- 4.5 Types of water used in pharmaceutical industries (DM/Purified water). (K1,K2,K3)
- 4.6 Water for injection used in pharmaceutical industry and pyrogen testing. (K1,K2,K3,K5)

**UNIT –V: Microbial Assay of Antibiotics.****(7 hours)**

- 5.1 Sub culturing and culture suspension preparation. (K2,K3,K4,K5)
- 5.2 Microbial assay of antibiotics and vitamins. (K2,K3,K4,K5)
- 5.3 Sterility testing. (K2,K3,K4,K5)
- 5.4 Bacterial Endotoxin Test (BET). (K2,K3,K4,K5)
- 5.5 Good Documentation Practice (GDP) – SOP – GLP. (K2,K3,K4,K5)
- 5.6 Failure investigation. (K1,K2,K3)

**TEXT BOOKS:**

1. Patel A.H (2001). Industrial Microbiology. 3<sup>rd</sup> edition, Mac Millan India ltd, Chennai.
2. Chisti, Y., (2006) Fermentation, Biocatalysis and bioseparation, Encyclopedia of Bioprocess Technology, Vol. 5, John Wiley and Sons, New York

**REFERENCE BOOKS:**

1. Casida J.E (1986). Industrial Microbiology, 1<sup>st</sup> edition. Wiley Eastern publishers.UK

2. Stanbury P.F., Whitaker A and Hall S.J (1995). Principles of Fermentation technology. 1<sup>st</sup> edition, Pergamon, UK.
3. Prescott and Dunn, S., (1982) Industrial Microbiology. 4<sup>th</sup> edition .The AVI Publishing Company Inc., USA.
4. Belter, P.A., Cussler, E.L. and Hu, W.S., (2005) Bioseparation: Downstream processing for Biotechnology, 1<sup>st</sup> edition. John Wiley and Sons, N.Y

**OER:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## PEMBC20 - ELECTIVE II A: BIOLOGICAL TECHNIQUES

<b>Year:</b> <b>I</b>	<b>Course Code</b> PEMBC20	<b>Title Of The Course</b> Biological Techniques	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
<b>SEM:</b> <b>II</b>							

### Course Objective:

To demonstrate proper and safe laboratory practices, use of various laboratory equipment, and to enhance the use of advanced techniques.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Discuss about various microscopes, its parts and their working mechanism.

**CO2:** Apply the principle and usage of spectroscopic, centrifugation, biosensors and radioactive analysis.

**CO3:** Analyse principles and applications of chromatographic techniques.

**CO4:** Demonstrate principles and applications of electrophoresis.

**CO5:** Compile the techniques involved in molecular biology.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	L	H	M	L	M	H
<b>CO2</b>	L	H	M	L	M	H
<b>CO3</b>	L	H	M	L	M	H
<b>CO4</b>	L	H	M	L	M	H
<b>CO5</b>	L	H	M	L	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	H	L	H
<b>CO2</b>	H	H	H	H	L	H
<b>CO3</b>	M	M	M	M	L	H
<b>CO4</b>	H	H	H	H	L	H
<b>CO5</b>	H	H	H	H	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

### COURSE SYLLABUS

#### UNIT-I: Microscopy.

**(15 hours)**

1.1 Applications of various types of microscopy such as bright field, dark field, phase contrast. (K2,K3,K4,K5)

1.2 Immunofluorescence - In situ hybridization confocal Microscope, Atomic Force Microscope (AFM). (K2,K3,K4,K5)

1.3 Electron Microscopy - Principle, specimen preparation and applications. (K2,K3,K4,K5)

- 1.4 Transmission Electron microscope (TEM) and Scanning Electron Microscope (SEM) (K2,K3,K4,K5)
- 1.5 Brief account on Photomicrography and Video micrography. (K2,K3,K4,K5)
- 1.6 Developing and Printing of microphotographs. (K2,K3,K4,K5)

**UNIT-II: Analytical Techniques. (15 hours)**

- 2.1 Spectroscopic methods - UV-Visible (K2,K3,K4,K5)
- 2.2 Atomic Absorption Spectrophotometer, Atomic Emission Spectroscopy. (K2,K3,K4,K5)
- 2.3 Centrifugation - Principles, various types including centrifugation. (K2,K3,K4,K5)
- 2.4 Electroanalytical methods - electrolytic all 4 galvanic cell - Potentiometric, conductimetric, coulometric & voltametric analysis. (K2,K3,K4,K5)
- 2.5 Biosensors. (K2,K3,K4,K5)
- 2.6 Radioactive Analysis: Principles of radioactivity, GM counter & LS counter. (K2,K3,K4,K5)

**UNIT-III: Chromatography. (15 hours)**

- 3.1 Account on Principles & Applications of Chromatographic Techniques. (K1,K2)
- 3.2 Adsorption and gel permeation in chromatography. (K2,K3,K4,K5)
- 3.3 Ion exchange chromatography. (K2,K3,K4,K5)
- 3.4 Affinity Chromatography. (K2,K3,K4,K5)
- 3.5 Gas Chromatography. (K2,K3,K4,K5)
- 3.6 HPLC. (K2,K3,K4,K5)

**UNIT-IV: Electrophoresis. (15 hours)**

- 4.1 Principle and types of Electrophoretic techniques. (K1,K2)
- 4.2 Significance and Application of Electrophoresis. (K1,K2)
- 4.3 Factors affecting electrophoretic mobility. (K1,K2)
- 4.4 Support medium-Agarose and Polyacrylamide gels. (K1,K2)
- 4.5 Electrophoresis of proteins. (K2,K3,K4,K5)
- 4.6 Electrophoresis of nucleic acids. (K2,K3,K4,K5)

**UNIT-V: Molecular Biological Techniques. (15 hours)**

- 5.1 Isolation of nucleic acid - Plasmid isolation, chromosomal DNA isolation. (K2,K3,K4,K5)
- 5.2 Gene cloning techniques - Restriction digestion and ligation of vector and foreign gene. (K2,K3,K4,K5,K6)
- 5.3 Separation and staining of DNA, quantification of DNA. (K2,K3,K4,K5)
- 5.4 Gene transfer mechanisms – Transformation, transfection and electroporation. (K2,K3,K4,K5)
- 5.5 Methods of detection of clones - Nucleic acid transfer by blotting, Hybridization- plaque & colony hybridization. (K2,K3,K4,K5)
- 5.6 Amplification of nucleic acid- Polymerase chain reaction. (K2,K3,K4,K5)

**TEXT BOOKS:**

1. Westermeier, R (1993). Electrophoresis in practice – VCH – Federal Republic of Germany. Germany.

2. Willett, J.E. (1991). Gas Chromatography, 1<sup>st</sup> edition. John Wiley & Sons. New York.
3. Wilson, K. and Walker (1995). Practical Biochemistry Principles and Techniques, Cambridge University Press, London.
4. James G Cappuccino and Natalie Sherman (2004). Microbiology: A laboratory manual. Sixth edition, Published by Pearson Education, United States.
5. Sambrook, J. and Ruseell, D.W. (2001) Molecular Cloning – A Laboratory Manual (3rd edition, Vol. 1,2 & 3) Cold Spring Laboratory Press, New York.

**REFERENCE BOOKS :**

1. Bajpai P.K (2010). Biological Instrumentation and Methodology. Revised edition, S.Chand& Co.Ltd., New Delhi.
2. John G Webster (2004). Bioinstrumentation. Student edition. John Wiley and Sons, Ltd., New Delhi.
3. Palanivelu P (2004). Analytical Biochemistry and Separation techniques. 3<sup>rd</sup> edition, MKU Coop,Press Ltd., Palkalai Nagar, Madurai.
4. Gurumani N (2006). Research Methodology for Biological Sciences. 1<sup>st</sup> edition, MJP Publishers,A Unit of Tamil Nadu Book House, Chennai.
5. Subramanian M.A (2005). Biophysics - Principles and Techniques. 1<sup>st</sup> edition, MJP Publishers, AUnit of Tamil Nadu Book House, Chennai.

**OER:**

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

## PEMBD20 - ELECTIVE II B: HUMAN ANATOMY AND PHYSIOLOGY

<b>Year: I SEM: II</b>	<b>Course Code</b> PEMBD20	<b>Title Of The Course</b> Human Anatomy and Physiology	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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**Course Objective:** To provide an in depth understanding about anatomy and physiology of the human body.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Discuss protective mechanism of respiratory system and sensory organs.

**CO2:** Explain the role of gastrointestinal system and lympho - reticular system.

**CO3:** Identify the major components of musculoskeletal and nervous system.

**CO4:** Analyse the production of RBC, compare the role and function of endocrine system.

**CO5:** Revise the anatomical differences between male and female reproductive and urinary system.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	L	L	L	M	L	H
CO2	L	L	L	M	L	H
CO3	L	L	L	M	L	H
CO4	L	L	L	M	L	H
CO5	L	L	L	M	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	M	M	L	H
CO2	H	L	M	M	L	H
CO3	H	L	M	M	L	H
CO4	H	L	M	M	L	H
CO5	H	L	M	M	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

### COURSE SYLLABUS

#### UNIT-I: Respiratory System and Special Sensory Organs.

**(9 hours)**

- 1.1 Introduction to applied human anatomy and physiology. (K1,K2)
- 1.2 Respiratory System: Different organs of the Respiratory System. (K1,K2)
- 1.3 Functions of the different organs of the Respiratory System. (K1,K2)
- 1.4 Special Sensory Organs: Introduction to special sensory organs. (K1,K2)
- 1.5 Function and functions of, ear, nose, tongue. (K1,K2)
- 1.6 Functions of eye and skin. (K1,K2)

**UNIT-II: Gastro Intestinal System and Lympho-Reticular System. (9 hours)**

- 2.1 Gastro Intestinal System: Introduction and different organs associated with the Gastro Intestinal system. (K1,K2)
- 2.2 Salivary glands and its functions. (K1,K2)
- 2.3 Liver and its function. (K1,K2)
- 2.4 Pancreas and Gall bladder- its functions. (K1,K2)
- 2.5 Lympho-reticular System- Introduction to different organs of LRS. (K1,K2)
- 2.6 Lymph, Lymphatic vessels and Lymph nodes - functions of the different organs of Lympho-reticular system. (K1,K2)

**UNIT-III: Musculoskeletal System, Skin and Nervous System. (9 hours)**

- 3.1 Musculoskeletal System- Introduction of musculo-skeleton system. (K1,K2)
- 3.2 Different parts of involved in skeleton system. (K1,K2)
- 3.3 Function of muscular system. (K1,K2)
- 3.4 Skin – Parts and function of skin. (K1,K2)
- 3.5 Nervous System: Introduction to nervous system and its functions. (K1,K2)
- 3.6 Central nervous system and peripheral nervous system. (K1,K2)

**UNIT-IV: Circulatory System and Endocrine System. (9 hours)**

- 4.1 Circulatory System: Blood: Site of formation. (K1,K2)
- 4.2 Composition, functions of blood cells. (K1,K2)
- 4.3 Different parts of the circulatory system and its function. (K1,K2)
- 4.4 Endocrine System: Introduction to endocrine system. (K1,K2)
- 4.5 Different organs of endocrine system. (K1,K2)
- 4.6 Functions of endocrine system. (K1,K2)

**UNIT-V: Reproductive System and Urinary System. (9 hours)**

- 5.1 Reproductive System: Introduction Male reproductive system – physiological anatomy, spermatogenesis and its regulation. (K1,K2)
- 5.2 Testicular hormones, composition of semen. (K1,K2)
- 5.3 Female reproductive system – menstrual cycle, pregnancy and parturition. (K1,K2)
- 5.4 Lactation and family planning. (K1,K2)
- 5.5 Urinary System: Different organs and Functions of Urinary System. (K1,K2)
- 5.6 Mechanism of urine formation and composition of urine. (K1,K2)

**TEXT BOOKS:**

1. Sampath Madhyastha, (2016) Manipal Manual of Anatomy, 3rd Edition, CBS Publishers and Distributors Pvt Ltd. Chennai.
2. Chandar Sekar, C.N. (2006). Manipal Manual of Physiology, CBS Publishers and distributors Pvt Ltd., Chennai.
3. Chaurasia, B.D, (2005) Handbook of Human anatomy 3rd Edition, CBS Publishers and Distributors Pvt Ltd. Chennai.
4. Human physiology, 2nd edition- BJ Mejer, HS Meij, AC Meyer, AITBs publishers and distributors.

## **REFERENCES BOOKS:**

1. Srivastava, (2013), Text book of Anatomy, Books and Allied (P) Ltd, Kolkatha.
2. Suresh.R, (2012), Essentials of Human Physiology, Books and Allied (P) Ltd, Kolkatta.
3. Asis Das (2006), Medical Physiology, Books and Allied (P) Ltd, Kolkatta.
4. A Text book of Animal Physiology, KA Goel, KV Sastri, (2005) Rastogi publications Meerut.
5. A Hand Book of Basic Human physiology- K. Saradha subramanyam, S. (2000)Chand & Co., Ltd.

## **OER:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

**PCMBG20 - MAIN PRACTICAL –I: APPLIED MICROBIOLOGY AND  
IMMUNOLOGY**

<b>Year: I SEM: II</b>	<b>Course Code</b> PCMBG20	<b>Title Of The Course</b> Main Practical I: Applied Microbiology and Immunology	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Objective:**

To enable the students to get hands-on training on various aspects of general, food, agricultural, environmental microbiology and immunotechnology.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Identify morphology of bacteria using different staining procedure and isolating them by pure culture techniques.

**CO2:** Assess the quality of air, water, food and soil samples.

**CO3:** Examine the activity of extracellular enzymes.

**CO4:** Apply agglutination and precipitation methods to detect antigen and antibody.

**CO5:** Select appropriate chromatographic methods to separate aminoacids, pigments and from crude extracts.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	H
CO2	H	H	H	L	M	H
CO3	H	H	M	M	L	H
CO4	L	H	H	H	L	H
CO5	L	H	M	L	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	H	L	H
CO2	H	H	H	L	L	H
CO3	H	M	M	M	L	H
CO4	H	M	H	H	L	H
CO5	H	M	M	L	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

**COURSE SYLLABUS**

1. Cleaning of glassware and sterilization.
2. Preparation and use of glassware cleaning solutions, sterilization.
3. Micrometry - counting and measurements.
4. Pure and axenic culture techniques - serial dilution - pour plate, spread plate, streak plate methods and stab culture techniques.

5. Bacterial Staining methods - simple, Gram's, acid fast, flagella, capsule and spore.
6. Fungal staining method – Lacto phenol cotton blue.
7. Motility of bacteria – Hanging drop technique.
8. Determination of growth - growth curve - generation time and a synchronous growth.
9. Microbial analysis of food products - bacterial and fungal.
10. Extracellular enzyme activities - cellulase, protease, lipase and phosphatase.
11. Dairy microbiology - Direct microscopic count - Standard plate count - reductase test (resazurin/methylene blue) - isolation of microbes from yoghurt, curd.
12. Quantification of microorganisms in air - solid and liquid impingement techniques.
13. Analysis of water – Most probable number test and membrane filter technique.
14. Microbial flora from different soil types and habitats - isolation of nitrogen fixing bacteria, phosphate solubilizing organisms- development of Winogradsky Column
15. Precipitation techniques: Agar gel diffusion - Ouchterlony's method, Single radial immunodiffusion, Counter immuno electrophoresis & Rocket Immuno Electrophoresis.
16. Agglutination techniques: Blood grouping and Rh factor - Latex agglutination - RF & ASO. Haemagglutination RPHA / IHA.
17. Labelled Assays: Demo: Enzyme Linked Immunosorbent Assay (ELISA).
18. Separation of pigments using paper chromatography.
19. Separation of compounds from crude extracts using TLC.

## REFERENCE BOOKS

1. Dubey, R.C. and Maheshwari, D.K. (2002) Practical Microbiology, 1st Edn. S. Chand & Co. Ltd., New Delhi.
2. Cappuccino, J. and Sherman, N. (2002) Microbiology: A Laboratory Manual, 6th Edn. Pearson Education Publication, New Delhi.
3. Collee, J.C., Duguid, J.P., Fraser, A.C. and Marimon, B.P. (1996) Mackie and McCartney Practical Medical Microbiology, 14th Edn. Churchill Livingstone, London.
6. Holt, J.S., Krieg, N.R., Sneath, P.H.A. and Williams, S.S.T. (1994) Bergey's Manual of Determinative Bacteriology, 9th Edn. Williams & Wilkins, Baltimore.
7. Gerhardt, P., Murray, R.G., Wood, W.A. and Kreig, N.R. (Eds) (1994) Methods for General and Molecular Bacteriology. ASM Press, Washington, DC.

8. Finegold, S.M. (2000) Diagnostic Microbiology, 10th Edn. C.V. Mosby Company, St. Louis.

**OER:**

**VIRTUAL LABS/ INTERACTIVE SIMULATIONS:**

1. [www.vlab.co.in](http://www.vlab.co.in)
2. [www.aview.in/aview](http://www.aview.in/aview)
3. [www.pbs.org](http://www.pbs.org)
4. [www.micro.magnet.fsu.edu/primer/java/scienceopticsu](http://www.micro.magnet.fsu.edu/primer/java/scienceopticsu)

**VIDEO LESSONS:**

1. [www.learnerstv.com](http://www.learnerstv.com)
2. [www.webcast.berkeley.edu](http://www.webcast.berkeley.edu)
3. [www.cosmolearning.org](http://www.cosmolearning.org)

## PCMBH20: MAIN PRACTICAL – II: MEDICAL MICROBIOLOGY

<b>Year: I SEM: II</b>	<b>Course Code</b> PCMBH20	<b>Title Of The Course</b> Main Practical II: Medical Microbiology	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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### Course Objective:

To enable the students to get hands-on training on various aspects of Clinical Microbiology, Microbial physiology and Biomolecules.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Demonstrate collection, transport and processing of clinical specimens.

**CO2:** Identify the bacterial pathogens from various clinical samples and detect their antimicrobial activity.

**CO3:** Analyse the clinical specimens for the examination and cultivation of pathogenic fungi.

**CO4:** Estimate worm burden stool for the identification of parasite.

**CO5:** Enumerate blood cells.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	H
CO2	H	H	M	H	L	H
CO3	H	H	M	H	L	H
CO4	H	H	H	H	L	H
CO5	H	H	H	H	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	H
CO2	H	H	H	H	L	H
CO3	H	H	M	M	M	H
CO4	H	H	M	M	M	H
CO5	H	H	L	M	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

### COURSE SYLLABUS

1. Collection and transport of pathological specimens for microbiological examinations.
2. Bacteriological methods: Microscopic examination - blood - faeces - pus - sputum - throat swab and nose swab - urine - body fluids
3. Isolation and identification of the pathogen – Pure and mixed culture and biochemical tests.
4. Antimicrobial assay - sensitivity test - Stokes and Kirby Bauer methods - Disc diffusion - agar dilution - broth dilution - MBC/MIC. Quality control for antibiotics.

5. Mycological methods: Macroscopic observation - microscopic observation - culture. Identification of *Mucor*, *Rhizopus*, *Aspergillus*, *Penicillium*, *Candida*, *Trichophyton*, *Microsporum*, *Epidermophyton* - SDA/Corn Meal Agar - Slide culture method - Germ tube method - Sugar assimilation/fermentation tests.
6. Examination of parasites in clinical specimens - ova/cyst in faeces.
7. Haematology: Total count (TC): RBC and WBC, - Differential count (DC) - Haemoglobin level, - Bleeding time - Clotting time – ESR.

#### **REFERENCE BOOKS:**

1. Dubey, R.C. and Maheshwari, D.K. (2002) Practical Microbiology, 1st Edn. S. Chand & Co. Ltd., New Delhi.
2. Cappuccino, J. and Sherman, N. (2002) Microbiology: A Laboratory Manual, 6th Edn. Pearson Education Publication, New Delhi.
3. Collee, J.C., Duguid, J.P., Fraser, A.C. and Marimon, B.P. (1996) Mackie and McCartney Practical Medical Microbiology, 14th Edn. Churchill Livingstone, London.
4. Holt, J.S., Krieg, N.R., Sneath, P.H.A. and Williams, S.S.T. (1994) Bergey's Manual of Determinative Bacteriology, 9th Edn. Williams & Wilkins, Baltimore.
5. Finegold, S.M. (2000) Diagnostic Microbiology, 10th Edn. C.V. Mosby Company, St. Louis.

#### **OER:**

#### **VIRTUAL LABS/ INTERACTIVE SIMULATIONS:**

1. [www.vlab.co.in](http://www.vlab.co.in)
2. [www.aview.in/aview](http://www.aview.in/aview)
3. [www.pbs.org](http://www.pbs.org)
4. [www.micro.magnet.fsu.edu/primer/java/scienceopticsu](http://www.micro.magnet.fsu.edu/primer/java/scienceopticsu)

#### **VIDEO LESSONS:**

1. [www.learnerstv.com](http://www.learnerstv.com)
2. [www.webcast.berkeley.edu](http://www.webcast.berkeley.edu)
3. [www.cosmolearning.org](http://www.cosmolearning.org)

## INDEPENDENT ELECTIVE COURSES

### PIMBA20 - IEC- I: PUBLIC HEALTH MICROBIOLOGY

<b>Year: I SEM: I</b>	<b>Course Code</b> PIMBA20	<b>Title Of The Course</b> Public Health Microbiology	<b>Course Type</b> Theory	<b>Course Category</b> Independent elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objective:

To provide in depth knowledge about significance of public health at theoretical and practical levels.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Explain the significance of public health.

**CO2:** Communicate the mode of transmission of human diseases.

**CO3:** Discuss the role of medically important pathogens and the diseases caused.

**CO4:** Outline the vector complex interactions between the pathogens and host.

**CO5:** Create awareness on hospital-acquired infections, prevention and its control measures.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	L	H
CO2	H	H	H	H	L	H
CO3	H	H	M	M	M	H
CO4	H	H	M	M	M	H
CO5	H	H	L	M	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	L	M	H	L	H
CO3	H	L	M	H	L	H
CO4	H	L	M	H	L	H
CO5	H	M	H	M	M	H

**H – High (3), M – Moderate (2), L – Low (1)**

#### COURSE SYLLABUS

##### UNIT–I: Water Borne Diseases.

1.1 Overview on common water borne diseases. (K1,K2)

1.2 Microbiology of causative agents, epidemiology, pathogenesis, laboratory diagnosis, prevention and control of hepatitis. (K1,K2,K3,K4)

1.3 Microbiology of causative agents, epidemiology, pathogenesis, laboratory diagnosis, prevention and control of cholera, typhoid. (K1,K2,K3,K4)

1.4 Microbiology of causative agents, epidemiology, pathogenesis, laboratory diagnosis, prevention and control of amoebiasis, giardiasis. (K1,K2,K3,K4)

1.5 Microbiology of causative agents, epidemiology, pathogenesis, laboratory diagnosis, prevention and control of poliomyelitis. (K1,K2,K3,K4)

1.6 Non Diarrhoeal diseases (bacterial and viral). (K1,K2,K3,K4)

## **UNIT–II: Air Borne Diseases.**

2.1 Overview on common air-borne diseases. (K1,K2)

2.2 Microbiology of causative agents, epidemiology, pathogenesis, laboratory diagnosis of pneumonia. (K1,K2,K3,K4)

2.3 Microbiology of causative agents, epidemiology, pathogenesis, laboratory diagnosis of diphtheria. (K1,K2,K3,K4)

2.4 Microbiology of causative agents, epidemiology, pathogenesis, laboratory diagnosis of tuberculosis. (K1,K2,K3,K4)

2.5 Microbiology of causative agents, epidemiology, pathogenesis, laboratory diagnosis of anthrax. (K1,K2,K3,K4)

2.6 Microbiology of causative agents, epidemiology, pathogenesis, laboratory diagnosis of influenza and measles. (K1,K2,K3,K4)

## **UNIT–III: Food Borne Diseases.**

3.1 Concept on food borne infections and food intoxication. (K1,K2)

3.2 Microbiology of causative microorganisms, epidemiology, pathogenesis, laboratory diagnosis, prevention and control of Staphylococcal food intoxication. (K1,K2,K3,K4)

3.3 Microbiology of causative microorganisms, epidemiology, pathogenesis, laboratory diagnosis, prevention and control of Clostridial food poisoning. (K1,K2,K3,K4)

3.4 Microbiology of causative microorganisms, epidemiology, pathogenesis, laboratory diagnosis, prevention and control of Salmonellosis. (K1,K2,K3,K4)

3.5 Microbiology of causative microorganisms, epidemiology, pathogenesis, laboratory diagnosis, prevention and control of Shigellosis. (K1,K2,K3,K4)

3.6 Microbiology of causative microorganisms, epidemiology, pathogenesis, laboratory diagnosis, prevention and control of travelers' diarrhea. (K1,K2,K3,K4)

## **UNIT–IV: Vector Borne Diseases.**

4.1 Overview on common vector-borne diseases and their vectors (K1,K2)

4.2 Microbiology of causative organisms, epidemiology, pathogenesis, laboratory diagnosis and prevention and control of visceral leishmaniasis. (K1,K2,K3,K4)

4.3 Microbiology of causative organisms, epidemiology, pathogenesis, laboratory diagnosis and prevention and control of malaria. (K1,K2,K3,K4)

4.4 Microbiology of causative organisms, epidemiology, pathogenesis, laboratory diagnosis and prevention and control of filariasis. (K1,K2,K3,K4)

4.5 Microbiology of causative organisms, epidemiology, pathogenesis, laboratory diagnosis and prevention and control of Japanese encephalitis and dengue. (K1,K2,K3,K4)

4.6 Microbiology of causative organisms, epidemiology, pathogenesis, laboratory diagnosis and prevention and control of West Nile fever and plague. (K1,K2,K3,K4)

## **UNIT–V: Hospital Acquired Infection**

5.1 Concept on common nosocomial infections (K1,K2)

- 5.2 Disinfection procedures of hospital environment. (K1,K2,K3)
- 5.3 Equipments and materials used in hospitals. (K1,K2,K3)
- 5.4 Methods of disposal of infective hospital waste. (K1,K2,K3,K4)
- 5.5 Methods of disposal of laboratory materials. (K1,K2,K3,K4)
- 5.6 Monitoring of sanitation in hospital environment. (K1,K2,K3,K4)

**TEXT BOOKS:**

1. Ananthanarayan R & Paniker C.K.J. (2013). Text Book of Microbiology, 9<sup>th</sup> edition, Universities Press, Hyderabad.
2. Jawetz, Melnick, & Adelberg's. (2013). Medical Microbiology. 26<sup>th</sup> edition. McGraw-Hill, New York.
3. Mehrotra RS and Aneja KR (2006). An Introduction to Mycology. 1<sup>st</sup> edition, New age international publishers, Chennai.
4. Subhash Chandra Parija (2013). Text book of Medical Parasitology. 4<sup>th</sup> edition, All India Publishers and Distributors (Medical Books Publishers), New Delhi.
5. Dimmok N.J and Primrose S.B (1994). Introduction to modern virology 4<sup>th</sup> edition, Blackwell scientific company publications, United States.

**REFERENCE BOOKS:**

1. Tille P. Bailey and Scott (2013). Diagnostic Microbiology, 13<sup>th</sup> edition, Mosby Publishers, United States.
2. Satish Gupte (2005). The Short Textbook of Medical Microbiology. 8<sup>th</sup> edition, Jaypee Brothers, Medical publishers (P) Ltd., New Delhi.
3. Monica Cheesbrough (2003). District Laboratory Practice in Tropical Countries. Part 1 & 2, Cambridge University Press.
4. Jagadish Chander (1996). A text book of Medical Mycology. 1<sup>st</sup> edition. Interprint, New Delhi.
5. Chatterjee K.D (2016). Parasitology, Protozoology & Helminthology. 13<sup>th</sup> edition. Joe media Publishers. Calcutta.

**OER:**

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5. <http://bookboon.com/>
6. <http://www.freebooks.com/ebooks/>

## PIMBB20: IEC-II: ANIMAL TISSUE CULTURE

<b>Year:</b> <b>I</b> <b>SEM:</b> <b>I</b>	<b>Course Code</b> PIMBB20	<b>Title Of The Course</b> Animal Tissue Culture	<b>Course Type</b> Theory	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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### Course Objective:

To acquaint students with a clear background on processing, culturing animal cells and cell lines in laboratory.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Introduce the importance of cell culture.

**CO2:** Demonstrate knowledge of cell lines used in tissue culture, their origins and applications and explain major components of cell and tissue culture media.

**CO3:** Identify methods to maintain cultures of animal cells and established cell lines with good viability and minimal contamination.

**CO4:** Utilize hybridoma technology for monoclonal and polyclonal antibodies production.

**CO5:** Outline the applications of animal cell culture.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	M
CO2	M	H	M	L	H	H
CO3	H	H	M	M	M	H
CO4	H	H	M	M	M	H
CO5	H	M	L	L	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	L	H	L	H
CO2	H	L	M	H	L	H
CO3	H	H	M	M	M	H
CO4	H	H	M	M	M	H
CO5	H	M	L	H	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

## COURSE SYLLABUS

### UNIT–I: Cell Culture and Types.

- 1.1 Introduction and Importance of cell culture. (K1,K2)
- 1.2 Historical background of cell culture technology. (K1,K2)
- 1.3 Tissue culture techniques – primary culture. (K1,K2,K3)
- 1.4 Tissue culture Techniques - secondary culture. (K1,K2,K3)
- 1.5 Continuous cell lines, suspension cultures. (K1,K2,K3)

1.6 Organ cultures. (K1,K2,K3)

## **UNIT–II: Culture Media and Behaviour of Cells.**

2.1 Different types of media for culturing cells and tissues. (K1,K2,K3)

2.2 Natural and defined media and growth supplements. (K1,K2,K3)

2.3 Culture of different tissues and its application. (K1,K2,K3)

2.4 Behaviour of cells in terms of growth differentiation and metabolism. (K1,K2,K3)

2.5 Cell division, growth patterns of cells. (K1,K2,K3)

2.6 Estimation of cell number. (K1,K2,K3)

## **UNIT–III: Characterization and Maintenance of Cell.**

3.1 Development of cell lines. (K1,K2,K3)

3.2 Characterization of cell lines (K1,K2,K3)

3.3 Maintenance of cell lines (K1,K2, K3).

3.4 Stem cells and their applications. (K1,K2)

3.5 Cryopreservation. (K1,K2,K3)

3.6 Common cell culture contaminants. (K1,K2)

## **UNIT–IV: Hybridoma Technology.**

4.1 Hybridoma technology: Production of monoclonal and polyclonal antibodies with different types of antigens. (K1,K2,K3)

4.2 Antigen preparation and modification. (K1,K2,K3)

4.3 Adjuvants dose. (K1,K2,K3)

4.4 Routes of antigen administration. (K1,K2,K3)

4.5 Collection of sera and purification of antibodies. (K1,K2,K3)

4.6 Production and applications of monoclonal antibodies for diagnosis and therapy. (K1,K2,K3)

## **UNIT–V: Applications of Animal Cell Culture.**

5.1 Applications of Animal Cell Culture: Use in gene therapy. (K1,K2,K3)

5.2 Cloning from short-term and long term cultured cells. (K1,K2,K3,K4,K5)

5.3 Cloning for production of transgenic animals. (K1,K2,K3,K4,K5,K6)

5.4 Cloning for conservation. (K1,K2,K3)

5.5 Application of animal cell culture for in vitro testing of drugs. (K1,K2,K3)

5.6 Testing of toxicity of environmental pollutants in cell culture. (K1,K2,K3,K4,K5)

**TEXTBOOKS:**

1. Freshney RI. 2005. Culture of Animal Cells. 1<sup>st</sup> edition. Wiley Press.
2. Portner R. 2007. Animal Cell Biotechnology. 1<sup>st</sup> edition. Humana Press.
3. Mishra Bina 2011. Animal Cell Culture. 1<sup>st</sup> edition. Studium Press.

**REFERENCES BOOKS:**

1. Basanth Kumar Sinha, Rinesh Kumar. 2008. Principles of animal Cell Culture. IBDC Press.
2. John Masters. 2000. Animal Cell Culture: A Practical Approach. Oxford University Press.
3. Ian Freshney.R, 2010.Culture of Animal Cells: A Manual of Basic Technique and Specialized Application. Wiley-Blackwell.

**OER:**

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3. <http://www.bookrix.com>
4. <http://www.e-booksdirectory.com/>
5. <http://bookboon.com/>
6. <http://www.freebooks.com/ebooks/>

## PIMBC20 - IEC III: HAEMATOLOGY AND BLOOD BANKING

<b>Year:</b> <b>I</b> <b>SEM:</b> <b>II</b>	<b>Course Code</b> PIMBC20	<b>Title Of The Course</b> Haematology and blood banking	<b>Course Type</b> Theory	<b>Course Category</b> Independent elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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### Course Objective:

To acquaint students with a clear background on haematology and blood banking procedures

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the ABO blood grouping and Rh typing.

**CO2:** Apply techniques to collect and store blood samples.

**CO3:** Describe the composition of blood and discuss on various blood disorders.

**CO4:** Perform routine haematological tests.

**CO5:** Elaborate the clinical significance of blood transfusion.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	L	H	H	M	H	H
<b>CO2</b>	L	H	H	M	H	H
<b>CO3</b>	L	L	M	M	M	H
<b>CO4</b>	M	H	H	H	M	H
<b>CO5</b>	M	H	H	H	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	L	H
<b>CO2</b>	H	H	H	M	L	H
<b>CO3</b>	H	L	M	M	L	H
<b>CO4</b>	H	H	H	H	L	H
<b>CO5</b>	H	H	H	H	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

## COURSE SYLLABUS

### UNIT- I: ABO blood grouping and collection of blood samples

- 1.1 ABO blood grouping and Rh typing. (K1,K2)
- 1.2 Blood - Specimen collection. (K1,K2,K3)
- 1.3 Laboratory preparation in Haematology – Veinpuncture method (K1,K2,K3)
- 1.4 capillary method and finger prick method of blood sample collection (K1,K2,K3)
- 1.5 Anticoagulants. (K1,K2,K3)
- 1.6 Storage of blood specimen. (K1,K2,K3)

## **UNIT -II: Composition of blood**

- 2.1 Composition of blood- cellular fraction. (K1,K2)
- 2.2 Composition of blood- plasma fraction. (K1,K2)
- 2.3 Morphological study of RBC. (K1,K2,K3)
- 2.4 WBC- Granulocytes -Neutrophils, Eosinophils, Basophils (K1,K2,K3)
- 2.5 Non granulocytes- lymphocytes, monocytes. (K1,K2,K3)
- 2.6 Platelet and its significance. (K1,K2,K3)

## **UNIT- III: Blood disorders**

- 3.1 Blood Disorder- Leukemia. (K1,K2,K3,K4)
- 3.2 Anaemia- its causes. (K1,K2,K3,K4)
- 3.3 Leucopaenia- its causes. (K1,K2,K3,K4)
- 3.4 Eosinophilia- its causes. (K1,K2,K3,K4)
- 3.5 Thrombocytopaenia - its causes (K1,K2,K3,K4)
- 3.6 Haematology - Normal values. (K1,K2,K3,K4)

## **UNIT- IV: Routine Haematological test**

- 4.1 Introduction to Routine Haematological tests. (K2,K3,K4,K5)
- 4.2 Haemocytometer -WBC counting. (K2,K3,K4,K5)
- 4.3 Haemocytometer- RBC counting. (K2,K3,K4,K5)
- 4.4 Buffy coat (determination of Haematocrit). (K2,K3,K4,K5)
- 4.5 Determination of erythrocyte sedimentation rate. (K2,K3,K4,K5)
- 4.6 Differential count of leucocytes. (K2,K3,K4,K5)

## **UNIT- V: clinical significance of blood transfusion.**

- 5.1 Clinical significance of blood transfusion. (K1,K2)
- 5.2 Collection of blood for transfusion. (K1,K2,K3)
- 5.3 Processing of blood for transfusion. (K1,K2,K3)
- 5.4 Routine laboratory procedure in Blood bank. (K1,K2)
- 5.5 Transfusion reaction. (K1,K2)
- 5.6 Haemolytic disease of new born. (K1,K2)

## **REFERENCE BOOKS:**

1. Maiti. C.R . 2002. “A Concise note on Medical laboratory technology” – New central book agency:Page 1-49.
2. Kanai. L. Mukherjee. 1988. “Medical Laboratory technology”- Volume I – Tata McGraw Hill.

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## PIMBD20: IEC -IV: FORENSIC SCIENCE

<b>Year:</b> <b>I</b>	<b>Course Code</b> PIMBD20	<b>Title Of The Course</b> Forensic science	<b>Course Type</b> Theory	<b>Course Category</b> Independent elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
<b>SEM:</b> <b>II</b>							

### Course Objective:

To provide students psychological understanding of the scientific principles of crime scene investigation and reconstruction, including evidence collection and preservation.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the history, scope and development of forensic science.

**CO2:** Evaluate the methods underpinning forensic science, from crime scene investigation to report evidential value within a case.

**CO3:** Reflect on the use of various divisions of forensic science in the crime investigation.

**CO4:** Explain the theory of DNA fingerprints, blood pattern analysis, footwear and tool mark impression evidence, and drugs of abuse in the context of Forensic Science.

**CO5:** Utilize psychological principles in crime investigation.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	L	H	H	M	H	H
<b>CO2</b>	L	H	H	M	H	H
<b>CO3</b>	L	L	M	M	M	H
<b>CO4</b>	M	H	H	H	M	H
<b>CO5</b>	M	H	H	H	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	L	H
<b>CO2</b>	H	H	H	M	L	H
<b>CO3</b>	H	L	M	M	L	H
<b>CO4</b>	H	H	H	H	L	H
<b>CO5</b>	H	H	H	H	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

### COURSE SYLLABUS

#### UNIT-I: History, Scope and Development of Forensic Science.

- 1.1 Definition of Forensic science (K1)
- 1.2 Development of Forensic science. (K1,K2)
- 1.3 Scope of Forensic Science.( K1,K2)
- 1.4 History of Forensic Science in India. (K1,K2)

1.5 Development and scope of Forensic Science in India. (K1,K2)

1.6 Growth of Core laboratories, set up in country. (K1,K2)

### **UNIT–II: Sociological and Scientific Aspects of Crime.**

2.1 Introduction to crime, Sociological aspect in society. (K1,K2)

2.2 Types of crimes. (K1,K2)

2.3 Crimes in India. (K1,K2)

2.4 Crime Scene Management, Crime Scene procedures. (K1,K2,K3)

2.5 Protection of crime scene physical evidence - Scientific collection of physical evidence.  
(K1,K2,K3)

2.6 Crime scene management in manmade and natural disaster. (K1,K2,K3)

### **UNIT–III: Divisions of Crime Investigation.**

3.1 Duties of forensic scientist. (K1,K2)

3.2 Introduction to various divisions of crime investigation. (K1,K2)

3.3 Crime investigation- Biology, Serology. (K1,K2,K3)

3.4 Crime investigation -Chemistry, Physics. (K1,K2,K3)

3.5 Crime investigation -Toxicology, Ballistics. (K1,K2,K3)

3.6 Crime investigation -Prohibition Document and other divisions. (K1,K2)

### **UNIT–IV: Forensic Science Laboratory Techniques.**

4.1 Specialised facilities offered by forensic science laboratory – DNA fingerprinting.  
(K1,K2,K3)

4.2 Polygraph Narco analysis. (K1,K2,K3)

4.3 Brain electrical oscillation. (K1,K2,K3)

4.4 Signature proficiency (BEOSP) Cyber forensic. (K1,K2,K3)

4.5 Tape and video authentication. (K1,K2,K3)

4.6 Speaker identification. (K1,K2,K3)

### **UNIT–V: Investigative Psychology.**

5.1 Concepts of psychology. (K1,K2)

5.2 History of psychology. (K1,K2)

5.3 Modern perspectives of Psychology. (K1,K2)

5.4 Types of psychology. (K1,K2)

5.5 Professionals psychology - The science and research methods. (K1,K2,K3)

5.6 Professional and ethical issues in psychology. (K1,K2)

**REFERENCE BOOKS:**

1. Dr.Rukmani Krishnamurty. 2011. Introduction to Forensic Science in Crime Investigation. 1<sup>st</sup> edition. Scientific Books publishers.India.
2. Richard Saferstein. 2016. Criminalistics - An Introduction to Forensic Science. 8thEdition Pearson Prentice Hall.
3. Morgan, King, Weiss and Schopler. 1989. Introduction to Psychology, 7<sup>th</sup> edition.McGraw Hill, India.
4. Carson RC & Butcher JN .2012. Abnormal psychology & modern life.10th Ed. Harper-Collins.
5. Patterson, Lewis E.&Welfel, Elizabeth Reynold. 2000. The Counseling process – Hilgard.publishers.

**OER:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## SEMESTER III

### PCMBI20: MOLECULAR BIOLOGY AND MICROBIAL GENETICS

<b>Year:</b> <b>II</b> <b>SEM:</b> <b>III</b>	<b>Course Code</b> PCMBI20	<b>Title Of The Course</b> Molecular Biology and Microbial Genetics	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

To provide an insight into the various aspects of microbial genetics and be proficient on cloning vectors used in rDNA technology.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

CO1: Discuss molecular mechanisms underlying mutations.

CO2: Explain the concepts of gene transfer mechanism in prokaryotes and eukaryotes.

CO3: Identify the role of plasmids as cloning vectors.

CO4: Evaluate on the role of transposable elements with gene mapping.

CO5: Analyse the control methods for gene expression.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	L	M	M	H	H
CO2	H	L	H	L	M	H
CO3	H	L	H	L	M	H
CO4	H	L	M	M	H	H
CO5	H	M	M	L	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	L	H	M	H	H
CO2	H	L	H	M	M	H
CO3	H	L	H	L	M	H
CO4	H	L	H	M	H	H
CO5	H	M	H	L	M	H

**H – High (3), M – Moderate (2), L – Low (1)**

#### COURSE SYLLABUS

##### UNIT-I: Genetic Material and Mutations.

**(15 hours)**

1.1 Identification of Genetic Material (Griffith, Avery and Hershey and Chase Experiments).

(K1,K2)

1.2 Gene as a unit of mutation and Recombination. (K1,K2)

1.3 Mutagenesis, Mutations and Auxotrophic mutants. (K1,K2)

1.4 Spontaneous and induced mutations. (K1,K2)

1.5 Isolation of mutants, mutagenesis, reversion, suppression. (K1,K2, K3)

1.6 Genetic analysis of mutants. (K1,K2, K3, K4)

**UNIT-II: Gene Transfer Mechanisms.****(15 hours)**

- 2.1 Transformation - competence cells. (K1,K2)
- 2.2 Regulation and importance of natural transformation. (K1,K2)
- 2.3 Transduction - general transduction. (K1,K2)
- 2.4 Transduction- specialized transduction. (K1,K2)
- 2.5 Conjugation - Hfr, Triparental mating. (K1,K2)
- 2.6 Self-transmissible and mobilizable plasmids – functions of pili. (K1,K2)

**UNIT-III: Natural and Artificial Plasmids.****(15 hours)**

- 3.1 Biology of Plasmids – Extra chromosomal heredity - biology of bacterial plasmids. (K1,K2)
- 3.2 General Structure of the plasmids - F1 & ColE1 plasmids. (K1,K2)
- 3.3 Natural resistant plasmid - pSC101. (K1,K2)
- 3.4 Artificial cloning vector- pBR322. (K1,K2, K3,K4)
- 3.5 Ti plasmids. (K1,K2, K3,K4)
- 3.6 Replication of plasmid , control, partitioning, incompatibility and gene transfer methods. (K1,K2, K3, K4)

**UNIT-IV: Transposable Elements and Gene Mapping.****(15 hours)**

- 4.1 Transposable genetic elements and Gene Mapping - Introduction - Discovery, insertion sequences. (K1,K2)
- 4.2 Complex and Compound transposons - T10, T5, and retroposon. (K1,K2)
- 4.3 Genetic mapping – *E. coli*. (K1,K2)
- 4.4 Virus T4 phage – using r II system. (K1,K2)
- 4.5 Bacteriophage vectors -  $\lambda$  phage. (K1,K2, K3,K4)
- 4.6 Bacteriophage vector- M13 phage. (K1,K2, K3,K4)

**UNIT-V: Gene Regulation and Expression****(15 hours)**

- 5.1 Concept of gene and Gene regulation. (K1,K2)
- 5.2 Organization of gene in prokaryotes and eukaryotes. (K1,K2)
- 5.3 Introduction to Operon concept, lac and Trp operons, promoters and repressors. (K1,K2)
- 5.4 Regulation of gene expression. (K1,K2)
- 5.5 Transcriptional control – functions of promoters, terminators, attenuators. (K1,K2)
- 5.6 Induction and repression control mechanism. (K1,K2, K3, K4)

**TEXT BOOKS**

1. Robert H Tamarin (2002). Principles of Genetics. 7<sup>th</sup> edition, Tata McGraw Hill P. Ltd., New Delhi.
2. Benjamin A. Pierce (2002). Genetics: A Conceptual Approach. W.H.Freeman and Company, United States.
3. Brown T. A (2016). Gene cloning and DNA analysis- An introduction. 7<sup>th</sup> edition, Black wiley, United States.
4. Old R.S and Primrose S.B (2001). Principles of Gene Manipulation: An introduction to Genetic Engineering. 6<sup>th</sup> edition, Blackwell Scientific publication, London.

## REFERENCE BOOKS

1. Gardner Simion Snustad (2005). Principles of Genetics. 8<sup>th</sup> edition, John Wiley and Sons Inc, New York.
2. Peter Snustad D and Michael J Simmons (2003). Principles of Genetics. 3<sup>rd</sup> edition, John Wiley and Sons, Inc. publication, New Delhi.
3. Bernad R Glick and Pasternak, J.J (2003). Molecular Biotechnology - Principles and Applications of Recombinant DNA.3<sup>rd</sup> edition, ASM Press, Washington, D.C.
4. Jogdnand S.N (2005). Gene biotechnology. 2<sup>nd</sup> edition, Himalaya Publishing House, Mumbai.
5. Satyanarayana U (2005). Biotechnology. 1<sup>st</sup> edition, Books and Allied (P) Ltd., Kolkata.
6. Dubey R.C (2005). A Text of Biotechnology. Multicolour Illustrative edition, S.Chand and Company Ltd., New Delhi.

## OER:

## VIDEOS/VIDEO LESSONS / E-CONTENT FOR LEARNING

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

## PCMBJ20: ADVANCED MICROBIOLOGY

<b>Year:</b> <b>II</b> <b>SEM:</b> <b>III</b>	<b>Course Code</b> PCMBJ20	<b>Title Of The Course</b> Advanced Microbiology	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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### Course Objective:

To provide the learners an overview on the advanced aspects of Microbiology.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Utilize microorganisms in the preparation of cosmetics.

**CO2:** Evaluate the biological potential in samples return from satellites and solar system.

**CO3:** Discuss the role of antimicrobial fabrics, carpets, tiles and colorants.

**CO4:** Produce bacteriostatic sanitary napkins and towels.

**CO5:** Comprehend on paper, rubber and plastic Microbiology

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	L	H	M
CO2	H	L	L	M	L	H
CO3	H	H	M	H	L	H
CO4	H	L	L	M	M	H
CO5	H	H	M	H	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	L	H	M
CO2	H	M	M	L	L	H
CO3	H	H	M	H	L	H
CO4	H	L	L	L	M	H
CO5	H	H	M	H	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

## COURSE SYLLABUS

### UNIT-I: Cosmetic Microbiology.

**(15 hours)**

1.1 Definition; Preparations of Skin whitening compositions from microbes like Ascomycetes and Black yeast. (K1,K2, K3)

1.2 Preparations of Skin whitening compositions- enzymes. (K1,K2, K3)

1.3 Preparations of Skin whitening compositions- Mineral yeast ferments. (K1,K2,K3)

1.4 Microbial Production of Alpha Arbutin. (K1,K2,K3)

1.5 Microbial production of Hyaluronic acid. (K1,K2,K3)

1.6 Kojic acid and their use in Cosmetics preparations. (K1,K2)

**UNIT–II: Space Microbiology. (15 hours)**

- 2.1 Introduction to Space Microbiology. (K1,K2)
- 2.2 Monitoring of astronauts microbial flora. (K1,K2,K3)
- 2.3 Alterations in the load of medically important microorganisms. (K1,K2)
- 2.4 ESA STONE experiment. (K1,K2,K3,K4)
- 2.5 Evaluating the Biological Potential in Samples Returned from Planetary Satellites. (K1,K2, K3,K4)
- 2.6 Evaluating the Biological Potential of Small Solar System Bodies. (K1,K2,K3,K4)

**UNIT–III: Textile Microbiology. (15 hours)**

- 3.1 Introduction to Textile Microbiology. (K1,K2)
- 3.2 Antimicrobial fabrics. (K1,K2)
- 3.3 Antimicrobial garments. (K1,K2)
- 3.4 Antimicrobial carpets. (K1,K2)
- 3.5 Antimicrobial colorants. (K1,K2)
- 3.6 Bacteriostatic sanitary napkins and towels. (K1,K2,K3)

**UNIT–IV: Paper and Rubber Microbiology. (15 hours)**

- 4.1 Paper Microbiology- Introduction & Definition. (K1,K2)
- 4.2 Antimicrobial papers and its production. (K1,K2)
- 4.3 Antimicrobial currency. (K1,K2)
- 4.4 Rubber Microbiology – Introduction & Definition. (K1,K2)
- 4.5 Note on Antimicrobial rubbers. (K1,K2)
- 4.6 Antimicrobial rubber compositions. (K1,K2)

**UNIT–V: Plastic Microbiology. (15 hours)**

- 5.1 Definition- Bacteriostatic plastics. (K1,K2)
- 5.2 Antimicrobial plastic composition and production. (K1,K2)
- 5.3 Antiseptic plastics. Fungistatic plastics: Definition and production. (K1,K2)
- 5.4 Production of plastics materials from microorganisms. (K1,K2,K3)
- 5.5 Methods for producing anti-microbial plastic product. (K1,K2,K3,K4)
- 5.6 Plastic article containing a metallic bactericidal agent. Casein plastic. (K1,K2,K3)

**TEXT BOOKS:**

1. Vimaladevi M (2015) Text book of Herbal Cosmetics.1<sup>st</sup> edition, CBS Publishers and Distributors, New Delhi.
2. Alfonso F Davila (2010). Astromicrobiology.1<sup>st</sup> edition, John Wiley & Sons, Inc. New Delhi.
3. Srikanth Pilla (2011). Handbook of Bioplastics and Biocomposites Engineering and Applications.1<sup>st</sup> edition, John Wiley and Sons Inc., New Delhi.
4. Nierstrasz V and Cavaco Paulo A (2010). Advances in Textile Biotechnology. 1<sup>st</sup> edition, Elsevier, London.

**REFERENCE BOOKS:**

1. Philip A. Geis (2006) *Cosmetic Microbiology: A Practical Approach*. 2<sup>nd</sup> edition, CRC Press, Taylor and Francis Group, New York, London.
2. David M. Klaus (2003). *Space Microbiology: Microgravity and Microorganisms*. 1<sup>st</sup> edition, John Wiley & Sons, Inc. New Delhi
3. Ashish Kumar Sen (2007). *Coated Textiles: Principles and Applications*. 2<sup>nd</sup> edition, CRC Press, New Delhi
4. Tappi (2007). *Monograph on Microbiology of Papermaking systems*. Tappi publishers, New York.
5. Roberts A.D (1988). *Natural Rubber Science and Technology*. 1<sup>st</sup> edition, Oxford University Press. UK.
6. Chen, George Guo- Qiang (2010). *Plastics from Bacteria: Natural Functions and Applications*. 1<sup>st</sup> edition, Springer, United States.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## PCMBK20: RESEARCH METHODOLOGY

<b>Year :</b> II <b>SEM:</b> III	<b>Course Code</b> PCMBK20	<b>Title Of The Course</b> Research Methodology	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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### Course Objective:

To provide the learners knowledge about the concept of research, its importance and learn the art of thesis, paper writing and publication.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Explain basic concepts of research and its methodologies.

**CO2:** Identify the relationship between methodology, framework and data collection.

**CO3:** Analyze the diverse cases using statistical methods.

**CO4:** Use of digital library as a resource of microbiological research.

**CO5:** Discuss the principles and algorithms of pairwise and multiple alignments, and sequence database searching.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	L	H
CO3	H	H	H	L	L	H
CO4	H	H	H	L	L	H
CO5	H	H	H	L	L	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	H
CO2	H	H	H	H	L	H
CO3	H	H	H	H	L	H
CO4	H	H	H	H	L	H
CO5	H	H	H	H	L	H

H – High (3), M – Moderate (2), L – Low (1)

### COURSE SYLLABUS:

#### UNIT-I: Methodologies in Research.

(15 hours)

- 1.1 Research Methodology - Meaning and importance. Statement, Constraints. (K1,K2)
- 1.2 Review of literature - Review and synopsis presentation. (K1,K2,K3,K4,K5,K6)
- 1.3 Types of research, Research tools, Qualities of a good researcher. (K1,K2,K3,K4,K5,K6)
- 1.4 Research process, Research designs – Experimental and non-experimental. (K1,K2,K3,K4,K5,K6)
- 1.5 Preparation of research report. Guidelines for preparing an article. (K1,K2,K3,K4,K5,K6)

1.6 Computers in biological research- Plagiarism checking softwares. (K1,K2,K3,K4,K5)

**UNIT-II: Data Collection and Analysis. (15 hours)**

2.1 Introduction to Data collection. (K1,K2)

2.2 Source of data- Primary and Secondary. (K1,K2,K3,K4,K5)

2.3 Types of classification of data. (K1,K2,K3,K4,K5)

2.4 Tabulation of data. (K1,K2,K3,K4,K5,K6)

2.5 Diagrammatic representation of data (line, bar diagram, pie diagram, pictogram and cartogram). (K1,K2,K3,K4,K5,K6)

2.6 Graphical representation of data. (K1,K2,K3,K4,K5,K6)

**UNIT-III: Statistical Methodology-I. (15 hours)**

3.1 Introduction to statistical methodology in research. (K1,K2)

3.2 Measures of central tendency – mean, median, mode. (K1,K2,K3,K4,K5)

3.3 Standard deviation. (K1,K2,K3,K4,K5)

3.4 Correlation – coefficient of correlation (Karl Pearson method, group bi –variable data). (K1,K2,K3,K4,K5)

3.5 Coefficient of variation. (K1,K2,K3,K4,K5)

3.6 Probability. (K1,K2,K3,K4)

**UNIT-IV: Statistical Methodology-II. (15 hours)**

4.1 ANOVA (one way and two ways). (K1,K2,K3,K4,K5)

4.2 Chi square test. (K1,K2,K3,K4,K5)

4.3 Student's T test. (K1,K2,K3,K4,K5)

4.4 Testing of hypothesis-null hypothesis- level of significance-standard error. (K1,K2,K3,K4,K5)

4.5 F Test Web. (K1,K2,K3,K4,K5)

4.6 Resources for Microbiology – Use of Digital Library. (K1,K2,K3,K4)

**UNIT-V: Bioinformatics. (15 hours)**

5.1 Bioinformatics - Introduction and skills for a bioinformatician. (K1,K2)

5.2 Biological databases- An introduction. (K1,K2,K3)

5.3 Database searching, Sequence analysis, Pair alignment. (K1,K2,K3,K4)

5.4 Visualizing protein structures. (K1,K2,K3,K4)

5.5 Predicting structure and function of protein using sequences. (K1,K2,K3,K4)

5.6 Tools for genomics and proteomics. (K1,K2,K3,K4)

**TEXT BOOKS:**

1. Kothari, C.R., (1988). Research methodology, 2<sup>nd</sup> edition. Wiley Eastern Ltd., New Delhi.
2. Anderson, J., Duros, B.H. and Poole, M. (1986). Thesis and assignment writing, 1<sup>st</sup> edition, Wiley Eastern Ltd., New Delhi.
3. Gurumani N. (2002). Research Methodology for Biological sciences, MJP publishers, Chennai. 2006.

**REFERENCES BOOKS:**

1. Frederic H. Erbisch, Karim M. Maredia (2004). "Intellectual Property Rights in Agricultural Biotechnology", CABI Publisher. London
2. Felix Thiele, Richard E. Ashcroft (2005). "Bioethics in a Small World". Springer. USA
3. John Bryant (2002) "Bioethics for Scientists". John Wiley and Sons Publisher. New York
4. Mittal D.P. (1999). "Indian Patents Law". Taxmann Allied Services (p) Ltd. New Delhi

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

**PEMBE20 – ELECTIVE III A: BIOINOCULANTS TECHNOLOGY**

<b>Year:</b> <b>II</b>	<b>Course Code</b> PEMBE20	<b>Title Of The Course</b> Bioinoculants Technology	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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**Course Objective:**

To provide the learners an overview on the potentials of microbes as fertilizers and their beneficial impacts in soil and agriculture.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Outline the importance of bioinoculant technology and discuss on the significance of biofertilizers.

**CO2:** Demonstrate the mass production and applications of bio fertilizer and their impact on plant growth.

**CO3:** Identify in-depth information on the mycorrhizal taxonomy, occurrence and distribution.

**CO4:** Explain the types of mycorrhizal associations and quantification.

**CO5:** Formulate the growth of phosphate solubilizing microbes.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	H
CO2	H	H	H	L	L	H
CO3	H	M	M	H	M	H
CO4	H	M	H	H	M	H
CO5	H	M	H	M	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	H	L	H
CO2	H	L	H	M	L	H
CO3	H	M	H	L	L	H
CO4	H	H	H	M	L	H
CO5	H	L	H	L	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

**COURSE SYLLABUS:**

**UNIT– I: Symbiotic Bacterial N<sub>2</sub> fixers.**

**(9 hours)**

1.1 General account of the microbes used as biofertilizers for crop plants. (K1,K2)

1.2 Advantages of Biofertilizers over chemical fertilizers. (K1,K2)

1.3 Symbiotic N<sub>2</sub> fixers: Rhizobium - Isolation, characterization, identification, classification. (K1,K2, K3,K4)

1.4 Inoculum production and field application. (K1,K2,K3,K4,K6)

- 1.5 Frankia - Isolation, characterization. (K1,K2,K3,K4)  
1.6 Actinorrhizal nodules – non-leguminous crop symbiosis. (K1,K2)

**UNIT – II: Non Symbiotic N<sub>2</sub> fixers. (9 hours)**

- 2.1 Introduction to non-symbiotic N<sub>2</sub> fixation. (K1,K2)  
2.2 Non - Symbiotic N<sub>2</sub> fixers – Azospirillum. (K1,K2)  
2.3 Free living - Azotobacter . (K1,K2)  
2.4 Isolation of free living nitrogen fixers from soil. (K1,K2,K3)  
2.5 Characterization of non-symbiotic N<sub>2</sub> fixers. (K1,K2,K3)  
2.6 Mass inoculum production and field application. (K1,K2, K3, K4,K6)

**UNIT – III: Algal Biofertilizers. (9 hours)**

- 3.1 Symbiotic N<sub>2</sub> fixers – Cyanobacteria. (K1,K2)  
3.2 Azolla – Isolation and characterization. (K1,K2,K3)  
3.3 Mass multiplication- production. (K1,K2,K3,K4)  
3.4 Role of Azolla in rice cultivation .(K1,K2)  
3.5 Crop response to algal biofertilizers. (K1,K2)  
3.6 Field application - immobilization. (K1,K2,K3)

**UNIT – IV: Phosphate Solubilizers. (9 hours)**

- 4.1 Phosphate solubilizers - Phosphate solubilizing microbes. (K1,K2)  
4.2 Isolation of phosphate solubilizers from soil. (K1,K2,K3,K4)  
4.3 Characterization of phosphate solubilizers, (K1,K2, K3,K4)  
4.4 Mass inoculum production. (K1,K2, K3,K4)  
4.5 Field application and crop response. (K1,K2,K3)  
4.6 Mechanism of Phosphate solubilization. (K1,K2)

**UNIT – V: Mycorrhizal Biofertilizers. (9 hours)**

- 5.1 Mycorrhizal bioinoculants – classification. (K1,K2)  
5.2 Importance of mycorrhizal Ectomycorrhizae - Endomycorrhizae - Ectendo mycorrhizae - Taxonomy of mycorrhizae. (K1,K2)  
5.3 Isolation of VA mycorrhizae. (K1,K2, K3,K4)  
5.4 Quantification and assessment of VAM in roots . (K1,K2,K3,K4)  
5.5 Mass inoculum production of VAM . (K1,K2,K3,K4,K6)  
5.6 Field applications and advantages of Ectomycorrhizae and VAM. (K1,K2,K3)

**TEXT BOOKS**

1. Kannaiyan, S. (2003). Bioethnology of Biofertilizers, CHIPS, Texas.
2. Dubey R.C (2005). A Text of Biotechnology. Multicolour Illustrative edition, S.Chand and Company Ltd., New Delhi.
3. Subba Rao NS (2004). Soil Microbiology. 4<sup>th</sup> edition, Oxford and BH Publishing Co.Pvt. Ltd., New Delhi.

**REFERENCES:**

1. Mahendra K. Rai (2005). Hand book of Microbial biofertilizers, The Haworth Press, Inc. New York.
2. Reddy, S.M. et. al. (2002). Bioinoculants for sustainable agriculture and forestry, Scientific Publishers.
3. Subba Rao N.S (1995) Soil microorganisms and plant growth Oxford and IBH publishing co. Pvt. Ltd. NewDelhi.
4. Subba Rao N.S. (1988) Biofertilizers in Agriculture and forestry Oxford and IBH Publishing Co., Ltd., New Delhi.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

**PEMBF20 - ELECTIVE III B: FUNGAL BIOTECHNOLOGY AND  
BIOPROSPECTING**

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code</b> PEMBF20	<b>Title Of The Course</b> Fungal biotechnology and bioprospecting	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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**Course Objective:**

This paper is designed to provide an exposure to the students about the potential of fungi as food and in field of biotechnology as source of different enzymes, secondary metabolites, vitamins, polysaccharides, polyhydric alcohols, pigments, lipids, glycolipids, biofertilizers and biopesticides.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Perform screening and strain development for production of different bio-molecules.

**CO2:** Design a bioreactor with special emphasis on fungal systems.

**CO3:** Comprehend about different secondary metabolites of fungal origin.

**CO4:** Demonstrate methods of recombinant technology with special emphasis on fungal system.

**CO5:** Explain the role of fungi in food and feed industries.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	M	M	L	H	H
CO3	H	M	M	L	H	H
CO4	H	M	M	L	H	H
CO5	H	H	H	L	H	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	M	M	H	H	H
CO3	H	M	M	H	H	H
CO4	H	M	M	H	H	H
CO5	H	H	H	H	H	H

**H – High (3), M – Moderate (2), L – Low (1)**

**COURSE SYLLABUS**

**UNIT- I: Fungal diversity and industrial important fungal strains. (9 hours)**

1.1 Fungal diversity; habitat relationship. (K1,K2)

1.2 Different ecological groups of fungi Ecotaxonomic approach in chemical screening. (K1,K2)

1.3 Primary and secondary products of metabolism; Screening of industrially useful fungal metabolites. (K1,K2)

1.4 Classification of secondary metabolites in fungi. (K1,K2)

1.5 Primary and secondary screening of antibiotic producers; auxanography; enrichment culture. (K1,K2, K3,K4)

1.6 Industrial important fungal strains. (K1,K2)

**UNIT- II: Fungal Biotechnology.**

**(9 hours)**

1.1 Fungal Biotechnology: Fungal biotechnological processes, Principles of fermenter design and operation with respect to Fungal process. (K1,K2)

1.2 Types of fermenters used in Fungal Biotechnology, formulation of fermentation medium. (K1,K2,K3,K4,K6)

1.3 Analysis of fermentation products especially for fungal biotechnology. (K1,K2K3,K4)

1.4 Techniques for strain improvement and strain development. (K1,K2,K3,K4)

1.5 Recombinant technology in fungi: composition of the different types of fungal vectors, selection markers, transformation strategies. (K1,K2,K3,K4,K5,K6)

1.6 Gene replacement or inactivation, applications and future perspectives. (K1,K2,K3,K4)

**UNIT- III: Edible fungi.**

**(9 hours)**

3.1 Introduction to Edible fungi; Mycoproteins. (K1,K2)

3.2 Advancement in mushroom cultivation technology. (K1,K2,K3)

3.3 Commercial mushroom species. (K1,K2)

3.4 Strain improvement and cultivation. (K1,K2, K3)

3.5 Tropical mushrooms and their cultivation; mushroom spawns. (K1,K2, K3, K4)

3.6 Nutritional and medicinal values of mushrooms. (K1,K2)

**UNIT- IV: Fungi in food processing and agriculture application.**

**(9 hours)**

4.1 Introduction to food processing technology. (K1,K2)

4.2 Fungi in food processing, (K1,K2)

4.3 Fungus for Biomass pretreatment for ethanol production. (K1,K2)

4.4 Fungi in agriculture application. (K1,K2)

4.5 Fungal biofertilizers and Biopesticides. (K1,K2, K3)

4.6 Myconematicides . (K1,K2)

**UNIT-V: Biotechnological application of fungi.**

**(9 hours)**

5.1 Biotechnological applications of fungi and their derivatives. (K1,K2,K3)

5.2 Production of Industrially important products from fungi-organic acids (citric acid). (K1,K2,K3)

5.3 Production of enzymes from fungi (cellulase xylanase, amylase, protease). (K1,K2, K3)

5.4 Applications of Fungi in medical and pharmaceutical products. (K1,K2,K3)

5.5 Production of antibiotic (Penicillin). (K1,K2,K3)

5.6 Vitamins and therapeutic peptides from fungi. (K1,K2)

**TEXT BOOKS:**

1. Poonam Singh & Ashok Pandey, Biotechnology for agro-Industrial residues utilisation. (2009), Springer.
2. Satyanarayana T. and Johri B.N. (2005). Microbial diversity, Current Perspectives and Potential Applications , IK international

**REFERENCE BOOKS:**

1. Nair, L. N. (2007). Topics in Mycology and Pathology, New Central Book agency, Kolkata.
2. Oliver R. P. and Michael Schweizer ( 1999). Molecular Fungal Biology, CUP.
2. Berry D. R. (1988). Physiology of industrial Fungi, Blackwell Scientific Publishers.
3. Zhingiang Ann (2005). Handbook of Industrial Mycology, CRC Press

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## SEMESTER IV

### PCMBL20 - MICROBIAL GENE TECHNOLOGY

<b>Year:</b> <b>II</b> <b>SEM:</b> <b>IV</b>	<b>Course Code</b> PCMBL20	<b>Title Of The Course</b> Microbial Gene Technology	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

To provide the learners an insight on the concepts of genetic engineering and techniques employed in recombinant DNA technology.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Analyze the various techniques involved in identification and quantification of nucleic acids.

**CO2:** Utilize the tools and techniques of genetic engineering and the role of DNA manipulative enzymes.

**CO3:** Compile DNA sequencing methods.

**CO4:** Explain about genomic libraries and artificial chromosomes.

**CO5:** Discuss the modern tools and techniques of genomics and application of antisense technologies.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	M
CO2	H	H	H	L	L	M
CO3	H	H	H	M	M	L
CO4	H	H	H	H	M	M
CO5	H	H	H	L	L	M

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	L	H
CO2	H	H	H	L	M	H
CO3	H	H	H	L	M	M
CO4	H	H	H	M	L	H
CO5	H	H	H	L	M	M

**H – High (3), M – Moderate (2), L – Low (1)**

#### COURSE SYLLABUS

##### UNIT-I: Gene Analysis and Techniques.

**(15 hours)**

1.1 Isolation of DNA and RNA from microbes. (K1,K2, K3, K4)

1.2 Handling & Quantification of Nucleic acids.. (K1,K2,K3,K4)

1.3 Radiolabelling of Nucleic acids - End labeling - Nick translation - Labelling by primer extension. (K1,K2, K3,K4)

1.4 PAGE and its applications. (K1,K2)

1.5 Nucleic acid hybridization- colony and plaque hybridization. (K1,K2, K3)

1.6 Blotting techniques – Southern, northern and western blots. (K1,K2, K3)

**UNIT-II: DNA manipulative enzymes (15 hours)**

2.1 DNA manipulative enzymes - Restriction enzymes : Nomenclature - Classification - restriction and DNA Methylation . (K1,K2)

2.2 Type II restriction endonuclease - use of type II restriction endonucleases in gene cloning. (K1,K2)

2.3 Restriction mapping and its applications. (K1,K2)

2.4 DNA modifying enzymes, helicase, gyrase & topoisomerases. (K1,K2)

2.5 Polymerases – DNA polymerases, Klenow polymerase and Reverse Transcriptase. (K1,K2)

2.6 DNA ligases and its function. (K1,K2)

**UNIT-III: DNA sequence analysis (15 hours)**

3.1 DNA sequence analysis: Maxam - Gilbert (Chemical) sequencing - Sangar - Coulson (DiDeoxy/enzymatic) sequencing . (K1,K2, K3,K4)

3.2 Automated DNA sequencing. (K1,K2,K3)

3.3 Genome sequencing by Physical Mapping of genomes. (K1,K2)

3.4 PCR - methods and its application. (K1,K2, K3)

3.5 DNA fingerprinting in forensic application. (K1,K2)

3.6 RFLP - Microarray and its applications. (K1,K2)

**UNIT-IV: Vectors and gene libraries (15 hours)**

4.1 Vectors - nature - uses of vectors- types of vectors . (K1,K2)

4.2 Plasmids, Bacteriophages , Cosmid and Shuttle vectors - An introduction. (K1,K2)

4.3 Cloning strategies – Screening, selection and isolation of recombinants clones. (K1,K2,K3,K4)

4.4 Gene libraries - Genomic and cDNA. (K1,K2)

4.5 Artificial chromosomes – BAC. (K1,K2)

4.6 Artificial chromosomes - YAC. (K1,K2)

**UNIT-V: Gene Annotations and Nanobiologics (15 hours)**

5.1 Gene Annotations. (K1,K2)

5.2 Gene silencing. (K1,K2)

5.3 Human Genome Project. (K1,K2)

5.4 Legal aspects of rDNA technology and cloning. (K1,K2, K3)

5.5 Recombinant DNA products and applications – Humulin, Hepatitis B antigen vaccine, TPA. (K1,K2, K3, K4)

5.6 Nanobiologics - Bioactive peptides as hormones, antimicrobials, vaccines, drug carriers and therapeutics. (K1,K2, K3)

**TEXT BOOKS:**

1. Brown T. A (2016). Gene cloning and DNA analysis- An introduction. 7<sup>th</sup> edition, Black wiley, United States.
2. Old R.S and Primrose S.B (2001). Principles of Gene Manipulation: An introduction to Genetic Engineering. 6<sup>th</sup> edition, Blackwell Scientific publication, London.

**REFERENCE BOOKS:**

1. Jogdnand S.N (2005). Gene biotechnology. 2<sup>nd</sup> edition, Himalaya Publishing House, Mumbai.
2. Satyanarayana U (2005). Biotechnology. 1<sup>st</sup> edition, Books and Allied (P) Ltd., Kolkata.
3. Dubey R.C (2005). A Text of Biotechnology. Multicolour Illustrative edition, S.Chand and Company Ltd., New Delhi.
4. Bernad R Glick and Pasternak, J.J (2003). Molecular Biotechnology - Principles and Applications of Recombinant DNA.3<sup>rd</sup> edition, ASM Press, Washington, D.C.

**OER:****VIDEOS/VIDEO LESSONS / E-CONTENT FOR LEARNING**

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

## PCMBM20 - BIOETHICS AND BIOSAFETY

<b>Year:</b> <b>II</b>	<b>Course Code</b> PCMBM20	<b>Title Of The Course</b> Bioethics and Biosafety	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
<b>SEM:</b> <b>IV</b>							

### Course Objective:

To provide the learners knowledge about biosafety concerns at the level of individuals, institution, society, region, country and the world.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the principles of bioethics and explain the biosafety concerns with safeguard measures.

**CO2:** Compile the BSA statement for the industrial production of pharmaceuticals.

**CO3:** Adapt the WHO quality standards in food process technology.

**CO4:** Discuss on the global scenario of patenting.

**CO5:** Comprehend the forms of patents, patentability and process of patenting.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	M	M	M	H
<b>CO2</b>	H	H	M	L	L	H
<b>CO3</b>	H	M	L	H	M	H
<b>CO4</b>	H	M	L	H	M	H
<b>CO5</b>	H	H	M	M	H	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	L	H	H
<b>CO2</b>	H	H	H	M	L	H
<b>CO3</b>	H	H	H	L	M	H
<b>CO4</b>	H	M	H	L	M	H
<b>CO5</b>	H	H	H	L	H	H

**H – High (3), M – Moderate (2), L – Low (1)**

### COURSE SYLLABUS

#### UNIT-I: Principles of Bioethics.

**(15 hours)**

- 1.1 Definition- Bioethics. (K1,K2)
- 1.2 Legality, morality and ethics- An introduction (K1,K2)
- 1.3 Introduction to the principles of Bioethics. . (K1,K2)
- 1.4 Principles of autonomy. . (K1,K2)
- 1.5 Human rights. . (K1,K2)
- 1.6 Beneficence and privacy justice equality. . (K1,K2)

**UNIT-II: Biosafety concerns.****(15 hours)**

- 1.1 Introduction to Biosafety. . (K1,K2)
- 1.2 Concept and issues of Biosafety. . (K1,K2)
- 1.3 Rational Vs subjective perceptions of risks and benefits. . (K1,K2)
- 1.4 Relationship between risk hazard, exposure, and safe guard. . (K1,K2)
- 1.5 Biosafety concerns at the level of individuals, institutions, society, region, country and the world. . (K1,K2,K3)
- 1.6 Lab associated infections. . (K1,K2,K4)

**UNIT-III: Statement of Ethical practice****(15 hours)**

- 3.1 Introduction to BSA. . (K1,K2)
- 3.2 History of BSA. (K1,K2)
- 3.3 British Sociological Association (BSA) statement of ethical practices of biotechnology in the production of pharmaceutical products. . (K1,K2)
- 3.4 BSA statement ethical practices of biotechnology in the production of drugs. . (K1,K2,K3)
- 3.5 BSA statement ethical practices of biotechnology in the production vaccines . (K1,K2,K3)
- 3.6 BSA statement ethical practices of biotechnology in the production biomolecules. (K1,K2,K3)

**UNIT-IV: WHO quality standards.****(15 hours)**

- 4.1 Introduction to WHO and its functions. (K1,K2)
- 4.2 WHO standards – Quality control. (K1,K2,K3)
- 4.3 Quality control in food process technology. (K1,K2,K3,K4,K5)
- 4.4 Quality control in dairy product technology. (K1,K2,K3,K4,K5)
- 4.5 Quality control for potable water. (K1,K2,K3,K4,K5)
- 4.6 Quality control measures in pharmaceutical industries. (K1,K2,K3,K4,K5)

**UNIT-V: IPR and Patenting.****(15 hours)**

- 5.1 Introduction to IPR and Patenting. (K1,K2)
- 5.2 GATT and IPR, forms of IPR, IPR in India, WTO Act. (K1,K2,K3,K4,K5)
- 5.3 Convention on Biodiversity (CBD), Patent Co-operation Treaty (PCT). (K1,K2,K3,K4,K5)
- 5.4 Forms of patents and patentability, process of Patenting. (K1,K2,K3,K4,K5)
- 5.5 Indian and international agencies involved in IPR & patenting. (K1,K2,K3,K4,K5)
- 5.6 Global scenario of patents and India's position, patenting of biological material, GLP, GMP. (K1,K2,K3,K4,K5)

**TEXT BOOKS:**

1. Frederic H. Erbisch, Karim M. Maredia (2004). Intellectual Property Rights in Agricultural Biotechnology, CABI Publisher.
2. John Bryant (2002) Bioethics for Scientists. John Wiley and Sons Publisher.

**REFERENCES BOOKS:**

1. Mittal D.P. (1999). Indian Patents Law. Taxmann Allied Services (p) Ltd.
2. Christian Lenk, Nils Hoppe, Roberto Andorno (2007). Ethics and Law of Intellectual Property: Current Problems in Politics, Science and Technology, Ashgate Publisher (p) Ltd.
3. Felix Thiele, Richard E. Ashcroft (2005). Bioethics in a Small World. Springer.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## PEMBG20: ELECTIVE IV-A: TAXONOMY AND MICROBIAL BIODIVERSITY

<b>Year:</b> <b>II</b>	<b>Course Code</b> PCMBG20	<b>Title Of The Course</b> Taxonomy and Microbial Biodiversity	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
<b>SEM:</b> IV							

### Course Objective:

The aim of the course is to impart knowledge on Microbial diversity, principles of classification, rules and its applications.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Introduce Microbial classification and Taxonomy.

**CO2:** Describe the classification system in prokaryotes.

**CO3:** Comprehend the classification of virus.

**CO4:** Discuss on the eukaryotic diversity and endosymbiotic theories.

**CO5:** Compile cytology of algae and protozoa.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	L	H
CO2	H	H	H	L	L	H
CO3	H	M	M	H	M	H
CO4	H	M	H	H	M	H
CO5	H	M	H	M	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	H	L	H
CO2	H	L	H	M	L	H
CO3	H	M	H	L	L	H
CO4	H	H	H	M	L	H
CO5	H	L	H	L	L	H

H – High (3), M – Moderate (2), L – Low (1)

### COURSE SYLLABUS

#### UNIT- I: Introduction to microbial Classification.

(9 hours)

- 1.1 An Introduction to Microbial Classification. (K1,K2)
- 1.2 Taxonomy and Taxonomic Ranks. (K1,K2)
- 1.3 Techniques used for determination of Microbial Taxonomy. (K1,K2)
- 1.4 Phylogenetic analysis method. (K1,K2, K3,K4)
- 1.5 Systems of Prokaryotic phylogeny. (K1,K2,K3,K4)
- 1.6 Systems of Eukaryotic Phylogeny. (K1,K2,K3,K4)

**UNIT- II: Classification system in prokaryotes. (9 hours)**

- 2.1 Classification systems in Prokaryotes, Bergey's Manual of Systematic Bacteriology. (K1,K2)
- 2.2 Prokaryotic groups with unusual characteristics: Cyanobacteria. (K1,K2)
- 2.3 Green and Purple sulphur bacteria, Gliding bacteria. (K1,K2)
- 2.4 Rickettsia and Chlamydia. (K1,K2)
- 2.5 Actinomycetes. (K1,K2)
- 2.6 Archaea- Classification, Significance. (K1,K2)

**UNIT-III: Viruses. (9 hours)**

- 3.1 Viruses - Definition, Viroids and Prions. (K1,K2)
- 3.2 Classification systems of Viruses-LHT, Baltimore. (K1,K2)
- 3.3 General Structure and properties of viruses. (K1,K2)
- 3.4 Concepts of Lytic and Lysogenic life cycles. (K1,K2)
- 3.5 Basic Concepts of Virus cultivation- An introduction. (K1,K2)
- 3.6 Egg inoculation, cell culture and Tissue culture techniques. (K1,K2)

**UNIT- IV: Eukaryotic diversity. (9 hours)**

- 4.1 Eukaryotic Diversity- Three Domains of Life. (K1,K2)
- 4.2 Endosymbiotic theories, Eukaryotic cell cycle and Cell division – Mitosis and Meiosis. (K1,K2)
- 4.3 Fungi: Distribution and importance. (K1,K2)
- 4.4 Morphology of fungi –cell wall structure, fungal thallus and filamentous. (K1,K2)
- 4.5 Cytology of fungi- Mitochondria, Golgi bodies- Endoplasmic reticulum. (K1,K2)
- 4.6 Recent classification of fungi. Study of yeasts and molds. (K1,K2)

**UNIT-V: Algae and protozoa. (9 hours)**

- 5.1 Algae: photosynthetic protists. (K1,K2)
- 5.2 Algal classification with their characteristics features. (K1,K2)
- 5.3 Type of vegetative forms- heterocyst and non-heterocyst forms. (K1,K2)
- 5.4 Cytology of algae- pigment and cell inclusions. Distribution and importance. (K1,K2)
- 5.5 Classification of protozoa. Morphology of protozoa – shapes and size. (K1,K2)
- 5.6 Cytology of protozoa- Body covering and skeletons, locomotory and internal organelles. (K1,K2)

**TEXT BOOKS:**

1. Willey, Joanne M. (2014). Prescott's Microbiology. 9th Edition: McGraw-Hill Education – Europe.
2. Kathleen Park Talaro (2011) , Foundations in Microbiology . 8th International edition, McGraw Hill.

**REFERENCE BOOKS:**

1. R.C. Dubey . (2007). A Textbook of Biotechnology, 4th edition, First Multicolor Illustrative Edition, Reprint
2. Michael.T.Madigan, John.M.Martinko, Paul V. (2009). Brock Biology of Microorganisms. 12<sup>th</sup> edition .Pearson Benjamin Cummings.
3. Gerard J.Tortora, BerdellR.Funke, Christine L. Case (2008) Microbiology – An Introduction, , 10th ed., Pearson Education.

**OER:****DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## PEMBH20 - ELECTIVE IV-B: MICROBIAL NANOTECHNOLOGY

<b>Year:</b> <b>II</b>	<b>Course Code</b> PCMBH20	<b>Title Of The Course</b> Microbial Nanotechnology	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
<b>SEM:</b> <b>IV</b>							

### Course Objective:

To provide in depth knowledge on microbial bionanotechnology.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the history of bionanotechnology.

**CO2:** Describe about molecular nanotechnology and microbial synthesis of nanoparticles.

**CO3:** Discuss on types, function and characterization of nanoparticles.

**CO4:** Comprehend the use of nanoparticles in cancer therapy and in biology.

**CO5:** Elaborate the advantages and disadvantages of nanoparticles.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	H
CO2	H	H	H	L	L	M
CO3	H	M	M	H	L	M
CO4	H	M	H	H	M	M
CO5	H	L	M	M	H	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	L	M	H
CO2	H	H	H	L	L	M
CO3	H	H	H	L	L	M
CO4	H	H	H	M	M	M
CO5	H	H	H	M	H	H

**H – High (3), M – Moderate (2), L – Low (1)**

## COURSE SYLLABUS

### UNIT-I: History of Bionanotechnology.

**(9 hours)**

- 1.1 Introduction and History of bionanotechnology. (K1,K2)
- 1.2 Concept and future prospects of bionanotechnology. (K1,K2)
- 1.3 Application of nanotechnology in Life Sciences. (K1,K2)
- 1.4 Terminologies – nanotechnology Vs bionanotechnology, (K1,K2)
- 1.5 Nanomedicine and Nanowires. (K1,K2,K3,K4)
- 1.6 Quantum Dots, nanocomposite, nanoparticles. (K1,K2,K3,K4)

**UNIT- II: Molecular nanotechnology. (9 hours)**

- 2.1 Molecular nanotechnology - nanomachines - collagen. (K1,K2)
- 2.2 Uses of nanoparticles - cancer therapy. (K1,K2)
- 2.3 Manipulation of cell and biomolecules. (K1,K2)
- 2.4 Cytoskeleton and cell organelles. (K1,K2)
- 2.5 Types of nanoparticles production - physical, chemical and biological. (K1,K2)
- 2.6 Microbial synthesis of nanoparticles. (K1,K2, K3,K4)

**UNIT-III: Types and characterization of nanoparticles. (9 hours)**

- 3.1 Nanoparticles - types, functions - Silver, Gold and Titanium. (K1,K2)
- 3.2 Physical and chemical properties of nanoparticles. (K1,K2)
- 3.3 Characterization of nanoparticles - UV-Vis spectroscopy. (K1,K2, K3,K4)
- 3.4 Characterization of nanoparticles Electron Microscopy - HRTEM, SEM. (K1,K2, K3,K4)
- 3.5 Characterization of nanoparticles AFM. (K1,K2, K3,K4)
- 3.6 Characterization of nanoparticles EDS and XRD. (K1,K2, K3,K4)

**UNIT-IV: Uses of nanoparticles in biology. (9 hours)**

- 4.1 Uses of nanoparticles in biology. (K1,K2)
- 4.2 Drug delivery - protein mediated and nanoparticle mediated. (K1,K2, K3)
- 4.3 Uses of nanoparticles in MRI, DNA and Protein Microarrays. (K1,K2, K3)
- 4.4 Nanotechnology in health sectors. (K1,K2, K3)
- 4.5 Toxicology in nanoparticles. (K1,K2)
- 4.6 Dosimetry. (K1,K2, K3)

**UNIT-V: Advantaged and disadvantages of nanoparticles. (9 hours)**

- 5.1 Advantages of nanoparticles. (K1,K2)
- 5.2 Drug targeting, protein detection and MRI. (K1,K2, K3,K4)
- 5.3 Development of green chemistry. (K1,K2)
- 5.4 Commercial viability of nanoparticles. (K1,K2)
- 5.5 Disadvantages - health risk associated with nanoparticles. (K1,K2)
- 5.6 Adequate and inadequate knowledge on nanoparticles research. (K1,K2)

**TEXT BOOKS:**

1. Elisabeth Papazoglou and Aravind Parthasarathy (2007). Bionanotechnology. Morgan & Claypool Publishers.
2. David E. Reisner, Joseph D. Bronzino (2008). Bionanotechnology: Global Prospects. CRC Press.

**REFERENCES BOOKS:**

1. Parthasarathy, B.K. (2007). Introduction to Nanotechnology, Isha Publication.
2. Bernd Rehm (2006). Microbial Bionanotechnology: Biological Self-assembly Systems and Biopolymer-based Nanostructures. Horizon Scientific Press.
3. Ehud Gazit (2006). Plenty of Room for Biology at the Bottom: An Introduction to Bionanotechnology. Imperial College Press.

**OER:**

**DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## PCMBN20 - MAIN PRACTICAL – III: GENETIC ENGINEERING

<b>Year:</b> <b>II</b>	<b>Course Code</b> PCMBN20	<b>Title Of The Course</b> Main Practical III: Genetic Engineering	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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### Course Objective:

To provide hands-on training and acquire adequate skill required to isolate, demonstrate and quantitate nucleic acids, transfer DNA to bacteria and separate biomolecules by electrophoresis.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

CO1: Utilize technical skills in isolation of DNA, their quantification and plasmid.

CO2: Analyse gene transfer mechanism and protein.

CO3: Use the basic skill on blotting techniques & PCR.

CO4: Select methods for the immobilization of enzymes.

CO5: Demonstrate the process of induction of mutation.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	H
CO2	H	H	H	L	M	H
CO3	H	H	M	M	L	H
CO4	L	H	H	H	L	H
CO5	L	H	M	L	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	H	L	H
CO2	H	H	H	L	L	H
CO3	H	M	M	M	L	H
CO4	H	M	H	H	L	H
CO5	H	M	M	L	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

### COURSE SYLLABUS

1. Isolation of DNA and RNA from microbial system - quantification - chemical methods dinitrophenol, orcinol - physical methods - UV absorption.
2. Isolation of plasmid DNA from bacteria.
3. Size characterization of DNA by agarose gel electrophoresis.
4. Enzyme immobilization technique.
5. Induction of mutation by ultra-violet radiation and chemical mutagens.

6. Preparation of competent *E. coli* cells.
7. Transformation of Plasmid DNA to the *E. coli* cells.
8. Southern blotting
9. Western blotting.
10. Separation of proteins by SDS - PAGE
11. PCR amplification – Demonstration.

#### **REFERENCE BOOKS :**

1. Ausubel, F.M., Roger, B., Robert E. Kingston, David A. Moore, Seidman J.G., John A. Smith. and Kelvin, S. 1992. Third Edition, Short Protocols in Molecular Biology, John Wiley & Sons Inc., New York.
2. Berger, S.L. and Kimmel, R. 1987. Guide to Molecular Cloning Techniques, Academic Press, Inc., New York.
3. Brown, T.A. 1998. Molecular Biology Lab Fax 11 Gene Analysis, Academic Press, London.
4. Cappuccino, J.H. and Sherman, N 2007. Microbiology – A Lab Manual, seventh Edition, the Benjamin Publishing Company, Singapore.
5. Malov, S.R. 1990. Experimental Techniques in Bacterial Genetics, Jones and Bartlett Publishers, Boston.
6. Miller, J.H. 1992. A Short Course in Bacterial Genetics: A Lab Manual & Hand Book for *E. coli* and related Bacteria. Cold Spring Harbor Lab press, Cold Spring Harbour.

#### **OBE:**

#### **VIDEOS/VIDEO LESSONS / E-CONTENT FOR LEARNING:**

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

## PCMBO20 - MAIN PRACTICAL – IV: TEXTILE AND COSMETIC

### MICROBIOLOGY

<b>Year:</b> <b>II</b> <b>SEM:</b> <b>IV</b>	<b>Course Code</b> PCMBO20	<b>Title Of The Course</b> Main Practical IV: Textile and cosmetic Microbiology	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objective:

To provide hands-on training and acquire adequate skill required for testing the quality of cosmetics and textile materials.

#### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Utilize the techniques for decolourization of textile industrial waste.

**CO2:** Estimate of BOD, COD and total solids in effluent sample.

**CO3:** Demonstrate the antimicrobial activity of textile materials.

**CO4:** Evaluate the antifungal property of treated textile materials.

**CO5:** Enumerate microorganisms in cosmetics, perfumes and essential oils.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	H
CO2	H	H	H	L	M	H
CO3	H	H	M	M	L	H
CO4	L	H	H	H	L	H
CO5	L	H	M	L	M	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	H	L	H
CO2	H	H	H	L	L	H
CO3	H	M	M	M	L	H
CO4	H	M	H	H	L	H
CO5	H	M	M	L	L	H

**H – High (3), M – Moderate (2), L – Low (1)**

#### COURSE SYLLABUS

1. Determination of biological oxygen demand (BOD) of water.
2. Determination of chemical oxygen demand (COD) of water.
3. Estimation of total solids in effluent sample.
4. Analysis of TDS of effluent content.
5. Estimation of total suspended solids of effluent.
6. Decolorization of distillery or textile industrial waste.
7. Antibacterial activity assessment of textile materials.
8. Evaluation of antifungal property of treated textile materials.

9. Testing for antibacterial activity and efficacy on textile products, Qualitative and quantitative.
10. Determination of antibacterial activity of Textile fabrics by Agar diffusion plate test.
11. Microbiological Enumeration Tests of Cosmetics, Perfumes and Essential Oils.

**REFERENCES:**

1. R.C. Dubey and D.K.Maheswari. (2005) Practical Microbiology. S.Chand & Company.
2. S.Rajan and R.Selvi Christy. (2007) Experimental Procedures in Life Sciences. Anjana Book House Publishers & Distributors.
3. Philip A. Geis. (2006). Cosmetic Microbiology. A Practical Approach. 2<sup>nd</sup> edition. Taylor and Francis Group.

**OER:**

**VIDEOS/VIDEO LESSONS / E-CONTENT FOR LEARNING:**

1. <http://www.learnerstv.com/>
2. <http://webcast.berkeley.edu/>
3. <http://cosmolearning.org/>
4. <http://www.world-lecture-project.org/>
5. <http://cec.nic.in/>
6. <http://epgp.inflibnet.ac.in/>
7. <http://www.co-learn.in/>

**PIMBE20: IEC-V: ENTREPRENEURSHIP AND MANAGEMENT IN MICROBIAL TECHNOLOGY**

<b>Year:</b> <b>II</b> <b>SEM:</b> <b>III</b>	<b>Course Code</b> PIMBE20	<b>Title Of The Course</b> Entrepreneurship and Management in Microbial Technology	<b>Course Type</b> Theory	<b>Course Category</b> Independent elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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**Course Objective:**

To provide an understanding on the concepts of entrepreneurship such as Planning, decision making, leadership, organizations and authority and to provide idea on the basic requirements for establishing a bio-based start-up programme.

**Course Outcomes (CO):**

At the end of the course, the learners will be able to;

**CO1:** Acquaint basic concepts of management such as planning, decision making, leadership, organization and authority.

**CO2:** Compile the motivational theories.

**CO3:** Explain the concepts of centralization and decentralization.

**CO4:** Discuss on IPR and Bioethics with an understanding of government policies.

**CO5:** Attain skill to manage start up and run an organization.

<b>CO/PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>CO1</b>	H	H	M	M	M	H
<b>CO2</b>	H	H	M	L	L	H
<b>CO3</b>	H	M	L	H	M	H
<b>CO4</b>	H	M	L	H	M	H
<b>CO5</b>	H	H	M	M	H	H

<b>CO/PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>CO1</b>	H	H	H	L	H	H
<b>CO2</b>	H	H	H	M	L	H
<b>CO3</b>	H	H	H	L	M	H
<b>CO4</b>	H	M	H	L	M	H
<b>CO5</b>	H	H	H	L	H	H

**H – High (3), M – Moderate (2), L – Low (1)**

**COURSE SYLLABUS**

**UNIT -I: Understanding management and administration.**

1.1 Understanding management and administration. (K1,K2)

1.2 Management: Nature and scope. (K1,K2)

1.3 Management: functional aspects/areas. (K1,K2)

1.4 Evolution of management thought: early, contemporary and modern. (K1,K2)

- 1.5 Roles of Management. (K1,K2)
- 1.6 Levels of managements. (K1,K2)

### **UNIT-II: Major components of management skills.**

- 2.1 Major component of management skills. (K1,K2,K3)
- 2.2 Planning: nature, purpose and importance. (K1,K2,K3)
- 2.3 Types of plans. (K1,K2,K3,K4,K5,K6)
- 2.4 Steps in planning & planning premises. (K1,K2,K3,K4,K5,K6)
- 2.5 Hierarchy of plans. (K1,K2,K3,K4,K5,K6)
- 2.6 Components of planning, Decision making. (K1,K2,K3,K4,K5,K6)

### **UNIT- III: Motivational theories**

- 3.1 Leadership Meaning and nature of directing. (K1,K2,K3)
- 3.2 Understanding, Supervision, motivation . (K1,K2,K3)
- 3.3 Leadership styles, Motivation Theories (Abraham Maslo, Herzberg and Victor Hvrom's). (K1,K2)
- 3.4 Communication – Meaning and importance. (K1,K2,K3)
- 3.5 Meaning and steps in controlling – Essentials of a control system. (K1,K2,K3)
- 3.6 Methods of establishing control (in brief). (K1, K2,K3)

### **UNIT-IV: Centralization Vs Decentralization**

- 4.1 Centralization Vs Decentralization of authority and responsibility. (K1,K2)
- 4.2 Nature and importance of staffing–Process of Recruitment and Selection. (K1,K2,K3)
- 4.3 Organisation: nature and purpose. (K1,K2,K3)
- 4.4 Principles of organization. (K1,K2,K3)
- 4.5 Types of organization. (K1,K2,K3)
- 4.6 Departmental Committees. (K1,K2,K3,K4,K5,K6)

### **UNIT-V: Structure of biobased technology company.**

- 5.1 Structure of a Bio based technology Company. (K1,K2,K3)
- 5.2 Start-up of Bio based technology Company. (K1,K2,K3,K4,K5,K6)
- 5.3 New Product Development. (K1,K2,K3,K4,K5,K6)
- 5.4 Market Research. (K1,K2,K3,K4,K5,K6)
- 5.5 Capital and source investors. (K1,K2,K3,K4,K5, K6)
- 5.6 Sales & Marketing Principles. (K1,K2,K3, K4, K5)

### **TEXT BOOKS:**

1. Naidu, NVR. (2013) Management and Entrepreneurship . 1<sup>st</sup> edn. I. K. International Pvt Ltd
2. Tripathi, PC., Reddy, PN. (2008) Principles of Management — Tata McGraw Hill,

### **REFERENCE BOOKS:**

1. Desai V. (2004) .Dynamics of Entrepreneurial Development & Management– Vasant Desai – Himalaya Publishing House
2. Charantimath , PM. (2006) Entrepreneurship Development Pearson Education – 2006

3. Thomson Robbins, S. (2003) Entrepreneurship Development– 17th Edition - Pearson Education/PHI

**OER:**

**DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

## PIMBF20: IEC-VI: CYANOBACTERIOLOGY

<b>Year:</b> <b>II</b>	<b>Course Code</b> PIMBF20	<b>Title Of The Course</b> Cyanobacteriology	<b>Course Type</b> Theory	<b>Course Category</b> Independent elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
<b>SEM:</b> <b>III</b>							

### Course Objective:

To provide an understanding on the structure, genomics, molecular regulation and applications of Cyanobacteria.

### Course Outcomes (CO):

At the end of the course, the learners will be able to;

**CO1:** Outline the diversity of cyanobacteria.

**CO2:** Discuss on the genomics of Cyanobacteria.

**CO3:** Explain the molecular biology of Cyanobacteria.

**CO4:** Demonstrate molecular regulation of Cyanobacteria.

**CO5:** Comprehend the mass cultivation and applications of Cyanobacteria.

CO/PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	M	M	H
CO2	H	H	H	L	L	M
CO3	H	M	M	H	L	M
CO4	H	M	H	H	M	M
CO5	H	H	M	M	H	H

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	H
CO2	H	M	H	M	L	H
CO3	H	M	H	M	L	H
CO4	H	M	H	M	L	H
CO5	H	H	H	H	H	H

**H – High (3), M – Moderate (2), L – Low (1)**

### COURSE SYLLABUS

#### UNIT-I: Introduction to cyanobacteria

- 1.1 Overview on cyanobacteriology. (K1,K2)
- 1.2 Introduction: Origins of life. (K1,K2)
- 1.3 Photosynthesis in cyanobacteria. (K1,K2)
- 1.4 Diversity of cyanobacteria. (K1,K2)
- 1.5 Fossil history of cyanobacteria. (K1,K2)
- 1.6 The Oceanic Cyanobacterial Picoplankton. (K1,K2)

#### UNIT-II: Genomics of Cyanobacteria

- 2.1 Gene transfer in cyanobacteria in nature. (K1,K2)
- 2.2 Gene transfer to cyanobacteria in lab. (K1,K2,K3)

- 2.3 Molecular ecology of Cyanobacteria. (K1,K2)
- 2.4 Environmental genomics of cyanobacteria. (K1,K2)
- 2.5 Comparative genomics of marine cyanobacteria. (K1,K2)
- 2.6 Stress response-regulatory system and regulated genes. (K1,K2)

### **UNIT-III: Molecular Biology of Cyanobacteria**

- 3.1 Molecular Biology of Cyanelles and Chloroplast Origins and Evolution. (K1,K2)
- 3.2 Supramolecular Membrane Organization. (K1,K2)
- 3.3 Phycobilisome and Phycobiliprotein Structures. (K1,K2)
- 3.4 The Use of Cyanobacteria in the Study of the Structure and Function of Photosystem II. (K1,K2)
- 3.5 The Cytochrome Complex. (K1,K2)
- 3.6 Photosystem I in Cyanobacteria. (K1,K2)

### **UNIT-IV: Biochemistry and molecular regulation in cyanobacteria**

- 4.1 The Biochemistry of cyanobacteria. (K1,K2)
- 4.2 Molecular Regulation of Carbon Dioxide Metabolism in Cyanobacteria. (K1,K2)
- 4.3 Genetic Analysis of Cyanobacteria. (K1,K2)
- 4.4 Heterocyst development. (K1,K2)
- 4.5 Heterocyst Metabolism. (K1,K2)
- 4.6 Differentiation of Hormogonia. (K1,K2)

### **UNIT-V: Applications of Cyanobacteria**

- 5.1 Mass cultivation of cyanobacteria under outdoor and indoor conditions. (K1,K2)
- 5.2 Cyanobacteria as a source of fine chemicals: polysaccharides and bioactive molecules. (K1,K2,K3)
- 5.3 Cyanobacteria as a source of pigments and antioxidants. (K1,K2,K3)
- 5.4 Cyanobacteria as a source of lipids and polyunsaturated fatty acids. (K1,K2,K3)
- 5.5 Cyanobacteria as biofertilizer for paddy cultivation. (K1,K2,K3)
- 5.6 Hydrogen production by cyanobacteria: Mechanism, progress and prospects. (K1,K2)

### **TEXT BOOKS:**

1. Samit Ray. (2006). Cyanobacteria. 1<sup>st</sup> edition. New Age International Pvt Ltd Publishers.
2. Percy M. Gault and Harris J. Marler. (2009) .Handbook on Cyanobacteria: Biochemistry, Biotechnology and Applications (Bacteriology Research Developments), Nova Science publishers, Inc.

### **REFERENCE BOOKS:**

1. Antonia Herrero and Enrique Flores. (2008). The Cyanobacteria: Molecular Biology, Genomics and Evolution, Caister academic press.
2. T. A. Sarma. (2012) Handbook of Cyanobacteria, CRC press.
3. D.A. Bryant. (1995). The Molecular Biology of Cyanobacteria (Advances in Photosynthesis and Respiration) Springer.

**OER:**

**DIGITAL LIBRARIES:**

1. <http://www.loc.gov/>
2. <http://library.clark.edu/>
3. <http://www.dli.ernet.in/>
4. <http://www.loc.gov/education/>

# Department of Chemistry (PG)

## SYLLABUS AND REGULATIONS

Under

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)*

**Gandhi Nagar, Vellore-632 006.**

## M.Sc. CHEMISTRY

(Effective for those admitted from the Academic Year 2020 - 2021)

### Eligibility for Admission to M.Sc. Chemistry

- A pass in undergraduate course in Chemistry with a minimum of 55%

### The Course of Study and Scheme of Examination:

Sem	Course Category	Course Code	Title	Hours/Week	Exam		Credits	Marks
					Th	Pr		
I	Core	PCCHA20	Stereo Chemistry and Conformational Analysis	5	3	-	5	40+60
	Core	PCCHB20	Structural Inorganic Chemistry	5	3	-	4	40+60
	Core	PCCHC20	Kinetics and Photo Chemistry	5	3	-	4	40+60
	Core Elective - I	PECHA20	Elective I A: Polymer Chemistry	5	3	-	4	40+60
		PECHB20	Elective I B: Nanochemistry					
	Core Practicals	PCCHG20	Practical I: Organic Chemistry I	3	-	-	-	-
		PCCHH20	Practical II: Inorganic Chemistry I	4	-	-	-	-
		PCCHI20	Practical III: Physical Chemistry I	3	-	-	-	-
IEP – I	PICHA20 PICHB20 PICHG20	Dairy Chemistry Quality Control and Chemical Analysis Research Methodology**	0	3	-	2*	40+60	
<b>Total</b>				<b>30</b>	<b>-</b>	<b>-</b>	<b>17+2*</b>	<b>400+100</b>
II	Core	PCCHD20	Organic Reactions and Mechanisms	4	3	-	4	40+60
	Core	PCCHE20	Advanced Coordination Chemistry	5	3	-	4	40+60
	Core	PCCHF20	Group Theory and Quantum Chemistry	5	3	-	4	40+60
	Core Elective - II	PECHC20	Elective IIA: Pharmaceutical Chemistry	5	3	-	4	40+60
		PECHD20	Elective IIB: Medicinal Chemistry					
	Core Practicals	PCCHG20	Practical I: Organic Chemistry I	3	-	6	3	40+60
		PCCHH20	Practical II: Inorganic Chemistry I	3	-	6	3	40+60
PCCHI20		Practical III: Physical Chemistry I	3	-	6	3	40+60	
	PNHRA20	Human Rights	2	3	-	2	40+60	

	IEP – II	PICHC20 PICHD20	CSIR-NET Preparatory Course in Inorganic Chemistry Water Chemistry	0	3	-	2*	40+60
<b>Total</b>				<b>30</b>	-	-	<b>27 + 2*</b>	<b>800+100</b>
III	Core	PCCHJ20	Synthetic Organic Chemistry	4	3	-	4	40+60
	Core	PCCHK20	Molecular Spectroscopy	5	3	-	4	40+60
	Core	PCCHL20	Electro Chemistry	4	3	-	4	40+60
	Core Elective - III	PECHE20 PECHF20	Elective III A: Analytical Chemistry Elective III B: Green Chemistry	5	3	-	5	40+60
	Core Practicals	PCCHP20	Practical IV: Organic Chemistry II	4	-	-	-	-
		PCCHQ20	Practical V: Inorganic Chemistry II	4	-	-	-	-
		PCCHR20	Practical VI: Physical Chemistry II	4	-	-	-	-
		PGTRA20	Teaching and Research Aptitude	-	3	-	3	40+60
	IEP – III	PICHE20	CSIR-NET Preparatory Course in Organic Chemistry	0	3	-	2*	40+60
		PICHF20	Forensic Chemistry					
PICHG20		Research Methodology**						
<b>Total</b>				<b>30</b>			<b>20+2*</b>	<b>500+100</b>
IV	Core	PCCHM20	Natural Products and Bioorganic Chemistry	5	3	-	4	40+60
	Core	PCCHN20	Solid State Chemistry and Nuclear Chemistry	5	3	-	4	40+60
	Core	PCCHO20	Thermodynamics	5	3	-	5	40+60
	Core Elective – IV	PECHG20 PECHH20	Elective IV A: Organometallic and Bioinorganic Chemistry Elective IV B: Organic Farming and Solid Waste Management	5	3	-	4	40+60
	Core Practicals	PCCHP20	Practical IV: Organic Chemistry II	3	-	-	3	40+60
		PCCHQ20	Practical V: Inorganic Chemistry II	4	-	-	3	40+60
		PCCHR20	Practical VI: Physical Chemistry II	3	-	-	3	40+60
	IEP – IV	PICHH20	CSIR-NET Preparatory Course in Physical Chemistry	0	3	-	2*	40+60
PICHI20		Advanced Instrumentation Techniques						
PICHJ20		Leather Chemistry						
<b>Total</b>				<b>30</b>	-	-	<b>26+2*</b>	<b>700+100</b>

<b>Grand Total</b>							<b>90+8*</b>	<b>2400+400</b>
		PSCHA20	Summer Research Project	-	-	-	2	100

\*Additional credits for Independent Elective Papers (IEP)

### PROGRAMME OUTCOMES (PO)

On completion of the PG Programme, students will be able to:

- PO1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.
- PO2:** Assimilate and apply principles and concepts towards skill development and employability.
- PO3:** Apply critical and scientific approaches to address problems and find solutions.
- PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.
- PO5:** Integrate issues of social relevance in the field of study.
- PO6:** Persist in life-long learning for personal and societal progress.

### PROGRAMME SPECIFIC OUTCOMES (PSO)

**PSO1:** Attain an in-depth knowledge on advanced concepts in various branches of chemistry augmented through self-learning, persist in life-long learning for personal and societal progress.

**PSO2:** Demonstrate an ability to conduct experiments and perform accurate quantitative measurements with an understanding of the theory and develop practical skills in handling analytical instruments.

**PSO3:** Interpret experimental results, perform calculations on these results and draw reasonable, accurate conclusions.

**PSO4:** Assimilate and apply principles and concepts towards skill development, employability, critical and scientific approaches to address the problems and find solutions.

**PSO5:** Develop research skills through multi/inter/trans-disciplinary perspectives and to qualify CSIR-NET and other competitive examinations.

**PSO6:** Communicate effectively through report writing, documentation and effective presentations and integrate the knowledge in chemistry for sustainable environment.

PSO/PO	PO1	PO2	PO3	PO4	PO5	PO6
<b>PSO1</b>	3	3	3	3	3	3
<b>PSO2</b>	3	3	3	3	3	3
<b>PSO3</b>	3	3	3	3	3	3
<b>PSO4</b>	3	3	3	3	3	3
<b>PSO5</b>	3	3	3	3	3	3
<b>PSO6</b>	3	3	3	3	3	3

STRONGLY CORRELATED - 3, MODERATELY CORRELATED - 2, WEAKLY CORRELATED - 1

## SEMESTER I

### PCCHA20 - STEREOCHEMISTRY AND CONFORMATIONAL ANALYSIS

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code</b> PCCHA20	<b>Title of the Course</b> Stereochemistry and Conformational Analysis	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Learning Objectives:

- To learn the concepts of stereochemistry, conformational analysis and their application in the determination of reaction mechanism.
- To understand the mechanism and stereo chemistry of substitution and elimination reactions.
- To gain knowledge about the optical rotatory dispersion and circular dichroism.

#### Course Outcomes:

The Learners will be able to

1. Assign the configuration of stereoisomers including those with no stereogenic carbon centre and classify the stereospecific and stereoselective reactions.
2. Compare the relative stability and reactivity of conformational isomers of cyclohexane and related compounds.
3. Ascertain the knowledge on the mechanism and stereo chemical outcome of aliphatic nucleophilic substitution reactions.
4. Compare the mechanistic spectra of elimination reactions.
5. Employ the principles of Optical Rotatory Dispersion and Circular Dichroism for various applications.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	H
CO2	H	M	H	M	H	H
CO3	H	M	M	H	H	H
CO4	H	M	M	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Chirality and optical activity - symmetry elements, classification of chiral molecules as asymmetric and dissymmetric. (K1, K2, K3, K4, K5 & K6)
- 1.2 Projection formulae - Sawhorse, Newmann and Fischer projections and their inter conversions. (K1, K2, K3, K4, K5 & K6)
- 1.3 Nomenclature - absolute configuration - R/S and D/L, relative configurations - threo/erythro and syn/anti. (K1, K2, K3, K4, K5 & K6)
- 1.4 A brief study of dissymmetry of allenes, biphenyls - atropisomerism, spiro compounds, transcyclooctene, cyclononene and molecules with helical structures. (K1, K2, K3, K4, K5 & K6)
- 1.5 Stereo specific and stereo selective reactions - definition and examples. Asymmetric synthesis - Cram's rule. (K1, K2, K3, K4, K5 & K6)
- 1.6 Geometrical isomerism - E/Z nomenclature of olefins, geometrical and optical isomerism of disubstituted cyclopropane, cyclobutane and cyclopentanes. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Conformational analysis of di-substituted cyclohexanes and their stereo chemical features - geometric and optical isomerism of these derivatives. (K1, K2, K3, K4 & K5)
- 2.2 Conformation and reactivity of cyclohexene - allylic 1, 2 and 1, 3 strains and related compound alkyldiene cyclohexane. (K1, K2, K3, K4 & K5)
- 2.3 Conformation of cyclohexanone - 2-alkyl and 3-alkyl ketone effect and reactivity of cyclohexanone in comparison with cyclopentanones. (K1, K2, K3, K4 & K5)
- 2.4 Conformations of six membered rings containing hetero atoms. (K1, K2, K3, K4 & K5)
- 2.5 Conformation and stereochemistry of cis and trans decalin and 9-methyl decalin. (K1, K2, K3, K4 & K5)
- 2.6 Quantitative correlation between conformation and reactivity - Curtin-Hammett principle. (K1, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1  $S_N2$  reaction - kinetics, mechanism and factors influencing the reaction. (K1, K2, K3, K4, K5 & K6)
- 3.2  $S_N1$  reaction - kinetics, mechanism, factors influencing the reactions, rearrangement reaction. (K1, K2, K3, K4, K5 & K6)
- 3.3 Mixed  $S_N1$  and  $S_N2$  reactions - competition between  $S_N1$  and  $S_N2$  mechanism. (K1, K2, K3, K4, K5 & K6)
- 3.4 Substitution by ambident nucleophiles, substitution at allylic, vinylic, benzylic and aryl halides. (K1, K2, K3, K4, K5 & K6)
- 3.5 SET (single electron transfer) - types of electron transfer reactions - photo induced and chemically induced electron transfer. (K1, K2, K3, K4, K5 & K6)
- 3.6 Neighbouring group participation - introduction of an acyclic open chain system,  $\Pi$  systems of aromatic rings, cyclic system, double bond and  $\sigma$  bond. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 E<sub>1</sub>, E<sub>2</sub>, E<sub>1</sub>CB reaction - kinetics, mechanism and evidences. (K1, K2, K3, K4 & K5)
- 4.2 E<sub>1</sub>, E<sub>2</sub> and E<sub>1</sub>CB variables - mechanistic spectrum, competition between elimination and substitution. (K1, K2, K3, K4 & K5)
- 4.3 Stereochemistry of E<sub>2</sub> - syn and anti-elimination reactions, orientation of the double bond. (K1, K2, K3, K4 & K5)
- 4.4 Regiochemistry of E<sub>1</sub>, E<sub>2</sub> and E<sub>1</sub>CB reactions with examples. (K1, K2, K3, K4 & K5)
- 4.5 Pyrolytic eliminations - acyclic and alicyclic systems, molecular rearrangements during elimination. (K1, K2, K3, K4 & K5)
- 4.6 Grob's fragmentations - incorporation of fragmentation - mechanism of fragmentation - mechanism allied to E<sub>1</sub> and E<sub>2</sub> eliminations. (K1, K2, K3, K4 & K5)

**Unit V****(15 Hours)**

- 5.1 Optical Rotatory Dispersion and Circular Dichroism - terminology - optical rotation, circular birefringence, circular dichroism and Cotton effect. (K1, K2, K3, K4, K5 & K6)
- 5.2 Plain curves - application of plain curves - determination of structure, configuration, conformation and optical activity. (K1, K2, K3, K4, K5 & K6)
- 5.3 Rotatory dispersion of ketones - structure, configuration, conformation of unsaturated ketones. (K1, K2, K3, K4, K5 & K6)
- 5.4 Empirical and semi empirical rules - the axial halo ketone rule, the octant rule (configuration and conformation) (K1, K2, K3, K4, K5 & K6)
- 5.5 Absolute configuration and ketal formation. (K1, K2, K3, K4, K5 & K6)
- 5.6 Stereochemical analysis - polarimetry, chiral GC & HPLC and NMR techniques. (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. R. O. C. Norman & Coxon, Principles of Organic Chemistry, NY, 3<sup>rd</sup> Edition, 2017.
2. S. M. Mukherji and S. P. Singh, Reaction Mechanism in Organic Chemistry, MacMillan India Ltd., Chennai, Reprint 2010.
3. Stanley H Pines, Organic Chemistry, McGraw Hill Publication, 5<sup>th</sup> Edition, Reprint 2007.
4. Francis A. Carey and Richard J. Sundberg, Part A and B, Advanced Organic Chemistry, Plenum Press, 4<sup>th</sup> Edition, Reprint 2013.
5. Jerry March, Advanced Organic Reaction Mechanism and Structure, A Wiley Inter Science, 4<sup>th</sup> Edition, Reprint 2005.
6. D. Nasipuri, Stereochemistry of Organic Compounds, New Age Publishers, 2<sup>nd</sup> Edition, Reprint 2013.
7. P. S. Kalsi, Stereochemistry, Conformation and Mechanism, New Age International Ltd, Reprint 2017.
8. Ernest L. Eliel, Stereochemistry of Carbon Compounds, Tata McGraw Hill Publishing, Reprint 2007.
9. C. K. Ingold, Structure and Mechanism in Organic Chemistry, CBS Publishers and Distributors Pvt. Ltd., 2<sup>nd</sup> Edition, Reprint 2000.
10. P. S. Kalsi, Stereochemistry and Mechanism through Solved Problems, New Age International Publishers, Reprint 2003.

11. R. K. Bansal, Organic Reaction Mechanism, Tata McGraw Hill Publishing, 4<sup>th</sup> Edition, Reprint 2013.
12. Bernard Miller Advanced Organic Chemistry Reaction & Mechanism, Pearson Education, 2<sup>nd</sup> Edition, Reprint 2005.
13. P. S. Kalsi, Organic Reactions and their Mechanism, New Age International Publishers, 2<sup>nd</sup> Edition, Reprint 2017.
14. Nimai Tewari, Advanced Organic Stereochemistry (Problems & Solutions), Books and Allied (P), 1<sup>st</sup> Edition, 2010.

**Open Educational Resources (OER):**

1. <https://babel.hathitrust.org/cgi/pt?id=umn.31951p01139217c&view=2up&seq=300>
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P-01, P-05)
3. <https://www.hippocampus.org/HippoCampus/Chemistry;jsessionid=D178EB9CB8034395C03D09EFC98A06CA>
4. [http://ocw.uci.edu/lectures/chem\\_51a\\_lecture\\_13\\_organic\\_chemistry\\_ch\\_4\\_conformations\\_of\\_cyclohexane.html](http://ocw.uci.edu/lectures/chem_51a_lecture_13_organic_chemistry_ch_4_conformations_of_cyclohexane.html)

## SEMESTER I

### PCCHB20 - STRUCTURAL INORGANIC CHEMISTRY

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code</b> PCCHB20	<b>Title of the Course</b> Structural Inorganic Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To learn the concepts of Lewis acids and bases.
- To learn the structures of complex solids, metals, and alloys.
- To gain knowledge about the structure and bonding in poly acids, boron hydrides and metal clusters.

#### Course Outcomes:

The Learners will be able to

1. Summarize the theories of acids and bases.
2. Discuss conductors, semiconductors and insulators based on band theory.
3. Assess the structure and bonding in different types of ionic solids, metals and alloys.
4. Discuss the structure and bonding in polyacids, silicates and inorganic polymers.
5. Distinguish the structure and bonding in boranes, carboranes, metallo carboranes, boron nitrides and metal clusters.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	H
CO2	H	M	M	H	H	H
CO3	H	M	M	H	H	H
CO4	H	M	M	H	H	H
CO5	H	M	M	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Acids and bases, proton transfer equilibria in water - solvent leveling effects. (K1, K2, K3, K4, K5 & K6)
- 1.2 Aqua acids - periodic trends in aqua acids - simple oxo acids - anhydrous oxides - polyoxo compound formation. (K1, K2, K3, K4, K5 & K6)
- 1.3 Lewis acid - base concepts, hard and soft acids and bases, group characteristics of Lewis acids. (K1, K2, K3, K4, K5 & K6)
- 1.4 Lux - Flood theory of acids and bases, Usanovich acids and bases, super acids and super bases. (K1, K2, K3, K4, K5 & K6)
- 1.5 Non aqueous solvents, classification, protic and aprotic solvents, molten salts as solvents and ionic liquids. (K1, K2, K3, K4, K5 & K6)
- 1.6 Heterogeneous acids and bases - symbiosis and proton sponges. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Structure of complex solids - layered structures - conducting ionic solids – graphite - solids held together by covalent bonding - diamond - Madelung constants. (K1, K2, K3, K4 & K5)
- 2.2 Imperfections in crystals - stoichiometric defects - Schottky, controlled valency, F-center and Frenkel defect - non-stoichiometric defects - metal excess defect, metal deficient defect - impurity defect. (K1, K2, K3, K4 & K5)
- 2.3 Band theory of solids, intrinsic and extrinsic semiconductors, piezoelectric and pyroelectric crystals. (K1, K2, K3, K4 & K5)
- 2.4 Superconductivity – Meissner effect, critical temperature and critical magnetic field - BCS theory. (K1, K2, K3, K4 & K5)
- 2.5 Type I and Type II superconductors. (K1, K2, K3, K4 & K5)
- 2.6 Ternary oxides - structures of 123 oxides (YBa-Cu- O) - applications of high temperature superconducting materials. (K1, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1 Structures of simple solids - unit cell and crystal structures. (K1, K2, K3, K4, K5 & K6)
- 3.2 Close packing of spheres - holes in closed packed structures. (K1, K2, K3, K4, K5 & K6)
- 3.3 Structure of metals and alloys - non-closed packed structures. (K1, K2, K3, K4, K5 & K6)
- 3.4 Atomic radii of metals - polytypism - polymorphism of metals. (K1, K2, K3, K4, K5 & K6)
- 3.5 Alloys - substitutional solid solutions, interstitial solid solutions of non-metals - intermetallic compounds. (K1, K2, K3, K4, K5 & K6)
- 3.6 Characteristic structures of ionic solids - binary phases (AX and AX<sub>2</sub>) - ternary phases (ABO<sub>3</sub> and AB<sub>2</sub>O<sub>4</sub>). (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Structure and bonding - polyacids - isopolyacids and heteropolyacids of molybdenum and tungsten. (K1, K2, K3, K4 & K5)
- 4.2 Dawson and Keggin structure of poly acids, heteropolyanions and heteropoly blues. (K1, K2, K3, K4 & K5)
- 4.3 Inorganic polymers - silicates, structures, properties, correlation and applications. (K1, K2, K3, K4 & K5)
- 4.4 Molecular sieves, feldspar, zeolites and ultramarines and their applications. (K1, K2, K3, K4 & K5)
- 4.5 Polysulphur-nitrogen compounds - structure and bonding in tetrasulphur tetranitride, polythiazyl and  $S_xS_y$  compounds. (K1, K2, K3, K4 & K5)
- 4.6 Poly organo phosphazenes. (K1, K2, K3, K4 & K5)

**Unit V****(15 Hours)**

- 5.1 Structure and bonding - boron hydrides - introduction, classification of boranes - diborane, tetra borane, pentaborane, hexaborane and decaborane. (K1, K2, K3, K4, K5 & K6)
- 5.2 Polyhedral boranes - Wade's rule - closo, nido and arachno structures, hydroboration. (K1, K2, K3, K4, K5 & K6)
- 5.3 Carboranes - closo, nido and arachno structures of carboranes. (K1, K2, K3, K4, K5 & K6)
- 5.4 Metallocarboranes - closo, nido and arachno structures of carboranes. (K1, K2, K3, K4, K5 & K6)
- 5.5 Structure and bonding of boronitrides. (K1, K2, K3, K4, K5 & K6)
- 5.6 Metal clusters - chemistry of low molecularity metal clusters (up to trinuclear metal clusters). (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. J. E. Huheey, Inorganic Chemistry, Principles, Structure and Reactivity, Harper Collins, New York, 4<sup>th</sup> Edition, 2013.
2. F. A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry: A Comprehensive Text, John Wiley and Sons, 6<sup>th</sup> Edition, 2007.
3. K. F. Purcell and J. C. Kotz, Inorganic Chemistry, WB Saunders Co., USA, 2010.
4. M. C. Day and J. Selbin, Theoretical Inorganic Chemistry, Van Nostrand Co., New York, 1974.
5. G. S. Manku, Inorganic Chemistry, Tata McGraw Hill Publications, 1989.
6. D. F. Shriver, P. W. Atkins and C. H. Langford, Inorganic Chemistry, OUP, 2006.
7. N. H. Ray, Inorganic Polymers, Academic Press, 1978.
8. F. Basolo and R. G. Pearson, Mechanism of Inorganic Reaction, Wiley NY, 1967.

**Open Educational Resources (OER):**

1. <https://nptel.ac.in/content/storage2/courses/104103071/pdf/mod2.pdf>
2. <https://nptel.ac.in/content/storage2/courses/104103069/module4/lec3/1.html>
3. <https://nptel.ac.in/courses/115/105/115105099/>
4. <http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P-11, M-19)

## SEMESTER I

### PCCHC20 - KINETICS AND PHOTOCHEMISTRY

<b>Year:</b> I <b>SEM:</b> I	<b>Course Code</b> PCCHC20	<b>Title of the Course</b> Kinetics and Photochemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To get exposed to the kinetics of reactions in solutions, acid- base catalysis and surface reactions.
- To gain knowledge on photochemical and photo physical processes.
- To have an in-depth knowledge on the kinetics of complex and fast reactions.

#### Course Outcomes:

The Learners will be able to

1. Describe Activated Complex Theory in terms of translational and vibrational partition functions and apply it to derive the kinetics of reactions in solutions, Hammett and Taft equations and kinetic isotope effects in studying the mechanism of chemical reactions.
2. Discuss the concepts and kinetics of homogeneous and heterogeneous catalysis and explain adsorption isotherms of Langmuir and BET.
3. Derive the kinetics of complex reactions and apply the techniques of fast reactions.
4. Analyse the principles involved in photo excitation of molecules.
5. Derive the kinetics of photochemical reactions, and explain the applications of radiation chemistry, kinetics of photochemical reactions, solar energy conversion and radiolysis of water.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	M	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Activated complex theory - derivation - partition functions and activated complex - Eyring equation in terms of translational and vibrational partition functions. (KI, K2, K3, K4, K5 & K6)
- 1.2 Determination of free energy, enthalpy and entropy of activation and their significance. (KI, K2, K3, K4, K5 & K6)
- 1.3 Potential energy surfaces. (KI, K2, K3, K4, K5 & K6)
- 1.4 Applications of activated complex theory to reactions in solution - effect of pressure, and dielectric constant. (KI, K2, K3, K4, K5 & K6)
- 1.5 Effect of ionic strength on reactions in solutions, cage effect. (KI, K2, K3, K4, K5 & K6)
- 1.6 Kinetic isotope effect, linear free energy relationships - Hammett and Taft equations. (KI, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Catalysis - homogeneous catalysis - acid-base catalysis - types of acid-base catalysis - specific and general acid-base catalysis. Mechanisms and kinetics of acid-base catalyzed reactions (protolytic and prototropic mechanism) – Bronsted catalysis law. ((KI, K2, K3, K4 & K5)
- 2.2 Heterogeneous catalysis - surface reactions, types - physisorption and chemisorption, difference between physisorption and chemisorption, Lennard-Jones plots. (KI, K2, K3, K4 & K5)
- 2.3 Adsorption isotherms - Langmuir and BET isotherms - postulates and derivations. (KI, K2, K3, K4 & K5)
- 2.4 Kinetics of surface reactions - unimolecular and bimolecular reactions, catalysis by semiconductor oxides (n-type and p-type). (KI, K2, K3, K4 & K5)
- 2.5 Mechanism of heterogeneous catalytic reactions, Langmuir and Rideal-Eley mechanism - adsorption co-efficient and its significance. (KI, K2, K3, K4 & K5)
- 2.6 Enzyme catalysis - types of enzyme catalysis, rate of enzyme catalyzed reactions by Michaelis-Menton mechanism - study of effect of substrate concentration, pH and temperature on enzyme catalyzed reactions - inhibition in enzyme catalyzed reactions. (KI, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1 Complex reactions - definition with examples, kinetics of reversible, consecutive and parallel reactions. (KI, K2, K3, K4, K5 & K6)
- 3.2 Chain reactions - types of chain reactions (stationary and non-stationary). (KI, K2, K3, K4, K5 & K6)
- 3.3 General treatment of chain reactions - chain length - explosion limits. (KI, K2, K3, K4, K5 & K6)
- 3.4 Rice Herzfeld mechanism - order of reactions of unity, one-half and three-halves for photolysis of acetaldehyde. (KI, K2, K3, K4, K5 & K6)
- 3.5 Fast reactions - relaxation methods - pressure and temperature jump methods (KI, K2, K3, K4, K5 & K6)
- 3.6 Stopped flow and flash photolysis methods. (KI, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Photochemistry - introduction, absorption and emission of radiation - intensity distribution in the electronic, vibrational species - Franck Condon Principle. (K1, K2, K3, K4 & K5)
- 4.2 Jablonski diagram - radiative and non-radiative processes - fluorescence and phosphorescence - E-type and P-type delayed fluorescence - spin forbidden radiative transition - internal conversion and intersystem crossing. (K1, K2, K3, K4 & K5)
- 4.3 Electronically excited states - excited state dipole moment and acidity constant. (K1, K2, K3, K4 & K5)
- 4.4 Decay of electronically excited states, dissociation and predissociation of diatomic molecules - energy transfer process. (K1, K2, K3, K4 & K5)
- 4.5 Photophysical processes - kinetics of unimolecular and bimolecular photophysical processes - kinetic treatment of excimer and exciplex formation. (K1, K2, K3, K4 & K5)
- 4.6 Quenching - static and dynamic quenching - Stern-Volmer equation. (K1, K2, K3, K4 & K5)

**Unit V****(15 Hours)**

- 5.1 Photochemical reactions - photo assisted mechanism, hydrogen and halogen reactions. (K1, K2, K3, K4, K5 & K6)
- 5.2 Kinetics of photochemical reaction, photoredox, photosubstitution, photoisomerization and photosensitized reactions. (K1, K2, K3, K4, K5 & K6)
- 5.3 Photovoltaic and photogalvanic cells, photo assisted electrolysis of water, application of solar energy conversion. (K1, K2, K3, K4, K5 & K6)
- 5.4 Radiation chemistry - interaction of high-energy radiation with matter - primary and secondary processes. (K1, K2, K3, K4, K5 & K6)
- 5.5 G value - radiolysis of water - hydrated electron, ion pair yield. (K1, K2, K3, K4, K5 & K6)
- 5.6 Photocatalysis - applications of TiO<sub>2</sub> photocatalyst for oxidation of organic pollutants - photochemical reaction of vision. (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. R. G. Frost and Pearson, Kinetics and Mechanism, Wiley, New York, First Reprint 1970.
2. Keith J. Laidler, Chemical Kinetics, Pearson Edition Company Pvt. Ltd., 3<sup>rd</sup> Edition, 2005.
3. B. R. Puri, L. R. Sharma and M. S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., January 2019.
4. N. J. Turro, Modern Molecular Photo Chemistry, Benjamin, Cumming, Menlo Park, California, 1978.
5. K. K. Rohatgi Mukherjee, Fundamentals of Photo Chemistry, Wiley Eastern Ltd., 2<sup>nd</sup> Edition, 1992.
6. Gurdeep Raj, Photochemistry, Goel Publishing House, 4<sup>th</sup> Edition, 2002.
7. A. Singh, R. Singh, Photochemistry, Campus Books International, 1<sup>st</sup> Edition, 2005.
8. P. W. Atkins, Physical Chemistry, Oxford University Press, 11<sup>th</sup> Edition, 2018.
9. G. W. Castellan, Physical Chemistry, Narosa Publishing House, Seventh Reprint, 2004.

10. Donald A. Mc Quarrie and John D. Simon, Physical Chemistry: A Molecular Approach - 1997, Viva Books Pvt., Ltd., New Delhi, Reprint 2004.
11. J. Rajaram J.C. Kuriacose, Kinetics and Mechanisms of Chemical Transformations: Applications of Femto Chemistry, Mc Millan Publishers India Ltd., Reprint, 2009.

**Open Educational Resources (OER):**

1. <http://photobiology.info/Ilichev.html> (Photochemistry basics)
2. [https://chem.libretexts.org/Courses/University\\_of\\_California\\_Davis/UCD\\_Chem\\_107/B%3A\\_Physical\\_Chemistry\\_for\\_Life\\_Scientists/Chapters/2%3A\\_Chemical\\_Kinetics/2.10%3A\\_Fast\\_Reactions\\_in\\_Solution](https://chem.libretexts.org/Courses/University_of_California_Davis/UCD_Chem_107/B%3A_Physical_Chemistry_for_Life_Scientists/Chapters/2%3A_Chemical_Kinetics/2.10%3A_Fast_Reactions_in_Solution).
3. [https://swayam.gov.in/nd1\\_noc20\\_cy22/preview](https://swayam.gov.in/nd1_noc20_cy22/preview) (Introduction to Chemical Thermodynamics and Kinetics)
4. Brian Wardle, Principles and applications of photochemistry, Wiley publications, 2009, ISBN – 978-0-470-01494.  
[https://cds.cern.ch/record/1254287/files/9780470014936\\_TOC.pdf](https://cds.cern.ch/record/1254287/files/9780470014936_TOC.pdf)

## SEMESTER I

### PECHA20 - ELECTIVE I A: POLYMER CHEMISTRY

<b>Year: I</b> SEM: I	<b>Course Code</b> PECHA20	<b>Title of the Course</b> Polymer Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To gain knowledge on polymerization techniques and characterization of polymers.
- To get acquainted with the recent applications of polymers.

#### Course Outcomes:

The Learners will be able to

1. Classify polymers and illustrate the types of polymerization techniques.
2. Illustrate the characterization techniques such as XRD, TGA, DSC, SEM and TEM.
3. Discuss the polymer reactions and degradation.
4. Evaluate polymer processing techniques in industries, determine molecular weight of polymers by selected methods such as GPC, osmometry, viscometry, ultracentrifugation and MALDI methods.
5. Compile the synthesis, properties and applications of polymers and biopolymers.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	L	H	H	H
CO2	H	H	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	L	M	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Introduction - basic concepts of polymer science - definitions, degree of polymerization, molecular forces, and chemical bonding in polymers. (K1, K2, K3, K4, K5 & K6)
- 1.2 Classification of polymers - natural and synthetic - organic and inorganic - thermoplastic and thermosetting polymers - plastics, elastomers, fibres and liquid resins. Linear, branched, and cross-linked polymers, addition polymers and condensation polymers. (K1, K2, K3, K4, K5 & K6)
- 1.1 Polymerization techniques - bulk, suspension, solution, and emulsion techniques. (K1, K2, K3, K4, K5 & K6)
- 1.2 Mechanism and kinetics of addition polymerization - cationic and anionic polymerization. (K1, K2, K3, K4, K5 & K6)
- 1.3 Mechanism and kinetics of free radical and condensation polymerization. (K1, K2, K3, K4, K5 & K6)
- 1.4 Co-ordination polymerization - mechanism using Ziegler Natta catalyst. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Characterization methods - crystalline nature - degree of crystallinity, degree of crystallisability and X-ray diffraction studies. (K1, K2, K3, K4 & K5)
- 2.2 Glass transition temperature (T<sub>g</sub>) - definition, factors affecting glass transition temperature. (K1, K2, K3, K4 & K5)
- 2.3 Importance of glass transition temperature - relationship between glass transition temperature and melting point. (K1, K2, K3, K4 & K5)
- 2.4 Study of polymers - Differential Scanning Calorimetric (DSC) and Thermo Gravimetric Analysis of polymers (TGA). (K1, K2, K3, K4 & K5)
- 2.5 Relation to structure - surface morphology - Scanning Electron Microscopy (SEM). (K1, K2, K3, K4 & K5)
- 2.6 Size of the particle determination - Transmission Electron Microscopy (TEM). (K1, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1 Polymer reactions - hydrolysis, acidolysis, hydrogenation, addition and substitution reactions. (K1, K2, K3, K4, K5 & K6)
- 3.2 Cyclisation, cross-linking and vulcanization. (K1, K2, K3, K4, K5 & K6)
- 3.3 Graft and block copolymers - definition and reactions leading to the formation of graft and block copolymers. (K1, K2, K3, K4, K5 & K6)
- 3.4 Types of degradation - chemical degradation, physical degradation, biodegradable polymers, and mechanism of degradation. (K1, K2, K3, K4, K5 & K6)
- 3.5 Thermal oxidation, photooxidation, mechanical degradation, degradation by ionizing radiation, ozone attack. (K1, K2, K3, K4, K5 & K6)
- 3.6 Degradation of special polymers: polyolefins, polyvinyl chloride (PVC) and polymethylmethacrylate (PMMA). (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Physical properties, stress-strain behaviour, mechanical properties (tensile, flexural, impact, fatigue, hardness, creep, abrasion). (K1, K2, K3, K4 & K5)
- 4.2 Electrical properties (dielectric strength, surface resistivity, volume resistivity, power factor, arc resistance). (K1, K2, K3, K4 & K5)

- 4.3 Polymer processing - films sheets: moulding - compression, blow moulding, injection moulding and extrusion moulding, casting of films and calendaring, recycling of plastics. (K1, K2, K3, K4 & K5)
- 4.4 Elastomers - introduction, processing, rubber types, vulcanization, properties, reclaiming. (K1, K2, K3, K4 & K5)
- 4.5 Fibers - introduction, production, fiber spinning, textile fibers, industrial fibers, recycling. (K1, K2, K3, K4 & K5)
- 4.6 Molecular weights of polymers - number average and weight average molecular weights, determination of molecular weight of polymers by viscometry, Gel Permeation Chromatography (GPC), membrane osmometry, vapour phase osmometry, ultracentrifugation, light scattering, and Matrix-Assisted Laser Desorption Ionization (MALDI) methods. (K1, K2, K3, K4 & K5)

## Unit V

(15 Hours)

- 5.1 Applications of polymers - industrially important polymers - synthesis, properties and uses of natural and synthetic polymers. (K1, K2, K3, K4, K5 & K6)
- 5.2 Synthesis, properties and uses of polytetrafluoroethylene (Teflon), polystyrene, rayon, nylon, polyacrylates, polyvinyl chloride (PVC), polyacrylonitrile (PAN) and polystyrene-divinylbenzene. (K1, K2, K3, K4, K5 & K6)
- 5.3 Electrically conducting polymers - poly acetylene - poly aniline. (K1, K2, K3, K4, K5 & K6)
- 5.4 Biopolymers - natural - starch, cellulose, chitosan and silk and synthetic - polyvinyl alcohol (PVA), polyvinylpyrrolidone (PVP) and polylactic acid. (K1, K2, K3, K4, K5 & K6)
- 5.5 Biomedical application of biopolymers - dental materials, ophthalmology, orthopaedic implants, tissue engineering and drug delivery. (K1, K2, K3, K4, K5 & K6)
- 5.6 Industrial applications of biopolymers - packaging, automotive and electronics (K1, K2, K3, K4, K5 & K6)

## Reference Books:

1. V. R. Gowariker, N. V. Viswanathan and Jayadev Sridhar, Polymer Science, New Age International (P) Ltd., Reprint 2012.
2. F. W. Billmeyer, Textbook of Polymer Science, Wiley Inter Science, 3<sup>rd</sup> Edition, 2005.
3. Joel R., Polymer Science and Technology, Fried Prentice Hall, India, Reprint 2000.
4. G. S. Mishra, Introduction to Polymer Chemistry, Wiley Eastern Ltd., Reprint 2005.
5. M. G. Arora and M. Singh, Polymer Chemistry, Anmol Publications, Reprint 1996.
6. M. S. Bhatnagar, Textbook of Polymers, S. Chand and Company, First Edition, 2004.
7. R. J. Young and P. A. Lovell, Introduction to Polymers, Nelson Thornes Ltd., Reprint 2004.

## Open Educational Resources (OER):

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P06 -Physical Chemistry-II-Macromolecules)
2. <https://nptel.ac.in/courses/104/105/104105039/> (Polymer Chemistry)
3. [https://chem.libretexts.org/Bookshelves/General\\_Chemistry/Book%3A\\_Chem1\\_\(Lower\)/07%3A\\_Solids\\_and\\_Liquids/7.09%3A\\_Polymers\\_and\\_Plastics](https://chem.libretexts.org/Bookshelves/General_Chemistry/Book%3A_Chem1_(Lower)/07%3A_Solids_and_Liquids/7.09%3A_Polymers_and_Plastics)
4. [https://chem.libretexts.org/Bookshelves/Organic\\_Chemistry/Supplemental\\_Modules\\_\(Organic\\_Chemistry\)/Polymers](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Supplemental_Modules_(Organic_Chemistry)/Polymers)
5. <https://ocw.mit.edu/courses/chemical-engineering/10-569-synthesis-of-polymers-fall-2006/lecture-notes/>

## SEMESTER I

### PECHB20 - ELECTIVE I B: NANO CHEMISTRY

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code</b> PECHB20	<b>Title of the Course</b> Nano Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To study the concepts in nano chemistry.
- To gain knowledge about characterization of nanoparticles by different techniques.
- To get exposed to the applications of nano chemistry.

#### Course Outcomes:

The Learners will be able to

1. Discuss the basic concepts of nano chemistry including theories of nano chemistry, and to classify the various types of nano systems.
2. Explain the different methods and techniques of synthesizing nanoparticles.
3. Discuss the characterization of the nanomaterials.
4. Explain the applications of nano chemistry in optics, electronics, and sensors.
5. Outline the biomedical application of nanoparticles.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

H-High (3), M-Moderate (2), L-Low (1)

#### Unit I

(15 Hours)

- 1.1 Fundamental science behind nano chemistry - scientific revolutions - nanosized effects - surface to volume ratio. (K1, K2, K3, K4, K5 & K6)
- 1.2 Atomic structure - molecules & phases - energy at the nanoscale, molecular and atomic size; quantum effects. (K1, K2, K3, K4, K5 & K6)

- 1.3 Classification based on the dimensionality - nanoparticles, nanoclusters, nanotubes, nanowires and nanodots. (K1, K2, K3, K4, K5 & K6)
- 1.4 Influence of nano structuring on mechanical, optical, electronic, magnetic and chemical properties. (K1, K2, K3, K4, K5 & K6)
- 1.5 Intermolecular forces, van der Waals' forces, dynamic properties of interfaces, contact angle, Brownian motion, and surface free energy. (K1, K2, K3, K4, K5 & K6)
- 1.6 Classical colloid theory - nucleation and growth, adsorption, and desorption kinetics - Ostwald ripening - homogeneous and heterogeneous nucleation. (K1, K2, K3, K4, K5 & K6)

## **Unit II**

**(15 Hours)**

- 2.1 Methods of synthesizing nanoparticles - top-down and bottom-up approach - grain growth - grain boundary - segregation, pinning and aggregation. (K1, K2, K3, K4 & K5)
- 2.2 Top-down methods - inert gas condensation, arc discharge, ion sputtering, laser pyrolysis, ball milling and Molecular Beam Epitaxy (MBE). (K1, K2, K3, K4 & K5)
- 2.3 Soft chemical methods - chemical precipitation and coprecipitation - metal nanocrystals - synthesis by polyol and borohydride reduction methods. (K1, K2, K3, K4 & K5)
- 2.4 Chemical vapour deposition (CVD) method, sol-gel synthesis, microemulsion synthesis, normal and reverse micelles formation, hydrothermal and solvothermal methods. (K1, K2, K3, K4 & K5)
- 2.5 Chemical processes - thermolysis routes, microwave assisted synthesis and Sono chemical assisted synthesis. (K1, K2, K3, K4 & K5)
- 2.6 Microbial routes - biosynthesis - template route, DC and pulsed electrodeposition and electroless deposition - combustion route. (K1, K2, K3, K4 & K5)

## **Unit III**

**(15 Hours)**

- 3.1 X-ray powder diffraction - quantitative determination of phases - structure analysis, particle size analysis using Scherer formula. (K1, K2, K3, K4, K5 & K6)
- 3.2 Thermal analysis methods - Thermo Gravimetric Analysis (TGA), Differential Thermal Analysis (DTA) and Differential Scanning Calorimetry (DSC). (K1, K2, K3, K4, K5 & K6)
- 3.3 Spectroscopy studies - Ultra Violet-Visible (UV), Fourier Transform Infrared spectroscopy (FTIR), Raman Spectroscopy and Photoluminescence Spectroscopy. (K1, K2, K3, K4, K5 & K6)
- 3.4 Microscopic techniques - optical microscope, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM) and Atomic Force Microscopy (AFM). (K1, K2, K3, K4, K5 & K6)
- 3.5 Surface analysis and particle size - X-ray photoelectron spectroscopy, auger electron spectroscopy, zeta potential measurement and Dynamic Light Scattering (DLS) and ellipsometry. (K1, K2, K3, K4, K5 & K6)
- 3.6 Lithography - X-ray lithography, wet etching, dry etching, etch resists - dip pen lithography. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Zero-dimensional nanoparticles - quantum dots for solar cells, quantum dots for light emitting diode, molecular electronics, and nanoparticles as catalysts. (K1, K2, K3, K4 & K5)
- 4.2 Nanotube/nanowire-based field effect transistors for biosensing, gas sensing, piezoelectric nanowires as nanogenerator - carbon nanostructures - C60, C80, SWNT and MWNT. (K1, K2, K3, K4 & K5)
- 4.3 Nano porous anodized aluminum oxide, nano porous metal-organic framework for adsorption, separation and catalytic conversion of CO<sub>2</sub>, nano porous materials for Li/Cd-ion battery applications. (K1, K2, K3, K4 & K5)
- 4.4 Nano sensors - optical, chemical, and physical sensors. (K1, K2, K3, K4 & K5)
- 4.5 Nano bioelectronics - DNA based biosensors, glucose sensors, protein-based biosensors and quantum dot based bioimaging. (K1, K2, K3, K4 & K5)
- 4.6 Nanoscale electronic devices - Complementary Metal Oxide Semiconductor (CMOS) and Magneto Resistive Random Access Memory (MRAM) devices. (K1, K2, K3, K4 & K5)

**Unit V****(15 Hours)**

- 5.1 Bio-medical applications - drug delivery - targeted drug delivery systems - various forms - liposomes, micelles, and dendrimers. (K1, K2, K3, K4, K5 & K6)
- 5.2 Photoablation therapy - photodynamic therapy and photo thermal therapy. (K1, K2, K3, K4, K5 & K6)
- 5.3 Cancer therapy - destruction of cancer cells with nanoparticles - magnetic hyperthermia. (K1, K2, K3, K4, K5 & K6)
- 5.4 Neuro electronic interface and nano luminescent tag. (K1, K2, K3, K4, K5 & K6)
- 5.5 Bioimaging, biosensors and biomass energy. (K1, K2, K3, K4, K5 & K6)
- 5.6 Genetic and tissue engineering. (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. Cao, Guozhong, Nanostructures & Nanomaterials: Synthesis, Properties, and Applications, Imperial College Press, London, 2004.
2. Mickwilson, Basic Science and Emerging Technologies, Overseas Press, 2005.
3. Richard Booker and Earlboysen, Nano Technology, Willey Publication, 2005
4. Ratner, Nano Technology, Pearson Education, 2006.
5. K. Goser, Nano Electronics and Nano Systems, Springer International Edition, 2008.
6. W. R. Fahrner, Nano Technology and Electronics, Springer International Edition, 2008.
7. L. Daniel, Schodek, Paulo Ferreira, Michael F. Ash, Nanomaterials, Nanotechnologies and Design: An Introduction for Engineers, Elsevier, 2009.
8. G. A. Ozin, A. C. Arsenault, and L. Cademartiri, Nanochemistry: A Chemical Approach to Nanomaterials, The Royal Society of Chemistry, Cambridge, 2<sup>nd</sup> Edition, 2009.

**Open Educational Resources (OER):**

1. <https://nptel.ac.in/courses/118/104/118104008/>(Nanostructures and Nanomaterials)
2. <https://nptel.ac.in/courses/118/102/118102003/> (Nanotechnology)
3. [https://chem.libretexts.org/Bookshelves/General\\_Chemistry/Map%3A\\_Chemistry\\_T  
he\\_Central\\_Science\\_\(Brown\\_et\\_al.\)/12%3A\\_Solids\\_and\\_Modern\\_Materials/12.6%3  
A\\_Materials\\_for\\_Nanotechnology](https://chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_Chemistry_T<br/>he_Central_Science_(Brown_et_al.)/12%3A_Solids_and_Modern_Materials/12.6%3<br/>A_Materials_for_Nanotechnology)
4. [https://chem.libretexts.org/Bookshelves/Inorganic\\_Chemistry/Book%3A\\_Introduction  
\\_to\\_Inorganic\\_Chemistry/11%3A\\_Basic\\_Science\\_of\\_Nanomaterials](https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Book%3A_Introduction<br/>_to_Inorganic_Chemistry/11%3A_Basic_Science_of_Nanomaterials)
5. [https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-701-  
introduction-to-nanoelectronics-spring-2010/](https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-701-<br/>introduction-to-nanoelectronics-spring-2010/)

## SEMESTER I

### PICHA20 - IEP - DAIRY CHEMISTRY

<b>Year:</b> I <b>SEM:</b> I	<b>Course Code</b> PICHA20	<b>Title of the Course</b> Dairy Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W Own Pace</b>	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

- To impart knowledge on the principles and practical applications of various dairy products.
- To help the students to understand the analysis of dairy products by using physical, biochemical, and instrumental methods of analysis.

#### Course Outcomes:

The Learners will be able to

1. Summarize the knowledge on dairy products, processing, and their applications.
2. Discuss the physical and chemical properties of milk.
3. Explain the different processing techniques of milk.
4. Explain marketing of milk and apply skills in detecting adulterants in milk products.
5. Describe the nutritive value of milk and chemistry of dairy products in bone and muscle formation.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

H-High (3), M-Moderate (2), L-Low (1)

## **Unit I**

- 1.1 Milk - constituents of milk - water, lipids, carbohydrates, proteins, salts and miscellaneous constituents. (K1 & K2)
- 1.2 Milk products and their composition - fluid milks and creams, plain milk, skim milk, low fat milk, ultra-high temperature (UHT) sterile milk. (K1 & K2)
- 1.3 Flavoured fluid milk products, fermented and acidified milks, butter milk, yogurt, and kumis. (K1 & K2)
- 1.4 Concentrated fermented milks - fluid cream, table cream, whipping cream. (K1 & K2)
- 1.5 Concentrated milk products - evaporated milk, plain condensed milk, and sweetened condensed milk. (K1 & K2)
- 1.6 Concentrated milk products - condensed skim milk, butter, ghee, cheese and its classification. (K1 & K2)

## **Unit II**

- 2.1 Sampling of milk. (K1 & K2)
- 2.2 Physical test - cream line - freezing point. (K1 & K2)
- 2.3 Physical test - refractive index - temperature. (K1 & K2)
- 2.4 Chemical test - albumin, casein, lactic acid, lactose. (K1 & K2)
- 2.5 Total solids - lactometer - gravimetric analysis. (K1 & K2)
- 2.6 Bacteriological test. (K1 & K2)

## **Unit III**

- 3.1 Introduction - fluid milk products - cooling and agitation. (K1 & K2)
- 3.2 Clarification - separation and standardization. (K1 & K2)
- 3.3 Pasteurization - vacuum removal of off-flavours. (K1 & K2)
- 3.4 Homogenization - packaging and distribution. (K1 & K2)
- 3.5 Ice cream - ingredients and their functionality - butter - processing the cream. (K1 & K2)
- 3.6 Evaporated milk - standardization - cheese and curd processing. (K1 & K2)

## **Unit IV**

- 4.1 Market milk - introduction and definition - market milk industry in India and abroad. (K1 & K2)
- 4.2 Indian standards - food chemical codex. (K1 & K2)
- 4.3 Milk and public health - milk adulteration - lactometer. (K1 & K2)
- 4.4 Safeguarding milk supply - clean milk production. (K1 & K2)
- 4.5 Buying and collection of milk - cooling and transportation of milk. (K1 & K2)
- 4.6 Cleaning and sanitation of equipment - judging and grading of milk. (K1 & K2)

## **Unit V**

- 5.1 Nutrition and muscles - effect of various nutritional factors on muscle of agricultural animals. (K1 & K2)
- 5.2 Effects of under nutrition on human muscle. (K1 & K2)
- 5.3 Nutrition and bone formation - bone formation and remodeling. (K1 & K2)
- 5.4 Calcification - effects of nutrients on bone formation. (K1 & K2)
- 5.5 Nutrition, regeneration and repair - regeneration in lower animals. (K1 & K2)
- 5.6 Regeneration in man and other animals. (K1 & K2)

**Reference Books:**

1. N. P. Wong, R. Jenness, M. Keeney, E. H. Marth, Fundamentals of Dairy Chemistry, CBS publishers & Distributors, 3<sup>rd</sup> Edition, 2001.
2. J. G. Davis, Milk Testing, A laboratory control of milk, Agrobios(India), 2015.
3. V. K. Chhazllani, Dairy Chemistry and Animal Nutrition, Mangalam Publications, 2008.
4. Sukumar De, Outlines of Dairy Technology, Oxford University Press, 2003.
5. Clarence Henry Eckles, Willes Barnes Combs, Harold Macy, Milk and Milk Products, Tata McGraw-Hill Publishing Company Limited, 4<sup>th</sup> Edition, 2002.

**Open Educational Resources (OER):**

1. <http://www.digimat.in/nptel/courses/video/126105013/L44.html>
2. <https://freevideolectures.com/course/4443/nptel-dairy-food-process-products-technology>
3. <https://freevideolectures.com/course/4443/nptel-dairy-food-process-products-technology/3>

## SEMESTER I

### PICHB20 - IEP - QUALITY CONTROL AND CHEMICAL ANALYSIS

<b>Year:</b> I	<b>Course Code</b> PICHB20	<b>Title of the Course</b> Quality Control and Chemical Analysis	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W Own Pace</b>	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

- To provide information on fundamental concepts of quality control, quality analysis and good laboratory practices and their applications in chemical industries.
- To understand the various methods of testing of food, textile, water, soil and air.
- To familiarize the standards and specifications involved in quality control.

#### Course Outcomes:

The Learners will be able to

1. Define quality control, quality assurance and describe the necessity of TQM.
2. Apply standards and specifications in quality control.
3. Discuss the testing methods involved in quality control of food and textile industries.
4. Evaluate quality analysis of water, soil, and air.
5. Demonstrate the basics of good laboratory practices and describe the importance of sampling, documenting and usage of computer aids in QC labs.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	M
CO2	H	M	H	M	M	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

## **Unit I**

- 1.1 Definition and dimension of quality - need for quality. (K1 & K2)
- 1.2 Quality control - objects of quality control - advantages of quality control - relation to quality assurance. (K1, K2 & K3)
- 1.3 Statistical quality control - merit, difference between quality control and statistical quality control. (K1, K2 & K3)
- 1.4 Quality assessment - internal and external methods. (K1, K2, K3 & K4)
- 1.5 Total quality management - Six Sigma, 5S- KAIZEN TQM approach. (K1, K2, K3 & K4)
- 1.6 Barrier to total quality management implementation - a case study of TQM. (K1, K2, K3 & K4)

## **Unit II**

- 2.1 Specifications - role of specifications and its benefits. (K1 & K2)
- 2.2 Standards - reasons for developing standards. Difference between standards and specifications. (K1, K2 & K3)
- 2.3 Data Sheets - MSDS, typical specification of industrial chemicals. (K1, K2 & K3)
- 2.4 Specific specifications - colour, flash and fire points, density of liquids and solids, particle size, viscosity, thixotropy, loss on drying and residue on ignition. (K1, K2 & K3)
- 2.5 International standards: ISO 9001 series, ISO 14001, ASTM, FAO, FDA and their functions. (K1, K2, K3 & K4)
- 2.6 National standard developing organizations: ISI, BIS, APEDA, BEE, FSSAI, AGMARK, CDSCO, CPCB and their functions. (K1, K2, K3 & K4)

## **Unit III**

- 3.1 Quality control and testing of food additives in industries - food preservatives - Class I and Class II preservatives - qualitative analysis of Class II preservatives (sodium benzoate and benzoic acid). (K1, K2, K3 & K4)
- 3.2 Food colours - natural and artificial food colours - identification of colours by chromatographic techniques. (K1, K2, K3 & K4)
- 3.3 HACCP - definition, principles, plan, implementing and managing HACCP system. (K1, K2 & K3)
- 3.4 Quality control and testing in textile industries - importance of quality control. (K1, K2 & K3)
- 3.5 Textile testing methods - physical methods - dimension stability test, fabric shrinkage test, tensile strength, bursting strength. (K1, K2 & K3)
- 3.6 Chemical Methods - solubility test, colour fastness properties. Quality standards in textile - handloom mark, wool mark and silk mark. (K1, K2, K3 & K4)

## **Unit IV**

- 4.1 Physico-chemical analysis of water - sampling procedure - analysis of physical parameter - colour, temperature, turbidity. (K1, K2, K3 & K4)
- 4.2 Chemical parameter - pH, conductivity, total hardness, DO, BOD, COD and their measurements. (K1, K2, K3 & K4)
- 4.3 Physico-chemical analysis of soil - sampling procedure - analysis of physical parameter - bulk density, moisture content. (K1, K2, K3 & K4)
- 4.4 Chemical parameter - pH, total nitrogen, available phosphorous, estimation of available S and common metals like Ca, Mg, Na, K and Fe. (K1, K2, K3 & K4)

- 4.5 National ambient air quality standards and permissible limits. (K1, K2 & K3)
- 4.6 Air quality monitoring of particulate matter (PM 10, PM 2.5), SO<sub>2</sub>, NO<sub>x</sub>, CO and CO<sub>2</sub>. (K1, K2, K3 & K4)

#### **Unit V**

- 5.1 Good Laboratory Practices (GLP) - definition - 10 GLP principles and their functions. (K1, K2 & K3)
- 5.2 Quality control laboratory - responsibilities, routine control, sampling plans, data generation and storage. (K1, K2 & K3)
- 5.3 Sampling techniques - terms involved - developing the sample plan depending on sample size, location and collection. (K1, K2, K3 & K4)
- 5.4 Preparation of laboratory samples - making homogeneous samples, reducing size, prevention of changes in sample. (K1, K2, K3 & K4)
- 5.5 Protocols for handling chemicals and their disposal. (K1, K2, K3 & K4)
- 5.6 Use of computers and sensors in quality control. (K1, K2 & K3)

#### **Reference Books:**

1. Piot Konieczka, Jacek Namiesnik, Quality Assurance and Quality Control in the Analytical Chemical Laboratory: A Practical Approach, CRC Press, First Edition, 2016.
2. G. R. Basotia, Total Quality Management, Mangal Deep Publications, 2001.
3. Marton E. Bader, Practical Quality Management in the Chemical Process Industry, CRC Press, 1983.
4. S. N. Mahindru, Food Additives - Characteristics, Detection and Estimation, APH Publishing, 2009.
5. Manual of methods of Analysis of Food: As Issued by FSSAI, ILBCO India, 2018.
6. Elliot B, Grover D, Hamby S, Handbook of Textile Testing and Quality Control, Textile Book Publishers, 1960.
7. K. Amutha, A Practical Guide to Textile Testing, CRC Press, 2016.
8. S. P. Maharajan, Pollution Control in Process Industries, Tata McGraw-Hill Education, 1985.
9. R. J. Heinsoln and R. L. Kabel, Sources and Control of Air pollution, Prentice Hall, 1999
10. Revised National Ambient Air Quality Standards, 2009.
11. B. S. Dhillon, Applied Reliability and Quality - Fundamentals, Methods and Procedures, Springer, 2007.
12. Allen F. Hirsch, Good Laboratory Practice Regulation, 1989.

#### **Open Educational Resources (OER):**

1. <http://indiastandardsportal.org/StandardBodies.aspx>
2. <http://www.inchem.org/documents/ehc/ehc/ehc141.htm#SectionNumber:3.2>
3. <http://ecoursesonline.iasri.res.in/course/view.php?id=185>
4. <https://dst.gov.in/oecd-principles-glp>

## SEMESTER II

### PCCHD20 - ORGANIC REACTIONS AND MECHANISMS

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PCCHD20	<b>Title of the Course</b> Organic Reactions and Mechanisms	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To discuss the various oxidation and reduction reactions.
- To understand the mechanisms of rearrangements.
- To learn about photochemical and pericyclic reactions.

#### Course Outcomes:

The Learners will be able to

1. Discuss the oxidation of organic compounds using selected oxidizing reagents.
2. Discuss the reduction of organic compounds using selected reducing reagents.
3. Describe the mechanisms of various rearrangement reactions and their applications.
4. Explain the reaction mechanisms and applications of selected named reactions.
5. Illustrate the types of photo chemical reactions, classify pericyclic reactions, and examine the correlation diagram for butadiene-cyclobutene system.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(12 Hours)**

- 1.1 Oxidation by quinones and selenium dioxide. (K1, K2, K3, K4, K5 & K6)
- 1.2 Oxidation by osmium tetroxide and lead tetraacetate. (K1, K2, K3, K4, K5 & K6)
- 1.3 Formation of C-C bond in phenol coupling and acetylenic coupling. (K1, K2, K3, K4, K5 & K6)
- 1.4 Oxidation by chromic acid (Jones reagent) and chromium trioxide - pyridine (Sarett's reagent), ozone, hydrogen peroxide and potassium permanganate. (K1, K2, K3, K4, K5 & K6)
- 1.5 DMSO-DCC (Pfitzer-Moffatt reagent) and Oppenauer oxidation. (K1, K2, K3, K4, K5 & K6)
- 1.6 Dakin reaction and Swern oxidation. (K1, K2, K3, K4, K5 & K6)

**Unit II****(12 Hours)**

- 2.1 Catalytic reduction - hydrogenation, hydrogenolysis - reduction by metals (Cu, Pd, Ni). (K1, K2, K3, K4 & K5)
- 2.2 Wolf- Kishner reduction and its modification and Clemmensen reduction. (K1, K2, K3, K4 & K5)
- 2.3 Birch and MPV reduction reactions. (K1, K2, K3, K4 & K5)
- 2.4 Reduction of carbonyl compounds (aldehydes and ketones) with  $\text{LiAlH}_4$  and  $\text{NaBH}_4$ . (K1, K2, K3, K4 & K5)
- 2.5 Reduction of carbonyl compounds (aldehydes and ketones) with tritertiary butoxyaluminium hydride and sodium cyanoborohydride. (K1, K2, K3, K4 & K5)
- 2.6 Selectivity in reduction of 4-t-butylcyclohexanone using selected hydrides. ( $\text{LiAlH}_4$  and  $\text{NaBH}_4$ ) (K1, K2, K3, K4 & K5)

**Unit III****(12 Hours)**

- 3.1 A detailed study with suitable examples of the mechanism of the following rearrangements - Wagner-Meerwein and Demjanov rearrangements. (K1, K2, K3, K4, K5 & K6)
- 3.2 Dienone - Phenol and Favorski rearrangements. (K1, K2, K3, K4, K5 & K6)
- 3.3 Baeyer-Villiger and Wolf rearrangements. (K1, K2, K3, K4, K5 & K6)
- 3.4 Von-Richter and Curtius rearrangements. (K1, K2, K3, K4, K5 & K6)
- 3.5 Lossen and Schmidt rearrangements. (K1, K2, K3, K4, K5 & K6)
- 3.6 Nitrenes - singlet and triplet nitrenes. Methods of generating nitrenes and their reactions. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(12 Hours)**

- 4.1 Reaction mechanism and applications of Barton and Simmons-Smith reactions. (K1, K2, K3, K4 & K5)
- 4.2 Reaction mechanisms and applications of Stobbe condensation and Mannich. (K1, K2, K3, K4 & K5)
- 4.3 Darzen condensation and Chichibabin reactions. (K1, K2, K3, K4 & K5)
- 4.4 Reaction mechanisms and applications of Michael addition and Skraup synthesis. (K1, K2, K3, K4 & K5)
- 4.5 Reaction mechanisms and applications of Hunsdiecker and Ullmann reactions. (K1, K2, K3, K4 & K5)

4.6 Reaction mechanisms and applications of Nef and HVZ. (K1, K2, K3, K4 & K5)

**Unit V** (12 Hours)

5.1 Photochemical excitation - fate of the excited molecules - Jablonski diagram - study of photo chemical reaction of ketone. (K1, K2, K3, K4, K5 & K6)

5.2 Norrish type I and Norrish type II reactions. (K1, K2, K3, K4, K5 & K6)

5.3 Photocycloaddition - Paterno-Buchi reduction - photo cycloaddition of  $\alpha$ - $\beta$  unsaturated ketones- di-pi methane rearrangement. (K1, K2, K3, K4, K5 & K6)

5.4 Pericyclic reactions - classification, orbital symmetry - Woodward Hoffmann rules. (K1, K2, K3, K4, K5 & K6)

5.5 Analysis of electrocyclic reactions - types -  $4n$  and  $4n + 2$  systems - cyclo addition – types – [2+2] and [4+2] cycloaddition reactions. Sigmatropic reactions - 1, n hydrogen shift, Cope rearrangement and Claisen rearrangement. (K1, K2, K3, K4, K5 & K6)

5.6 Correlation diagrams for butadiene - cyclobutene system. (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. R. O. C. Norman & Coxon, Principles of Organic Chemistry, New York, 3<sup>rd</sup> Edition, Reprint 2012.
2. Francis A. Carey and Richard J, Sundberg, Part B-Advanced Organic Chemistry Kluwer Academic Publishers, 5<sup>th</sup> Edition, Reprint 2007.
3. S. M. Mukherji and S. P. Singh, Organic Reaction Mechanism, Mac Millan India Ltd., Chennai, 3<sup>rd</sup> Edition, Reprint 2010.
4. Sanyal S. N. Bharathi Bhawan, Reactions, Rearrangements and Reagents, Reprint 2019.
5. Jerry March, Advanced Organic Chemistry, Wiley Inter Science, 4<sup>th</sup> Edition, Reprint 2015.
6. P. S. Kalsi, Stereochemistry and Mechanism Through Solved Problems, Wiley Eastern Ltd., Reprint 2018.
7. W. Carruthers, Modern Methods of Organic Synthesis, Cambridge University Press, 4<sup>th</sup> Edition, Reprint 2015.
8. P. S. Kalsi, Organic Reaction and their Mechanism, New Age International Limited, Reprint 2017.
9. V. K. Ahluwalia, Organic Reaction Mechanisms, Narosa Publishing House, 2<sup>nd</sup> Edition, 2018.
10. R. K. Mackie and D. M. Smith, Organic Synthesis, Longman Publication, Reprint 1983.
11. P. S. Kalsi, Stereochemistry Conformation and Mechanism, New Age International (P) Ltd., Reprint 2017.
12. Jagdamba Singh and Jaya Singh, Photochemistry and Pericyclic Reactions, New Age International Publishers, 3<sup>rd</sup> Edition, 2019.
13. Dr. Raj K. Bansal, Organic Reaction Mechanisms, Tata Mc Graw- Hill Publishing Company Ltd., 4<sup>th</sup> Reprint 2012.

**OER:**

1. <https://nptel.ac.in/courses/104/105/104105038/>
2. <https://nptel.ac.in/content/storage2/courses/104103022/download/module8.pdf>
3. <https://nptel.ac.in/courses/104/103/104103023/>
4. <https://nptel.ac.in/courses/104/103/104103023/>

## SEMESTER II

### PCCHE20 - ADVANCED COORDINATION CHEMISTRY

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PCCHE20	<b>Title of the Course</b> Advanced Coordination Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To have an in-depth knowledge on coordination chemistry, stability of the complexes and stereochemistry of complexes.
- To study about the crystal field theory and applications of inorganic complexes.
- To gain knowledge about the concepts of electron transfer and substitution reactions.

#### Course Outcomes:

The Learners will be able to

1. Interpret the stability of complexes and explain the applications of various macrocyclic ligands.
2. Explain and analyse the concepts of CFT, MOT and Jahn Teller distortion.
3. Analyse the absorption spectra and determine magnetic susceptibility of metal complexes by different methods.
4. Discuss the electron transfer reaction mechanisms and their importance in biological systems.
5. Explain the reactivity and mechanisms of square planar and octahedral complexes and appraise the applications of complexes in various fields.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	M	H	M	M	H
CO3	H	H	H	H	M	H
CO4	H	M	L	M	H	H
CO5	H	M	M	M	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	L	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	M	H	H

H-High (3), M-Moderate (2), L-Low (1)

**Unit I****(15 Hours)**

- 1.1 Thermodynamic and kinetic stability - stepwise and overall stability constants - relationship between both the constants. (K1, K2, K3, K4, K5 & K6)
- 1.2 Trend in K-value - Irving-Williams series - classification of metals. (K1, K2, K3, K4, K5 & K6)
- 1.3 Factors affecting the stability of complexes. (K1, K2, K3, K4, K5 & K6)
- 1.4 Determination of stability constants by spectrophotometric, polarographic and potentiometric methods - detection of complex formation. (K1, K2, K3, K4, K5 & K6)
- 1.5 Optical rotatory dispersion and circular dichroism - application to complexes. (K1, K2, K3, K4, K5 & K6)
- 1.6 Macrocyclic ligands: thermodynamic and kinetic template effect - structure, stability and applications of porphyrins, corrins, Schiff bases, crown ethers and crypts. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 CFT - salient features of CFT, crystal field splitting of d-orbitals in octahedral complexes - factors affecting the magnitude of  $\Delta_o$ , crystal field splitting of d-orbitals in tetrahedral, tetragonal, and square planar complexes. (K1, K2, K3, K4 & K5)
- 2.2 Consequences of CF splitting - formation of high-spin and low-spin complexes, distribution of d-electrons. (K1, K2, K3, K4 & K5)
- 2.3 CFSE - calculation of CFSE for various d systems in  $O_h$  and  $T_d$  fields - uses of CFSE values, applications of CFT, limitations. (K1, K2, K3, K4 & K5)
- 2.4 Jahn-Teller distortion - theorem, z-in and z-out cases, causes and consequences. (K1, K2, K3, K4 & K5)
- 2.5 MOT - experimental evidences for metal-ligand covalent bonding in complexes,  $\sigma$ -bonding in  $O_h$  complexes - construction of MO diagrams. (K1, K2, K3, K4 & K5)
- 2.6  $\pi$ -bonding in  $O_h$  complexes, effect of  $\pi$ -bonding on the value of  $\Delta_o$ , relation between  $\pi$  bonding ability of ligands and spectrochemical series, comparison of CFT with MOT. (K1, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1 Types of absorption spectra - ligand spectra, counter - ion spectra, CT spectra, ligand field spectra - R-S coupling. (K1, K2, K3, K4, K5 & K6)
- 3.2 Microstates - spectroscopic terms - ground state term: Hund's rule - term states for 'd' - ions. (K1, K2, K3, K4, K5 & K6)
- 3.3 Selection rules - Laporte's and spin selection rules, splitting of terms in octahedral and tetrahedral complexes. (K1, K2, K3, K4, K5 & K6)
- 3.4 Correlation diagrams - Orgel diagrams and Tanabe-Sugano diagrams - important features - spectra of different d systems - Racah parameters - nephelauxetic effect. (K1, K2, K3, K4, K5 & K6)
- 3.5 Charge transfer spectra - classification - ligand to metal, metal to ligand, inter valence and intra ligand charge transfer. (K1, K2, K3, K4, K5 & K6)
- 3.6 Magnetic characteristics of transition metal complexes - types of magnetic character - determination of magnetic susceptibility - Gouy and Faraday's method -magnetic properties of complex ions - magnetic criterion of bond type in complex and orbital contribution to magnetic moment. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Electron transfer reactions (redox reactions): Outer Sphere Mechanism - characteristics, factors influencing OSM. (K1, K2, K3, K4 & K5)
- 4.2 Cross reactions - Marcus-Hush principle. Inner Sphere Mechanism - characteristics. (K1, K2, K3, K4 & K5)
- 4.3 Inner Sphere Mechanism - factors influencing ISM, OSM versus ISM. (K1, K2, K3, K4 & K5)
- 4.4 Two electron transfers, non-complementary electron transfer reactions, reactions of the coordinated ligands, geometrical and optical isomerization reactions. (K1, K2, K3, K4 & K5)
- 4.5 Electron transfer reactions in biological systems - cytochromes, rubredoxins and ferredoxins. (K1, K2, K3, K4 & K5)
- 4.6 Ligand substitution reactions in square-planar complexes - mechanism - influences of entering, leaving and central metal ion on the reactivity of square planar complexes of Pt (II). (K1, K2, K3, K4 & K5)

**Unit V****(15 Hours)**

- 5.1 Trans effect - trans effect series - theories and applications, cis effect. (K1, K2, K3, K4, K5 & K6)
- 5.2 Mechanisms of substitutions in octahedral complexes - dissociative, associative and interchange ( $I_a$  and  $I_d$ ) mechanisms. (K1, K2, K3, K4, K5 & K6)
- 5.3 Hydrolysis reactions - acid hydrolysis and base hydrolysis reactions of six-coordinated Co(III) ammine complexes - mechanisms - evidences. (K1, K2, K3, K4, K5 & K6)
- 5.4 Replacement of coordinated water - mechanisms - evidences - rates of water replacement - orbital occupation effects. (K1, K2, K3, K4, K5 & K6)
- 5.5 Synthesis of coordination compounds by substitution reactions - chemistry of Pt and Co compounds. (K1, K2, K3, K4, K5 & K6)
- 5.6 Metal complexes in medicinal chemistry, industrial processes, and agriculture. (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. K. F. Purcell and J. C. Kotz, Inorganic Chemistry, WB Saunders Co., USA, Indian Edition, Reprint 2012.
2. J. E. Huheey, Inorganic Chemistry, Harper and Collins, NY, 4<sup>th</sup> Edition, Reprint 2006.
3. F. A. Cotton and G. W. Wilkinson, Advanced Inorganic Chemistry: A Comprehensive Text, John Wiley and Sons, 6<sup>th</sup> Edition, Reprint 2007.
4. R. Gopalan, Concise Coordination Chemistry, Vikas Publishing House Pvt. Ltd., Reprint 2008.
5. B. E. Douglas DH McDaniel's and Alexander, Concepts and Models of Inorganic Chemistry, Wiley Publication, 3<sup>rd</sup> Edition, Reprint 2006.
6. Wahid U. Malik, G. D. Tuli, R. D. Madan, Selected Topics in Inorganic Chemistry, S. Chand and Co., New Delhi, Reprint 2010.
7. S. F. A. Kettle, Coordination Chemistry, ELBS, Reprint 1990.
8. M. C. Shrivvers, P. W Atkins, C. H. Langford, Inorganic Chemistry, Oxford University Press, 6<sup>th</sup> Edition, Reprint 2014.

9. G. S. Manku, Theoretical Principles of Inorganic Chemistry, Tata McGraw-Hill Publishers, Reprint 2011.

**OER:**

1. <http://wwwchem.uwimona.edu.jm/courses/IC10Kout.html>
2. <https://ocw.mit.edu/courses/chemistry/5-04-principles-of-inorganic-chemistry-ii-fall-2008/>
3. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P-03, P-07)
4. <https://nptel.ac.in/courses/104/101/104101116/> (Electron Transfer (ET) in living systems)

## SEMESTER II

### PCCHF20 - GROUP THEORY AND QUANTUM CHEMISTRY

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PCCHF20	<b>Title of the Course</b> Group Theory and Quantum Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To learn the concepts of Group theory and its applications.
- To study the fundamental principles of Quantum Chemistry, Schrodinger wave equation and its applications.
- To understand the application of Quantum Chemistry to chemical bonding.

#### Course Outcomes:

The Learners will be able to

1. Identify symmetry operations and assign point groups of molecules.
2. Construct the character tables for  $C_{2v}$  and  $C_{3v}$  point groups, apply the concepts of symmetry in molecular vibrations, chemical bonding, and electronic transitions.
3. Identify the limitations of classical mechanics, apply quantum chemistry to solve Schrödinger wave equation for one, two- and three-dimensional boxes and for hydrogen atom and helium ion.
4. Discuss classical and quantum mechanical treatments of one-dimensional harmonic oscillator, calculate the rotational constant and bond length of diatomic molecules.
5. Discuss and apply the approximation methods to single and multi-electron systems, apply the MO theory to di and polyatomic molecules, explain the application of HMO theory to ethylene, butadiene, and benzene.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	M	M	H	L
CO3	H	M	M	M	H	L
CO4	H	M	M	M	H	L
CO5	H	M	M	M	H	L

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	L	H
CO3	H	H	H	H	L	H
CO4	H	H	H	H	L	H
CO5	H	H	H	H	L	H

H-High (3), M-Moderate (2), L-Low (1)

- Unit I** (15 Hours)
- 1.1 Introduction - symmetry elements and symmetry operations, group postulates and types of groups, sub groups, abelian and non-abelian groups. (K1, K2, K3, K4, K5 & K6)
  - 1.2 Group multiplication table, similarity transformations and classes of symmetry operations. (K1, K2, K3, K4, K5 & K6)
  - 1.3 Molecular point groups - point groups of molecules, point groups of tetrahedral and octahedral molecules. Identification of symmetry operations and determination of point groups. (K1, K2, K3, K4, K5 & K6)
  - 1.4 Matrices - matrix representations of symmetry operations, reducible and irreducible representations. (K1, K2, K3, K4, K5 & K6)
  - 1.5 Orthogonality theorem and its consequences, properties of irreducible representations, labeling of irreducible representations. (K1, K2, K3, K4, K5 & K6)
  - 1.6 Crystallographic symmetry - the 32 crystallographic point groups - space groups - screw axis - glide planes - comparison of crystallographic symmetry with molecular symmetry. (K1, K2, K3, K4, K5 & K6)
- Unit II** (15 Hours)
- 2.1 Construction of character table for  $C_{2V}$  and  $C_{3V}$  point groups - explanation for the complete character table for  $C_{2V}$  and  $C_{3V}$  point groups. (K1, K2, K3, K4 & K5)
  - 2.2 Selection rules for vibrational IR and Raman spectra. (K1, K2, K3, K4 & K5)
  - 2.3 Mutual exclusion rule for molecules with centre of symmetry. (K1, K2, K3, K4 & K5)
  - 2.4 Applications to molecular vibrations (IR and Raman) for determining symmetry of normal modes of vibration in nonlinear molecules  $H_2O$ ,  $CH_4$ ,  $BF_3$  and  $NH_3$  using group theory. (K1, K2, K3, K4 & K5)
  - 2.5 Hybrid orbitals in nonlinear molecules  $CH_4$ ,  $XeF_4$ ,  $BF_3$ ,  $SF_6$ ,  $NH_3$ . (K1, K2, K3, K4 & K5)
  - 2.6 Application of group theory to electronic spectra of ethylene and formaldehyde. (K1, K2, K3, K4 & K5)
- Unit III** (15 Hours)
- 3.1 Introduction to quantum mechanics - black body radiation - distribution of energy in the black body radiation - Rayleigh Jeans' and Planck's law of radiation. (K1, K2, K3, K4, K5 & K6)
  - 3.2 Photoelectric effect, Bohr's quantum theory and subsequent developments - duality of electron and Compton Effect. (K1, K2, K3, K4, K5 & K6)
  - 3.3 Quantum theory - quantum mechanical postulates – operators - definition, types of operators and Hermitian property. (K1, K2, K3, K4, K5 & K6)
  - 3.4 Particle in a box model (one-, two- and three-dimensional cases). (K1, K2, K3, K4, K5 & K6)
  - 3.5 Schrodinger equation for hydrogen atom and  $He^+$  ion. (K1, K2, K3, K4, K5 & K6)
  - 3.6 Origin of quantum numbers and their significance. (K1, K2, K3, K4, K5 & K6)
- Unit IV** (15 Hours)
- 4.1 One dimensional harmonic oscillator - classical treatment and quantum mechanical treatment. (K1, K2, K3, K4 & K5)
  - 4.2 Normalization and the characteristics of the Eigen functions of a harmonic oscillator. (K1, K2, K3, K4 & K5)
  - 4.3 The recursion formula for the Hermite polynomials, selection rules of the harmonic oscillator and space quantization of electronic orbitals. (K1, K2, K3, K4 & K5)

4.4 Rotation of diatomic molecules - wave equation and solution of the rigid rotor. (K1, K2, K3, K4 & K5)

4.5 Schrodinger wave equation and solution of particle in a ring. (K1, K2, K3, K4 & K5)

4.6 Calculation of rotational constants and bond lengths of diatomic molecules. (K1, K2, K3, K4 & K5)

#### Unit V

(15 Hours)

5.1 Approximation methods - variation methods - trial wave function - application of variation method to hydrogen and helium atoms. (K1, K2, K3, K4, K5 & K6)

5.2 Perturbation method and its application to particle in one dimensional box. (K1, K2, K3, K4, K5 & K6)

5.3 Born Oppenheimer approximation - treatment of molecules - application to helium atom. (K1, K2, K3, K4, K5 & K6)

5.4 Hydrogen molecule - Heiter-London theory or valence bond treatment - energy level diagram. (K1, K2, K3, K4, K5 & K6)

5.5 Linear Combination of Atomic Orbitals (LCAO) - molecular orbital theory for hydrogen molecule ion and hydrogen molecule. (K1, K2, K3, K4, K5 & K6)

5.6 Huckel's theory for conjugated molecules - ethylene, butadiene and benzene - semi empirical methods - Slater orbital and Hartree Fock–Self Consistent Field (HFSCF) methods. (K1, K2, K3, K4, K5 & K6)

#### Reference Books:

1. R. K. Prasad, Quantum Chemistry, New Age International (P) Ltd. Publishers, New Delhi, 3<sup>rd</sup> Edition, 2006.
2. D. A. Mcquarrie, Quantum Chemistry, University Science Books, Mill Valley, California, Reprint 2007.
3. R. Anantharaman, Fundamentals of Quantum Chemistry, Macmillan India Ltd., 2001.
4. Ira N. Levine, Quantum Chemistry, Prentice Hall of India, New Delhi, 5<sup>th</sup> Edition, 2006.
5. Mahendra R. Awode, Quantum Chemistry, S. Chand & Company Ltd., New Delhi, 2002.
6. A. K. Chandra, Quantum Chemistry, Tata McGraw-Hill Publishing Company, New Delhi, 10<sup>th</sup> Edition, 2008.
7. Melvin W. Hanna, Quantum Mechanics in Chemistry, The Benjamin / Cummings Publishing Company, 2<sup>nd</sup> Edition, 1969.
8. K. V. Raman, Group Theory and Its Applications to Chemistry, Tata McGraw-Hill Publishing Company Ltd., Reprint 2004.
9. M. S. Gopinathan and V. Ramakrishnan, Group Theory in Chemistry, Vishal Publishing Co., Reprint 2005.
10. F. A. Cotton, Group Theory and Its Applications to Chemistry, John Wiley & Sons (Asia) Pvt. Ltd., Singapore, 2004.
11. A. Salahuddin Kunju and G. Krishnan, Group theory and its Applications in Chemistry, Asoke K. Ghosh, PHI Learning Pvt. Ltd., New Delhi, 2010.

#### OER:

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P-02 PhysicalChemistry-1 Quantum Chemistry)
2. <https://symotter.org/> (Group Theory)
3. <https://nptel.ac.in/courses/104/106/104106074/> (Quantum Chemistry)
4. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P-13 Applications of molecular symmetry and Group Theory)
5. <https://nptel.ac.in/courses/104/104/104104080/> (Chemical applications of group theory)

## SEMESTER II

### PECHC20 - ELECTIVE II A: PHARMACEUTICAL CHEMISTRY

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PECHC20	<b>Title of the Course</b> Pharmaceutical Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To learn about the drugs, metabolism and the side effects.
- To understand the importance of drug design and development of drugs.
- To know the cancer and the drugs used.
- To learn about the various nutraceuticals and anticoagulants.

#### Course Outcomes:

The Learners will be able to

1. Classify the pharmaceutical drugs and explain the mechanism of drug action and absorption of drugs.
2. Elaborate the biological role of important inorganic compounds and the drugs used in the treatment of mental disorders.
3. Summarize the methods of drug design and development.
4. Review the causes of cancer and its treatment, and to assess the mechanism and the mode of action of anticancer drugs.
5. Formulate the different types of Nutraceuticals and their applications, and to justify the role of anticoagulants in the treatment of blood disorder.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	H
CO2	H	M	L	H	H	H
CO3	H	M	L	H	H	H
CO4	H	M	L	H	H	H
CO5	H	M	L	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I** (15 Hours)

- 1.1 Classification of drugs: biological, chemical, commercial consideration and lay public. (K1, K2, K3, K4, K5 & K6)
- 1.2 Mechanism of drug action and metabolism of drugs - mechanism of action, drug receptors binding, biological responses - covalent bond, hydrogen bond, van der Waal's forces. (K1, K2, K3, K4, K5 & K6)
- 1.3 Metabolism of drugs - chemical pathways - phase I and phase II reactions, biotransformation. (K1, K2, K3, K4, K5 & K6)
- 1.4 Routes of administration of drugs. (K1, K2, K3, K4, K5 & K6)
- 1.5 Absorption of drugs - factors affecting absorption. (K1, K2, K3, K4, K5 & K6)
- 1.6 Digestion and absorption of proteins and fats. (K1, K2, K3, K4, K5 & K6)

**Unit II** (15 Hours)

- 2.1 Assay of drugs - chemical, biological, and immunological assay. (K1, K2, K3, K4 & K5)
- 2.2 Psychopharmacology - antipsychotic drugs, phenothiazines, LSD, marijuana. (K1, K2, K3, K4 & K5)
- 2.3 Barbiturates - mechanism of action. (K1, K2, K3, K4 & K5)
- 2.4 Biological role of some inorganic compounds - sodium and potassium and their compounds. (K1, K2, K3, K4 & K5)
- 2.5 Calcium and iodine and their compounds. (K1, K2, K3, K4 & K5)
- 2.6 Copper and zinc and their compounds. (K1, K2, K3, K4 & K5)

**Unit III** (15 Hours)

- 3.1 Drug design and development - introduction, discovery of drugs and lead compounds, different approaches to find lead compounds. (K1, K2, K3, K4, K5 & K6)
- 3.2 Development of drugs: Lead modification - pharmacophore modification, modification of structure or functional group, Structure Activity Relationship (SAR) - Prontosil, Streptomycin. (K1, K2, K3, K4, K5 & K6)
- 3.3 Structure modification methodologies to increase potency - homologation, chain branching, ring-chain transformation, extension of structure, isosteres and bioisosteres. (K1, K2, K3, K4, K5 & K6)
- 3.4 Quantitative Structure Activity Relationship (QSAR) - Hammett equation (electronic effects), Taft Equation (steric effects), Hansch equation (lipophilicity effect), Hansch analysis. (K1, K2, K3, K4, K5 & K6)
- 3.5 Craig plot, drug design using QSAR. (K1, K2, K3, K4, K5 & K6)
- 3.6 Computer assisted drug design (CADD). (K1, K2, K3, K4, K5 & K6)

**Unit IV** (15 Hours)

- 4.1 Cancer chemotherapy - terms used - types of neoplasms, stages of cancer, metastasis, and difference between cancer and normal cells. (K1, K2, K3, K4 & K5)
- 4.2 Tumor formation mechanism, causes of cancer, ways of reducing the risks. (K1, K2, K3, K4 & K5)
- 4.3 Treatment of cancer - radiation, surgery, chemotherapy, photodynamic therapy (PDT), immunotherapy, combined therapy, actions of antitumor agents. (K1, K2, K3, K4 & K5)
- 4.4 Determination of drug response - growth fraction, the mass doubling time, total tumor burden, tumor heterogeneity, cell cycle phase, drug resistance, host factors. (K1, K2, K3, K4 & K5)

4.5 Cytotoxic anticancer drugs - alkylating agents (Mustards) and their modes of action, antimetabolites - folic acid antagonist, purine antagonist and their modes of action. (K1, K2, K3, K4 & K5)

4.6 Pyrimidine agents and their modes of action, antitumor antibiotics and their modes of action, plant products, podophyllotoxins and their modes of action, endocrine agents and their modes of action, miscellaneous anticancer agents. (K1, K2, K3, K4 & K5)

#### **Unit V**

**(15 Hours)**

5.1 Nutraceuticals - introduction, types - plant sources. (K1, K2, K3, K4, K5 & K6)

5.2 Animal sources, microbial sources, nutraceuticals derived from all sources. (K1, K2, K3, K4, K5 & K6)

5.3 Antioxidants - definition, examples, role of antioxidants. (K1, K2, K3, K4, K5 & K6)

5.4 Toxins and their medicinal values - introduction, classification of toxins, toxins from reptiles and animals. (K1, K2, K3, K4, K5 & K6)

5.5 Toxins from insects, plants, marine origin, and microorganisms. (K1, K2, K3, K4, K5 & K6)

5.6 Anticoagulants - blood coagulation pathway, prevention of coagulation, direct and indirect acting anticoagulants, and anticoagulation therapy. (K1, K2, K3, K4, K5 & K6)

#### **Reference Books:**

1. V. K. Ahluwalia, Madhu Chopra, Medicinal Chemistry, ANE Books India, 2008.
2. Jayashree Ghosh, Fundamental Concepts of Applied Chemistry, S. Chand Company Ltd., 2<sup>nd</sup> Edition, 2006.
3. Graham L. Patrick, An Introduction to Medicinal Chemistry, Oxford University Press, 6<sup>th</sup> Edition, Reprinted 2017.
4. David A. Williams, Foye's Principles of Medicinal Chemistry, Lippincott Williams and Wilkins, 2012.
5. Asuthosh Kar, Medicinal Chemistry, New Age International Publishers, New Delhi, 7<sup>th</sup> Edition, 2018.
6. N. K. Jain, Progress in Controlled and Novel Drug Delivery Systems, CBS Publishers & Distributors, New Delhi, 2013.
7. P. S. Kalsi and Sangeeta Jagtap, Pharmaceutical, Medicinal and Natural Product Chemistry, Narosa Publishing House, New Delhi, 2013.

#### **OER:**

1. <https://opentextbc.ca/anatomyandphysiology/chapter/18-5-hemostasis/>
2. <https://nptel.ac.in/courses/102/106/102106070/>

## SEMESTER II

### PECHD20 - ELECTIVE II B: MEDICINAL CHEMISTRY

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PECHD20	<b>Title of the Course</b> Medicinal Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To have a clear understanding about drug designing and the principles involved in it.
- To deepen the knowledge on biochemical considerations of drug designing.

#### Course Outcomes:

The Learners will be able to

1. Explain the designing of drugs by different approaches.
2. Define the physiochemical properties of drug molecules, and illustrate pharmacophore, toxicophore, metabophore and interchangeable bioisosteres.
3. Describe the nature of drug receptors and their binding interactions.
4. Explain the stereochemical properties and biological activity of drug molecules, and to identify the properties of drug molecules by quantum mechanics and molecular mechanics.
5. Describe the physiological and pathological approaches while designing newer drugs for newer diseases, and to Discuss the biological activity of steroids and radioisotopes.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I** (15 Hours)

- 1.1 Drug design - rational approach and conceptual approach. (K1, K2, K3, K4, K5 & K6)
- 1.2 Practical approach and humanitarian approach. (K1, K2, K3, K4, K5 & K6)
- 1.3 The method of variation. (K1, K2, K3, K4, K5 & K6)
- 1.4 Drug design through disjunction and conjunction. (K1, K2, K3, K4, K5 & K6)
- 1.5 Research and development strategies. (K1, K2, K3, K4, K5 & K6)
- 1.6 Molecular hybridization, rigidity, and flexibility versus drug design, tailoring of drugs. (K1, K2, K3, K4, K5 & K6)

**Unit II** (15 Hours)

- 2.1 Definition and properties of drug molecules. (K1, K2, K3, K4 & K5)
- 2.2 Physiochemical properties of drug design. (K1, K2, K3, K4 & K5)
- 2.3 Structural integrity of drug molecules. (K1, K2, K3, K4 & K5)
- 2.4 Pharmaceutical, pharmacokinetics and pharmacodynamic phases. (K1, K2, K3, K4 & K5)
- 2.5 Structural fragments of drug molecules - pharmacophore and toxicophore. (K1, K2, K3, K4 & K5)
- 2.6 Metabophores and interchangeable bioisosteres. (K1, K2, K3, K4 & K5)

**Unit III** (15 Hours)

- 3.1 The receptor concept - the nature of receptors and criteria for receptor identity. (K1, K2, K3, K4, K5 & K6)
- 3.2 Definitions of drug - receptor binding interactions. (K1, K2, K3, K4, K5 & K6)
- 3.3 Selection of drug - receptor binding forces in drug design. (K1, K2, K3, K4, K5 & K6)
- 3.4 General molecular concepts of drug receptor action, functional molecular properties of drug receptors. (K1, K2, K3, K4, K5 & K6)
- 3.5 Definition of classical binding terms for drug - receptor interactions. (K1, K2, K3, K4, K5 & K6)
- 3.6 The clinical-molecular interface: The concept of rational poly pharmacy - drug-drug interactions in drug design. (K1, K2, K3, K4, K5 & K6)

**Unit IV** (15 Hours)

- 4.1 Structure and properties of drug molecules. (K1, K2, K3, K4 & K5)
- 4.2 Conformational, topological, and steric properties of drug molecules. (K1, K2, K3, K4 & K5)
- 4.3 Enantiomers and diastereomers of drug molecules. (K1, K2, K3, K4 & K5)
- 4.4 Stereochemistry and biological activity of drug molecules. (K1, K2, K3, K4 & K5)
- 4.5 Electronic properties of drug molecules. (K1, K2, K3, K4 & K5)
- 4.6 Predicting the properties of drug molecules - quantum mechanics and molecular mechanics. (K1, K2, K3, K4 & K5)

**Unit V** (15 Hours)

- 5.1 Biochemical considerations in drug design - the physiological and pathological approaches. (K1, K2, K3, K4, K5 & K6)

- 5.2 Newer drugs for newer diseases - introduction, newer drugs. (K1, K2, K3, K4, K5 & K6)
- 5.3 Hormone antagonists - anti estrogen - aldosterone antagonists. (K1, K2, K3, K4, K5 & K6)
- 5.4 Anti progestational steroids - cardiac steroids and related inotropic drugs. (K1, K2, K3, K4, K5 & K6)
- 5.5 Cardiac steroids, phosphodiesterase inhibitors, adenylate cyclase stimulants, drugs that enhance the  $\text{Ca}^{2+}$  sensitivity of myocardial contractile proteins. (K1, K2, K3, K4, K5 & K6)
- 5.6 Radio sensitizer - therapeutic radioisotopes, imaging radioisotopes - drugs to combat AIDS. (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. Thomas Nogrady, Dona Id F. Weaver, Medicinal Chemistry: A Molecular and Biochemical Approach, Oxford University Press, Third Edition, 2005.
2. V. K. Ahluwalia, Madhu Chopra, Medicinal Chemistry, Ane Books India, 2008.
3. D. Sriram, P. Yogeewari, Medicinal Chemistry, Pearson Education, 2007.
4. Asuthosh Kar, Medicinal Chemistry, New Age International Publishers, New Delhi, 7<sup>th</sup> Edition, 2018.

**OER:**

1. <http://epj.eg.net/article.asp?issn=1687-4315;year=2013;volume=12;issue=2;spage=95;epage=108;aulast=Kamel;type=3>
2. <https://www.britannica.com/science/steroid/Steroid-numbering-system-and-nomenclature>
3. <https://nptel.ac.in/courses/102/106/102106070/>

## SEMESTER II

### PCCHG20 - PRACTICAL I: ORGANIC CHEMISTRY - I

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PCCHG20	<b>Title of the Course</b> Practical I: Organic Chemistry – I	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Outcomes:

The Learners will be able to

1. Identify the components in two component mixture and detect the functional groups.
2. Prepare the organic compounds and purify them.
3. Perform common laboratory techniques like separation, refluxing, recrystallization, vacuum filtration, and sublimation.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	L	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

1. Identification of components in a two-component mixture and preparation of their derivatives.
2. Preparations:
  - (i) p-nitrobenzoic acid from p-nitrotoluene (Oxidation)
  - (ii) Anthroquinone from Anthracene (Oxidation)
  - (iii) 1,2,3,4 - tetrahydrocarbazole from Cyclohexanone (Reduction)
  - (iv) Methyl orange from Sulphanilic acid
  - (v) Acetyl Salicylic acid (Aspirin) from Salicylic acid (Acetylation)
  - (vi) m-nitro aniline from m-dinitrobenzene (Reduction)

## Reference Books:

1. S. Furniss Brain, Vogel's Textbook of Practical Organic Chemistry, Pearson Publication, 5<sup>th</sup> Edition, Reprint 2004.
2. N. S. Gnanaprasam & G. Ramamurthy, Organic Lab Manual (Semi-Micro Qualitative Analysis and Separation), S. Viswanathan Printers & Publishers Pvt., Ltd, Reprint 2002.

## OER:

1. <http://vlab.amrita.edu/?sub=2&brch=191&sim=345&cnt=1>
2. [https://www.brainkart.com/article/Organic-Qualitative-Analysis\\_38680/](https://www.brainkart.com/article/Organic-Qualitative-Analysis_38680/)
3. <http://amrita.olabs.edu.in/?sub=73&brch=8&sim=141&cnt=715>

## Continuous Assessment - 40 Marks

I C.A. - 50 Marks

II C.A. - 50 Marks

Average - 25 Marks

Performance during regular practicals - 10 Marks

Regularity in submission of observation notebook and Record - 5 Marks

## CA Practical Examination - 50 Marks

Record - 5 Marks

Viva - 5 Marks

Experiment - 30 Marks

Preparation - 10 Marks

(Quality - 4 Marks, Quantity - 4 Marks, Recrystallization - 2 Marks)

## Semester Practical Examination - 60 marks

Record - 10 Marks

Viva - 5 Marks

Qualitative Organic Analysis - 35 Marks

Preparation - 10 Marks

(Quality - 4 Marks, Quantity - 4 Marks, Recrystallization - 2 Marks)

## SEMESTER II

### PCCHH20 - PRACTICAL II: INORGANIC CHEMISTRY - I

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PCCHH20	<b>Title of the Course</b> Practical II: Inorganic Chemistry – I	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Outcomes:

The Learners will be able to

1. Demonstrate group separation and analysis of inorganic mixtures.
2. Identify rare and common ions present in the inorganic mixtures.
3. Prepare selected inorganic complexes.
4. Estimate the metal ions present in the sample by colorimetric method.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

1. Semi micro qualitative analysis of mixture containing two common and two rare cations. (The following are the rare cations to be included - W, Te, Se, Ce, Zr, Be, V, Mo, Li)
2. Colorimetric Analysis using photoelectric method: Estimation of Iron, Nickel, Copper and Manganese.
3. Preparations:
  - i. Potassium tris(oxalato)aluminate(III) trihydrate
  - ii. Tris(thiourea)copper(I) chloride
  - iii. Sodium hexanitrocobaltate(III)
  - iv. Tetramminecopper(II) sulphate
  - v. Sodium cuprousthiosulphate

## Reference Books:

1. V. V. Ramanujam, Inorganic Semi Micro Qualitative Analysis, The National Publication, 3<sup>rd</sup> Edition, Reprint 2004.
2. G. Svehila, Vogel's Qualitative Inorganic Analysis, Pearson Publication, 7<sup>th</sup> Edition, Reprint 2012.

## OER:

1. <http://www.public.asu.edu/~jpbirk/index.html>
2. <http://amrita.olabs.edu.in/?sub=73&brch=7&sim=180&cnt=515>
3. [http://wwwchem.uwimona.edu.jm/lab\\_manuals/c21jexpt.html](http://wwwchem.uwimona.edu.jm/lab_manuals/c21jexpt.html)

## Continuous Assessment - 40 Marks

I C.A.	- 50 Marks
II C.A.	- 50 Marks
Average	- 25 Marks

Performance during regular practicals - 10 Marks

Regularity in submission of observation note-book and Record - 5 Marks

## CA Practical Examination - 50 Marks

Record	- 5 Marks
Viva	- 5 Marks
Short Procedure	- 5 Marks
Semi micro qualitative analysis (2 rare + 2 common cations)	- 15 Marks
Preparation	- 10 Marks
Colorimetric analysis	- 10 Marks

## Error Percentage for Colorimetric Estimation:

Upto 5%	- 10 Marks
5 – 7%	- 9 Marks
7 – 9%	- 8 Marks
9 – 12%	- 7 Marks
Above 12%	- 5 Marks

## Semester Practical Examination - 60 marks

Record	- 10 Marks
Viva – Voce	- 5 Marks
Short Procedure	- 5 Marks
Semi micro qualitative analysis (2 rare + 2 common cations)	- 20 Marks
Preparation	- 10 Marks
Colorimetric analysis	- 10 Marks

## Error Percentage for Colorimetric Estimation:

Upto 5%	- 10 Marks
5 – 7%	- 9 Marks
7 – 9%	- 8 Marks
9 – 12%	- 7 Marks
Above 12%	- 5 Marks

## SEMESTER - II

### PCCHI20 - PRACTICAL III: PHYSICAL CHEMISTRY - I

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PCCHI20	<b>Title of the Course</b> Practical III: Physical Chemistry - I	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Outcomes:

The Learners will be able to

1. Prepare the solutions of different concentrations.
2. Experiment and calculate the rate constant of ester hydrolysis and primary salt effect.
3. Determine the order and energy of activation using kinetics.
4. Construct and analyze phase diagrams, and examine the validity of Freundlich and Langmuir adsorption isotherms.
5. Determine the rate constant using polarimeter and stability constant using photo colorimeter, and develop skills in handling colorimeter and polarimeter.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

1. Determination of rate constant and order of the reaction of iodination of acetone in the presence of acid catalyst.
2. Determination of order of the reaction of potassium iodide and potassium persulphate.
3. Determination of the strengths of the given unknown acids and their relative strength.
4. Determination of activation energy and Arrhenius parameter for the acid catalyzed hydrolysis of methyl acetate at two different temperatures.

5. Determination of rate constant of the reaction between potassium iodide and potassium persulphate and study the effect of added neutral salt on the rate constant of the reaction.
6. Determination of adsorption of oxalic acid from aqueous solutions by activated charcoal and examines the validity of Freundlich adsorption isotherm.
7. Verification of the Freundlich and Langmuir isotherms for adsorption of acetic acid on activated charcoal.
8. Construction of the phase diagram for a binary mixture to determine the eutectic temperature and composition and determination of the composition of the given mixture A and B by making use of the phase diagram - simple eutectic system.
9. \*Determination of the saponification of ethyl acetate with sodium hydroxide at equal concentrations of ester and alkali.
10. Kinetics of inversion of sucrose - polarimetry.
11. \*Determination of composition of ferric ions-salicylic acid by Job's method.
12. \*Determination of partial molar volume of acetic acid in aqueous solution by apparent molar volume method.

\*Not to be given for examination

#### Reference Books:

1. V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu, Basic Principles of Practical Physical Chemistry, Sultan Chand and Sons Educational Publishers, Reprint 1995.
2. V. K. Ahluwalia, Sunita Dhingra Adarsh Gulati, College Practical Chemistry, University Press (India) Private Limited, Reprint 2008.
3. David Shoemaker, Joseph Nibler, Carl Garland, Experiments in Physical Chemistry, 7<sup>th</sup> Edition, 2003.
4. B. D. Khosla, V. C. Garg, Adarsh Gulati, Senior Practical Physical Chemistry, R. Chand and Co., Edition 2007.

#### OER:

1. <http://vlab.amrita.edu/?sub=3&brch=208&sim=563&cnt=958>

#### Continuous Assessment - 40 Marks

- |   |            |
|---|------------|
| I C.A.  | - 50 Marks |
| II C.A.   | - 50 Marks |
| Average   | - 25Marks  |
| Performance during regular practicals                       | - 10 Marks |
| Regularity in submission of observation notebook and Record | - 5 Marks  |

#### CA Practical Examination - 50 Marks

- |                           |            |
|---------------------------|------------|
| Record                    | - 5 Marks  |
| Viva                      | - 5 Marks  |
| Principle and model graph | - 5 Marks  |
| Manipulation              | - 15 Marks |
| Result                    | - 20 Marks |

#### Semester Practical Examination - 60 Marks

- |                           |            |
|---------------------------|------------|
| Record                    | - 10 Marks |
| Viva-Voce                 | - 5 Marks  |
| Principle and model graph | - 5 Marks  |

Manipulation - 20 Marks  
Result - 20 Marks

1. KINETICS: (Iodination of acetone, Second order kinetics)

Error:

Upto + 0.2 - 20 Marks

>+ 0.2 to + 0.4 - 13 Marks

> + 0.4 - 7 Marks

2. PHASE DIAGRAM FOR SIMPLE EUTECTIC SYSTEM:

Eutectic temperature and composition - 20 Marks

Eutectic temperature - 10 Marks

Error:

Upto + 2°C - 10 Marks

>+ 2°C to + 4°C - 7 Marks

>+4°C - 5 Marks

Unknown composition - 10 Marks

Upto 5% - 10 Marks

>5-6% - 7 Marks

>6% - 5 Marks

3. ARRHENIUS:

Arrhenius parameter - 10 Marks

Error:

< 1% - 10 Marks

>1-2% - 7 Marks

> 2% - 5 Marks

Activation Energy - 10 Marks

Below a factor of 10 - 10 Marks

By a factor of 10 - 7 Marks

Above a factor of 10 - 5 Marks

4. PRIMARY SALT EFFECT: (Absence of electrolyte = 10 Marks; Presence =10 Marks)

Error:

Below a factor of 10 - 10 Marks

By a factor of 10 - 7 Marks

Above a factor of 10 - 5 Marks

5. ACID STRENGTH:

Error:

< 2% - 20 Marks

>2-3% - 13 Marks

> 3% - 7 Marks

6. ADSORPTION OF ACETIC ACID/OXALIC ACID ON CHARCOAL:

Error:

< 2% - 20 Marks

>2-3% - 13 Marks

> 3% - 7 Marks

## SEMESTER II

### PICHC20 - IEP - CSIR-NET PREPARATORY COURSE IN INORGANIC CHEMISTRY

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PICHC20	<b>Title of the Course</b> CSIR-NET Preparatory Course in Inorganic Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W</b> Own Pace	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objective:

- Upon studying this paper, the students will be able to answer CSIR-NET questions in Inorganic Chemistry.

#### Course Outcomes:

The Learner will be able to

1. Apply and analyze the periodicity of properties of elements, MOT, VSEPR theory, concepts of acids and bases, and the basic aspects of solid-state chemistry.
2. Apply and analyze the properties of main group elements and their compounds.
3. Apply VB, CF and MO theories, and analyze the reactions and properties of complexes.
4. Apply and analyze the chemistry of organometallic and bioinorganic compounds.
5. Apply and analyze the various techniques involved in the characterization of inorganic compounds.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

H-High (3), M-Moderate (2), L-Low (1)

## Unit I

- 1.1 Chemical periodicity: Periodic table, grouping of elements, classification of elements - s, p, d and f block elements, periodic trends - atomic size, ionic size, ionization potential, electronegativity. (K1, K2 & K3)
- 1.2 Structure and bonding: Molecular Orbital Theory - bonding and anti-bonding molecular orbitals, bond order, bonding in homo and hetero nuclear molecules. (K1, K2 & K3)
- 1.3 VSEPR theory: Geometries of molecules. (K1, K2, K3 & K4)
- 1.4 Acids and bases: Concepts of acids and bases - Arrhenius, Bronsted-Lowry and Lewis concepts, Hard-Soft Acid Base concept - Pearson theory, non-aqueous solvents. (K1, K2, K3 & K4)
- 1.5 Solids: Crystal systems and lattices, Miller planes, crystal packing, crystal defects, Bragg's law, ionic crystals, structures of AX, AX<sub>2</sub>, ABX<sub>3</sub> type compounds. (K1, K2 & K3)
- 1.6 Spinels, band theory, metals, and semiconductors. (K1, K2, K3 & K4)

## Unit II

- 2.1 Main group elements: General characteristics of alkali metals, alkaline earth metals, boron family, carbon family, nitrogen family, chalcogens. (K1, K2 & K3)
- 2.2 Compounds of main group elements - hydrides, halides, oxides, oxoacids, nitrides, sulphides - shapes and reactivity. (K1, K2 & K3)
- 2.3 Structure and bonding of boranes, carboranes, silicones, silicates, boron nitride, borazine and phosphazenes, industrial importance of these compounds. (K1, K2, K3 & K4)
- 2.4 Allotropy, chemistry of noble gases, pseudo halogens and inter halogen compounds. (K1, K2 & K3)
- 2.5 Transition elements: General characteristics, Ti, V, Cr, Mn and Fe group elements. (K1, K2 & K3)
- 2.6 Inner transition elements: Spectral and magnetic properties, redox chemistry, analytical applications. (K1, K2, K3 & K4)

## Unit III

- 3.1 Coordination chemistry - isomerism, Valence Bond Theory (VBT). (K1 & K2)
- 3.2 Crystal Field Theory - energy level diagrams in various crystal fields, CFSE, applications of CFT, Jahn-Teller distortion. (K1, K2 & K3)
- 3.3 MOT - evidences,  $\sigma$  &  $\pi$  - bonding in complexes - construction of molecular orbital diagrams. (K1, K2 & K3)
- 3.4 Electronic spectra of transition metal complexes: spectroscopic term symbols, selection rules, Orgel diagrams, charge-transfer spectra. (K1, K2 & K3)
- 3.5 Spectral and magnetic properties of transition metal complexes. (K1, K2 & K3)
- 3.6 Reaction mechanisms: kinetic and thermodynamic stability, substitution reactions. (K1, K2 & K3)

## Unit IV

- 4.1 Organometallic compounds: Synthesis, bonding and structure, and reactivity. Cages and metal clusters. (K1, K2 & K3)
- 4.2 18-Electron rule: Metal-alkyl, metal-carbonyl, metal-olefin and metal-carbene complexes and metallocenes. Fluxionality in organometallic complexes. (K1, K2, K3 & K4)

- 4.3 Types of organometallic reactions: Homogeneous catalysis - hydrogenation, hydroformylation, acetic acid synthesis, metathesis and olefin oxidation. (K1, K2 & K3)
- 4.4 Heterogeneous catalysis - Fischer-Tropsch reaction, Ziegler-Natta polymerization. (K1, K2 & K3)
- 4.5 Bioinorganic chemistry: Photosystems, porphyrins, metallo enzymes, oxygen transport, nitrogen fixation, metal complexes in medicine. (K1, K2 & K3)
- 4.6 Electron-transfer reactions - ISM and OSM, electron transfer in biological systems. (K1, K2, K3 & K4)

#### Unit V

- 5.1 Characterization of inorganic compounds: By IR, Raman, UV-Vis and MS. (K1, K2, K3 & K4)
- 5.2 Characterization of inorganic compounds: By NMR, EPR, Mössbauer and NQR. (K1, K2, K3 & K4)
- 5.3 Microscopic techniques - optical, electron and scanning probe techniques. (K1, K2 & K3)
- 5.4 Electro analytical methods - polarography, cyclic voltammetry, ion-selective electrodes. Thermo analytical methods. (K1, K2, K3 & K4)
- 5.5 Nuclear chemistry: Radioactivity - decay processes, half-life of radioactive elements, nuclear reactions, fission and fusion. (K1, K2 & K3)
- 5.6 Radio-analytical techniques and activation analysis. (K1, K2 & K3)

#### References Books:

1. P. S. Kalsi, J. P. Kalsi, and Ashu Chaudhary, Bioinorganic and Supramolecular Chemistry, New Age International Publishers, 4<sup>th</sup> Edition, 2020.
2. H. J. Arnikaar, Essentials of Nuclear Chemistry, New Age International Publishers, 4<sup>th</sup> Revised Edition, 2011.
3. H. J. Arnikaar, Nuclear Chemistry through Problems, New Age International Publishers, 2<sup>nd</sup> Edition, 2016.
4. R. C. Mehrotra, A. Singh, Organometallic Chemistry: A Unified Approach, New Age International Publishers, Revised 2<sup>nd</sup> Edition, 1991.
5. K. Veera Reddy, Symmetry and Spectroscopy of Molecules, New Age International (P) Limited, Publishers, Reprint 2005.
6. W. U. Malik & *et al.*, Selected Topics in Inorganic Chemistry, S. Chand, Revised Edition, 2010.
7. R. Gupta, CSIR-UGC NET: Chemical Sciences Previous Papers (Solved), RPH Editorial Board, 2014.
8. J. D. Lee, Concise Inorganic Chemistry, Wiley, Fifth Edition, 2008.
9. James E Huheey & *et al.*, Inorganic Chemistry: Principles of Structure and Reactivity, Pearson Publications, 4<sup>th</sup> Edition, 2006.
10. G. Svehla, B. Sivasankar, Vogel's Qualitative Inorganic Analysis, Pearson Publications, 7<sup>th</sup> Edition, 2012.
11. Weller, Overton, Rourke & Armstrong, Inorganic Chemistry, Oxford University Press, 6<sup>th</sup> Edition, 2015.
12. D. N. Sathyanarayana, Introduction to Magnetic Resonance Spectroscopy ESR, NMR, NQR, I. K. International Publishing House Pvt. Ltd., 2<sup>nd</sup> Edition, 2013.

#### OER:

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P-03, P-07, P-11 & P-15)
2. <https://nptel.ac.in/course.html>
3. <https://www.khanacademy.org/science/chemistry>

## SEMESTER II

### PICHD20 - IEP - WATER CHEMISTRY

<b>Year:</b> I <b>SEM:</b> II	<b>Course Code</b> PICHD20	<b>Title of the Course</b> Water Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W</b> Own Pace	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

- To gain a thorough knowledge on the properties of water, water quality monitoring methods and water pollutants.
- To understand the various waste water treatment methods.

#### Course Outcomes:

The Learners will be able to

1. Explain the physical and chemical properties of water.
2. Describe the instruments used for water quality monitoring.
3. Examine the physical, chemical and biological pollutants in water.
4. Demonstrate the treatment methods used for recycling of waste water.
5. Explain the policies and laws related to water in Indian constitution.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

H-High (3), M-Moderate (2), L-Low (1)

#### Unit I

- 1.1 Elements, radicals, and compounds. (K1 & K2)
- 1.2 Potable drinking water. (K1 & K2)
- 1.3 Sources of water - hardness, definition, types of hardness - temporary & permanent. (K1 & K2)

- 1.4 Chemical water analysis - hydrogen ion concentration and pH, gas solubility. (K1, K2, K3 & K4)
- 1.5 Alkalinity - colloids & coagulation. (K1, K2, K3 & K4)
- 1.6 Organic compounds - organic matter in waste water. (K1 & K2)

## **Unit II**

- 2.1 Boiler feed water - requirements - formation of deposits in steam boilers and heat exchangers. (K1, K2 & K3)
- 2.2 Disadvantages - wastage of fuels, decrease in efficiency and boiler explosion. (K1, K2 & K3)
- 2.3 Water softening methods - external treatment - ion-exchange method, activated charcoal method & zeolite method. (K1, K2 & K3)
- 2.4 Internal treatment - boiler compounds (phosphate, calgon, carbonate, colloidal methods) - caustic embrittlement. (K1, K2 & K3)
- 2.5 Water quality monitoring instruments - types of water quality instruments - pH meter, conductivity meter, DO meter, turbidity meter, BOD incubator, COD meter. (K1, K2 & K3)
- 2.6 Nephelometer - turbidity, GC - volatile organics, AAS - metal pollutants. (K1, K2 & K3)

## **Unit III**

- 3.1 Water pollution: Physical examination of water - colour, conductivity, temperature, odour, taste, turbidity & hardness. (K1, K2 & K3)
- 3.2 Chemical characterization of water - calcium, magnesium, sodium, potassium, chlorine, sulphate, carbonates, bicarbonates, and solids. (K1, K2 & K3)
- 3.3 Minor elements of water - fluorine, iron, manganese, silica, and nitrogen elements. (K1, K2 & K3)
- 3.4 Biological investigation of water - deoxygenation - dissolved oxygen in water, biological oxygen demand and chemical oxygen demand - algal toxins. (K1, K2, K3 & K4)
- 3.5 Water pollution. (K1 & K2)
- 3.6 Water borne diseases. (K1 & K2)

## **Unit IV**

- 4.1 Introduction - characteristics of waste water - nutrient content and controls - toxicity evaluation. (K1, K2 & K3)
- 4.2 Recovery of aluminium by liquid ion exchangers - removal of iron as its chelated complex with plants. (K1, K2 & K3)
- 4.3 Treatment of waste water for reuse - membrane based filtration - microfiltration, ultra filtration, desalinization of brackish water - reverse osmosis, nanofiltration, electrolysis, electro dialysis and electro oxidation - method, diagram and advantages. Biosensors in water monitoring. (K1, K2, K3 & K4)
- 4.4 Recycle and reuse of treated waste water - recycling and reuse of distillery waste water. (K1, K2 & K3)
- 4.5 Recycling of waste water - status in India - reuse of water. (K1, K2, K3, K4 & K5)
- 4.6 Health guidelines before reuse of waste water - health protection - recycled water - use in metropolitan cities. (K1, K2, K3, K4 & K5)

## Unit V

- 5.1 Water and the Constitution of India. (K1, K2 & K3)
- 5.2 Inter-state Water Disputes Act-1956 - difficulties and solution. The Cauvery Water Dispute. . (K1, K2 & K3)
- 5.3 The story of the National Water Policy-1987. (K1, K2, K3 & K4)
- 5.4 The Water Prevention and Control of Pollution Act-2003 and the National Water Policy-2012. (K1, K2, K3 & K4)
- 5.5 National Rain-fed Authority, Inland Waterways Authority of India, Central Ground Water Authority, Central Pollution Control Board. (K1, K2, K3, K4 & K5)
- 5.6 National Water Resources Council, Integrated Watershed Management Programme, National Rural Drinking Water Programme. (K1, K2, K3, K4, K5 & K6)

### Reference Books:

1. S. M. Khopkar, Environmental pollution monitoring and control, New age International Publishers, Second Edition, 2015.
2. N. F. Gray, Water Technology - An Introduction for Environmental Scientists and Engineers, Butterworth – Heinemann An imprint of Elsevier, Second Edition, 2006.
3. Mark J. Hammer, Mark J. Hammer Jr, Water and waste water Technology, Asoke K Ghosh Publishers, Third Edition, 2000.
4. Ramaswamy R. Iyer, Water, Perspectives, Issues, Concerns, Sage publications, 2008.
5. Jain & Jain, Engineering Chemistry, Dhanpat Rai Publishing Company, 17<sup>th</sup> Edition, 2015.
6. B. K. Sharma, Engineering Chemistry, Krishna's Educational Publishers, 2014.
7. A. Ravikrishnan, Engineering Chemistry, Sri Krishna Hitech Publishing Company Pvt. Ltd., 2017.

### OER:

1. <http://cwc.gov.in/sites/default/files/constitutional-provisions-and-central-water-laws.pdf> (Provisions and laws)
2. <http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=14> (Prevention and control of pollution act)
3. <http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (Water quality standards)

**SEMESTER III**  
**PCCHJ20 - SYNTHETIC ORGANIC CHEMISTRY**

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code</b> PCCHJ20	<b>Title of the Course</b> Synthetic Organic Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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**Learning Objectives:**

- To understand the importance of different organic reagents in organic synthesis.
- To get exposed to the mechanisms of retro synthesis and their applications.
- To learn methods of asymmetric synthesis and resolution, transition metal catalyzed reactions, chemoselectivity, regioselectivity, stereoselectivity and diastereoselectivity.

**Course Outcomes:**

The Learners will be able to

1. Analyze and evaluate the concepts of retrosynthesis, disconnection approach and protection of common functional groups and apply them in synthesizing target molecules.
2. Evaluate the methods of asymmetric synthesis and resolution.
3. Analyze the preparation and uses of selected organic reagents.
4. Evaluate the role of PTC in organic synthesis.
5. Appraise the role of transition metals in selected named reactions and plan chemo selective, regioselective and stereoselective named reactions.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	H
CO2	H	M	L	H	H	H
CO3	H	M	L	H	H	H
CO4	H	M	L	H	H	H
CO5	H	M	L	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L- Low (1)**

**Unit I****(12 Hours)**

- 1.1 Retrosynthesis, disconnection approach, synthons, linear and convergent synthesis. (K1, K2, K3, K4, K5 & K6)
- 1.2 One group C-X disconnection and two group C-X disconnection. (K1, K2, K3, K4, K5 & K6)
- 1.3 Umpolung of reactivity, protection of functional groups (hydroxyl, amino, carbonyl and carboxyl groups). (K1, K2, K3, K4, K5 & K6)
- 1.4 Synthesis of target molecules based on disconnection and synthon approach - aspirin, 3-methyl-1-pentene, methyl-3-phenyl butanoate. (K1, K2, K3, K4, K5 & K6)
- 1.5 Synthesis of target molecules based on disconnection and synthon approach - cis-1-isopropyl-2-benzyl ethylene and 2,6-dibromoaniline. (K1, K2, K3, K4, K5 & K6)
- 1.6 Synthesis of target molecules based on disconnection and synthon approach - reserpine, saccharine, paracetamol, morpholine. (K1, K2, K3, K4, K5 & K6)

**Unit II****(12 Hours)**

- 2.1 Prostereoisomerism - prochirality, topicity of ligands and faces - homotopic. (K1, K2, K3, K4 & K5)
- 2.2 Heterotopic and enantiotopic ligands. (K1, K2, K3, K4 & K5)
- 2.3 Asymmetric synthesis, chiral auxiliaries, methods of asymmetric induction, substrate, reagent, and catalyst-controlled reactions - examples. (K1, K2, K3, K4 & K5)
- 2.4 Determination of enantiomeric and diastereomeric excess. (K1, K2, K3, K4 & K5)
- 2.5 Methods of resolution - mechanical separation, formation of diastereomers. (K1, K2, K3, K4 & K5)
- 2.6 Methods of resolution - chromatography and biochemical transformation. (K1, K2, K3, K4 & K5)

**Unit III****(12 Hours)**

- 3.1 Organolithium compounds - preparation, reactions and uses (resemblance with Grignard reagent, difference from Grignard reagent). (K1, K2, K3, K4, K5 & K6)
- 3.2 Organosilanes - synthetic applications of trimethyl silyl iodide, trimethyl silyl chloride, trimethyl silyl cyanide and trimethyl silyl triflate. (K1, K2, K3, K4, K5 & K6)
- 3.3 Uses of the following reagents - DCC, 1,3-dithiane (Umpolung), Lithium diisopropylamide (LDA). (K1, K2, K3, K4, K5 & K6)
- 3.4 Uses of the following reagents - Diisobutylaluminium hydride (DIBAL), 9-borabicyclo[3.3.1]nonane (9BBN), Gilman's reagent. (K1, K2, K3, K4, K5 & K6)
- 3.5 Preparation and uses of phosphorous ylides. (K1, K2, K3, K4, K5 & K6)
- 3.6 Preparation and uses of nitrogen and sulphur ylides. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(12 Hours)**

- 4.1 Principles and synthetic process involving phase transfer catalysis - nitriles from alkyl halides, benzoyl cyanides from benzoyl chlorides. (K1, K2, K3, K4 & K5)
- 4.2 Preparation of alkyl fluorides from alkyl halides, alcohols from alkyl halides using PTC. (K1, K2, K3, K4 & K5)
- 4.3 Preparation of azides from alkyl halides, sodium alkyl sulphonates from alkyl halides using PTC. (K1, K2, K3, K4 & K5)
- 4.4 Preparation of alkyl nitrates, thiocyanates, cyanates and p-toluenesulphonates from alkyl halides using PTC. (K1, K2, K3, K4 & K5)

4.5 Preparation of aryl ethers and thioethers, esterification using PTC. (K1, K2, K3, K4 & K5)

4.6 Diazotransfer by phase transfer catalyst, dihalocarbenes. (K1, K2, K3, K4 & K5)

#### **Unit V**

**(12 Hours)**

5.1 Transition metal catalyzed reactions - reaction and mechanism of Heck reaction and Suzuki cross coupling reaction. (K1, K2, K3, K4, K5 & K6)

5.2 Reaction and mechanism of carboxymethylation, hydro formylation and epoxide-allylic alcohol rearrangement. (K1, K2, K3, K4, K5 & K6)

5.3 Chemoselectivity - reduction and oxidation - examples, calculation. (K1, K2, K3, K4, K5 & K6)

5.4 Regioselectivity - Birch reduction. (K1, K2, K3, K4, K5 & K6)

5.5 Stereoselectivity - stereoselective Claisen reaction. (K1, K2, K3, K4, K5 & K6)

5.6 Diastereoselective reaction - hydroboration (formation of an alcohol). (K1, K2, K3, K4, K5 & K6)

#### **Reference Books:**

1. Stuart Warren, Organic Synthesis: The Disconnection Approach, Wiley Student Edition, Reprint 2007.
2. Puneet Karnad, Organic Synthesis, RBSA Publishers, 2007.
3. V. K. Ahluwalia, Organic Synthesis: Special Techniques, Narosa Publishing House, 2<sup>nd</sup> Edition, 2005.
4. S. N. Sanyal., Reactions, Rearrangements and reagents, Bharati Bhawan, Reprint 2003.
5. P. S. Kalsi, Stereo Chemistry, Conformations and Mechanisms, New Age International Pvt. Ltd., 10<sup>th</sup> Edition, 2019.
6. P. S. Kalsi, Organic Reactions and Their Mechanisms, New Age International Ltd., Reprint, 2017.
7. S. M. Mukherji and S. P. Singh, Organic Reaction Mechanism, Trinity Press, Revised Edition, 2017.
8. O. P. Agarwal, Organic Chemistry, Reactions and Reagents, 55<sup>th</sup> Edition, GOEL Publishing House, 2017.
9. W. Carruthers, Some Modern Methods of Organic Synthesis, Cambridge University Press, 4<sup>th</sup> Edition, Reprint 2004.
10. Jonathan Clayden, Nick Greeves and Stuart Warren, Organic Chemistry, Oxford University Press, 2<sup>nd</sup> Edition, 2012.
11. Francis A. Carey and Richard J, Advanced Organic Chemistry, Part B - Sundberg, 4<sup>th</sup> Edition, Reprint 2001.
12. J. March, Advanced Organic Chemistry, Wiley Inter Science, 4<sup>th</sup> Edition, Reprint 2001
13. R. K. Mackie and D. M. Smith, Guide book to Organic Synthesis, Longman Publication, Reprint 1990.
14. R. O. C. Norman, Principles of Organic Synthesis, Chapman and Hall, London, 2<sup>nd</sup> Edition, Reprint 1980.
15. E. S. Gould, Structure and Mechanism, Copyright, 1959.

**OER:**

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P014-Retrosynthesis, disconnection approach)
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P01-Prochirality, asymmetric synthesis)
3. Infowledge - <https://www.youtube.com/watch?v=sJnqi3bQlXw> (Topicity problems)
4. Infowledge - <https://www.youtube.com/watch?v=0gJdVbCqf8o>(Regioselectiveand chemoselective reactions)
5. Infowledge - <https://www.youtube.com/watch?v=u3PCt-MNTfo>(Stereoselective reactions)
6. Infowledge - <https://www.youtube.com/watch?v=JLFdKFMit0Y> (Enantioselective and diastereoselective reactions)

## SEMESTER III

### PCCHK20 - MOLECULAR SPECTROSCOPY

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code</b> PCCHK20	<b>Title of the Course</b> Molecular Spectroscopy	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To understand the concepts of spectral techniques and to apply these techniques for the quantitative and structural analysis of organic and inorganic compounds.
- To work out combined spectroscopic problems.

#### Course Outcomes:

The Learners will be able to

- Apply Ultraviolet spectroscopy for the identification of organic compounds and inorganic complexes, and to interpret the IR spectra of organic compounds and inorganic complexes.
- Discuss the different ionization techniques involved in Mass spectroscopy, principle of GC-MS and its advantages over MS, and to elucidate the molecular formulae and structures of unknown compounds using Mass spectroscopy.
- Analyze the splitting pattern in the  $^1\text{H}$ ,  $^{13}\text{C}$ ,  $^{19}\text{F}$  and  $^{31}\text{P}$  NMR spectra for structural determination. Discuss the principle, instrumentation and applications of Mossbauer spectroscopy and analyze the Mossbauer spectra of iron and tin compounds.
- Explain hyper fine splitting in EPR and interpret EPR spectra of simple radicals and complexes, and to explain the electronic spectra for chemical analysis.
- Elaborate on the concepts and theories of microwave, IR, rotational and vibrational Raman, and electronic spectroscopy.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Ultra violet spectroscopy - Woodward-Fieser rules for conjugated dienes, polyenes and alpha, beta unsaturated carbonyl compounds. The effect of steric hindrance to coplanarity - charge transfer spectral absorption. (K1, K2, K3, K4, K5 & K6)
- 1.2 Transitions in transition metal complexes - selection rules for electronic transitions - band widths - nature of electronic transitions in complexes. Auxochrome - types - chromophore concept - types. (K1, K2, K3, K4, K5 & K6)
- 1.3 Applications of UV Spectroscopy. (K1, K2, K3, K4, K5 & K6)
- 1.4 Applications of IR spectroscopy to identify alkane, alkene, alkyne, aromatic compounds, nitrile and aromatic residues. Identification of alcohols, ethers, phenols, amines and carbonyl compounds such as ketones, aldehydes, esters, amides, acids, hetero aromatic compounds, halogen compounds, sulphur compounds, thiocyanates and isothiocyanates, amino acids and amines. (K1, K2, K3, K4, K5 & K6)
- 1.5 Metal-ligand stretching vibrations for metal carbonyls, sulphates, thiocyanides, nitro and nitrito complexes. (K1, K2, K3, K4, K5 & K6)
- 1.6 Applications of IR Spectroscopy - quantitative analysis, qualitative analysis, coordination compounds, hydrogen bonding studies, calculation of force constants and determination of aromaticity. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Mass spectroscopy - ionization techniques such as chemical ionization, electron ionization - ESI, FD, FAB, SIMS and MALDI. (K1, K2, K3, K4 & K5)
- 2.2 Molecular ions, isotope ions, meta-stable peak, secondary ion mass spectroscopy. nitrogen rule and ring rule, fragment ions of odd and even electron types. (K1, K2, K3, K4 & K5)
- 2.3 Rearrangement ions - cleavage patterns - simple and multi center fragmentation. (K1, K2, K3, K4 & K5)
- 2.4 Applications of mass spectra to elucidate molecular formula and structure. (K1, K2, K3, K4 & K5)
- 2.5 McLafferty rearrangement - interpretation of fragmentation pattern of phenols, aldehydes, lactones, nitro compounds, esters, acetals and ketals, hetero aromatic compounds, and sulphides. (K1, K2, K3, K4 & K5)
- 2.6 Introduction to GC-MS and its advantages over MS. (K1, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1 NMR spectroscopy - introduction - nuclear spin - Larmor frequency, precessional frequency - relaxation process - chemical shift - shielding constants - ring current and aromaticity - shifts for  $^1\text{H}$  and  $^{13}\text{C}$ . (K1, K2, K3, K4, K5 & K6)
- 3.2 Spin-spin interaction - nuclear magnetic double resonance - Nuclear Overhauser Effect (NOE). (K1, K2, K3, K4, K5 & K6)
- 3.3 Applications of  $^1\text{H}$ NMR,  $^{13}\text{C}$ NMR,  $^{31}\text{P}$ NMR ( $\text{HPF}_2$ ,  $\text{H}_3\text{PO}_2$ ,  $\text{H}_3\text{PO}_3$ ,  $\text{H}_3\text{PO}_4$  and  $\text{P}_4\text{S}_3$ ),  $^{19}\text{F}$ NMR ( $\text{ClF}_3$ ,  $\text{ClF}_5$ ,  $\text{SF}_4$  and  $\text{BrF}_5$ ) and their applications to inorganic systems. (K1, K2, K3, K4, K5 & K6)
- 3.4 Mossbauer spectroscopy - Mossbauer effect - recoilless emission and absorption, Doppler effect, hyperfine interaction - chemical isomer shift, quadrupole interaction, and magnetic splitting. (K1, K2, K3, K4, K5 & K6)
- 3.5 Instrumentation - selection of suitable source, limitations. (K1, K2, K3, K4, K5 & K6)

3.6 Interpretation of spectra - bonding and structures of  $\text{Fe}^{2+}$  and  $\text{Fe}^{3+}$  compounds,  $\text{Sn}^{2+}$  and  $\text{Sn}^{4+}$  compounds and detection of oxidation states and in-equivalent MB atoms, applications of Mossbauer spectroscopy. (K1, K2, K3, K4, K5 & K6)

**Unit IV** **(15 Hours)**

4.1 ESR - principle, origin of an EPR signal, derivative spectra, g value - factors affecting the magnitude of g values, anisotropy, hyperfine splitting - hyperfine coupling constant, relative intensities of EPR signals. (K1, K2, K3, K4 & K5)

4.2 Interpretation of the spectra of simple carbon centered free radicals, hyperfine splitting in Cu and Mn compounds, zero field splitting and Kramer's degeneracy. (K1, K2, K3, K4 & K5)

4.3 Electron delocalization - Mc Connell's equation, line width in solid state EPR, applications of ESR. (K1, K2, K3, K4 & K5)

4.4 Photoelectron spectroscopy - photo electric effect, UV and X-ray PES, Koopmans' theorem, fine structure in PES. (K1, K2, K3, K4 & K5)

4.5 Interpretation of photo electron spectra of  $\text{H}_2$ ,  $\text{N}_2$ ,  $\text{O}_2$ , CO, NO,  $\text{N}_2\text{O}$ ,  $\text{H}_2\text{O}$ , azide, HCl and  $\text{NH}_3$ . (K1, K2, K3, K4 & K5)

4.6 Electron Spectroscopy for Chemical Analysis - applications of ESCA. (K1, K2, K3, K4 & K5)

**Unit V** **(15 Hours)**

5.1 Rotational spectroscopy: Classification of molecules, molecular energy levels, the rigid rotator, selection rules, intensity of spectral lines, effect of isotopic substitution. (K1, K2, K3, K4, K5 & K6)

5.2 Non rigid rotator, microwave spectra of polyatomic molecules. (K1, K2, K3, K4, K5 & K6)

5.3 Vibrational spectroscopy: Vibrational energy of diatomic molecules, simple harmonic oscillator, selection rules, zero-point energy, force constant and bond strength. (K1, K2, K3, K4, K5 & K6)

5.4 Anharmonicity, Morse potential energy diagram, Franck Condon principle, the diatomic vibrating rotator, P, Q, R, branches, the vibration-rotation spectrum of CO. (K1, K2, K3, K4, K5 & K6)

5.5 Breakdown of Born-Oppenheimer approximation, vibrations of polyatomic molecules, normal modes of vibration, overtones, hot bands, Fermi resonance. (K1, K2, K3, K4, K5 & K6)

5.6 Raman: Classical and quantum theories of Raman effect, pure rotational, vibrational and vibrational-rotational Raman spectra, selection rules, stokes and anti-stokes lines, mutual exclusion principle. (K1, K2, K3, K4, K5 & K6)

Combined spectroscopic problems (organic and inorganic compounds)

**Reference Books:**

1. J. Dyer, Application of Absorption Spectroscopy of Organic Compounds, Prentice Hall of India Pvt. Ltd., New Delhi, 2005.
2. R. M. Silverstein, G. D. Bassler and Monson, Spectrometric Identification of Organic Compounds, John Wiley and Sons, New York, 6<sup>th</sup> Edition, 2005.
3. I. L. Finar, Organic Chemistry, Vol. II, ELBS Publication, 5<sup>th</sup> Edition, 2005.
4. P. S. Kalsi, Spectroscopy of Organic Compounds, New Age International (P) Limited, 6<sup>th</sup> Edition, 2007.

5. B. K. Sharma, Spectroscopy, Goel Publishing House, Delhi, 2019.
6. Dr. H. Kaur, Spectroscopy, Pragati Prakashan, Meerut, 14<sup>th</sup> Edition, 2018.
7. William Kemp, Organic Spectroscopy, Palgrave Publishers Ltd, New York, Reprint 2017.
8. L. D. S. Yadav, Organic Spectroscopy, Kluwer Academic Publishers, 2005.
9. Donald L. Pavia, Gary M. Lampman, George S. Kriz, James R. Vyvyan, Introduction to Spectroscopy, Brooks/Cole, Cengage Learning, 2009.
10. Y. R. Sharma, Elementary Organic Spectroscopy: Principles and Chemical Applications, S. Chand & Company Pvt. Ltd., 2013.
11. E. A. V. Ebsworth, D. W. H. Rankin and S. Cradock, Structural Methods in Inorganic Chemistry, Blackwell Scientific Publishers, 1986.
12. R. S. Drago, Physical Methods in Inorganic Chemistry, Wiley Eastern Company, 3<sup>rd</sup> Edition, 1972.
13. G. R. Chatwal and S. K. Anand, Spectroscopy: Atomic and Molecular, Himalaya Publishing House, 2016.
14. C. N. Banwell and E. M. McCash, Fundamentals of Molecular Spectroscopy, Tata McGraw-Hill, 4<sup>th</sup> Edition, 2017.
15. D. N. Sathyanarayana, Vibrational Spectroscopy: Theory and Applications, New Age International Publishers, 2015.
16. K. V. Raman, R. Gopalan, P. S. Raghavan, Molecular Spectroscopy, Thomson Publication, Copyright 2004.
17. G. Aruldas, Molecular Structure and Spectroscopy, PHI Learning, 2<sup>nd</sup> Edition, 2009.

**OER:**

1. <https://nptel.ac.in/courses/104/106/104106122/> (Introduction to spectroscopy)
2. <http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (Woodward-Fieser rules)
3. <http://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5>  
(Mass-General fragmentation rules)
4. <https://nptel.ac.in/courses/104/106/104106048/> (ESR Spectroscopy)
5. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5>  
(P-08-Physical Spectroscopy)

## SEMESTER III

### PCCHL20 - ELECTRO CHEMISTRY

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code</b> PCCHL20	<b>Title of the Course</b> Electro Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To have an in-depth knowledge on the theory of strong electrolytes.
- To learn the principles and techniques involved in polarography, cyclic voltammetry, amperometric and potentiometric titrations.
- To gain knowledge regarding electrode-electrolytic interface.
- To study the principle and functioning of fuel cells and electrochemical sensors.

#### Course Outcomes:

The Learners will be able to

1. Examine the concepts and theories of strong electrolytes and verify the Debye Huckle Onsager equation.
2. Explain the principle and application of various analytical techniques.
3. Compare the structure of double layers.
4. Examine and predict the kinetics of electrode reaction of single step and multistep and discuss the theories and mechanism of corrosion and passivation.
5. Classify the types of fuel cells and ion selective electrodes.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(12 Hours)**

- 1.1 Activity and activity coefficients, mean ionic activity and mean ionic activity coefficient, concept of ionic strength, related problems. (K1, K2, K3, K4, K5 & K6)
- 1.2 Debye Huckel theory of strong electrolytes - electrolytic conductance - interionic attraction - ionic atmosphere. (K1, K2, K3, K4, K5 & K6)
- 1.3 Determination of activity coefficient by electro chemical method. (K1, K2, K3, K4, K5 & K6)
- 1.4 Derivation of Debye Huckel limiting law, qualitative and quantitative verification. (K1, K2, K3, K4, K5 & K6)
- 1.5 Debye Huckel limiting law at appreciable concentrations of electrolytes. (K1, K2, K3, K4, K5 & K6)
- 1.6 Derivation of Debye Huckel Onsager equation - experimental verification and limitations. (K1, K2, K3, K4, K5 & K6)

**Unit II****(12 Hours)**

- 2.1 Polarography - theory, apparatus, DME, diffusion, kinetic and catalytic currents, current for reversible and irreversible systems, qualitative and quantitative application to inorganic systems. (K1, K2, K3, K4 & K5)
- 2.2 Amperometric titrations - theory, apparatus, types of titration curves, applications. (K1, K2, K3, K4 & K5)
- 2.3 Biamperometric titrations - successive titrations, indicator electrodes, applications. (K1, K2, K3, K4 & K5)
- 2.4 Cyclic Voltammetry - theory, instrumentation, application to inorganic systems. (K1, K2, K3, K4 & K5)
- 2.5 Potentiometry - potentiometric titrations, equivalence point potential for  $\text{Fe}^{2+}/\text{Fe}^{3+}$ - $\text{MnO}_4^-$ ,  $\text{H}^+/\text{Mn}^{2+}$  systems. (K1, K2, K3, K4 & K5)
- 2.6 Potentiometric titrations - determination of concentration of the species at the equivalence point. (K1, K2, K3, K4 & K5)

**Unit III****(12 Hours)**

- 3.1 Electrode-electrolyte interface, adsorption at electrified interface, electrical double layer. (K1, K2, K3, K4, K5 & K6)
- 3.2 Electro capillary phenomenon - Lippmann equation. (K1, K2, K3, K4, K5 & K6)
- 3.3 Structure of double layers - Helmholtz Perrin, Gouy-Chapman, and Stern model of electrical double layers. (K1, K2, K3, K4, K5 & K6)
- 3.4 Diffusion - Fick's law of diffusion - factors affecting Fick's law of diffusion - significance. (K1, K2, K3, K4, K5 & K6)
- 3.5 Membrane potential - current across the biological membrane - axon membrane. (K1, K2, K3, K4, K5 & K6)
- 3.6 Electrokinetic phenomena - electroosmosis, electrophoresis, sedimentation potential and streaming potential. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(12 Hours)**

- 4.1 Over potential - mechanism of the hydrogen and oxygen evolution reaction. Rates of simple electrode reactions - elementary electron - electrode process. (K1, K2, K3, K4 & K5)

- 4.2 Butler-Volmer equation for single step electron transfer reaction, significance of electron exchange current density and symmetry factor. (K1, K2, K3, K4 & K5)
- 4.3 Rates of multistep electrode reactions, Butler-Volmer equation for a multistep reaction, transfer coefficient and its significance. (K1, K2, K3, K4 & K5)
- 4.4 Corrosion of metals - theories of corrosion - types of corrosion - Pourbaix diagram (K1, K2, K3, K4 & K5)
- 4.5 Passivation of metals - Flade Potential - Evan's diagram (K1, K2, K3, K4 & K5)
- 4.6 Electro deposition - principle and applications, electrochemical reactions of technological interest. (K1, K2, K3, K4 & K5)

## Unit V

(12 Hours)

- 5.1 Fuel cells - efficiency, types of fuel cells - alkaline fuel cell, phosphoric acid, high temperature and solid polymer electrolyte. (K1, K2, K3, K4, K5 & K6)
- 5.2 Kinetics of fuel cell, general development of fuel cell technology. (K1, K2, K3, K4, K5 & K6)
- 5.3 Electrochemical sensors - ion selective electrodes - problems with ion selective electrodes. (K1, K2, K3, K4, K5 & K6)
- 5.4 Chemically modified electrodes - gas sensing electrodes. (K1, K2, K3, K4, K5 & K6)
- 5.5 Principle and working of enzyme electrodes. (K1, K2, K3, K4, K5 & K6)
- 5.6 Sensors based on modified metal-oxide-semiconductor field-effect transistors (MOSFET) - wall jet ring disc electrodes (WJRDE). (K1, K2, K3, K4, K5 & K6)

## Reference Books:

1. S. Glasstone, Introduction to Electro Chemistry, Affiliated East West Press, New Delhi, 1960.
2. J. O. M. Bockris and A. K. N. Reddy, Electro Chemistry - Volumes 1 and 2, Plenum, New York, 1977.
3. Willard, Merritt, Dean and Settle, Instrumental Methods of Analysis, CBS Publications, New Delhi, 6<sup>th</sup> Edition, 1986.
4. D. A. Skoog, Principles of Instrumental Methods of Analysis, Saunders College Publication, 3<sup>rd</sup> Edition, 1985.
5. G. D. Christian and J. E. G. Reily, Allegn Becon, Instrumental Analysis, 2<sup>nd</sup> Edition, 1986.
6. M. S. Yadav, Instrumental Methods of Chemical Analysis, Campus Books International, 2006.
7. B. Viswanathan and M. Aulice Scibioh, Fuel Cells: Principles and Applications, Reprint 2009.

## OER:

1. <https://ocw.mit.edu/courses/chemical-engineering/10-626-electrochemical-energy-systems-spring-2014/lecture-notes/>
2. [https://chem.libretexts.org/Bookshelves/Analytical\\_Chemistry/Supplemental\\_Modules\\_\(Analytical\\_Chemistry\)/Analytical\\_Sciences\\_Digital\\_Library/Active\\_Learning/In\\_Class\\_Activities/Electrochemical\\_Methods\\_of\\_Analysis/02\\_Text/7%3A\\_Electrochemical\\_Analytical\\_Methods/7.4%3A\\_Titrimetic\\_Methods\\_of\\_Analysis](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Analytical_Sciences_Digital_Library/Active_Learning/In_Class_Activities/Electrochemical_Methods_of_Analysis/02_Text/7%3A_Electrochemical_Analytical_Methods/7.4%3A_Titrimetic_Methods_of_Analysis)
3. [https://chem.libretexts.org/Bookshelves/Analytical\\_Chemistry/Supplemental\\_Modules\\_\(Analytical\\_Chemistry\)/Analytical\\_Sciences\\_Digital\\_Library/JASDL/Courseware/](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Analytical_Sciences_Digital_Library/JASDL/Courseware/)

Analytical Electrochemistry%3A The Basic Concepts/03 Fundamentals of Electrochemistry/A. Electrochemical Thermodynamics/02 Electrical Double Layer and Charging Current

4. <https://americanhistory.si.edu/fuelcells/index.html>
5. [https://chem.libretexts.org/Bookshelves/Analytical\\_Chemistry/Supplemental Modules \(Analytical Chemistry\)/Analytical Sciences Digital Library/JASDL/Courseware/Analytical Electrochemistry%3A Potentiometry/03 Potentiometric Theory/03 Ion-Selective Electrodes](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Analytical_Sciences_Digital_Library/JASDL/Courseware/Analytical_Electrochemistry%3A_Potentiometry/03_Potentiometric_Theory/03_Ion-Selective_Electrodes)

## SEMESTER III

### PECHE20 - ELECTIVE III A: ANALYTICAL CHEMISTRY

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code</b> PECHE20	<b>Title of the Course</b> Analytical Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Learning Objectives:

- To study in detail the different types of chromatographic techniques and their applications.
- To give an in-depth knowledge on environmental chemistry and its impacts.
- To understand the applications of computers in chemistry.

#### Course Outcomes:

The Learners will be able to

1. Compare different thermal methods of analysis and explain their applications in material science.
2. Elaborate the principle, instrumentations of the Gas, HPLC and SCF chromatographic techniques and their applications.
3. Examine the identification of metal ions using AAS and photo acoustic spectroscopy.
4. Solve simple problems in chemistry using 'C' program.
5. Analyze the importance of Green Chemistry and its impact on the sustainable environment and the quality of water.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	H
CO2	H	M	L	H	H	H
CO3	H	M	L	H	H	H
CO4	H	M	L	H	H	H
CO5	H	M	L	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Thermal Analysis - Thermo Gravimetric Analysis (TGA) - principle, instrumentation, thermogravimetric curves of  $\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$ ,  $\text{MgCr}_2\text{O}_4$ ,  $\text{Hg}_2\text{CrO}_4$ ,  $\text{Ag}_2\text{CrO}_4$ ,  $\text{AgNO}_3$  and  $\text{Cu}(\text{NO}_3)_2$ . (K1, K2, K3, K4, K5 & K6)
- 1.2 Factors affecting TGA, applications of TGA. (K1, K2, K3, K4, K5 & K6)
- 1.3 DTG - principles, comparison of DTG & TGA. (K1, K2, K3, K4, K5 & K6)
- 1.4 Differential Thermal Analysis (DTA) - principle, instrumentation, simultaneous TGA and DTA curves and applications. (K1, K2, K3, K4, K5 & K6)
- 1.5 Differential Scanning Calorimetry (DSC) - principle, instrumentation and applications. (K1, K2, K3, K4, K5 & K6)
- 1.6 Thermometric titrations - principle, instrumentation and applications. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Chromatographic techniques: Gas Chromatography, principle, types, instrumentation with block diagram - carrier gas, sample injection system, column, thermal compartment, detectors, recorder. (K1, K2, K3, K4 & K5)
- 2.2 Applications of GC. ((K1, K2, K3, K4 & K5)
- 2.3 High Pressure Liquid Chromatography (HPLC) - principle, characteristics of HPLC. (K1, K2, K3, K4 & K5)
- 2.4 Instrumentation, applications, comparison of HPLC with GLC. (K1, K2, K3, K4 & K5)
- 2.5 Super Critical Fluid Chromatography (SCFC) - principle, properties, instrumentation. (K1, K2, K3, K4 & K5)
- 2.6 Comparison with other types of chromatography, super critical fluid extraction and applications. (K1, K2, K3, K4 & K5)\

**Unit III****(15 Hours)**

- 3.1 Atomic absorption spectrometry - principle, difference between AAS and AES, measurement of absorption. (K1, K2, K3, K4, K5 & K6)
- 3.2 Instrumentation with block diagram - radiation source, atomization unit, oxidizing agents, flame and non-flame atomizer, burners, monochromators, detectors, and amplifier and readout devices. (K1, K2, K3, K4, K5 & K6)
- 3.3 Interferences in AAS - spectral, chemical, ionization, dissociation of metal compounds, effect of solvent. (K1, K2, K3, K4, K5 & K6)
- 3.4 Differences between atomic absorption and emission methods, advantages and disadvantages of atomic emission spectroscopy, advantages of AAS over flame emission spectroscopy, disadvantages of AAS. (K1, K2, K3, K4, K5 & K6)
- 3.5 Applications of AAS, some typical analysis like determination of metals like Na, K, Ca and Mg in blood serum, lead in petrol, metals in food stuff. (K1, K2, K3, K4, K5 & K6)
- 3.6 Photo acoustic spectroscopy: Principle, instrumentation with block diagram and applications. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Computers in Chemistry - introduction to computers - types of computers, hardware, software, types of software and programming languages - implementation and uses. (K1, K2, K3, K4 & K5)
- 4.2 C-Programming - definition, types of variables with examples, constant - definition, types with examples, C-operators - classification with examples. (K1, K2, K3, K4 & K5)
- 4.3 Input and output functions, control statement, loop, go to statement - functions, arrays and pointers. (K1, K2, K3, K4 & K5)
- 4.4 Calculation of pH, solubility product, calculation of bond energy using Born-Landé equation. (K1, K2, K3, K4 & K5)
- 4.5 Internet: Introduction to internet service providers in India, terms used in internet, www, http, html, TCP/IP band width, dialup service. (K1, K2, K3, K4 & K5)
- 4.6 ISDN and search engines. (K1, K2, K3, K4 & K5)

**Unit V****(15 Hours)**

- 5.1 Environmental chemistry: Water quality standards - BOD, COD, TDS, TSS & TS. (K1, K2, K3, K4, K5 & K6)
- 5.2 Analysis of waste water and its treatment. (K1, K2, K3, K4, K5 & K6)
- 5.3 Salinity of water and its treatment - Reverse Osmosis. (K1, K2, K3, K4, K5 & K6)
- 5.4 Toxic chemicals in environment - toxicity of mercury, lead, chromium, arsenic. (K1, K2, K3, K4, K5 & K6)
- 5.5 Green chemistry - principle, conditions followed in green synthesis. (K1, K2, K3, K4, K5 & K6)
- 5.6 Carbon-carbon bond formation in aldol condensations like silyl enol ethers in aqueous media, solid phase, supercritical water and asymmetric aldol condensation. (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. H. Kaur, Instrumental Methods of Chemical Analysis, Pragati Prakashan, Meerut, 3<sup>rd</sup> Edition, 2010.
2. B. K. Sharma, Instrumental Methods of Chemical Analysis, Krishna Prakashan Media (P) Ltd., 2014.
3. Y. Anjaneyulu, K. Chandrasekhar, Valli Manickam, A Textbook of Analytical Chemistry, Pharma Book Syndicate, Hyderabad, 2019.
4. V. K. Ahluwalia, Strategies for green organic synthesis, Ane Books Pvt. Ltd., New Delhi, 2012.
5. Willard Merritt, Dean Settle, Instrumental Methods of Analysis, CBS Publishers and Distributors, New Delhi, 7<sup>th</sup> Edition, 2018.
6. Skoog, Holler, Nieman, Principles of Instrumental Analysis, Thomson Books, United Kingdom, 5<sup>th</sup> Edition, 2005.
7. Skoog, West, Holler, Rouch, Fundamentals of Analytical Chemistry, Brooks/ Cole Cengage Learning, 9<sup>th</sup> Edition, 2013.
8. Jag Mohan, Organic Analytical Chemistry Theory and Practice, Narosa Publishing House, New Delhi, 2014.
9. A. K. De, Environmental Chemistry, New Age International Publishers, New Delhi, 7<sup>th</sup> Edition, 2010.

10. G. S. Sodhi, Fundamental Concept of Environmental Chemistry, Narosa Publishing House, 3<sup>rd</sup> Edition, New Delhi, 2013.
11. S. S. Dara, A Textbook of Environmental Chemistry and Pollution Control, S. Chand and Company Ltd., New Delhi, 2004.
12. S. M. Khopkar, Basic Concept of Analytical Chemistry, New Age International (P) Ltd. Publishers, New Delhi, 3<sup>rd</sup> Edition, 2008.
13. G. I. David Krupadanan, D. Vijaya Prasad, K. Varaprasad Rao, K. L. N. Reddy, C. Sudhakar, Analytical Chemistry, University Press, Hyderabad, Andhra Pradesh, 2001.
14. K. V. Raman, Computers in Chemistry, Tata McGraw-Hill, New Delhi, 2013.
15. Krishnan Kannan, Environmental Chemistry, Chand and Co. Ltd., 1995.
16. M. S. Yadav, Instrumental Methods of Chemical Analysis, Campus Books International, 2006.
17. A.K. Srivatasava, P.C. Jain, Instrumental Approach to Chemical Analysis, S. Chand & Company, 2010

**OER:**

1. <https://www.americanpharmaceuticalreview.com/Featured-Articles/36776-Thermal-Analysis-A-Review-of-Techniques-and-Applications-in-the-Pharmaceutical-Sciences/>
2. <https://nptel.ac.in/content/storage2/courses/102103044/pdf/mod5.pdf>
3. <https://www.iitk.ac.in/che/pdf/resources/AAS-GTA-reading-material.pdf>
4. <https://www.epa.gov/greenchemistry/basics-green-chemistry>

**SEMESTER III**  
**PECHF20 - ELECTIVE III B: GREEN CHEMISTRY**

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code</b> PECHF20	<b>Title of the Course</b> Green Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Learning Objectives:**

- To understand the goals and principles of green chemistry.
- To explain the green reactions.
- To understand the good laboratory practices and designing of green synthesis.
- To learn selected green preparations.
- To analyze the future trends in green chemistry.

**Course Outcomes:**

The Learners will be able to

1. Explain the goals and progress of green chemistry.
2. Summarize the principle of green chemistry and green reactions.
3. Discuss the good laboratory practices and designing of green synthesis, and to explain the mechanism and applications of certain named reactions and rearrangements.
4. Explain selected green preparations.
5. Analyze the future trends in green chemistry.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	H
CO2	H	M	M	H	H	H
CO3	H	M	M	H	H	H
CO4	H	M	M	H	H	H
CO5	H	M	M	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Green chemistry - definition, need for green chemistry. (K1, K2, K3, K4, K5 & K6)
- 1.2 Goals of green chemistry, the roots of innovation and its limitations. (K1, K2, K3, K4, K5 & K6)
- 1.3 Progress of green chemistry and planning a green synthesis in a chemical laboratory. (K1, K2, K3, K4, K5 & K6)
- 1.4 Percentage atom utilization, atom economy. (K1, K2, K3, K4, K5 & K6)
- 1.5 Evaluating the type and selection of starting materials. (K1, K2, K3, K4, K5 & K6)
- 1.6 Biocatalysts - production of bulk and fine chemicals by microbial fermentation. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Principles of green chemistry - twelve principles of green chemistry. (K1, K2, K3, K4 & K5)
- 2.2 Green reactions – addition and elimination reactions. (K1, K2, K3, K4 & K5)
- 2.3 Green reactions - substitution reactions. (K1, K2, K3, K4 & K5)
- 2.4 Concept of selectivity - chemoselectivity and regioselectivity. (K1, K2, K3, K4 & K5)
- 2.5 Enantioselectivity and diastereoselectivity. (K1, K2, K3, K4 & K5)
- 2.6 Green solvents - definition and uses. (K1, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1 Good laboratory practices - sampling preparation for analysis. (K1, K2, K3, K4, K5 & K6)
- 3.2 Equipment & glass wares - selection, suitability, cleaning and drying. (K1, K2, K3, K4, K5 & K6)
- 3.3 Designing a green synthesis - choice of starting materials (reagents, catalysts, solvents) (K1, K2, K3, K4, K5 & K6)
- 3.4 Mechanism and applications of Barbier and Barton reactions. (K1, K2, K3, K4, K5 & K6)
- 3.5 Mechanism and applications of Cannizzaro reaction. (K1, K2, K3, K4, K5 & K6)
- 3.6 Mechanism and applications of Claisen rearrangement and Baker-Venkataraman rearrangements. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Green preparations - aqueous phase reactions (hydrolysis, iodoform). (K1, K2, K3, K4 & K5)
- 4.2 Solid state reactions (phenyl benzoate). (K1, K2, K3, K4 & K5)
- 4.3 Photochemical reactions (benzopinacol, conversion of trans-stilbene into cis-stilbene). (K1, K2, K3, K4 & K5)
- 4.4 PTC catalyzed reactions (phenyl isocyanide, flavone). (K1, K2, K3, K4 & K5)
- 4.5 Microwave assisted reactions - Hofmann elimination and esterification. (K1, K2, K3, K4 & K5)
- 4.6 Microwave assisted reactions – saponification, preparation of Schiff's bases. (K1, K2, K3, K4 & K5)

## Unit V

(15 Hours)

- 5.1 Future trends in green chemistry - green nanosynthesis (biosynthesis of nanoparticles using plant extracts). (K1, K2, K3, K4, K5 & K6)
- 5.2 Green analytical methods - enzymatic transformation (ethanol, benzoin). (K1, K2, K3, K4, K5 & K6)
- 5.3 Green polymer chemistry - polymer from renewable resources. (K1, K2, K3, K4, K5 & K6)
- 5.4 Redox reagents and green catalysts. (K1, K2, K3, K4, K5 & K6)
- 5.5 Proliferation of solvent-less reactions and biomimetic. (K1, K2, K3, K4, K5 & K6)
- 5.6 Combinational green chemistry, green chemistry in sustainable developments. (K1, K2, K3, K4, K5 & K6)

### Reference Books:

1. V. Kumar, Introduction to Green Chemistry, Vishal Publishing Co., 1<sup>st</sup> Edition, 2007.
2. V. K. Ahluwalia, Green Chemistry, Ane Books India, 1<sup>st</sup> Edition, 2006.
3. V. K. Ahluwalia, Agarwal K., Organic Synthesis: Special Techniques, Narosa Publishing House, 1<sup>st</sup> Edition, 2005.
4. Rashmi Sanghi, M. M. Srivastava, Green Chemistry, Alpha Science, Fourth Reprint, 2009.
5. Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch, Fundamentals of Analytical Chemistry, Cengage Learning, 9<sup>th</sup> Edition, 2013.

### OER:

1. [https://shodhganga.inflibnet.ac.in/bitstream/10603/55041/7/07\\_chapter%201.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/55041/7/07_chapter%201.pdf) (Introduction to green chemistry)
2. <https://www.youtube.com/watch?v=J9SpYVx8H68> (Dr. Paul Anastas - Father of green chemistry)
3. <https://www.youtube.com/watch?v=NycWPUcN4YI> (Dr. Paul Anastas)
4. <https://www.youtube.com/watch?v=v6V22gwqxeY> (Dr. Paul Anastas)

## SEMESTER III

### PICHE20 - IEP - CSIR-NET PREPARATORY COURSE IN ORGANIC CHEMISTRY

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code</b> PICHE20	<b>Title of the Course</b> CSIR-NET Preparatory Course in Organic Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W</b> Own Pace	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objective:

- To apply the theories, concepts, processes and principles of organic chemistry to qualify UGC-CSIR and other competitive examinations.

#### Course Outcomes:

The Learner will be able to

- Evaluate and apply the theories, concepts, processes, and principles of stereochemistry to qualify UGC-CSIR and other competitive examinations.
- Appraise the reaction intermediates and named reactions in organic chemistry to qualify UGC-CSIR and other competitive examinations.
- Examine the organic transformations and asymmetric synthesis to qualify UGC-CSIR and other competitive examinations.
- Evaluate the pericyclic reactions and applications of heterocyclic compounds to qualify UGC-CSIR and other competitive examinations.
- Examine the natural product chemistry to qualify UGC-CSIR and other competitive examinations.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

H-High (3), M-Moderate (2), L-Low (1)

## Unit I

- 1.1 IUPAC nomenclature of organic molecules including regio and stereo isomers. (K1, K2, K3, K4, K5 & K6)
- 1.2 Principles of stereochemistry: Configurational and conformational isomerism in acyclic and cyclic compounds. (K1, K2, K3, K4, K5 & K6)
- 1.3 Stereogenicity, stereoselectivity. (K1, K2, K3, K4, K5 & K6)
- 1.4 Enantioselectivity, diastereoselectivity. (K1, K2, K3, K4, K5 & K6)
- 1.5 Asymmetric induction. (K1, K2, K3, K4, K5 & K6)
- 1.6 Aromaticity: benzenoid and non-benzenoid compounds - generation and reactions. (K1, K2, K3, K4, K5 & K6)

## Unit II

- 2.1 Organic reactive intermediates: Generation, stability and reactivity of carbocations, carbanions, free radicals. (K1, K2, K3, K4, K5 & K6)
- 2.2 Radical anions, radical cations, carbenes, benzyne and nitrenes - generation, stability and reactivity. (K1, K2, K3, K4, K5 & K6)
- 2.3 Organic reaction mechanisms involving addition, elimination and substitution reactions with electrophilic, nucleophilic and radical species. (K1, K2, K3, K4, K5 & K6)
- 2.4 Determination of reaction pathways. (K1, K2, K3, K4, K5 & K6)
- 2.5 Common named reactions (C-C and C=C formation). (K1, K2, K3, K4, K5 & K6)
- 2.6 Rearrangements (anionotropic, cationotropic, intermolecular and intramolecular) - applications in organic synthesis. (K1, K2, K3, K4, K5 & K6)

## Unit III

- 3.1 Organic transformations and reagents: Functional group interconversion including oxidations and reductions. (K1, K2, K3, K4, K5 & K6)
- 3.2 Common catalysts and reagents (organic, inorganic, organometallic and enzymatic). (K1, K2, K3, K4, K5 & K6)
- 3.3 Chemo, regio and stereoselective transformations. (CAN, Grignard reagent, Gilman reagent, PCC, DCC, 9BBN, BBQ and other reagents) (K1, K2, K3, K4, K5 & K6)
- 3.4 Concepts in organic synthesis: Retrosynthesis, disconnection, synthons, linear and convergent synthesis, umpolung of reactivity and protecting groups. (K1, K2, K3, K4, K5 & K6)
- 3.5 Asymmetric synthesis: Chiral auxiliaries, methods of asymmetric induction - substrate, reagent and catalyst-controlled reactions. (K1, K2, K3, K4, K5 & K6)
- 3.6 Determination of enantiomeric and diastereomeric excess, enantio-discrimination. Resolution - optical and kinetic. (K1, K2, K3, K4, K5 & K6)

## Unit IV

- 4.1 Pericyclic reactions - electrocycloaddition, cycloaddition, sigmatropic rearrangements and other related concerted reactions. (K1, K2, K3, K4, K5 & K6)
- 4.2 Principles and applications of photochemical reactions in organic chemistry. (K1, K2, K3, K4, K5 & K6)
- 4.3 Synthesis and reactivity of common heterocyclic compounds containing one or two heteroatoms (O, N, S) - oxirane, azirane. (K1, K2, K3, K4, K5 & K6)
- 4.4 Aziridine, thioepoxides. (K1, K2, K3, K4, K5 & K6)
- 4.5 Pyrrole, furan, thiophene. (K1, K2, K3, K4, K5 & K6)
- 4.6 Pyridine, pyran. (K1, K2, K3, K4, K5 & K6)

## Unit V

- 5.1 Chemistry of natural products - carbohydrates. (K1, K2, K3, K4, K5 & K6)
- 5.2 Proteins and peptides, fatty acids. (K1, K2, K3, K4, K5 & K6)
- 5.3 Nucleic acids, terpenes. (K1, K2, K3, K4, K5 & K6)
- 5.4 Steroids and alkaloids. (K1, K2, K3, K4, K5 & K6)
- 5.5 Biogenesis of terpenoids and alkaloids. (K1, K2, K3, K4, K5 & K6)
- 5.6 Structure determination of organic compounds by IR, UV-Vis,  $^1\text{H}$  and  $^{13}\text{C}$  NMR and Mass spectroscopic techniques. (K1, K2, K3, K4, K5 & K6)

### Reference Books:

1. Stuart Warren, Organic Synthesis: The Disconnection Approach, Wiley Student Edition, Reprint 2007.
2. Puneet Karnad, Organic Synthesis, RBSA Publishers, 2007.
3. V. K. Ahluwalia, Organic Synthesis: Special Techniques, Narosa Publishing House, 2<sup>nd</sup> Edition, 2005.
4. S. N. Sanyal., Reactions, Rearrangements and reagents. Bharati Bhawan, Reprint 2003.
5. P. S. Kalsi, Stereo Chemistry, Conformations and Mechanisms, New Age International Pvt. Ltd., 10<sup>th</sup> Edition, 2019.
6. P. S. Kalsi, Organic Reactions and Their Mechanisms, New Age International Ltd., Reprint, 2017.
7. S. M. Mukherji and S. P. Singh, Organic Reaction Mechanism, Trinity Press, Revised Edition, 2017.
8. O. P. Agarwal, Organic Chemistry, Reactions and Reagents, 55<sup>th</sup> Edition, GOEL Publishing House, 2017.
9. W. Carruthers, Some Modern Methods of Organic Synthesis, Cambridge University Press, 4<sup>th</sup> Edition, Reprint 2004.
10. Jonathan Clayden, Nick Greeves and Stuart Warren, Organic Chemistry, Oxford University Press, 2<sup>nd</sup> Edition, 2012.
11. Francis A. Carey and Richard J, Advanced Organic Chemistry, Part B - Sundberg, 4<sup>th</sup> Edition, Reprint 2001.
12. J. March, Advanced Organic Chemistry, Wiley Inter Science, 4<sup>th</sup> Edition, Reprint 2001.
13. R. K. Mackie and D. M. Smith, Guide book to Organic Synthesis, Longman Publication, Reprint 1990.
14. R. O. C. Norman, Principles of Organic Synthesis, Chapman and Hall, London, 2<sup>nd</sup> Edition, Reprint 1980.
15. E. S. Gould, Structure and Mechanism, Copyright, 1959.

### OER:

1. Infowledge - <https://www.youtube.com/watch?v=CdeBCfkSTJg> (Crams rule - CSIR problems)
2. Infowledge - <https://www.youtube.com/watch?v=3ATGcugIYCo> (Prelogs rule - CSIR problems)
3. [https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5\(P05-Reaction intermediates\)](https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5(P05-Reaction intermediates))
4. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P09-Named reactions)
5. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P014-Retrosynthesis)
6. [https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5\(P01-Asymmetric synthesis\)](https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5(P01-Asymmetric synthesis))

## SEMESTER III

### PICHF20 - IEP - FORENSIC CHEMISTRY

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code</b> PICHF20	<b>Title of the Course</b> Forensic Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W Own Pace</b>	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

- To impart knowledge on the principles and practical applications of various immunochemical and forensic analysis.
- To understand and perform forensic analysis using physical, biochemical and instrumental methods of analysis.

#### Course Outcomes:

The Learners will be able to

1. Explain the need, scope, and functions of forensic science.
2. Discuss the mode of action and chemical properties of poisons.
3. Explain the isolation, sample preparation and identification of forensic samples.
4. Outline the qualitative and quantitative determination of forensic samples by analytical methods.
5. Demonstrate the process of lie detection and fingerprint detection.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

#### Unit I

- 1.1 History of development of forensic science in India. (K1, K2 & K3)
- 1.2 Historical aspects of forensic science. (K1, K2 & K3)
- 1.3 Definitions and concepts of forensic science. (K1, K2, K3 & K4)
- 1.4 Functions of forensic science. (K1, K2 & K3)
- 1.5 Scope of forensic science. (K1, K2 & K3)

1.6 Need of Forensic Frye Case and Daubert Standard. (K1 & K2)

## **Unit II**

2.1 Forensic toxicology - classification of poisons on the basis of physical states. (K1, K2 & K3)

2.2 Corrosive, analgesic, irritant, hypnotic, tranquilizer - mode of action and chemical properties with examples for each type. (K1 & K2)

2.3 Narcotic, stimulants, paralytic, antihistamine - mode of action and chemical properties with examples for each type. (K1 & K2)

2.4 Domestic food poisoning - mode of action and chemical properties with examples for each type. (K1, K2 & K3)

2.5 Industrial food poisoning - mode of action and chemical properties with examples for each type. (K1, K2 & K3)

2.6 Study of common poisons - signs and symptoms of As, Pb, Hg, and cyanide poisoning. (K1, K2 & K3)

## **Unit III**

3.1 Analytical chemistry in forensic science. (K1, K2 & K3)

3.2 Analysis of biological stains and materials including blood, semen and saliva (qualitative and quantitative). (K1 & K2)

3.3 Isolation, sample preparation, identification and determination of narcotics - heroin, morphine and cocaine. (K1, K2 & K3)

3.4 Isolation, sample preparation, identification and determination of stimulants - amphetamines and caffeine. (K1 & K2)

3.5 Isolation, sample preparation, identification and determination of depressants - benzodiazepines, barbiturates and mandrax. (K1 & K2)

3.6 Isolation, sample preparation, identification, and determination of hallucinogens - LSD and cannabis. (K1 & K2)

## **Unit IV**

4.1 Physical and chemical methods of analysis in forensic science. (K1, K2 & K3)

4.2 Basic principles of non-destructive testing probes including radiography, Xeroradiography. (K1, K2 & K3)

4.3 Basic principles of surface penetration methods (SEM and Laser probes). (K1, K2 & K3)

4.4 Lie detection - introduction, process, merits and demerits. (K1, K2 & K3)

4.5 Chemical analysis of forensic samples - atomic absorption spectroscopy, GC-MS. (K1, K2 & K3)

4.6 Chemical analysis of forensic samples - FT-IR, UV-Visible spectroscopy. (K1, K2 & K3)

## **Unit V**

5.1 Fingerprints - definition, characteristics of fingerprints. (K1 & K2)

5.2 Classification of fingerprints - plain and rolled. (K1, K2 & K3)

5.3 Chemical methods of developing fingerprints, biological basis of fingerprints, formation of ridges. (K1, K2 & K3)

5.4 Application of light source in fingerprint detection. (K1 & K2)

5.5 Latent fingerprints detection by physical methods. (K1 & K2)

5.6 Latent fingerprints detection by chemical methods. (K1 & K2)

**References Books:**

1. B. B. Nanda and R. K. Tiwari, Forensic Science in India: A vision for 21<sup>st</sup> Century, Select Publishers, New Delhi, 2001.
2. S. H. James and J. J. Nordby, Forensic Science: An introduction to Scientific and Investigative techniques, CRC Press, Boca Raton, 2<sup>nd</sup> Edition, 2005.
3. JaVed I. Khan, Thomas J. Kennedy, Donnell R. Christian, Jr., Basic Principles of Forensic Chemistry, Humana Press, 2014, ISBN-13: 978-1627038928.
4. A Lucas, Forensic Chemistry, Forgotten Books, 2017, ISBN-13: 978-1330672037.
5. Udai Arvind, Textbook of forensic Chemistry, Centrum Press, 2014, ISBN13: 978-9350843031.

**OER:**

1. <https://www.britannica.com/science/crime-laboratory> (Lie Detection)
2. <https://www.compoundchem.com/2016/07/26/fingerprints/>
3. <http://www.forensicssciencesimplified.org/drugs/principles.html>

## SEMESTER III

### PICHG20 - IEP - RESEARCH METHODOLOGY

<b>Year:</b> II <b>SEM:</b> III	<b>Course Code</b> PICHG20	<b>Title of the Course</b> Research Methodology	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W Own Pace</b>	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

- To introduce the purpose and importance of research.
- To gain information about the various sources of literature.
- To learn the scientific method of collecting data and to compute statistical parameters to arrive at meaningful conclusions.
- To emphasize the importance of ethics in research and chemical safety.

#### Course Outcomes:

The Learners will be able to

1. Define research and its objectives, illustrate hypothesis testing, and draw the research plan.
2. Carry out literature search offline and online to fix the research problem and illustrate the importance of IF, SCI, h index and i-index.
3. Apply statistical analysis in research methodology.
4. Describe the general format of thesis writing and the research ethics to be followed.
5. Illustrate the safety measures to be taken in handling toxic, inflammable and explosive chemicals.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

## **Unit I**

- 1.1 Scope of research - research methodology - definition of research, purpose of research. (K1, K2 & K3)
- 1.2 Types of research - descriptive vs analytical, applied vs fundamental, quantitative vs qualitative, conceptual vs empirical and other types of research. (K1, K2 & K3)
- 1.3 Research design - planning of research, selection of a problem for research. (K1, K2, K3 & K4)
- 1.4 Research process - steps involved. (K1, K2 & K3)
- 1.5 Problems and hypothesis in research - identification of problems, sources, factors influencing selection of problems. (K1, K2, K3 & K4)
- 1.6 Development and testing of hypothesis. (K1, K2, K3 & K4)

## **Unit II**

- 2.1 Literature search techniques - sources of information, need for reviewing literature. (K1, K2 & K3)
- 2.2 Primary, secondary and tertiary sources - journals, E-journals, journal access, journal abbreviations, chemical abstracts, Beilstein, reviews, monographs, dictionaries, text books. (K1, K2 & K3)
- 2.3 UGC infonet, E-resources. (K1, K2, K3 & K4)
- 2.4 Search engines - Google scholar, chemical industry, Wiki-databases, chemSpider, Science Direct, SciFinder, Scopus, SPN, Reaxys, orbit.com, Thompson innovations. (K1, K2, K3 & K4)
- 2.5 Indices - subject index, substance index, author index, formula index and other indices with examples, searches through structure, knowledge of national and international journals. (K1, K2, K3 & K4)
- 2.6 Impact Factor, Citation-Index, h Index, I-index, SCI Journals. (K1, K2, K3 & K4)

## **Unit III**

- 3.1 Data Analysis - errors in chemical analysis, types of errors, precision and accuracy. (K1, K2, K3 & K4)
- 3.2 Significant figures, measures of central tendency - arithmetic mean, median, mode. (K1, K2, K3 & K4)
- 3.3 Methods of dispersion - standard deviation, co-efficient of variation (discrete series and continuous series). (K1, K2, K3 & K4)
- 3.4 Comparison of results - t- test, F- test and chi square test. (K1, K2, K3 & K4)
- 3.5 Correlation - coefficient of correlation, linear regression - coefficient of regression. (K1, K2, K3 & K4)
- 3.6 Multiple linear regression. (K1, K2, K3 & K4)

## **Unit IV**

- 4.1 Writing a thesis: The general format - page and chapter format - the use of quotations - footnotes and figures - referencing - appendices - references. (K1, K2 & K3)
- 4.2 Research Ethics - academic honesty, intellectual ownership - copy right, royalty. (K1, K2 & K3)
- 4.3 Intellectual property rights and patent law. (K1, K2 & K3)
- 4.4 Plagiarism - responsibility, reproduction of published material and accountability of the researcher, situation that raises ethical issues, freedom and privacy from coercion. (K1, K2 & K3)
- 4.5 Ethics in relation to other people, role of research participant. (K1, K2 & K3)

4.6 Software for detecting plagiarism. (K1, K2 & K3)

## Unit V

5.1 Concepts of chemical safety: Chemical safety and ethical handling of chemicals. (K1, K2, K3 & K4)

5.2 Safe working procedure and protective environment. (K1, K2, K3 & K4)

5.3 Emergency procedure and first aid, laboratory ventilation, safe storage and handling of hazardous chemical. (K1, K2, K3 & K4)

5.4 Procedure for working with substances that pose hazards, flammable or explosive hazards. (K1, K2, K3 & K4)

5.5 Procedures for working with gases at pressures above or below atmosphere. (K1, K2, K3 & K4)

5.6 Safe storage and disposal of waste chemicals, recovery, recycling and reuse of laboratory chemicals. (K1, K2, K3 & K4)

## Reference Books:

1. Anderson, Thesis and Assignment Writing, Wiley Eastern Ltd., 1<sup>st</sup> Edition, Eighth Reprint 1987.
2. C. R. Kothari, Research Methodology, Wiley Eastern Ltd., Fourth Reprint 1989.
3. R. P. Misra, Research Methodology, Concept Publishing Company, New Delhi, 2002.
4. R. Gopalan, Thesis Writing, Vijay Nicole Imprints Private Limited, 2005.
5. P. Ramadass and A. Wilson Aruni, Research and Writing: Across the Disciplines, MJP Publishers, 2009.
6. N. Gurumani, Scientific Thesis Writing and Paper Presentation, MJP Publishers, Chennai, 2010.
7. S. C. Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi, 1999.
8. G. W. Snedecor and W. G. Cochrans, Statistical Methods, Iowa State University Press, 1967.
9. R. Panneerselvam, Research Methodology, Prentice Hall of India Private Ltd., New Delhi, Abridged, 1<sup>st</sup> January 2013.
10. Satarkar, S. V., Intellectual Property Rights and Copyrights, Ess Ess Publications, 2003.
11. Anthony M Graziano and Michael L Rau, Research Methods: A Process of Inquiry, Prentice Hall, 2006.
12. P. Rajammal and P. Devadoss, A Hand Book of Methodology of Research, R. M. M. Vidya Press, 1976.
13. H. F. Ebel, C. Bliefert and W. E. Russey, The Art of Scientific Writing: From Students Reports to Professional Publications in Chemistry and Related Fields, VCH, Weinheim, New York, 1987.

## OER:

1. [https://www.google.com/url?sa=t&source=web&rct=j&url=https://dinus.ac.id/repository/docs/ajar/Kothari\\_-\\_Research\\_Methodology\\_Methods\\_and\\_Techniques\\_-\\_2004.pdf&ved=2ahUKEwiS3M7WsMzrAhWDcn0KHZU7AV8QFjAKegQICBAB&usq=AOvVaw00Lf\\_VgXYG-96PVmSGC0DG](https://www.google.com/url?sa=t&source=web&rct=j&url=https://dinus.ac.id/repository/docs/ajar/Kothari_-_Research_Methodology_Methods_and_Techniques_-_2004.pdf&ved=2ahUKEwiS3M7WsMzrAhWDcn0KHZU7AV8QFjAKegQICBAB&usq=AOvVaw00Lf_VgXYG-96PVmSGC0DG)
2. [http://www.insaindia.res.in/pdf/Ethics\\_Book.pdf](http://www.insaindia.res.in/pdf/Ethics_Book.pdf) - pages 35-43
3. <http://ccc.chem.pitt.edu/wipf/Web/HCH.pdf>

## SEMESTER IV

### PCCHM20 - NATURAL PRODUCTS AND BIOORGANIC CHEMISTRY

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PCCHM20	<b>Title of the Course</b> Natural Products and Bioorganic Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To impart knowledge on amino acids, peptides and proteins.
- To study in detail the chemistry of nucleic acids and enzymes.

#### Course Outcomes:

The Learners will be able to

1. Examine the synthesis and reactions of selected heterocyclic pigments, nucleic acids, vitamins and alkaloids.
2. Evaluate the biosynthesis and metabolism of lipids, cholesterol and hormones.
3. Explain the metabolic pathway of amino acids and proteins and to analyze the structural aspects of proteins.
4. Elaborate the role and metabolism of nucleic acids, genetic code, transcription and translation.
5. Describe the structure and biological role of enzymes ( $\alpha$ -chymotrypsin) and cofactors.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

H-High (3), M-Moderate (2), L-Low (1)

**Unit I****(15 Hours)**

- 1.1 Synthesis and reactions of imidazole, oxazole, thiazole. (K1, K2, K3, K4, K5 & K6)
- 1.2 Pigments - synthesis and reactions of flavones, isoflavones, anthocyanins. (K1, K2, K3, K4, K5 & K6)
- 1.3 Nucleic acids - synthesis and reactions of pyrimidines (cytosine and uracil only) (K1, K2, K3, K4, K5 & K6)
- 1.4 Purines (adenine and guanine only). (K1, K2, K3, K4, K5 & K6)
- 1.5 Vitamins - synthesis of Vitamin A (Reformatsky and Wittig reaction methods only), synthesis of Vitamin B<sub>1</sub> - thiamine. (K1, K2, K3, K4, K5 & K6)
- 1.6 Alkaloids - total synthesis of morphine, quinine and papaverine. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Lipids - classification (K1, K2, K3, K4. & K5)
- 2.2 Chemical properties - saponification, rancidity, oxidation, hydrogenation, dehydration and halogenations reactions - iodine number, saponification number, acetyl number. (K1, K2, K3, K4 & K5)
- 2.3 Synthesis and degradation of neutral lipids - metabolism of lipids - beta oxidation of fatty acids. (K1, K2, K3, K4 & K5)
- 2.4 Biosynthesis of fatty acids. (K1, K2, K3, K4 & K5)
- 2.5 Metabolism of cholesterol, biosynthesis of cholesterol. (K1, K2, K3, K4 & K5)
- 2.6 Biosynthesis of steroid hormones - conversion of cholesterol to progesterone, oestrone and testosterone. (K1, K2, K3, K4, & K5)

**Unit III****(15 Hours)**

- 3.1 Amino acids - metabolism of amino acids - oxidative deamination, transamination reactions and urea cycle. (K1, K2, K3, K4, K5 & K6)
- 3.2 Peptides - synthesis of tripeptide - solid phase peptide synthesis - Merrifield synthesis. (K1, K2, K3, K4, K5 & K6)
- 3.3 Separation and purification of proteins - dialysis, gel filtration and electrophoresis. (K1, K2, K3, K4, K5 & K6)
- 3.4 Structural aspects of proteins - determination of primary structure by end group analysis. (K1, K2, K3, K4, K5 & K6)
- 3.5 Determination of secondary and tertiary structure of proteins by XRD, cryoscopy method and NMR. (K1, K2, K3, K4, K5 & K6)
- 3.6 Biosynthesis of amino acids - phenylalanine, tyrosine and proline only. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Nucleic acids - introduction - types of nucleic acids - structure of nucleosides and nucleotides - DNA and RNA-polynucleotide chain - structural features of DNA and RNA - Watson-Crick Model. (K1, K2, K3, K4 & K5)
- 4.2 Chemical and enzymatic hydrolysis of nucleic acids - DNA sequence determination by chemical and enzymatic methods. (K1, K2, K3, K4 & K5)
- 4.3 DNA metabolism - replication - mechanism - mutation. (K1, K2, K3, K4 & K5)
- 4.4 Transcription - synthesis of RNA and its mechanism. (K1, K2, K3, K4 & K5)
- 4.5 Genetic code - origin and evolution, salient features - Wobble hypothesis. (K1, K2, K3, K4 & K5)
- 4.6 Biosynthesis of proteins (translation). (K1, K2, K3, K4 & K5)

## Unit V

(15 Hours)

- 5.1 Enzyme chemistry - enzyme mechanism of alpha chymotrypsin. (K1, K2, K3, K4, K5 & K6)
- 5.2 Immobilized enzyme technology - enzymes in synthetic organic chemistry. (K1, K2, K3, K4, K5 & K6)
- 5.3 Coenzyme chemistry - prosthetic groups, apo enzymes - structure, biological function and mechanism of reactions catalyzed by coenzyme A and thiamine pyrophosphate. (K1, K2, K3, K4, K5 & K6)
- 5.4 Structure, biological function and mechanism of reactions catalyzed by pyridoxal phosphate and NAD<sup>+</sup>. (K1, K2, K3, K4, K5 & K6)
- 5.5 Structure, biological function and mechanism of reactions catalyzed by NADP and FAD. (K1, K2, K3, K4, K5 & K6)
- 5.6 Structure, biological function and mechanism of reactions catalyzed by lipoic acid and Vitamin B<sub>12</sub> (K1, K2, K3, K4, K5 & K6)

### Reference Books:

1. I. L. Finar, Organic Chemistry, Vol. II, ELBS Publication, 5<sup>th</sup> Edition, 2005.
2. Raj K Bansal, Heterocyclic Chemistry, New Age International, 3<sup>rd</sup> Edition, Reprint 2005.
3. Nelson and Cox (Lehninger), Principles of Biochemistry, Freeman and Company, 4<sup>th</sup> Edition, 2005.
4. Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell, Harper's Illustrated Biochemistry, McGraw-Hill, 26<sup>th</sup> Edition, 2003.
5. Pamela C. Champe and Richard A. Harvey, Lippincott's Illustrated Reviews: Biochemistry, 3<sup>rd</sup> Edition, 2004.
6. U. Satyanarayana and U. Chakrapani, Fundamentals of Biochemistry, Books & Allied (P) Ltd., Reprint 2008.
7. Dr. R. Hannah Sulochana, Principles of Biochemistry, PBS Private Limited Chennai, 1<sup>st</sup> Edition, 2010.
8. A. C. Deb, Fundamentals of Biochemistry. New Central Book Agency (P) Ltd., 10<sup>th</sup> Edition, 2011.
9. Hermann Dugas, Bioorganic Chemistry - A Chemical Approach to Enzyme Action, Springer, 3<sup>rd</sup> Edition, Reprint 2007.
10. P. S. Kalsi and Sangeeta Jagtap, Pharmaceutical, Medicinal and Natural Product Chemistry, Narosa Publishing House, New Delhi, 2013.
11. Gurdeep R. Chatwal, Organic Chemistry of Natural Products (Vol. I & II), Himalaya Publishing House, Mumbai, 1<sup>st</sup> Edition, Reprint 2003.
12. R. C. Dubey and D. K. Maheshwari, A Textbook of Microbiology, S. Chand and Company Ltd., Revised Edition, 2010.

### OER:

1. <https://www.khanacademy.org/test-prep/mcat/biomolecules/enzyme-structure-and-function/v/an-introduction-to-enzymes-and-catalysis> (Enzyme and Catalysis).
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=2> (Lipid metabolism).
3. [https://bio.libretexts.org/Bookshelves/Biochemistry/Book%3A\\_Biochemistry\\_Free\\_and\\_Easy\\_\(Ahern\\_and\\_Rajagopal\)/06%3A\\_Metabolism\\_I\\_Oxidative%2F%2FReductive\\_Processes/6.13%3A\\_Metabolism\\_of\\_Fat](https://bio.libretexts.org/Bookshelves/Biochemistry/Book%3A_Biochemistry_Free_and_Easy_(Ahern_and_Rajagopal)/06%3A_Metabolism_I_Oxidative%2F%2FReductive_Processes/6.13%3A_Metabolism_of_Fat) (Metabolism of fat)
4. <https://nptel.ac.in/courses/104/102/104102016/> (Structure and function of Biomolecules)
5. <https://nptel.ac.in/courses/104/102/104102009/> (Structure of proteins)
6. <https://nptel.ac.in/courses/104/103/104103121/> (Nucleic acids)

## SEMESTER IV

### PCCHN20 - SOLID STATE CHEMISTRY AND NUCLEAR CHEMISTRY

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PCCHN20	<b>Title of the Course</b> Solid State Chemistry and Nuclear Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Outcomes:

- To know about the structure and properties of solids.
- To gain knowledge on nuclear chemistry and nuclear reactors.

#### Course Outcomes:

The Learners will be able to

1. Sketch the structures of perovskite, CdI, NiAs, spinels, explain electrical, magnetic and optical properties of solids, compare different methods of solid-state reactions and demonstrate selected single crystal growth techniques.
2. Discuss the magnetic properties of nuclides.
3. Describe quark theory and salient features of nuclear models.
4. Illustrate the types of nuclear reactions, explain the applications of radioisotopes in neutron activation analysis, isotope dilution analysis and age determination.
5. Compare the different types of particle detectors, accelerators and explain the knowledge on Nuclear Waste Management.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	H	H
CO2	H	M	M	M	H	M
CO3	H	L	M	M	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	M
CO2	H	H	H	L	M	M
CO3	H	H	H	M	M	H
CO4	H	H	H	M	H	M
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Structure of solids - Miller planes, Miller indices for hexagonal systems, distance between planes. (K1, K2, K3, K4, K5 & K6)
- 1.2 Reciprocal lattice, XRD instrumentation, XRD - analysis of pattern. (K1, K2, K3, K4, K5 & K6)
- 1.3 Structure of perovskite, cadmium iodide, nickel arsenide, spinels and inverse spinels. (K1, K2, K3, K4, K5 & K6)
- 1.4 Diffusion, diffusion co-efficient, diffusion mechanisms - vacancy and interstitial diffusion. (K1, K2, K3, K4, K5 & K6)
- 1.5 Growing single crystals - crystal growth from solution, growth from melt and chemical vapour deposition technique. (K1, K2, K3, K4, K5 & K6)
- 1.6 Electronic properties of solids - Hall Effect and its applications, pyroelectricity, piezo electricity and ferro electricity. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Magnetic properties of solids - hysteresis loss and loops. (K1, K2, K3, K4 & K5)
- 2.2 Types of magnetic behavior - dia, para, ferro, anti-ferro, ferri magnetism - ferrites, garnets. (K1, K2, K3, K4 & K5)
- 2.3 Optical properties of solids - luminescence and phosphors. (K1, K2, K3, K4 & K5)
- 2.4 Lasers - ruby laser, neodymium laser. (K1, K2, K3, K4 & K5)
- 2.5 Solid state electrolyte -  $\beta$ -alumina - application of solid state electrolytes. (K1, K2, K3, K4 & K5)
- 2.6 Solid-state reactions - formation of spinel ( $\text{MgAl}_2\text{O}_4$ ), co-precipitation and sol-gel method ( $\text{LiNbO}_3$ , silica). (K1, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1 The quark theory - quarks - classification, mass and charge, quark-quark gluon interaction. (K1, K2, K3, K4, K5 & K6)
- 3.2 The magnetic properties of the nucleus - Bohr magneton, nuclear magneton, the neutron magnetic moment and the structure of the nucleon. (K1, K2, K3, K4, K5 & K6)
- 3.3 The net magnetic moments of the nuclei - the spin I, the magnetic moment  $\mu_I$  and Nordheim rules. (K1, K2, K3, K4, K5 & K6)
- 3.4 Salient feature of the liquid drop model with derivations. (K1, K2, K3, K4, K5 & K6)
- 3.5 Fermi - gas model, collective model. (K1, K2, K3, K4, K5 & K6)
- 3.6 Nuclear reaction - cross-section, Q value, threshold energy and compound nucleus theory. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Bethe's notation, types of nuclear reactions - direct reactions, photonuclear and thermo nuclear reactions. (K1, K2, K3, K4 & K5)
- 4.2 Modes of radioactive decay, nuclear isomerism and isomeric transition, internal conversion. (K1, K2, K3, K4 & K5)
- 4.3 Stellar energy, the nucleosynthesis of light and heavy elements, hydrogen burning, carbon burning, the e, s, r, p and x processes. (K1, K2, K3, K4 & K5)
- 4.4 Separation of isotopes - boron isotope - isotope exchange and laser irradiation. (K1, K2, K3, K4 & K5)

- 4.5 Separation of uranium isotopes - ultracentrifugation and laser irradiation. (K1, K2, K3, K4 & K5)
- 4.6 Analytical applications of radioisotopes as traces - isotope dilution analysis and neutron activation analysis, age determination by tritium and carbon-14 content. (K1, K2, K3, K4 & K5)

#### **Unit V**

**(15 Hours)**

- 5.1 Hot atom chemistry and chemical effect of radioactive decay. (K1, K2, K3, K4, K5 & K6)
- 5.2 Detectors: Cloud chamber, bubble chamber, Geiger-Muller counter, scintillation and Cherenkov counters. (K1, K2, K3, K4, K5 & K6)
- 5.3 Particle accelerators - linear accelerators, cyclotron and synchrotron. (K1, K2, K3, K4, K5 & K6)
- 5.4 India's three stage nuclear power programme - pressurized heavy water reactor, fast breeder reactor, and thorium-based reactor. (K1, K2, K3, K4, K5 & K6)
- 5.5 Reprocessing of spent fuels: Recovery of uranium and plutonium. (K1, K2, K3, K4, K5 & K6)
- 5.6 Nuclear waste management - low level, intermediate level, high level wastes and ultimate disposal. (K1, K2, K3, K4, K5 & K6)

#### **Reference Books:**

1. A. R. West, Solid State Chemistry and its Application, John Wiley, Reprint 2011.
2. Smart & Moore, An Introduction to Solid State Chemistry, Chapman & Hall, 4<sup>th</sup> Edition, Reprint 2012.
3. D. K. Chakrabarty, Solid State Chemistry, New Age International, Reprint 2017.
4. Glen E. Rodgers, Inorganic and Solid State, Brooks/Cole Cengage Learning Publication, Indian Reprint 2011.
5. U. N. Dash, Nuclear Chemistry, Sultan Chand and Son Publication, First Edition, 1991.
6. H. J. Arnikar, Essentials of Nuclear Chemistry, New Age International, Reprint 2011.
7. R. K. Dave, Nuclear Chemistry, Campus Book International, 2006.
8. Maheshwar Sharon, Madhuri Sharon, Nuclear Chemistry, Anne Books Pvt. Ltd., 2<sup>nd</sup> Edition, Reprint 2018.
9. Walter D Loveland, Modern Nuclear Chemistry, Wiley, Reprint 2017.

#### **OER:**

1. <http://wwwchem.uwimona.edu.jm/courses/binsalts.html>
2. <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>
3. [http://www.barc.gov.in/about/anushakti\\_sne.html](http://www.barc.gov.in/about/anushakti_sne.html)
4. <https://www.khanacademy.org/science/cosmology-and-astronomy/stellar-life-topic/stellar-life-death-tutorial/v/lifecycle-of-massive-stars>

**SEMESTER IV****PCCHO20 - THERMODYNAMICS**

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PCCHO20	<b>Title of the Course</b> Thermodynamics	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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**Learning Objectives:**

- To give an in-depth knowledge on thermodynamics.
- To understand the concepts of statistical thermodynamics.
- To give insight into the applications of the M-B, B-E and F-D statistics.

**Course Outcomes:**

The Learners will be able to

1. Determine the partial molar properties, activity and activity coefficient of non-electrolytes, and standard free energies.
2. Illustrate the relationship between microscopic properties of individual atoms and molecules with macroscopic thermodynamic observables and derive the different types of distribution laws.
3. Derive different forms of molecular partition function, heat capacity of solids and explain law of equipartition of energy.
4. Distinguish the nuclear spin states of hydrogen and deuterium, explain electron gas in metals and blackbody radiation, and apply spectroscopic data for statistical thermodynamics.
5. Explain the concept of non-equilibrium thermodynamics, and derive entropy production in chemical reactions and open systems.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Partial molar properties - partial molar free energy - partial molar volume and partial molar heat content - their significance and determination of these quantities - determination of partial molar properties. (K1, K2, K3, K4, K5 & K6)
- 1.2 Chemical potential - variation of chemical potential with temperature and pressure, Duhem Margules equation. (K1, K2, K3, K4, K5 & K6)
- 1.3 Free energy - standard free energy - determination of standard free energies from entropy values, equilibrium constant and ionization method. (K1, K2, K3, K4, K5 & K6)
- 1.4 Fugacity and activity - definition of fugacity, variation of fugacity with temperature and pressure. (K1, K2, K3, K4, K5 & K6)
- 1.5 Concept of activity and activity co-efficient - choice of standard states. (K1, K2, K3, K4, K5 & K6)
- 1.6 Determination of activity and activity co-efficient of non-electrolytes by Henry's distribution law and vapor pressure measurements. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Thermodynamic and mathematical probability - Sterling approximation -Lagrange's method of indeterminate multipliers. (K1, K2, K3, K4 & K5)
- 2.2 Distribution and most probable distributions - distinguishable and indistinguishable particles. (K1, K2, K3, K4 & K5)
- 2.3 Statistical mechanics - Maxwell-Boltzmann Distribution - derivation and applications (K1, K2, K3, K4 & K5)
- 2.4 Bose-Einstein and Fermi Dirac distribution laws - derivations and applications - comparison of the distribution laws. (K1, K2, K3, K4 & K5)
- 2.5 Relation between partition and thermodynamic functions. (K1, K2, K3, K4 & K5)
- 2.6 Different types of ensembles and ensemble averaging. (K1, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1 Partition function - factorization of molecular partition function, partition functions for mixture of gases. (K1, K2, K3, K4, K5 & K6)
- 3.2 Evaluation of the independent molecular partition function - translational, rotational, vibrational partition function. (K1, K2, K3, K4, K5 & K6)
- 3.3 Evaluation of electronic and nuclear partition function. (K1, K2, K3, K4, K5 & K6)
- 3.4 Law of equipartition of energies. (K1, K2, K3, K4, K5 & K6)
- 3.5 Heat capacity of solids - specific heat capacity of solids. (K1, K2, K3, K4, K5 & K6)
- 3.6 Determination of heat capacity of solids at low temperature - Einstein model and Debye model. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Nuclear spin statistics - ortho-para nuclear states. (K1, K2, K3, K4 & K5)
- 4.2 Ortho-para hydrogen, nuclear spin statistics of deuterium. (K1, K2, K3, K4 & K5)
- 4.3 Investigation on system containing indistinguishable particles - electron in metals. (K1, K2, K3, K4 & K5)
- 4.4 Black body radiation - Planck's distribution law, Stefan-Boltzmann law, Wein's law. (K1, K2, K3, K4 & K5)
- 4.5 Application of statistical thermodynamics. (K1, K2, K3, K4 & K5)
- 4.6 Uses of spectroscopic and structural data to calculate thermodynamic functions. (K1, K2, K3, K4 & K5)

## Unit V

(15 Hours)

- 5.1 Non equilibrium thermodynamics: Irreversible thermodynamics - postulates of non-equilibrium thermodynamics. (K1, K2, K3, K4, K5 & K6)
- 5.2 Conservation of mass and energy. (K1, K2, K3, K4, K5 & K6)
- 5.3 Entropy production - entropy production in chemical reactions - entropy flow in open systems. (K1, K2, K3, K4, K5 & K6)
- 5.4 Flux and Force - transformation properties of rates and affinities. (K1, K2, K3, K4, K5 & K6)
- 5.5 Linear laws relative to fluxes and forces - Onsager's reciprocity relation (K1, K2, K3, K4, K5 & K6)
- 5.6 Curie's theorem, relaxation phenomenon. (K1, K2, K3, K4, K5 & K6)

### Reference Books:

1. Terrell L. Hill, An Introduction to statistical Thermodynamics, Dover Publications, First South Asian Edition, 2008.
2. B. G. Kyle, Chemical and Process Thermodynamics, Prentice Hall of India, 3<sup>rd</sup> Edition, 2004.
3. Samuel Glasstone, Thermodynamics for Chemists, East-West Press, Reprint 2017.
4. M. C. Gupta, Statistical Thermodynamics, New Age International, 2<sup>nd</sup> Edition, 2003.
5. R. C. Srivatsava, Subit K. Saha, Abhay K. Jain, Thermodynamics: A Core Course, PHC Pvt. Ltd., 2<sup>nd</sup> Edition, 2005.
6. J. Rajaram, J. C. Kuriacose, Chemical Thermodynamics, Dorling Kindersley Pvt. Ltd., Pearson Education Publisher, 2013.
7. Evelyn Guha, Basic Thermodynamics, Narosa Publishing House, 1<sup>st</sup> Edition, 2000.
8. P. C. Rakshit, Thermodynamics, The New Book Stall, 4<sup>th</sup> Edition, 1983.
9. Y. V. C Rao, An Introduction to Thermodynamics, New Age International Pvt. Ltd., 1<sup>st</sup> Edition, 1993.
10. Sears Salinger, Thermodynamics, Kinetic Theory and Statistical Thermodynamics, Narosa Publishing House, 3<sup>rd</sup> Edition, 1975.
11. R. P. Rastogi and R. R. Misra, An Introduction to Chemical Thermodynamics, Vikas Publishing House Pvt. Ltd., 1995, Reprint 2007.
12. Raza, Tahir-Kheli, General and Statistical thermodynamics, e-ISBN - 978-3-642-21481-3, Springer 2012.

### OER:

1. [https://ethz.ch/content/dam/ethz/special-interest/chab/physical-chemistry/epr-dam/documents/education/statistical-thermodynamics/stat\\_TD.pdf](https://ethz.ch/content/dam/ethz/special-interest/chab/physical-chemistry/epr-dam/documents/education/statistical-thermodynamics/stat_TD.pdf).
2. <http://ursula.chem.yale.edu/~batista/classes/vaa/vaa.pdf> (Statistical methods and thermodynamics)
3. <https://physics.info/planck/> (Black body radiation)
4. <https://www.intechopen.com/books/non-equilibrium-particle-dynamics/fundamentals-of-irreversible-thermodynamics-for-coupled-transport>.
5. <https://arxiv.org/pdf/1906.07656.pdf> (Spin statistics)

## SEMESTER IV

### PECHG20 - ELECTIVE IV A: ORGANOMETALLIC AND BIOINORGANIC CHEMISTRY

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PECHG20	<b>Title of the Course</b> Organometallic and Bioinorganic Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To expose the students to the principles and reactions involved in Organometallic chemistry.
- To understand the role of catalysts in different types of reactions.
- To have a clear understanding on bioinorganic compounds.

#### Course Outcomes:

The Learners will be able to

1. Explain the preparation, properties, structure and bonding of organometallic complexes and appraise 18 electron rule and EAN rule for metal carbonyls.
2. Explain the mechanism of organometallic reactions, rearrangement reactions of aluminium and tin compounds.
3. Appraise the role of transition metal catalysts in industrial processes.
4. Evaluate the role of oxygen transport, ion transport and electrolytic balance in organisms, and review nitrogen fixation.
5. Elaborate on the biological role of metalloenzymes, and the importance of metals used for diagnosis and treatment of cancer.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	H	H	H
CO2	H	M	L	H	H	H
CO3	H	M	L	H	H	H
CO4	H	M	L	H	H	H
CO5	H	M	L	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I****(15 Hours)**

- 1.1 Introduction - 18 electron rule and EAN rule - calculation, capacity - definition. (K1, K2, K3, K4, K5 & K6)
- 1.2 Metal carbonyl complexes and poly nuclear carbonyl complexes - preparation, properties, structure and bonding. (K1, K2, K3, K4, K5 & K6)
- 1.3 Carbonylate ion, carbonyl hydride complex – preparation, properties, structure and bonding. (K1, K2, K3, K4, K5 & K6)
- 1.4 Nitrosyl complex, metal alkyls - preparation and properties, structure and bonding. (K1, K2, K3, K4, K5 & K6)
- 1.5 Carbenes, carbynes and carbides, non-aromatic alkenes and alkyne complexes - preparation and properties. (K1, K2, K3, K4, K5 & K6)
- 1.6 Metallocenes - preparation and properties, structure and bonding. (K1, K2, K3, K4, K5 & K6)

**Unit II****(15 Hours)**

- 2.1 Addition reactions - 1,2 addition to double bonds. (K1, K2, K3, K4 & K5)
- 2.2 Carbonylation and decarbonylation. (K1, K2, K3, K4 & K5)
- 2.3 Oxidative addition reactions, reductive elimination reactions. (K1, K2, K3, K4 & K5)
- 2.4 Substitution reactions of octahedral complexes and their mechanisms. (K1, K2, K3, K4 & K5)
- 2.5 Insertion reaction, rearrangement reactions of aluminium and tin compounds and their mechanisms. (K1, K2, K3, K4 & K5)
- 2.6 Fluxional isomerism - definition, examples and mechanism. (K1, K2, K3, K4 & K5)

**Unit III****(15 Hours)**

- 3.1 Hydrogenation of olefins (Wilkinson's catalyst), modification of the original catalyst. (K1, K2, K3, K4, K5 & K6)
- 3.2 Hydroformylation of olefins using cobalt and rhodium catalyst (oxo process). (K1, K2, K3, K4, K5 & K6)
- 3.3 Oxidation of olefins to aldehydes and ketones (Wacker process). (K1, K2, K3, K4, K5 & K6)
- 3.4 Cyclo oligomerisation of acetylene using Nickel catalyst (Reppé's catalyst) (K1, K2, K3, K4, K5 & K6)
- 3.5 Olefin isomerization and its mechanism. (K1, K2, K3, K4, K5 & K6)
- 3.6 Olefin metathesis and polymer bound catalyst. (K1, K2, K3, K4, K5 & K6)

**Unit IV****(15 Hours)**

- 4.1 Metallo porphyrin and respiration (cytochromes). (K1, K2, K3, K4 & K5)
- 4.2 Interaction between heme and dioxygen, structure and function of haemoglobin. (K1, K2, K3, K4 & K5)
- 4.3 Ferredoxin and rubredoxin, blue copper proteins - structure and function. (K1, K2, K3, K4 & K5)
- 4.4 Ion transport in membranes, Na-K balance. (K1, K2, K3, K4 & K5)
- 4.5 Calcium in living cells (transport and regulation), selectivity of  $\text{Ca}^{2+}$  over  $\text{Mg}^{2+}$ . (K1, K2, K3, K4 & K5)
- 4.6 Nitrogen fixation - atmospheric, industrial and biological. (K1, K2, K3, K4 & K5)

**Unit V****(15 Hours)**

- 5.1 Biological role of metalloenzymes - carboxy peptidases. (K1, K2, K3, K4, K5 & K6)

- 5.2 Biological role of carbonic anhydrase. (K1, K2, K3, K4, K5 & K6)
- 5.3 Biological importance of catalase. (K1, K2, K3, K4, K5 & K6)
- 5.4 Biological role of peroxidase. (K1, K2, K3, K4, K5 & K6)
- 5.5 Oxotransferase enzymes - xanthine oxidase - biological role. (K1, K2, K3, K4, K5 & K6)
- 5.6 Metals used for diagnosis and chemotherapy with particular reference to anticancer drugs (platinum ammine halides, metallocenes and their halides). (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. R. Gopalan, Concise Coordination Chemistry, Vikas Publishing House Pvt. Ltd., Reprint 2008.
2. Asim K. Das, Bioinorganic Chemistry, Books and Allied Pvt. Ltd., Kolkota, Reprint 2013.
3. Gary Miessler, Paul J. Fischer, Donald A. Tarr, Inorganic Chemistry, Pearson, 5<sup>th</sup> Edition, 2014
4. B. E. Douglas DH McDaniel's and Alexander, Concepts and Models of Inorganic Chemistry, Wiley Publication, 2<sup>nd</sup> Edition, Reprint 2006.
5. Ivano Bertini, Harry B Gray, Stephen J Lippard, Joan Selverstone Valentine, Bioinorganic Chemistry, University Science Books, Mill Valley, California, 1<sup>st</sup> Edition, 1994
6. M. C. Shrivvers, P. W. Atkins, C. H. Langford, Inorganic Chemistry, Oxford University Press, 3<sup>rd</sup> Edition, Reprint 2002.
7. J. Huheey, Inorganic Chemistry, Pearson, 4<sup>th</sup> Edition, 2006.
8. Wahid U. Malik, G. D. Tuli, R. D. Madan, Selected Topics in Inorganic Chemistry, S. Chand and Co., New Delhi, Reprint 1993.
9. F. A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry, John Wiley and Sons, 5<sup>th</sup> Edition, 1988.
10. K. F. Purcell and J. C. Kotz, Inorganic Chemistry, W. B. Saunders Co., 1977.
11. S. F. A. Kettle, Coordination Chemistry, ELBS, Reprint 1975.
12. F. Basolo and RG Pearson, Mechanism of Inorganic Reactions, Wiley, 1967.

**OER:**

1. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P-03-Mechanism of substitution reactions)
2. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P-15-Iron transport, nitrogen fixation)
3. <https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=5> (P-11-Carbonyls and nitrosyls)
4. [file:///E:/E%20books/Inorganic\\_Chemistry\\_Miessler\\_Tarr.pdf](file:///E:/E%20books/Inorganic_Chemistry_Miessler_Tarr.pdf)

## SEMESTER IV

### PECHH20 - ELECTIVE IVB: ORGANIC FARMING AND SOLID WASTE MANAGEMENT

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PECHH20	<b>Title of the Course</b> Organic Farming and Solid Waste Management	<b>Course Type</b> Theory	<b>Course Category</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Learning Objectives:

- To understand the importance of solid waste management.
- To learn about hazardous waste management.
- To get a thorough knowledge on the concept of organic farming, components and practices.

#### Course Outcomes:

The Learners will be able to

1. Elaborate the concept of organic farming.
2. Explain the vision and importance of organic farming movements, apply vermicomposting process and prepare bio-fertilizers.
3. Evaluate the technology to approach the benefits of organic farming.
4. Explain the various aspects of solid waste management.
5. Demonstrate the methods to reduce hazards.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

**Unit I** (15 Hours)

- 1.1 Organic farming - concepts, relevance of organic farming to Indian agriculture. (K1, K2, K3, K4, K5 & K6)
- 1.2 Effects of green revolution, adverse effects of continuous use of chemicals. (K1, K2, K3, K4, K5 & K6)
- 1.3 Categories of organic farming, organic vs natural farming. (K1, K2, K3, K4, K5 & K6)
- 1.4 Essential characteristics of organic farming. (K1, K2, K3, K4, K5 & K6)
- 1.5 Key principles in organic farming system - components of organic farming systems. (K1, K2, K3, K4, K5 & K6)
- 1.6 Management of organic farming - research needs. (K1, K2, K3, K4, K5 & K6)

**Unit II** (15 Hours)

- 2.1 Principles and practices of organic farming. (K1, K2, K3, K4 & K5)
- 2.2 The vision and importance of organic farming movements. (K1, K2, K3, K4 & K5)
- 2.3 Guidelines for organic production system - organic farming practices - bulky organic manures. (K1, K2, K3, K4 & K5)
- 2.4 Role of micro-organisms (bio-fertilizers) in organic farming. (K1, K2, K3, K4 & K5)
- 2.5 Vermitechnology. (K1, K2, K3, K4 & K5)
- 2.6 Research advances in organic farming. (K1, K2, K3, K4 & K5)

**Unit III** (15 Hours)

- 3.1 Benefits of organic farming. (K1, K2, K3, K4, K5 & K6)
- 3.2 Nutritional values of organic foods. (K1, K2, K3, K4, K5 & K6)
- 3.3 Health benefits of organic foods. (K1, K2, K3, K4, K5 & K6)
- 3.4 SREP approach for promoting organic farming. (K1, K2, K3, K4, K5 & K6)
- 3.5 Use of organic practices in enhancing crop productivity. (K1, K2, K3, K4, K5 & K6)
- 3.6 Participatory technology development in organic farming. (K1, K2, K3, K4, K5 & K6)

**Unit IV** (15 Hours)

- 4.1 Solid Waste Management - introduction. (K1, K2, K3, K4 & K5)
- 4.2 Classification of solid wastes. (K1, K2, K3, K4 & K5)
- 4.3 Mismanagement and side effects. (K1, K2, K3, K4 & K5)
- 4.4 Physical and chemical characteristics. (K1, K2, K3, K4 & K5)
- 4.5 Waste collection, storage and transport. (K1, K2, K3, K4 & K5)
- 4.6 Waste disposal - types - composting, incineration, bio gasification. (K1, K2, K3, K4 & K5)

**Unit V** (15 Hours)

- 5.1 Plastics, bio medical and hazardous waste management. (K1, K2, K3, K4, K5 & K6)
- 5.2 Various types of plastics - plastic recycling and the environment. (K1, K2, K3, K4, K5 & K6)
- 5.3 Guidelines for the plastic waste hazards control. (K1, K2, K3, K4, K5 & K6)
- 5.4 Sources of biomedical waste - pathological waste, pharmaceutical wastes, genotoxic wastes, chemical wastes, radioactive wastes. (K1, K2, K3, K4, K5 & K6)
- 5.5 Measures to reduce hazards. (K1, K2, K3, K4, K5 & K6)
- 5.6 Household hazardous waste management - precautions, disposal, waste minimization. (K1, K2, K3, K4, K5 & K6)

## References Books:

1. L. V. Hirevenkanagoudar, Extension Strategies for Promotion of Organic Farming, Agrotech Publishing Academy, 2007.
2. B. B. Hosetti, Prospects and Perspectives of Solid Waste Management, New Age International Publishers, 2006.
3. A. Kamala, D. L. Kanth Rao, Environmental Engineering, Water Supply, Sanitary Engineering and Pollution, Tata McGraw-Hill Publishing Ltd., New Delhi, 13<sup>th</sup> Reprint, 2002.
4. S. S. Dara, A Textbook of Environmental Chemistry and Pollution Control, S. Chand & Company Ltd., 7<sup>th</sup> Edition, 2004.
5. B. K. Sharma, Environmental Chemistry, Goel Publishing House, Meerut, 2005.

## OER:

1. [http://agritech.tnau.ac.in/org\\_farm/orgfarm\\_introduction.html](http://agritech.tnau.ac.in/org_farm/orgfarm_introduction.html)
2. <https://www.nationalgeographic.com/environment/future-of-food/organic-farming-crops-consumers/>
3. <https://www.britannica.com/topic/organic-farming>
4. <https://www.conserve-energy-future.com/sources-effects-methods-of-solid-waste-management.php>
5. [https://ec.europa.eu/echo/files/evaluation/watsan2005/annex\\_files/WEDC/es/ES07CD.pdf](https://ec.europa.eu/echo/files/evaluation/watsan2005/annex_files/WEDC/es/ES07CD.pdf)
6. [https://www.geo.lu.lv/fileadmin/user\\_upload/lu\\_portal/projekti/gzzf/videunilgtspejiga\\_attistiba/VidZ1000/16.LECTURE-Solid\\_waste\\_management.pdf](https://www.geo.lu.lv/fileadmin/user_upload/lu_portal/projekti/gzzf/videunilgtspejiga_attistiba/VidZ1000/16.LECTURE-Solid_waste_management.pdf)
7. <http://www.indiaenvironmentportal.org.in/files/file/municipal%20solid%20waste%20management.pdf>

## SEMESTER IV

### PCCHP20 - PRACTICAL IV: ORGANIC CHEMISTRY - II

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PCCHP20	<b>Title of the Course</b> Practical IV: Organic Chemistry – II	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Outcomes:

The Learners will be able to

1. Develop skills to perform two stage preparations of organic compounds and crystallize them.
2. Calculate the saponification value of oil.
3. Estimate the amount of the given organic compound.
4. Demonstrate simple chromatographic techniques.
5. Interpret the structure of organic compounds by analyzing spectral data.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

#### Estimations:

1. Estimation of aniline
2. Estimation of phenol
3. Estimation of ethyl methyl ketone
4. Estimation of glucose (Bertrand's method)

5. \*Estimation of amide
6. Estimation of glycine
7. Saponification value of an oil

**Preparations:**

1. Benzanilide from benzophenone
2. m-nitrobenzoic acid from methyl benzoate
3. m-nitrobenzoic acid from benzaldehyde
4. 2,4-dinitrophenylhydrazine from chlorobenzene
5. Acetyl salicylic acid from methyl salicylate
6. Benzilic acid from benzoin

**\* Chromatographic Separations:**

1. Column chromatography- separation of dyes
2. Paper chromatography - separation of mixture of amino acids
3. Thin layer chromatography - separation of mixture of amino acids

**Interpretation of spectra of 10 organic compounds****\* Not to be given for examination****Reference Books:**

1. Mann and Saunders, Laboratory Manual of Organic Chemistry, Pearson Education, 4<sup>th</sup> Edition, 2009.
2. Vogel's Textbook of Practical Organic Chemistry, Pearson Education, 5<sup>th</sup> Edition, 2003.
3. Raj K. Bansal, Laboratory Manual of Organic Chemistry, New Age International Publishers, 5<sup>th</sup> Edition, 2009.
4. Gnanaprakasam, Ramamurthy, Organic Chemistry Manual, Viswanathan S. Printers and Publishers Pvt. Ltd., New Edition, 2009.

**OER:**

1. [https://sdbs.db.aist.go.jp/sdbs/cgi-bin/direct\\_frame\\_top.cgi](https://sdbs.db.aist.go.jp/sdbs/cgi-bin/direct_frame_top.cgi)
2. <http://www.chemspider.com/>
3. <https://cssp.chemspider.com>
4. <https://www.khanacademy.org/science/class-11-chemistry-india/xbbb6cb8fc2bd00c8:in-in-organic-chemistry-some-basic-principles-and-techniques/xbbb6cb8fc2bd00c8:in-in-methods-of-purification-of-organic-compounds/v/calculating-retention-factors-for-tlc>

**Continuous Assessment - 40 marks**

I C.A. - 50 Marks

II C.A. - 50 Marks

Average - 25 Marks

Performance during regular practicals - 10 Marks

Regularity in submission of observation note-book and Record - 5 Marks

**CA Practical Examination - 50 Marks**

Spectra - 5 Marks

Record - 5 Marks

Viva - 5 Marks

Estimation - 15 Mark

Preparation - 20 Marks

(Stage1 - Quantity (5 Marks), Quality (5 Marks), Stage2 - Quantity (4 Marks), Quality (4 Marks), Recrystallization - 2Marks)

**Semester Practical Examination - 60 Marks**

Spectra - 5 Marks

Record - 5 Marks

Viva - 5 Marks

Preparation - 20 Marks

Estimation - 25 Marks

**Quantitative Estimation**

Upto 2% - 25 Marks

2 - 3% - 20 Marks

3- 4% - 15 Marks

&gt; 4% - 10 Marks

## SEMESTER IV

### PCCHQ20 - PRACTICAL V: INORGANIC CHEMISTRY - II

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PCCHQ20	<b>Title of the Course</b> Practical V: Inorganic Chemistry - II	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 4	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Outcomes

The Learners will be able to

1. Estimate the amount of metal ions in inorganic mixtures by volumetric and gravimetric methods.
2. Estimate the percentage of metals in ores and alloys by volumetric and gravimetric methods.
3. Prepare selected inorganic complexes.
4. Interpret the spectra of selected inorganic compounds.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

#### Estimations:

1. Estimation of copper and nickel
2. Estimation of copper and zinc
3. Estimation of iron and nickel
4. Estimation of iron and magnesium
5. Estimation of iron and zinc

#### Preparations:

1. Hexaamminenickel(II) chloride

2. Bis(acetylacetonato)copper(II)
3. Hexaamminecobalt(III) chloride
4. Pentamminechlorocobalt(III) chloride
5. Tris(thiourea)copper(I) sulphate
6. Potassium tetrachlorocuprate(II)
7. \*Potassium tris(oxalato)aluminate(III) trihydrate

**\*Analysis of alloys:**

1. Determination of percentage of copper and zinc in brass
2. Determination of percentage of chromium and nickel in stainless steel

**\*Analysis of ores:**

1. Determination of percentage of calcium and magnesium in dolomite
2. Determination of percentage of MnO<sub>2</sub> in pyrolusite

**Interpretation of spectra of 10 inorganic compounds**

**\* Not to be given for examination**

**Reference Books:**

1. V. Venkateswaran, R. Veeraswamy, A.R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand & Sons, Educational Publishers, 2012.
2. G. Svehla, B. Sivasankar, Vogel's Qualitative Inorganic Analysis, Pearson Publication, 7<sup>th</sup> Edition, 2012.
3. R. Mukhopadhyay and P. Chatterjee, Advanced Practical Chemistry, Arunabha Sen Books and Allied (P) Ltd., Kolkatta, Third Edition, 2007.

**OER:**

1. <https://www.khanacademy.org/science/chemistry/chemical-reactions-stoichiome/limiting-reagent-stoichiometry/a/gravimetric-analysis-and-precipitation-gravimetry>. (Gravimetric Analysis)
2. [https://chem.libretexts.org/Courses/Northeastern\\_University/08%3A\\_Gravimetric\\_Methods/8.2%3A\\_Precipitation\\_Gravimetry](https://chem.libretexts.org/Courses/Northeastern_University/08%3A_Gravimetric_Methods/8.2%3A_Precipitation_Gravimetry). (Precipitation Gravimetry).
3. <http://vlab.amrita.edu/?sub=2&brch=193&sim=348&cnt=1> (Estimation of Nickel).

**Continuous Assessment - 40 Marks**

I C.A. - 50 Marks

II C.A. - 50 Marks

Average - 25 Marks

Performance during regular practical - 10 Marks

Regularity in submission of observation note-book and Record - 5 Marks

**CA Practical Examination - 50 Marks**

Spectra -5 Marks

Record -5 Marks

Viva -5 Marks

Preparation -10 Marks (Quantity – 5 Marks, Quality – 5 Marks)

Quantitative Estimation - 25 Marks (Volumetric - 10 Marks & Gravimetric - 15 Marks)

**Semester Practical Examination - 60 Marks**

Spectra	- 5 Marks
Record	- 5 Marks
Viva-Voce	- 5 Marks
Preparation	- 20 Marks (Quantity - 10 Marks, Quality - 10 Marks)
Quantitative Estimation	- 25 Marks (Volumetric - 10 Marks & Gravimetric - 15 Marks)

**Gravimetric Estimation**

up to 2%	- 15 Marks
2 - 3%	- 13 Marks
3- 4%	- 10 Marks
> 4%	- 7 Marks

**Volumetric Estimation**

up to 1%	- 10 Marks
1% to 2%	- 8 Marks
2% to 3%	- 5 Marks
>3%	- 4 Marks

## SEMESTER IV

### PCCHR20 - PRACTICAL VI: PHYSICAL CHEMISTRY - II

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PCCHR20	<b>Title of the Course</b> Practical VI: Physical Chemistry - II	<b>Course Type</b> Practical	<b>Course Category</b> Core	<b>H/W</b> 3	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Outcomes:

The Learners will be able to

1. Apply laboratory skills to perform physico-chemical experiments.
2. Demonstrate acid-base, redox and precipitation titrations using conductometry and potentiometry.
3. Determine the pH of buffer solution potentiometrically and verify Ostwald dilution law and Onsager's equation.
4. Interpret the experimental results obtained by conductometric and potentiometric titrations.
5. Describe spectral methods to calculate force constant and interpret UV, IR and NMR spectra.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

#### Experiments:

1. Determination of the strength of given weak acid by titrating potentiometrically with a strong base and determine dissociation constant of the weak acid to 1/4, 1/2 and 3/4 neutralization.

2. Determination of the strength of weak acid by titrating conductometrically against a standard sodium hydroxide solution.
3. Determination of pH values of the given buffer solutions by potentiometric method. You are provided with a buffer of known pH.
4. Determination of the strength of potassium iodide by titrating against standard potassium permanganate potentiometrically.
5. Verify the Onsager equation using the given solution and determine the equivalent conductance at infinite dilution.
6. Determination of the strength of ferrous ammonium sulphate solution by titrating against standard potassium permanganate potentiometrically.
7. Verify the Ostwald's dilution law and determine the dissociation constant of given acid.
8. Determination of the strength of potassium chloride by precipitation titration potentiometrically.
9. Titrate conductometrically the given mixture of strong and weak acids against a standard sodium hydroxide solution and determine the individual strength of the two acids in the mixture.
10. Determination of the strength of given strong acid by titrating potentiometrically with a strong base.
11. Determination of the strength of mixture of halides (KCl & KI) by precipitation titration potentiometrically.
12. Determination of the strength of given strong acid by titrating conductometrically with a strong base.
13. \*Titrate conductometrically the given mixture of HCl, CH<sub>3</sub>COOH and CuSO<sub>4</sub> · 5H<sub>2</sub>O against NaOH and determine the individual strengths of the mixture.

\* Not to be given for examination.

#### **Interpretation of spectra:**

- Interpretation of UV-Visible spectra of simple molecules for the calculation of molecular data and identification of functional groups (5 typical spectra will be provided).
- IR and NMR spectral calculations of force constant - identification and interpretation of spectra (5 each in IR and NMR will be provided).

#### **Reference Books:**

1. V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu, Basic Principles of Practical Physical Chemistry, Sultan Chand and Sons Educational Publishers, Reprint 2012.
2. V. K. Ahluwalia, Sunita Dhingra Adarsh Gulati, College Practical Chemistry, University Press (India) Private Limited, Reprint 2008.
3. B. Viswanathan, P. S. Raghavan, Practical Physical Chemistry, Viva Publishers, 2014.
4. J. B. Yadav, Advanced Practical Physical Chemistry, Krishna Prakashan Media (P) Ltd, 2015.

**OER:**

1. [https://docs.google.com/presentation/d/1tc5iAxF-Kjt\\_P\\_IXeyFCQl2m-UHnY\\_t6CcLmdRBX1Ug/edit?usp=sharing](https://docs.google.com/presentation/d/1tc5iAxF-Kjt_P_IXeyFCQl2m-UHnY_t6CcLmdRBX1Ug/edit?usp=sharing)
2. [https://chem.pg.edu.pl/documents/175260/14212622/chf\\_epm\\_lab\\_1.pdf](https://chem.pg.edu.pl/documents/175260/14212622/chf_epm_lab_1.pdf)
3. [http://web.iyte.edu.tr/~serifeyalcin/lectures/chem306/cn\\_3.pdf](http://web.iyte.edu.tr/~serifeyalcin/lectures/chem306/cn_3.pdf)

**Continuous Assessment - 40 Marks**

I C.A. - 50 Marks

II C.A. - 50 Marks

Average - 25 Marks

Performance during regular practicals - 10 Marks

Regularity in submission of observation notebook and Record - 5 Marks

**CA Practical Examination - 50 Marks**

Spectra - 5 Marks

Conductometry - 17.5 Marks

Potentiometry - 17.5 Marks

Record - 5 Marks

Viva-Voce - 5 Marks

**Conductometry / Potentiometry (17.5 Marks)**

Tabulation, Calculation, Graph - 7.5 Marks

Result - 10 Marks

**Semester Practical Examination - 60 Marks**

Spectra - 5 Marks

Conductometry - 20 Marks

Potentiometry - 20 Marks

Record - 10 Marks

Viva-Voce - 5 Marks

**Conductometry / Potentiometry (20 Marks)**

Tabulation, Calculation, Graph - 10 Marks

Result - 10 Marks

**Error:**

Upto 2% - 10 Marks

2% to 4% - 8 Marks

4% to 6% - 6 Marks

&gt;6% - 5 Marks

## SEMESTER IV

### PICHH20 - IEP - CSIR-NET PREPARATORY COURSE IN PHYSICAL CHEMISTRY

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PICHH20	<b>Title of the Course</b> CSIR-NET Preparatory Course in Physical Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W</b> Own Pace	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objective:

- Upon studying this paper, the students will be able to answer CSIR-NET questions in Physical Chemistry.

#### Course Outcomes:

The Learners will be able to

1. Apply quantum chemistry to solve Schrödinger wave equation for one, two- and three-dimensional boxes and for hydrogen and helium atoms, apply the approximation methods to single and multi-electron systems, and discuss the concepts of atomic structure, spectroscopy and apply term symbols to many electron systems.
2. Elaborate Huckel theory to conjugated systems, concepts of symmetry in molecular vibrations, chemical bonding and electronic transitions.
3. Compile the concepts of chemical kinetics and enzyme kinetics, describe the concepts of statistical thermodynamics and apply the partition function to model systems.
4. Relate the concepts of electrochemistry, explain the kinetics of reactions in solutions, acid-base catalysis and surface reactions.
5. Illustrate the theory and properties of colloids, mechanism of heterogeneous catalysis and structure of solids, discuss the kinetics of polymerization, and data analysis.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

H-High (3), M-Moderate (2), L-Low (1)

## Unit I

- 1.1. Basic principles of quantum mechanics, postulates, operator algebra, exactly-solvable systems. (K1, K2, K3 & K4)
- 1.2. Particle-in-a-box, harmonic oscillator and the hydrogen atom, including shapes of atomic orbitals, orbital and spin angular momenta, tunneling. (K1, K2, K3 & K4)
- 1.3. Approximation methods of quantum mechanics: Variational principle for multi electron systems. (K1, K2, K3, K4 & K5)
- 1.4. Perturbation method and its application to multielectron systems. (K1, K2, K3 & K4)
- 1.5. Atomic structure and spectroscopy. (K1, K2, K3 & K4)
- 1.6. Term symbols - many-electron systems and antisymmetry principle. (K1, K2, K3, K4 & K5)

## Unit II

- 2.1 Chemical bonding in diatomics, elementary concepts of MO and VB theories. (K1, K2, K3 & K4)
- 2.2 Huckel theory for conjugated  $\pi$ -electron systems. (K1, K2, K3, K4 & K5)
- 2.3 Chemical applications of group theory, symmetry elements, point groups, character tables, selection rules. (K1, K2, K3 & K4)
- 2.4 Molecular spectroscopy: Rotational and vibrational spectra of diatomic molecules. (K1, K2, K3 & K4)
- 2.5 Electronic spectra - principle and application. (K1, K2, K3, K4 & K5)
- 2.6 IR and Raman spectra - selection rules, basic principles of magnetic resonance. (K1, K2, K3 & K4)

## Unit III

- 3.1 Chemical thermodynamics: Laws, state and path functions and their applications, thermodynamic description of various types of processes. (K1, K2, K3 & K4)
- 3.2 Maxwell's relations, spontaneity and equilibria, temperature and pressure dependence of thermodynamic quantities. (K1, K2, K3, K4 & K5)
- 3.3 Le Chatelier's principle, elementary description of phase transitions, phase equilibria and phase rule. (K1, K2, K3 & K4)
- 3.4 Thermodynamics of ideal and non-ideal gases, and solutions. (K1, K2, K3 & K4)
- 3.5 Statistical thermodynamics: Boltzmann distribution and kinetic theory of gases. (K1, K2, K3 & K4)
- 3.6 Partition functions and their relation to thermodynamic quantities - calculations for model systems. (K1, K2, K3 & K4)

## Unit IV

- 4.1 Electrochemistry: Nernst equation, redox systems, electrochemical cells, Debye-Huckel theory (K1, K2, K3 & K4)
- 4.2 Electrolytic conductance - Kohlrausch's law and its applications, ionic equilibria, conductometric and potentiometric titrations. (K1, K2, K3 & K4)
- 4.3 Chemical kinetics: Empirical rate laws and temperature dependence, complex reactions, steady state approximation, determination of reaction mechanisms. (K1, K2, K3 & K4)
- 4.4 Collision and transition state theories of rate constants, unimolecular reactions. (K1, K2, K3, K4 & K5)

4.5 Enzyme kinetics and salt effects. (K1, K2, K3 & K4)

4.6 Homogeneous catalysis and photochemical reactions. (K1, K2, K3 & K4)

## Unit V

5.1 Colloids and surfaces: Stability and properties of colloids, isotherms and surface area. (K1, K2, K3 & K4)

5.2 Heterogeneous catalysis. (K1, K2, K3 & K4)

5.3 Solid state: Crystal structures, Bragg's law and applications, band structure of solids. (K1, K2, K3 & K4)

5.4 Polymer chemistry: Molar masses, kinetics of polymerization. (K1, K2, K3 & K4)

5.5 Data analysis: Mean and standard deviation, absolute and relative errors. (K1, K2 & K3)

5.6 Linear regression, covariance and correlation coefficient. (K1, K2, K3 & K4)

## Reference Books:

1. J. E. Huheey, Inorganic Chemistry, Principles, Structure and Reactivity, Harper Collins, New York, 4<sup>th</sup> Edition, 1993.
2. F. A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry: A Comprehensive Text, John Wiley and Sons, 5<sup>th</sup> Edition, 1988.
3. K. F. Purcell and J. C. Kotz, Inorganic Chemistry, WB Saunders Co., USA, 1977.
4. R. G. Frost and Pearson, Kinetics and Mechanism, Wiley, New York, First Reprint 1970.
5. Keith J. Laidler, Chemical Kinetics, Pearson Edition Company Pvt. Ltd., Third Edition, 2005.
6. P. W. Atkins, Physical Chemistry, Oxford University Press, 7<sup>th</sup> Edition, 2002.
7. J. Rajaram J. C. Kuriacose, Kinetics and Mechanisms of Chemical Transformations: Applications of Femto Chemistry, Mc Millan Publishers India Ltd., Reprint 2009.
8. V. R. Gowarikar, Viswanathan J. Sridhar, Polymer Science, Wiley Eastern, Reprint 2005.
9. F. W. Billmeyer, Textbook of Polymer Science, Wiley Inter Science, 3<sup>rd</sup> Edition. 2005.
10. K. V. Raman, Group Theory and Its Applications to Chemistry, Tata McGraw-Hill Publishing Company Ltd., Reprint 2004.
11. M. S. Gopinathan and V. Ramakrishnan, Group Theory in Chemistry, Vishal Publishing Co., Reprint 2005.
12. F. A. Cotton, Group Theory and Its Applications to Chemistry, John Wiley & Sons (Asia) Pvt. Ltd., Singapore, 2004.
13. A. Salahuddin Kunju and G. Krishnan, Group theory and its Applications in Chemistry, Asoke K. Ghosh, PHI Learning Pvt. Ltd., New Delhi, 2010.

## OER:

1. <https://www.examrace.com/CSIR/CSIR-Free-Study-Material/CSIR-Chemical-Sciences/Chemistry/Physical-Chemistry/>
2. <https://www.chemistryabc.com/download/notes/csir-ugc-net-notes/>
3. <https://ocw.mit.edu/courses/chemistry/5-61-physical-chemistry-fall-2007/lecture-notes/>

## SEMESTER IV

### PICH120 - IEP - ADVANCED INSTRUMENTATION TECHNIQUES

<b>Year:</b> II	<b>Course Code</b> PICH120	<b>Title of the Course</b> Advanced Instrumentation Techniques	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W Own Pace</b>	<b>Credits</b> 2	<b>Marks</b> 100
<b>SEM:</b> IV							

#### Learning Objectives:

- To study in detail the advanced instrumentation methods including spectroscopic, separation and voltammetric techniques.
- To give an in-depth knowledge about the techniques used in monitoring environmental pollution.

#### Course Outcomes:

The Learners will be able to

1. Outline the working principle of NMR, ESR and Mossbauer spectroscopy with selected applications.
2. Summarize the operating principle, sample preparation and imaging modes of XPS, AES, SEM, TEM, etc.
3. Outline the working principle of separation techniques such as HPLC, NP-HPLC, RP-HPLC, CZE, ICP and hyphenated techniques.
4. Define the principle of voltammetry such as LSV, AWV, DPV and theory and applications of Cyclic Voltammetry.
5. Outline the methods of monitoring air and water pollution.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

## **Unit I**

- 1.1 One Dimensional NMR: Principle. (K1, K2, K3, K4, K5 & K6)
- 1.2 Two-Dimensional NMR: Principle. (K1, K2, K3, K4, K5 & K6)
- 1.3 Solid state NMR with examples. (K1, K2, K3, K4, K5 & K6)
- 1.4 ESR: Basic principles, experimental conditions. (K1, K2, K3, K4, K5 & K6)
- 1.5 Mossbauer Spectroscopy: Principle, preparation of Mossbauer source. (K1, K2, K3, K4, K5 & K6)
- 1.6 Hyperfine interactions, evaluation of Mossbauer spectra, selected applications. (K1, K2, K3, K4, K5 & K6)

## **Unit II**

- 2.1 X-ray photoelectron spectroscopy (XPS). (K1, K2, K3, K4 & K5)
- 2.2 Auger electron spectroscopy (AES). K1, K2, K3, K4 & K5)
- 2.3 Scanning tunneling methods: AFM, STM, STS. K1, K2, K3, K4 & K5)
- 2.4 SEM: Operating principle, sample preparation and imaging modes. K1, K2, K3, K4 & K5)
- 2.5 TEM: Operating principle, sample preparation and imaging modes. K1, K2, K3, K4 & K5)
- 2.6 STEM: Operating principle, sample preparation and imaging modes. K1, K2, K3, K4 & K5)

## **Unit III**

- 3.1 Separation methods: HPLC, NP-HPLC, RP-HPLC - basic principles. (K1, K2, K3, K4, K5 & K6)
- 3.2 HPTLC - basic principles. (K1, K2, K3, K4, K5 & K6)
- 3.3 Capillary zone electrophoresis (CZE) - basic principles. (K1, K2, K3, K4, K5 & K6)
- 3.4 ICP - basic principles. (K1, K2, K3, K4, K5 & K6)
- 3.5 Hyphenated techniques: LC-MS, GC-MS, SFC-MS (Supercritical Fluid Chromatography-MS) and MALDI - principle, instrumentation and applications. (K1, K2, K3, K4, K5 & K6)
- 3.6 ICP-MS, CZE-MS (Capillary Zone Electrophoresis-MS) and LASER-MS - principle, instrumentation and applications. (K1, K2, K3, K4, K5 & K6)

## **Unit IV**

- 4.1 Voltammetric techniques: Linear Sweep Voltammetry (LSV) - basic principle. K1, K2, K3, K4 & K5)
- 4.2 Square Wave Voltammetry (SWV): Basic principle. K1, K2, K3, K4 & K5)
- 4.3 Anodic Stripping Voltammetry (ASV): Basic principle. K1, K2, K3, K4 & K5)
- 4.4 Differential Pulse Voltammetry (DPV): Basic principle. K1, K2, K3, K4 & K5)
- 4.5 Cyclic Voltammetry (CV): Basic principle and theory of CV - important parameters in a cyclic voltammogram - applications of CV. K1, K2, K3, K4 & K5)
- 4.6 Fast Scan Cyclic Voltammetry (FSCV). K1, K2, K3, K4 & K5)

## **Unit V**

- 5.1 Air pollution monitoring techniques for carbon monoxide. (K1, K2, K3, K4, K5 & K6)
- 5.2 Air pollution monitoring techniques for sulphur dioxide, nitrogen dioxide. (K1, K2, K3, K4, K5 & K6)
- 5.3 Air pollution monitoring techniques for hydrocarbons and ozone. (K1, K2, K3, K4, K5 & K6)
- 5.4 Automated wet-chemical air analysis. (K1, K2, K3, K4, K5 & K6)

5.5 Water pollution monitoring techniques - flame photometry and AAS. (K1, K2, K3, K4, K5 & K6)

5.6 Water pollution monitoring techniques - TDS. (K1, K2, K3, K4, K5 & K6)

**Reference Books:**

1. Helmut Gunzler and Alex Williams, Handbook of Analytical Techniques, Wiley-VCH, 2001.
2. R. Egerton, Physical Principles of Electron microscopy, Springer International Publishing, Second Edition, 2016.
3. R. S. Khandpur, Handbook of Analytical Instruments, McGraw-Hill Education Pvt. Ltd., Second Edition, 2006.
4. H. Kaur, Instrumental Methods of Chemical Analysis, Pragati Prakashan, Meerut, 2010.
5. B. K. Sharma, Instrumental Methods of Chemical Analysis, Krishna Prakashan Media (P) Ltd., 2014.
6. Skoog, West, Holler, Rouch, Fundamentals of Analytical Chemistry, Brooks/ Cole Cengage Learning, 9<sup>th</sup> Edition, 2013.

**OER:**

1. <http://chem.ch.huji.ac.il/nmr/techniques/2d/2d.html>
2. <https://link.springer.com/article/10.1007/s40828-015-0016-y>
3. <https://www.brown.edu/Departments/Engineering/Courses/En123/Lectures/potentiostat.pdf>
4. [http://www.zmb.uzh.ch/static/bio407/assets/Script\\_AK\\_2014.pdf](http://www.zmb.uzh.ch/static/bio407/assets/Script_AK_2014.pdf)

## SEMESTER IV

### PICHJ20 - IEP - LEATHER CHEMISTRY

<b>Year:</b> II <b>SEM:</b> IV	<b>Course Code</b> PICHJ20	<b>Title of the Course</b> Leather Chemistry	<b>Course Type</b> Theory	<b>Course Category</b> Independent Elective	<b>H/W Own Pace</b>	<b>Credits</b> 2	<b>Marks</b> 100
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#### Learning Objectives:

The Learners will be able

- To acquire technical competence on leather manufacturing with eco -friendly and sustainable approach.
- To develop indigenous and adaptable technologies related to leather for small scale production and to develop entrepreneurial skills, towards betterment of society.
- To develop state-of-art facilities for testing and consultancy for leather industries.

#### Course Outcomes:

The Learners will be able to

1. Outline the tanning processes in leather industry.
2. Discuss the cleaner technology in leather industry.
3. Illustrate the chrome tanning process.
4. Outline the mechanism of tanning and role of surface charge and importance of electrostatic, H-bond, dipole-dipole and hydrophobic interactions.
5. Apply waste water management and zero discharge approaches in leather industry.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	L	M
CO2	H	H	M	H	L	M
CO3	H	M	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-High (3), M-Moderate (2), L-Low (1)**

## **Unit I**

- 1.1 Raw materials, stages in the leather processing. (K1 & K2)
- 1.2 Pre-tanning operations - soaking, liming, deliming, bating, pickling, degreasing. (K1 & K2)
- 1.3 Tanning process - chrome tanning, vegetable tanning. (K1 & K2)
- 1.4 Post-tanning operations - rechroming of wet blue leathers, neutralization. (K1 & K2)
- 1.5 Retanning, dyeing and fatliquoring. (K1 & K2)
- 1.6 Drying and finishing. (K1 & K2)

## **Unit II**

- 2.1 Environmental challenges in leather industries. (K1 & K2)
- 2.2 Cleaner technology options - curing, air drying, frame drying, freezing, chemical methods, biocides for curing and control drying. (K1 & K2)
- 2.3 Desalting, soaking after desalting. (K1 & K2)
- 2.4 Liming and unhairing. (K1 & K2)
- 2.5 Advantages of sulphide free unhairing system by using dehairing process, advantages of less sulphide unhairing system, and advantages of sulphide lime unhairing system. (K1 & K2)
- 2.6 Delimiting and bating. (K1 & K2)

## **Unit III**

- 3.1 Chrome tanning - method of chrome tannage, masking principle of masking, effect of masking on chrome tannage. (K1 & K2)
- 3.2 Influence of reducing agent on nature of chrome complexes. (K1 & K2)
- 3.3 Mechanism of chrome tanning, variable parameters of chrome tanning. (K1 & K2)
- 3.4 Wet finishing operations - rechroming, neutralization, retanning, dyeing, fatliquoring and finishing. (K1 & K2)
- 3.5 Chrome management options - chrome recovery and reuse - partial replacement of chrome tanning agent by other tanning agents. (K1 & K2)
- 3.6 High exhaust tanning systems - closed loop tanning systems. (K1 & K2)

## **Unit IV**

- 4.1 Mechanism of tanning - transport of tanning materials into pelt. (K1 & K2)
- 4.2 Role of surface charge and importance of electrostatic, H-bond, dipole-dipole and hydrophobic interactions. (K1 & K2)
- 4.3 Theory of finishing with special emphasis to optical properties of pigments and binders. (K1 & K2)
- 4.4 Diffusion equilibria and mechanism of vegetable, mineral and combination tannages. (K1 & K2)
- 4.5 Role of crosslinking in leather finishing. (K1 & K2)
- 4.6 Fibre coating in matrix stability. (K1 & K2)

## **Unit V**

- 5.1 Quality control in leather processing. (K1 & K2)
- 5.2 Tannery effluents, effluent disposal, types of effluent disposal. (K1 & K2)
- 5.3 Recovery and reuse of water in tanning industry, utilization of treated effluents. (K1 & K2)
- 5.4 Productivity and quality consistency. (K1 & K2)
- 5.5 Waste water management and zero discharge approaches. (K1 & K2)

## 5.6 Energy audit and environmental footprints. (K1 & K2)

### Reference Books:

1. P. S. Briggs, Gloving, clothing and special leathers, Tropical Products Institute, London, 1981.
2. J. H. Sharphouse, Leather Technicians Hand Book, Leather Producers Association, Northampton NN3 1 JD, Reprinted 1995.
3. O. Flaherty, William T. Roddy and Robert M. Lollar, The Chemistry and Technology of Leather, Vol. 1, Preparation for tannages, EL. Robert Krieger Publishing Company, New York, 1978.
4. Bienkiewicz, Physical Chemistry of Leather Making, Krieger Publishing Co., Florida, 1982.
5. D. Covington, Tanning Chemistry: The Science of Leather, Royal Society of Chemistry, 2009.

### OER:

1. <http://wwwchem.uwimona.edu.jm/courses/CHEM2402/Textiles/Leather.html>
2. [https://www.researchgate.net/publication/337720281\\_Leather\\_Processing\\_Its\\_Effects\\_on\\_Environment\\_and\\_Alternatives\\_of\\_Chrome\\_Tanning](https://www.researchgate.net/publication/337720281_Leather_Processing_Its_Effects_on_Environment_and_Alternatives_of_Chrome_Tanning)
3. <https://www.iloencyclopaedia.org/component/k2/item/872-tanning-and-leather-finishing>
4. [https://shodhganga.inflibnet.ac.in/bitstream/10603/7476/10/10\\_chapter%201.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/7476/10/10_chapter%201.pdf)
5. [https://www.researchgate.net/publication/337720281\\_Leather\\_Processing\\_Its\\_Effects\\_on\\_Environment\\_and\\_Alternatives\\_of\\_Chrome\\_Tanning](https://www.researchgate.net/publication/337720281_Leather_Processing_Its_Effects_on_Environment_and_Alternatives_of_Chrome_Tanning)
6. [https://shodhganga.inflibnet.ac.in/bitstream/10603/75047/14/14\\_chapter%206.pdf](https://shodhganga.inflibnet.ac.in/bitstream/10603/75047/14/14_chapter%206.pdf)
7. <http://en.kimyasal.boun.edu.tr/webpages/courses/leathertechnology/deri16.htm>
8. [https://www.researchgate.net/publication/223418622\\_Reducing\\_the\\_environmental\\_impact\\_of\\_the\\_unhairing-liming\\_process\\_in\\_the\\_leather\\_tanning\\_industry](https://www.researchgate.net/publication/223418622_Reducing_the_environmental_impact_of_the_unhairing-liming_process_in_the_leather_tanning_industry)

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# **Department of Computer Science (PG)**

## **SYLLABUS AND REGULATIONS**

Under

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

Department of **Computer Science** (PG)

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighboring districts.

**Framework of Curriculum**

**Number of Credits:** 90 Credits

**Credit Distribution:** 15 Weeks/Semester

**Assessment and Evaluation Methods:**

There are two components in the Assessment and Evaluation of a student – Internal and External. These are implemented through

1. Continuous Assessment (CA) during the Semester for 40 marks. It consists of two written tests and an innovative component.
2. Semester Examination (SE) at the end of the Semester for 100 marks which will be converted to 60 marks.

The maximum marks for each paper shall be 100.

Each Postgraduate Programme consists of Four Semester.

**Continuous Assessment (CA)**

1. The Continuous Assessment of each student will be done by the respective Department.

2. Each written test is of two hours duration for 50 marks. The tests will be conducted centrally. The average of two such CA is calculated for 35 marks/
3. The innovative component is for 5 marks, conducted during the class hours by the staff member in charge of the course, in the form of assignments/ quiz/ seminars/ presentations/ online/ open book/ viva-voce/ group work/ mini project/ exhibition, etc. The topic and time for submission/ presentation will be announced by the staff member in charge of the course in advance. Each student should explain and defend her presentation.
4. Syllabus of not less than two units shall be included for each CA.
5. A retest for CA will be conducted for a student only if a student is absent due to NSS/NCC/Sports campus on prior written permission obtained through the concerned staff members.
6. There is no passing minimum for CA.
7. There is no provision for improvement in CA.

### **Semester Examination (SE)**

1. A student should register herself to appear for the Semester Examinations by payment of the prescribed fee.
2. The Semester Examination will be in the form of a comprehensive examination covering the entire syllabus in each course. It will be of 3 hours duration, irrespective of the number of credits allotted to it.

### **Valuation of Answer Scripts**

1. There shall be a single valuation for Postgraduate Courses. The panel of Examiners will consist of internal and external examiners.
2. The valuation will be centralized.
3. A student has a minimum period of five years from the date of Admission to clear all the courses prescribed for the Programme at the time of her admission. After the fifth year, to complete the Programme, the student has to appear for an examination in the same/equivalent paper offered under the revised syllabus structure.
4. The fraction of final marks in CA and SE shall be rounded off to the nearest integer.

### **Revaluation**

1. A student can apply for the photocopy of answer scripts, if needed, on payment of the prescribed fee.
2. A student can apply for revaluation of any paper, on payment of the prescribed fee within the specified date. Receipt of the photocopy of the answer script is a pre-requisite for revaluation.

## CA and SE for Laboratory and Practical Work

CA		SE	
Components	Marks	Components	Marks
Performance during regular Practical's	10	Record	10
Regularity and submission of observation Notebook and Record	5	Practical Examination	45
Practical Examination	25	Viva Voce	5
<b>Total</b>	<b>40</b>	<b>Total</b>	<b>60</b>

### B) NAME OF THE PROGRAMME: M.Sc. Computer Science

#### Vision of the Programme

- Build a strong research and teaching environment aimed towards the betterment of society and industrial needs.
- To be a leading, contemporary, innovative Computer Science department in inculcating professional competencies in the field of Computing and related interdisciplinary technologies to achieve academic excellence and to facilitate research activities as a timely response to dynamic needs and challenges of industry and society.

### D) List of courses

Sem	Part	Code	Title	Hours/ Week	Exam Hours		Credits	Marks
					Th	Pr		
I		PCCSA20	Java Programming	5	3	-	5	40+60
		PCCSB20	.Net Framework	5	3	-	5	40+60
		PCCSC20	Research Methodology	5	3	-	5	40+60
		PECSA20	Elective I A: Design and Analysis of Algorithm	5	3	-	5	40+60
		PECSB20	Elective I B: Cyber Security					
		PCCSD20	Practical I: Java Programming Lab	5	-	3	3	40+60
		PCCSE20	Practical II: .Net Programming Lab	5	-	3	3	40+60
<b>Total</b>							<b>26</b>	<b>600</b>
II		PCCSF20	Machine Learning	5	3	-	5	40+60
		PCCSG20	Open Source Programming	4	3	-	4	40+60
		PCCSH20	Wireless Communications and Networks	5	3	-	5	40+60
		PCCSI20	Theory of Computation	4	3	-	4	40+60
		PECSC20	Elective II A: Cryptography and Network Security	4	3	-	4	40+60
		PECSD20	Elective II B: Soft Computing					
		PCCSJ20	Practical III: Machine Learning	3	-	3	2	40+60
		PCCSK20	Practical IV: Open Source Programming Lab	3	-	3	2	40+60
		PNHRA12	Human Rights	2	3	-	2	40+60
<b>Total</b>							<b>28</b>	<b>800</b>
III		PCCSL20	Web Services	5	3	-	4	40+60
		PCCSM20	Distributed and Cloud Computing	5	3	-	5	40+60
		PCCSN20	Principles of Compiler Design	5	3	-	4	40+60
		PECSE20	Elective III A: Internet of Things	5	3	-	4	40+60

	PECSF20	Elective III B: Multimedia Communication					
	PECSG20	Elective IV A: Big Data Analytics	4	3	-	4	40+60
	PECSH20	Elective IV B: Software Project Management					
	PCCSO20	Practical V: Web Services Lab	3	-	3	2	40+60
	PCCSP20	Practical VI: Mini Project	3	-	3	3	40+60
<b>Total</b>						<b>26</b>	<b>700</b>
IV	PCCSQ20	Project Work				<b>10</b>	40+60
<b>Grand Total</b>						<b>90</b>	<b>2200</b>

#### INDEPENDENT ELECTIVES:

SEM	CODE	TITLE
I	PICSA20	Software Quality Assurance
I	PICSB20	Green Computing
I	PICSC20	Distributed Operating System
II	PICSD20	Wireless Sensor Networks
II	PICSE20	Digital Image Processing
II	PICSF20	Steganography and Digital Watermarking
III	PICSG20	Cloud Solution with Azure
III	PICSH20	Introduction to Block chain Technology
III	PICSI20	Embedded System

### **E) Program Objectives (POs)**

**PO1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.

**PO2:** Assimilate and apply principles and concepts towards skill development & employability.

**PO3:** Apply critical and scientific approaches to address problems and find solutions.

**PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO5:** Integrate issues of social relevance in the field of study.

**PO6:** Persist in life-long learning for personal and societal progress.

### **F) Programme Specific Outcomes (PSOs)**

**PSO1:** To apply fundamental knowledge of computing and science relevant to the discipline.

**PSO2:** Ability to learn & apply advance concepts to generate novel solutions for solving complex computational problems.

**PSO3:** To design, implement, and evaluate a computer-based system, process, component, or program for various applications.

**PSO4:** Contribute significantly to the research and the discovery of new knowledge and methods in the field of computer science.

**PSO5:** To use current techniques, skills, and modern tools necessary for research-based knowledge and research methods for the cultural, societal, environmental considerations and demonstrate the knowledge of and need for sustainable development.

**PSO6:** To Formulate models, design and conduct experiments for interpreting data and critical thinking.

## SEMESTER I

### PCCSA20 – JAVA PROGRAMMING

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PCCSA20	Java Programming	Theory	Core	5	5	100

#### Course Objectives

1. This paper helps to enhance the knowledge in advanced features of Java and programming skill as per the industry need.
2. Using Graphics, Animations and Multithreading for designing applet based applications.
3. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and event handling.
4. Designing GUI based applications using swing.
5. Design and develop Web applications using Java Server Pages.

#### Course Outcomes (COs)

1. Understand the basics of Java and AWT
2. Develop Swing-based GUI
3. Update and retrieve the data from the databases using JDBC
4. Develop client/server applications and distributed applications using RMI
5. Develop server-side programs in the form of Servlets

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	H	M	M	L	H
CO4	M	M	M	H	L	M
CO5	L	M	H	M	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I (18 Hours)

- 1.1 Introduction to Java – Features of Java– Constructors (K1, K2)
- 1.2 Exception handling: try, catch - Throw and throws – Multithreading (K1, K2)
- 1.3 Java AWT – working with Graphics – Font – Color (K1, K3)
- 1.4 Networking – Networking Basics – Networking Classes and Interface – InetAddress – Factory Methods – Instance Methods (K2, K3)
- 1.5 InetAddress and Inet5Address – TCP/IP Client Sockets – Cookies. (K3, K4)
- 1.6 URL – URL Connection – HTTP URL Connection – URI Class (K4, K5)

### Unit II (16 Hours)

- 2.1 Swing: JFC – Features of Swing – Swing Components (K1, K3)
- 2.2 Working with Swing – Event Handling Using Swing(K2, K3)
- 2.3 Exploring Swing: JLabel and JTextField - The Swing Buttons - JComboBox - JTable (K2, K3)
- 2.4 JDBC: Introduction- Architecture-- JDBC Environment – JDBC Driver Types (K4, K5)
- 2.5 Java, Sql Package – Data Manipulation – Data Navigation – JDBC Classes and Interfaces (K2, K3)
- 2.6 JDBC Statement Interface – Connection Interface – Statement Interface –ResultSet Interface (K3, K5)

### Unit III (14 Hours)

- 3.1 RMI – Introduction - RMI Architecture – RMI for Distributed Computing(K2, K3)
- 3.2 Working of an RMI application - Marshalling and Unmarshalling - RMI Registry - Goals of RMI(K1, K2, K3)
- 3.3 Working RMI Application – Defining Remote Interface – Simple Programs(K3, K4)
- 3.4 Working Servlets: Background – Life Cycle of Servlets – Servlet Architecture Cognitive (K2, K3)
- 3.5 Servlet API – Javax Servlet Packages – Creating Servlets – Reading Servlet Parameters, The javax.servlet.http Package(K4, K6)
- 3.6 Handling HTTP Request and Responses – Using Cookies - Simple Programs(K5, K6)

### Unit IV (15 Hours)

- 4.1 JSP: Introduction and Marketplace – JSP and HTTP – JSP Engines – JSP Works(K1, K2)
- 4.2 Anatomy of JSP page – Life Cycle of JSP – JSP API – JSP in IDE(K2, K3)
- 4.3 JSP Expressions – Declarations – - Scripting elements – Scriplet – Expression(K1, K4)
- 4.4 Directive Elements – Page – Include – Taglib Directive – Action Element(K4, K5)
- 4.5 Inserting Applet into JSP (K5, K6)
- 4.6 Accessing a Database from JSP (K5, K6)

### Unit V (12 Hours)

- 5.1 EJB: Introduction to EJB – EJB fundamentals - EJB Architecture - EJB Roles (K1, K5)
- 5.2 J2EE architecture, Enterprise application concepts(K1, K2)
- 5.3 J2EE platform, HTTP protocol, web application (K3, K5)
- 5.4 Web containers and Application servers (K2, K3, K4)
- 5.5 Java Web Frameworks: Spring MVC Overview of Spring, Spring Architecture(K3, K4, K5)
- 5.6 Hibernate 4.0 Overview of Hibernate, Hibernate Architecture(K5, K6)

**Text Books:**

1. Herbert Schildt (2017). The Complete Reference: Java. Tata McGraw Hill Publishing, Eighth Edition.
2. Ivan Bayross (2013). Web Enabled Commercial Applications Development using Java, 2-BPB Publications, Second Edition.
3. Phil Hanna (2013). The Complete Reference: JSP 2.0. Tata McGraw Hill Publishing.
4. UttamK.Roy (2017). Advanced Java Programming. Oxford University Press, Third Edition.

**Reference Books:**

1. Jim Keogh (2014). The Complete reference to J2EE. Tata McGraw-Hill.
2. Hall Brown (2015). Core Servlet and JavaServer page. Pearson Education, Second edition
3. Mike Mcgrath (2062).Java Server Pages in Easy Steps. Dreamtech Publications. Second Edition

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=vJ-Zn4fo0MQ>
2. <https://www.tutorialspoint.com/java/index.htm>[https://www.tutorialspoint.com/php/php\\_tutorial.pdf](https://www.tutorialspoint.com/php/php_tutorial.pdf)
3. <https://www.youtube.com/watch?v=eiu2eXxeCCU>

## SEMESTER I

### PCCSB20 - .NET FRAMEWORK

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PCCSB20	<b>Title of the Course:</b> .Net Framework	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. This course presents the practical aspects of application development using .Net framework.
2. It also covers the Common Language Runtime (CLR), .Net framework classes, C#, and ADO.NET
3. To update and enhance skills in writing Windows applications, ADO.NET and ASP.NET.
4. The student will gain programming skills in C# both in basic and advanced levels.
5. By building sample applications, the student will get experience and be ready for large - scale projects.

#### Course Outcomes (COs)

1. Understand code solutions and compile C# projects within the .NET Framework.
2. Develop C# console applications using Classes and Objects and Interfaces.
3. Design and Implement database connectivity using ADO.NET in Windows Based Applications.
4. To understand and be able to using XML in C#.NET specifically ADO.NET and SQL server.
5. Develop the Web Applications using C#.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	M	H	M	L	L
CO2	L	L	H	M	L	M
CO3	L	M	L	M	L	L
CO4	L	M	L	H	M	M
CO5	H	L	H	M	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I (18 Hours)

- 1.1 Introducing C# - .NET Framework - The C# Language (K1)
- 1.2 Variables and Data - Operators (K1, K2)
- 1.3 Control Structures (K3)
- 1.4 C# Array - ArrayList Class (K5)
- 1.5 String - StringBuilder Class (K3, K4)
- 1.6 Functions and Methods – Structures (K3, K6)

### Unit II (16 Hours)

- 2.1 Classes and Objects - Constructor and Destructors (K1, K2)
- 2.2 Types of Classes - Various Class Members (K2)
- 2.3 Interfaces - Delegates - Events (K4, K6)
- 2.4 Inheritance - Access Modifiers - Class Modifiers (K3, K4)
- 2.5 Polymorphism - Operator Overloading - Errors and Exceptions (K5)
- 2.6 C# Files and IO - C# Collections. (K5, K6)

### Unit III (14 Hours)

- 3.1 ADO.NET: C# Graphical User Interface and Application Development (K2, K3)
- 3.2 .Net Environment - User Interface Elements and Hierarchy in C# (K4)
- 3.3 Programming with the Windows Controls (K5)
- 3.4 C# MDI Form - Dialog Box (K4, K5)
- 3.5 C# ADO.Net: Data Providers - ADO.NET Objects (K3)
- 3.6 Data Set - Working with Data. (K6)

### Unit IV (15 Hours)

- 4.1 XML.Net: XML- A Brief Introduction - XML Syntax (K1)
- 4.2 Reading and Writing XML Files - Searching XML File using XPATH (K1, K2)
- 4.3 XML and ADO.NET for Handling Data (K6)
- 4.4 Fundamentals of Web Programming - ASP.NET Life Cycle (K2, K5)
- 4.5 ASP.NET Applications and Configuration - Web Forms (K4)
- 4.6 SOAP and Web Services - Creating and Consuming Web Service. (K5, K6)

### Unit V (12 Hours)

- 5.1 .Net Assemblies: Integrating Application Files (K2)
- 5.2 Security in .NET - Attributes (K2, K4)
- 5.3 Reflections - Type Discovery (K3)
- 5.4 Remote Programming: C# Remoting Architecture (K2, K6)
- 5.5 Domains - Contexts - Proxies (K2, K5)
- 5.6 Marshalling and Unmarshalling (K3)

**Text Books:**

1. Anamitra Deshmukh–Nimbalkar (2018). C# and .Net Programming. Technical Publications. First Edition.

**Reference Books:**

1. Christian Nageletal (2012). Professional C# 2012 with .NET 4.5. Wiley India.
2. Herbert Schildt (2012). The Complete Reference: C# 4.0. Tata McGraw Hill.
3. Andrew Troelsen (2010). Pro C# 2010 and the .NET 4 Platform. Fifth Edition.
4. Ian Griffiths- Matthew Adams- Jesse Liberty (2010). Programming C# 4.0. Sixth Edition. O'Reilly.

**Open Educational Resources (OER):**

1. <https://www.w3schools.com/cs/>
2. <https://www.youtube.com/watch?v=GcFJjpMFJvI&t=759s>

## SEMESTER I

### PCCSC20 – RESEARCH METHODOLOGY

<b>Year: I</b>	<b>Course Code:</b> PCCSC20	<b>Title of the Course:</b> Research Methodology	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To gain familiarity with a phenomenon or to achieve new insights into it.
2. To portray accurately the characteristics of a particular individual situation or a group.
3. To determine the frequency with which something occurs or with which it is associated with something else.
4. To test a hypothesis of a causal relationship between variables.
5. To find solutions for scientific, non-scientific and social problems.

#### Course Outcomes (COs)

1. Understand the concepts of research design, research process and various types of research.
2. Understand the different steps in writing report.
3. Implement the methods and techniques for experimental study.
4. Analyze the ethical issues in research.
5. Assess the Various research areas in Computer science.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	L	L	M	H	M
CO2	L	L	M	M	M	L
CO3	L	H	L	H	L	H
CO4	M	M	M	M	M	M
CO5	H	M	M	L	L	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I

(18 Hours)

- 1.1 Research - Definition- importance and meaning of research-characteristics of research (K2)
- 1.2 Type of research - steps in research (K2).
- 1.3 Research process – an overview (K2)
- 1.4 Identification of research area (K2)
- 1.5 Selection and formulation of research problem (K2).
- 1.6 Formulation of objectives (K6)

### Unit II

(16 Hours)

- 2.1 Review of Literature – Course work - Literature Survey (K2)
- 2.2 Collecting research papers from journals (K2)
- 2.3 Web Browsing - Efficient Searching (K2)
- 2.4 Online Resources - Reading a research paper - Scopus tool (K2)
- 2.5 Develop a theoretical framework (K6)
- 2.6 Improve your methodology (K5, K6)

### Unit III

(14 Hours)

- 3.1 Preparing the research design (K2)
- 3.2 Data collection and preparation (K2)
- 3.3 Experimental study – Result analysis and Discussions (K3)
- 3.4 Writing a research paper (K4)
- 3.5 Publishing the results (K6)
- 3.6 IEEE format – Latex tool (K1)

### Unit IV

(15 Hours)

- 4.1 Significance of Report writing – Different steps in writing report (K2, K4)
- 4.2 Layout of the research report - Types of Reports – Oral Presentation (K2)
- 4.3 Mechanics of writing a research report – Precautions for writing Research Reports (K5)
- 4.4 Ethical issues in research (K4)
- 4.5 Patent registration procedure – Funding agencies (K6)
- 4.6 Writing research proposals – Effective presenting methods (K6)

### Unit V

(12 Hours)

- 5.1 Various research areas in Computer science (K2)
- 5.2 Image processing (K4)
- 5.3 Networks and security (K4)
- 5.4 Data mining and machine learning (K4)
- 5.5 wireless and sensor systems (K4)
- 5.6 Audio, speech, language and signal processing (K2)

### Text Books:

1. Kothari, C.R (2013), Research Methodology – Methods and Techniques, Second Edition. Wiley Eastern Limited.
2. 1. R. Panneerselvam (2014). Research Methodology, Fourth Edition, Prentice Hall India Learning Private Limited.

**Reference Books:**

1. Ranjit Kumar (2011). Research Methodology – A step- by-step guide for beginners, Third Edition, Pearson Education.
2. Deepak Chawla and Neena Sondh (2011). Research Methodology, Concepts and Cases, Vikas Publishing House Pvt. Ltd.

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=PDjS20kic54>
2. [https://www.youtube.com/watch?v=w\\_Ujkt83i18](https://www.youtube.com/watch?v=w_Ujkt83i18)

## SEMESTER I

### PECSA20 – ELECTIVE I A: DESIGN AND ANALYSIS OF ALGORITHM

<b>Year:</b> I	<b>Course Code:</b> PECSA20	<b>Title of the Course:</b> Elective I A: Design and Analysis of Algorithm	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To develop skills in design and implementation of data structures and their applications.
2. To understand the usage of graph structures and spanning trees.
3. To acquire the knowledge of using advanced tree structures.
4. To learn the usage of heap structures.
5. To explain classification of problems based on the computational complexity

#### Course Outcomes (COs)

1. Understand data structures and the concepts of algorithm for Merge Sort, Quick Sort and Binary Search.
2. Understand the fundamental graph algorithms in solving optimization problems.
3. Update knowledge to learn advanced tree concepts in data structure and algorithm.
4. Able to perform all the operations on Hashing and Heaps.
5. Analyze the computational complexity of various algorithms.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	M	H	M	L	M
CO2	M	H	L	L	M	L
CO3	H	M	L	M	L	M
CO4	M	H	M	L	M	L
CO5	L	M	M	L	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I

(15 Hours)

- 1.1 Introduction: Fundamentals of algorithmic problem solving (K1)
- 1.2 Asymptotic notations (K2)
- 1.3 Mathematical Analysis for Recursive and Non-Recursive Algorithms (K1, K3)
- 1.4 External Sorting: k-way Merge Sort (K5, K6)
- 1.5 Quick Sort – Binary Search (K4, K5)
- 1.6 Strassen's Matrix Multiplication (K3, K6)

### Unit II

(15 Hours)

- 2.1 Graphs: Graph Terminology – Directed Graphs – Representation of Graphs (K1)
- 2.2 Graph Traversal Algorithms – Topological Sorting (K1, K2, K6)
- 2.3 Minimum Spanning Trees: Kruskal's Algorithm (K4, K5, K6)
- 2.4 Prim's Algorithm (K4, K5)
- 2.5 Shortest Path Algorithms: Dijkstra's Algorithm (K3, K4, K6)
- 2.6 Warshall's Algorithm – Floyd's Algorithm (K4, K5, K6)

### Unit III

(15 Hours)

- 3.1 Trees: Basic Terminology – Types of Trees (K1, K2)
- 3.2 Creating a Binary Tree from a General Tree – Traversing a Binary Tree (K2, K3)
- 3.3 Efficient Binary Search Trees: Binary Search Trees (K3, K6)
- 3.4 Optimal Binary Search Tree (OBST) – AVL Trees (K1, K5)
- 3.5 Multi-way Search Trees: M-way Search Trees (K1, K4)
- 3.6 B-Trees - B+ Trees (K3, K6)

### Unit IV

(15 Hours)

- 4.1 Hashing: Introduction to Static Hashing – Hash Tables (K1, K2)
- 4.2 Different Hash Functions – Secure Hash Functions Dynamic Hashing (K2)
- 4.3 Priority Queues (Heaps): Binary Heaps – Basic Heap Operations (K2, K6)
- 4.4 Applications of Priority Queues (K2, K4)
- 4.5 Binomial Heaps Structure and Implementation – Binomial Queue Operations (K5)
- 4.6 Comparison between Binary and Binary Heaps (K1, K3)

### Unit V

(15 Hours)

- 5.1 Backtracking: N- Queens problem – Hamiltonian Circuit Problem (K2)
- 5.2 Subset- Sum Problem – Branch and Bound (K3, K4)
- 5.3 Assignment Problem (K4, K6)
- 5.4 Knapsack Problem (K4, K5, K6)
- 5.5 Travelling Salesman Problem (K2, K5)
- 5.6 P & NP Problems – NP- Complete Problems (K3, K4)

### Text Books:

1. Reema Thareja, S. Rama Sree (2018), "Advanced Data Structure", Oxford University Press.

**Reference Books:**

1. J. LalithaVani, T. Priya Radhika Devi (2015). Design and Analysis of Algorithms. First Edition.
2. Anany Levitin (2011). Introduction to the Design and Analysis of Algorithms. Edition III, Addison-Wesley.
3. Thomas H. Cormen, Charles Eric Leiserson, Ronald L. Rivest, Clifford Stein (2009). Introduction to Algorithms. Edition III - MIT Press.

**Open Educational Resources (OER):**

1. [https://www.youtube.com/watch?v=gY0MwGLq9W8&list=PLGdMwVKbjVQ8Ew7KUp65sRL9\\_k2\\_3xIKE](https://www.youtube.com/watch?v=gY0MwGLq9W8&list=PLGdMwVKbjVQ8Ew7KUp65sRL9_k2_3xIKE)
2. <https://nptel.ac.in/courses/106/106/106106131/>

## SEMESTER I

### PECSB20 - ELECTIVE I B: CYBER SECURITY

<b>Year:</b> I	<b>Course Code:</b> PECSB20	<b>Title of the Course:</b> Elective I B: Cyber Security	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. Gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.
2. Understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.
3. Examine secure software development practices.
4. Understand principles of web security.
5. Gain familiarity with prevalent network and distributed system attacks, defenses against them, and forensics to investigate the aftermath.

#### Course Outcomes (COs)

1. Evaluate the computer network and information security needs of an organization.
2. Assess cyber security risk management policies in order to adequately protect an organization's critical information and assets.
3. Analyze the performance of applications in a variety of system contexts.
4. Implement continuous network monitoring and provide real-time security solutions.
5. Identify physical points of vulnerability in simple networks.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	H	L	M	L	M	H
CO2	L	M	M	H	M	L
CO3	H	M	M	L	M	L
CO4	M	M	M	L	M	M
CO5	L	M	L	M	H	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I

(16 Hours)

- 1.1 Digital securities introduction, types of attacks, digital privacy, online tracking, privacy laws (K1, K2)
- 1.2 Types of computer security risks - malware, hacking, pharming, phishing, ransomware, adware and spyware, trojan, virus, worms, wifi eavesdropping(K1, K2)
- 1.3 Scareware, distributed denial-of-service attack, rootkits, juice jacking (K1, K2)
- 1.4 Antivirus and other security solution – password (K1, K2)
- 1.5 Secure online browsing email security - iot security (K1, K2)
- 1.6 Physical security threads (K1, K2)

### Unit II

(16 Hours)

- 2.1 Online anonymity anonymous networks - tor network (K1, K4)
- 2.2 I2P network – freenet - darknet, anonymous os (K1, K4)
- 2.3 Tails – secure file sharing – vpn – proxy server (K1, K4)
- 2.4 Connection leak testing – secure search engine (K1, K4)
- 2.5 Web browser privacy configuration (K1, K4)
- 2.6 Anonymous payment (K1, K4)

### Unit III

(15 Hours)

- 3.1 Disk Encryption using windows BitLocker (K4)
- 3.2 Disk Encryption Using open source tools – multitask encryption tools(K4)
- 3.3 Attacking cryptographic systems – countermeasures against cryptography attacks (K4)
- 3.4 Securing data in transit – cloud storage encryption (K4)
- 3.5 Encrypt DNS Traffic and Email communication (K4)
- 3.6 Secure IM and video calls (K4)

### Unit IV

(14 Hours)

- 4.1 Cyber Crime issues and investigation unauthorized access, computer intrusions (K4, K5)
- 4.2 White collar crimes – viruses and malicious code – internet hacking and cracking(K4, K5)
- 4.3 Virus attacks – pornography – software piracy –intellectual property –mail bombs (K4, K5)
- 4.4 Digital evidence collection – evidence preservation – e-mail investigation (K4, K5)
- 4.5 E-mail tracking – IP tracking – e-mail recovery (K4, K5)
- 4.6 Recovering deleted evidences – password cracking (K4, K5)

### Unit V

(14 Hours)

- 5.1 Digital Forensics introduction to digital forensics – forensic software and hardware (K1, K3)
- 5.2 Analysis and advanced tools – forensic technology and practices, forensic ballistics and photography (K1, K3)
- 5.3 Face, iris and fingerprint recognition – audio video analysis (K1, K3)
- 5.4 Windows system forensics – linux system forensics (K1, K3)
- 5.5 WIFI Security (War-driving) – Network Forensics (K1, K3)
- 5.6 Mobile Forensics – Cloud Forensics (K1, K3)

### Text Books:

1. Digital Privacy and Security Using Windows: A Practical Guide by Nihad Hassan, Rami Hijazi, Apress, 2017.

**Reference Books:**

- a. Cybersecurity: The Ultimate Beginners Guide to Learn and Understand Cybersecurity Measures Effectively Kindle Edition by Zach Webber 2018.
- b. Cybersecurity for Beginners by Raef Meeuwisse Lulu Publishing Services, 2017.

**Open Educational Resources (OER):**

1. <https://www.goodreads.com/book/show/28320795-cybersecurity-for-beginners>
2. [2.https://www.academia.edu/40648445/Digital\\_Privacy\\_and\\_Security\\_Using\\_Windows\\_A\\_Practical\\_Guide](https://www.academia.edu/40648445/Digital_Privacy_and_Security_Using_Windows_A_Practical_Guide)
3. <https://www.slideshare.net/lawitwan112/digital-privacy-and-security-using-windows-a-practical-guide>

## SEMESTER I

### PCCSD20 - PRACTICAL I: JAVA PROGRAMMING LAB

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PCCSD20	<b>Title of the Course:</b> Practical I: Java Programming Lab	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Objectives

1. Create a full set of UI widgets and other components, including windows, menus, buttons, Checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings.
2. Apply event handling on AWT and Swing components.
3. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC).
4. Learn to develop server side programming using servlets.
5. Create dynamic web pages, using JSP.

#### Course Outcomes (COs)

1. Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
2. Update and retrieve the data from the databases using SQL.
3. Develop Applet based programming using IDE.
4. Develop server-side programs in the form of servlets.
5. Design and develop JSP based Web applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	M	L	H	M	L
CO2	H	M	L	M	H	M
CO3	M	M	L	M	H	M
CO4	L	M	L	M	M	L
CO5	L	M	H	M	L	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Exercises**

1. Program using Basic User Interface Components and Layouts (K1, K2)
2. Create Payroll Processing form using swing (K1, K3)
3. Student Mark Sheet Processing using JDBC (K2, K4)
4. Bank Account Processing using JDBC (K4, K5)
5. Survey form using applets and JDBC (K2, K5)
6. Creating authentication form using servlets (K1, K3)
7. Creating survey form using servlets (K6)
8. Programs using JSP
  - JSP program that creates a table of power of 2 (K1, K3)
  - Factorial of a number (K1, K2)
9. Registration and Login form using JSP (K1, K3)
10. JSP program to process credit card information. (K5)

## SEMESTER I

### PCCSE20 - PRACTICAL II: .NET PROGRAMMING LAB

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PCCSE20	<b>Title of the Course:</b> Practical II: .Net Programming Lab	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Objectives

1. This course presents the practical aspects of application development using .Net framework.
2. To learn the technologies of the .NET framework.
3. To cover all segments of programming in C# starting from the language basis, followed by the object oriented programming concepts.
4. To update and enhance skills in writing Windows applications, ADO.NET and ASP.NET.
5. Using XML in C#.NET specifically ADO.NET and SQL server.

#### Course Outcomes (COs)

1. Create user interactive web pages using ASP.NET.
2. Create simple data binding applications using ADO.NET connectivity.
3. Performing Database operations for Windows Form and Web Applications.
4. Create Mobile Application using .NET compact Framework
5. Work with the basic and advanced features of C# language.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	M	M	M	H	L
CO2	H	L	H	M	L	L
CO3	H	L	L	L	M	M
CO4	M	M	L	H	M	L
CO5	L	L	M	L	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Exercises

1. Write a Program to accept a String and Convert the Case of the Characters. (K1, K5)
2. Write a Program to implement a Calculator with Memory and Recall operations. (K1, K4)
3. Develop a menu based .Net application to implement a text editor with Cut- Copy- Paste- Save and Close operations using Master pages. (K2, K6)
4. “How is the book ASP.NET with C# by DreamTech?” Give the user three choices: i) Good ii) Satisfactory iii) Bad. Provide a VOTE button. After user votes- present the result in percentage using labels next to the choices. (K3, K6)
5. Develop an application to perform timer based quiz of 10 questions. (K1, K6)
6. Develop a database application to store the details of students using ADO.NET (K1, K6)
  - a. Develop a database application using ADO.NET to insert- modify- update and delete operations.
  - b. Develop a .Net application using Datagrid to display records.
  - c. Develop a .Net application using Datagrid to add- edit and modify records. (K1, K4)
7. Develop Windows form to
  - a. Display Product details (Product Id, Name, Category and other details) in DataGridView using Dataset and Data Adapter.
  - b. Fill Combobox for listing all the categories from the database using SqlDataReader and DataTable.
  - c. When user select particular category only that category’s products must be displayed in the Grid.
  - d. Generate xml file from above generated dataset.(K4, K6)
8. Create an application for Accessing a SQL Database by Using ADO.NET by connecting to the SQL Server database and call a stored procedure. You then display the data in a Repeater control. (K2, K5)
9. Develop a web application to read the details of a selected country stored in XML database and display back to the user using Web controls. (K1, K4)
10. Write a Program to implement View State and Session State. (K4, K5)

## SEMESTER II

### PCCSF20 – MACHINE LEARNING

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCCSF20	<b>Title of the Course:</b> Machine Learning	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To introduce basic concepts and techniques of Machine Learning.
2. To understand complexity of Machine Learning algorithms and their limitations.
3. To understand modern notions in data analysis oriented computing.
4. To discover patterns in user's data.
5. To make predictions based on user data.

#### Course Outcomes (COs)

1. Understand the basics of Machine Learning.
2. Explore knowledge about concept learning hypothesis.
3. Illustrate the working of basic classifier models.
4. Develop client/server applications and distributed applications using RMI.
5. Know about parametric methods bias and variance.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	M	L	L
CO2	M	L	M	H	L	M
CO3	L	H	M	H	M	L
CO4	M	L	H	M	L	H
CO5	H	L	M	M	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I (18 Hours)

- 1.1 Introduction to Machine Learning – Well Posed Learning Problems – Designing a Learning system (K1, K2)
- 1.2 Perspectives and Issues in Machine Learning (K1, K2)
- 1.3 choosing training experience – target function (K1, K3)
- 1.4 Essential Libraries and Tools – Jupyter Notebook – Numpy – Scipy – Matplotlib – Pandas (K2, K3)
- 1.5 Limitations of inference machines, Approximation and estimation errors (K3, K4)
- 1.6 Simple Application.(K4, K5)

### Unit II (16 Hours)

- 2.1 Inductive bias and bias-variance tradeoff (K1,K3)
- 2.2 Concept Learning and General to Specific Ordering – Introduction – Concept Learning Task (K2, K3)
- 2.3 Inductive Learning Hypothesis – Concept Learning as Search. (K2, K3)
- 2.4 FIND –S: Finding a Maximally Specific Hypothesis (K4, K5)
- 2.5 Representation – Inductive Bias. (K2, K3)
- 2.6 Learning theory, Hypothesis and target class. (K3, K5)

### Unit III (14 Hours)

- 3.1 Supervised Learning – Learning a Class from Examples (K2, K3)
- 3.2 Chervonenkis Dimension – Probably Approximately Correct Learning(K1, K2, K3)
- 3.3 Noise – Learning Multiple Classes (K3, K4)
- 3.4 Linear separability and decision regions, Linear discriminants (K2, K3)
- 3.5 Linear regression, Standard and stochastic gradient descent(K4, K6)
- 3.6 Regression – Model Selection and Generalization. (K5, K6)

### Unit IV (15 Hours)

- 4.1 Decision Tree Learning – Introduction – Decision Tree Representation (K1, K2)
- 4.2 Appropriate Problems for Decision Tree Learning (K2, K3)
- 4.3 Basic Decision Tree Learning Algorithm – Hypothesis Space Search in Decision Tree Learning (K1, K4)
- 4.4 Restriction Biases and Preferences – Issues in Decision Tree Learning. (K4, K5)
- 4.5 Overfitting, pruning of decision trees, Bagging and Boosting (K5.K6)
- 4.6 Dimensionality reduction and Feature selection (K5, K6)

### Unit V (12 Hours)

- 5.1 Parametric Methods – Introduction – Evaluating and Estimator (K1, K5)
- 5.2 Bias and Variance – Baye’s Estimator (K1, K2)
- 5.3 Parametric Classification (K3, K5)
- 5.4 Regression – Model Selection Procedure. (K2, K3, K4)
- 5.5 Evaluation: Performance evaluation metrics (K3, K4.K5)
- 5.6 ROC Curves, Validation methods. (K5.K6)

### Text Books:

1. Andreas C. Muller and Sarah Guide (2019). Introduction to Machine Learning with Python. FifthEdition. Shroff Publishers.
2. E. Alpaydin, Introduction to Machine Learning, 3rd Edition, Prentice Hall of India, 2014.

**Reference Books:**

1. Tom M. Mitchell (2019). Machine Learning. Third Edition Mc Graw Hill
2. Ethem Alpaydin (2016). Introduction to Machine Learning Third Edition PHI Learning.

**Open Educational Resources (OER):**

1. [https://www.tutorialspoint.com/machine\\_learning\\_with\\_python/index.htm](https://www.tutorialspoint.com/machine_learning_with_python/index.htm)
2. <https://www.youtube.com/watch?v=GwIo3gDZCVQ>
3. <https://www.youtube.com/watch?v=eiu2eXxeCCU>

## SEMESTER II

### PCCSG20 - OPEN SOURCE PROGRAMMING

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCCSG20	<b>Title of the Course:</b> Open Source Programming	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. Understand how server-side programming works on the web.
2. PHP Basic syntax for variable types and calculations.
3. Using PHP built-in functions and creating custom functions.
4. Use PHP to access a MySQL database.
5. To gain knowledge in Linux administration- features and multimedia using Red Hat Linux

#### Course Outcomes (COs)

1. Learned the need of open source technology, open source development model, application of open sources, aspects of open source movement
2. Knowledge about the problems with traditional commercial software.
3. Work with regular expressions, handle exceptions, and validate data.
4. Familiar with basis syntax of PHP, common PHP scripts elements and creating of the server-side scripting using PHP, implement PHP database connectivity, perform operation on database and open source database management system.
5. Familiar with basics of LINUX & SHELL Scripting

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	L	L	M	L	L
CO2	M	M	L	H	M	L
CO3	L	M	L	M	M	H
CO4	M	M	M	L	H	M
CO5	L	M	L	M	M	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I**

**(13 Hours)**

- 1.1 Installing and Configuring PHP: The Basics of PHP Scripts (K1)
- 1.2 The Building Blocks of PHP: Variables – Data Types – Operators and Expression – Constants (K1, K2)
- 1.3 Flow Control Functions in PHP: Switching Flow – Loops – Code Blocks and Browser Output (K1, K3)
- 1.4 Working with Functions: Variable Scope – Saving State between Function Calls with the Static Statement (K1, K4)
- 1.5 More About Arguments – Testing for the Existence of a Function (K1, K5)
- 1.6 Working with Arrays: Array – Creating Arrays – Some Array-Related Constructs and Functions (K1, K3)

### **Unit II**

**(14 Hours)**

- 2.1 Working with objects: creating an object – object inheritance (K1, K3)
- 2.2 Working with strings- dates and time – formatting strings with PHP – investigating strings with PHP – manipulating strings with PHP (K2, K3)
- 2.3 Using date and time functions in PHP – other strings- date and Time functions (K2, K3)
- 2.4 Working with Forms: creating a sample input form – accessing form input with User-defines arrays – combing HTML and PHP code on a single page – working with file uploads (K4, K5, K6)
- 2.5 Working with Cookies and user sessions – introducing cookies – setting and deleting a cookie with PHP (K2, K3)
- 2.6 Session function overview – starting a session – working with session variables – destroying sessions and unsetting variables – using sessions in an Environment with registered users (K3, K6)

### **Unit III**

**(11 Hours)**

- 3.1 Working with files and Directories: including files – using include once – validating files (K2, K3)
- 3.2 Creating and deleting files – opening a file for writing- reading or appending – reading from files – writing or appending to a file (K1, K2, K3)
- 3.3 Working with directories (K3, K4)
- 3.4 Working with images – understanding the image-creation process – necessary modification to PHP (K2, K5)
- 3.5 Drawing a new image – modifying existing images (K4, K5, K6)
- 3.6 Image creation from user input – using images created by scripts (K6)

### **Unit IV**

**(12 Hours)**

- 4.1 Learning Basics SQL commands: Learning the MySQL data Types (K1, K2)
- 4.2 Learning the Table-creation syntax – using DDL and DML (K2, K3)
- 4.3 Frequently used string function in MySQL (K1, K4)
- 4.4 Using Date and Time Function in MySQL (K1, K2)
- 4.5 Interacting with MySQL using PHP: MySQL or MySQL functions (K5)
- 4.6 Connecting to MySQL with PHP – Working with MySQL data (K2, K5, K6)

### **Unit V**

**(10 Hours)**

- 5.1 Case Study: creating a shopping cart mechanism (K5, K6)
- 5.2 An overview of Red Hat Linux – What is Linux? – Common Linux features – Primary advantages of Linux (K1, K2)
- 5.3 Using Linux commands: The shell Interface (K3, K6)
- 5.4 Understanding the Red Hat Linux shell (K2, K3)
- 5.5 Working with the Red Hat Linux file system (K3, K4)
- 5.6 Using the vi text Editor (K5, K6)

**Text Books:**

1. Julie C. Meloni- (2013). PHP- MySQL and Apache. Pearson Education.
2. Christopher Negus (2003). Red Hat Linux 9 Bible. Wiley publishing.
3. Ivan Bayross (2010). Web Enabled Commercial Application Development Using HTML, DHTML Java Script and PHP. BPB Publications. 4<sup>th</sup> Edition.

**Reference Books:**

1. AnBayross (2002). Using Linux- Apache MySQL PHP PERL on Linux-IV BPB publications.
2. Ed Lecky-ThompsonSteven d. Nowicki- Thomas Myer (2012). Professional PHP6. Wiley India Edition.

**Open Educational Resources (OER):**

1. <https://education.fsu.edu/wp-content/uploads/2015/04/Learning-PHP-MySQL-JavaScript-and-CSS-2nd-Edition-1.pdf>
2. <http://webalgarve.com/books/MySQL%20&%20PHP/Teach%20Yourself%20PHP,%20MySQL%20and%20Apache%20All%20in%20One,%205th%20Edition.pdf>
3. <https://udaygade.files.wordpress.com/2015/04/linux-bible-by-christopher-negus.pdf>
4. <https://nish.info/books/PHP.pdf>
5. [https://www.tutorialspoint.com/php/php\\_tutorial.pdf](https://www.tutorialspoint.com/php/php_tutorial.pdf)
6. <https://www.tecmint.com/linux-commands-cheat-sheet/>
7. <http://linuxcommand.org/index.php>
8. <https://linuxconfig.org/linux-commands#h1-introduction>
9. <https://www-uxsup.csx.cam.ac.uk/pub/doc/suse/suse9.0/userguide-9.0/ch24s04.html>

## SEMESTER II

### PCCSH20 – WIRELESS COMMUNICATION AND NETWORKS

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCCSH20	<b>Title of the Course:</b> Wireless Communication and Networks	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To provide an overview of Wireless Communication Networks area and its applications
2. To enable students to compare and contrast multiple division techniques, mobile communication systems, and existing wireless networks.
3. To explain the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies used in Wireless Communication Networks.
4. List and describe different network standards and protocols.
5. This course introduces the fundamentals of networking and principles of network operations. It also provides knowledge on various generations of cellular systems.

#### Course Outcomes (COs)

1. To design the various wireless networks.
2. Understand the principles behind the networking operation.
3. Examine the services provided in various layers of networks.
4. Classify different technologies followed in various generation of cellular networks.
5. Analyze different types of networks in wireless technology.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	L	H	M	L	M
CO2	M	L	M	H	M	L
CO3	H	L	L	M	M	L
CO4	L	M	M	M	L	H
CO5	M	L	M	L	M	H

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I (18 Hours)**

- 1.1 Introduction to Wireless Communications and Networks – Cellular Mobile - Wireless Networks: Description of Cellular Systems (K1, K2)
- 1.2 Propagation Models for Wireless Networks – Mobile Communication Antennas (K3)
- 1.3 Evolution of Modern Mobile Wireless Communication Systems: Personal Area Networks (PAN) – Low-Tier Wireless System (K3, K4)
- 1.4 Public Wide-area Wireless Networks – Wireless Local Area Networks (WLANs) (K2, K5)
- 1.5 Wireless Technology Divisions – Cellular-WLAN Integration (K1, K2)
- 1.6 All-IP Networks: Vision for 4G(K1, K6)

### **Unit II (16 Hours)**

- 2.1 Multiple Access Techniques in Wireless Communications: FDMA (K1)
- 2.2 TDMA (K2, K3)
- 2.3 SDMA (K2)
- 2.4 CDMA (K2)
- 2.5 GSM: Architecture and Protocols: GSM Network Architecture(K1, K5)
- 2.6 GSM Authentication and Security (K4, K6)

### **Unit III (14 Hours)**

- 3.1 2.5G GPRS: Revisited– GPRS Networks Architecture (K1, K2)
- 3.2 Overview of CDMA - CDMA Evolution (K2)
- 3.3 CDMA IS-95 Systems – Handoff Process in a CDMA System (K3, K5)
- 3.4 3G- UMTS: UMTS Network Architecture – UMTS Interfaces (K4)
- 3.5 UMTS FDD and TDD – UMTS Channels (K5, K6)
- 3.6 UMTS Network Protocol (K4, K5)

### **Unit IV (15 Hours)**

- 4.1 Overview of Internet Protocol and Mobile Internet Protocol: – TCP – UDP – DNS(K2)
- 4.2 Network Address Resolution Protocol (K2, K3)
- 4.3 IP Routing Protocols – Basic Mobile IP (K4)
- 4.4 Problems and Limitations of MIP (K3, K6)
- 4.5 Cellular and WLAN integration (K4, K5)
- 4.6 Internetworking Network Integration(K6)

### **Unit V (12 Hours)**

- 5.1 Fundamentals of Wireless Local Area Networks: IEEE 802.11 – WLAN Transmission Technology – Spread Spectrum Technology (K1, K2)
- 5.2 WLAN System Architecture – IEEE 802.11 Logical Architecture (K3)
- 5.3 Collision Sense Multiple Access with Collision Detection: CSMA/CD (K4)
- 5.4 Collision Sense Multiple Access with Collision Avoidance: CSMA/CA – MAC Frame Format and Fragmentation (K4, K5)
- 5.5 IEEE 802.11 PCF – IEEE 802.11 PHY Layer – 802.11 Systems Performance – Security Issues: Some Basic 802.11 Services (K3, K6)
- 5.6 Roaming Handover and Mobility Management for WLAN – WLAN Applications – Overview of WiMAX Technologies: – IEEE 802.16 Standard Architecture(K2, K6)

**Text Books:**

1. ITI SahaMisra (2013). Wireless Communications and Networks. McGraw Hill Education.

**Reference Books:**

1. Jochen Schiller (2011). Mobile Communications. PHI/Pearson Education. 2<sup>nd</sup> Edition.
2. Dharma Prakash Agrawal- Qing-An Zeng (2006). Introduction to Wireless and Mobile Systems Cengage Learning.
3. William Stallings (2002). Wireless Communications and Networks. PHI/ Pearson Education. Second Edition.
4. Kaveh Pahlavan-Prasanth Krishnamoorthy (2003). Principles of Wireless Networks. PHI/ Pearson Education

**Open Educational Resources (OER):**

1. [https://www.tutorialspoint.com/wireless\\_communication/wireless\\_communication\\_overview.htm](https://www.tutorialspoint.com/wireless_communication/wireless_communication_overview.htm)
2. <https://www.youtube.com/watch?v=f2wIHL1Sok8&list=PLuv3GM6-gsE3ypUYh43pPuZsXxJVG1e7F>

## SEMESTER II

### PCCSI20 – THEORY OF COMPUTATION

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCCSI20	<b>Title of the Course:</b> Theory of Computation	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To understand the concepts and operations of matrix algebra needed for computing graphics modeling.
2. To understand and apply the class of functions which transform a finite set into another finite set which relates to input output functions in computer science.
3. To impart discrete knowledge in computer engineering through finite automata and Context free grammars.
4. To develop methods by which computer scientists can describe and analyze the dynamic behavior of discrete systems, in which signals are sampled periodically.
5. To enhance student's ability to understand and conduct mathematical proofs for computation and algorithms.

#### Course Outcomes (COs)

1. Understand and conduct mathematical proofs for computation and algorithms.
2. Show a competent understanding of the basic concepts of graph theory.
3. Explain the models of computation, including formal languages, grammars and automata.
4. Recognize and comprehend formal reasoning about languages.
5. Expand knowledge of pushdown automata and Turing machines.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	M	M	H	L	H
CO2	L	H	M	M	M	H
CO3	H	L	M	H	M	M
CO4	L	M	H	M	L	H
CO5	L	M	L	H	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I (13 Hours)

- 1.1 Logic and Propositional Calculus: Introduction- Propositions and Compound Propositions (K1)
- 1.2 Basic Logical Operations – Tautologies and Contradictions – Logical Equivalence (K1, K2)
- 1.3 Algebra of Propositions – Conditional and Bi conditional Statements (K2, K3)
- 1.4 Argument- Logical Implications- Propositional Functions (K3, K4)
- 1.5 Quantifiers- Negation of Quantified Statements (K4)
- 1.6 Normal Forms- Predicate Logic (K4)

### Unit II (14 Hours)

- 2.1 Graph Theory: Introduction, Data Structures (K1)
- 2.2 Graphs and Multi graphs- Sub graphs, Isomorphic and Homeomorphic Graphs- Paths, Connectivity (K2)
- 2.3 The Bridges of Konigsberg, Traversable Multigraphs (K3)
- 2.4 Labeled and Weighted Graphs (K4)
- 2.5 Complete, Regular and Bipartite Graphs (K4, K5)
- 2.6 Tree Graphs- Planar Graphs-Graph Coloring (K4, K5)

### Unit III (11 Hours)

- 3.1 Deterministic finite automata (DFA) (K3, K4)
- 3.2 Nondeterministic finite automata (NFA) (K3, K4)
- 3.3 Equivalence of DFA and NFA, and regular expressions (K3)
- 3.4 Regular expression and regular languages (K3, K4)
- 3.5 Non-regular languages and pumping Lemma (K4)
- 3.6 Closure properties (K4)

### Unit IV (12 Hours)

- 4.1 Grammar Introduction– Types of Grammar (K1)
- 4.2 Context Free Grammars and Languages– Derivations and Languages (K1, K2)
- 4.3 Ambiguity- Relationship between derivation and derivation trees (K1, K3)
- 4.4 Simplification of CFG (K2)
- 4.5 Elimination of Useless symbols (K5)
- 4.6 Unit productions – Null productions (K5)

### Unit V (10 Hours)

- 5.1 Pushdown automata and grammar simplification (K3)
- 5.2 Chomsky normal form (K4)
- 5.3 Pumping lemma for context-free languages (K4)
- 5.4 Turing Machines: Formal definition and behavior (K3)
- 5.5 Languages of a TM, TM as accepters (K4)
- 5.6 Types of TMs (K4)

### Text Books:

1. Seymour Lipschutz, Marc Las Lipson, Varsha H Patil (2010). Discrete Mathematics, Fourth Edition, Tata McGraw Hill.
2. Hopcroft and Ullman (2002). Introduction to Automata Theory, Languages and Computation, Narosa Publishing House, Delhi.

**Reference Books:**

1. Kenneth H.Rosen (2002). Discrete Mathematics and Its Applications, Fourth Edition, Tata McGraw Hill.
2. A.Tamilarasi & A.M.Natarajan (2005). Discrete Mathematics and its Application, Second Edition, Khanna Publishers.
3. K. L. P Mishra, N. Chandrashekar (2003). Theory of Computer Science - Automata Languages and Computation, Second Edition, Prentice Hall of India, India.

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=LFKZLXVO-Dg>
2. [https://www.youtube.com/watch?v=58N2N7zJGrQ&list=PLBlnK6fEyqRgp46K4ZY69yXm\\_pwKOIev](https://www.youtube.com/watch?v=58N2N7zJGrQ&list=PLBlnK6fEyqRgp46K4ZY69yXm_pwKOIev)

## SEMESTER II

### PECSC20 - ELECTIVE II A: CRYPTOGRAPHY AND NETWORK SECURITY

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PECSC20	<b>Title of the Course:</b> Elective II A: Cryptography and Network Security	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To know about various encryption techniques.
2. To understand the concept of Public key cryptography.
3. To explore the working principles and utilities of various cryptographic algorithms including secret key cryptography, hashes and message digests, and public key algorithms.
4. To understand various protocols for network security to protect against the threats in the networks.
5. To develop the ability to use existing cryptographic utilities to build programs for secure communication.

#### Course Outcomes (COs)

1. Apply the knowledge of cryptographic checksums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes.
2. Understand network security basics, analyze different attacks on networks and evaluate the performance of firewalls and security protocols like SSL, IPsec, and PGP.
3. Analyze and apply system security concept to recognize malicious code.
4. Able to do research in the emerging areas of cryptography and network security.
5. Protect any network from the threats in the world.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	H	M	L	H	M
CO2	M	L	M	H	M	L
CO3	M	M	M	L	M	L
CO4	M	L	M	H	M	L
CO5	M	L	L	M	H	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I (16 Hours)

- 1.1 Introduction – Classical Encryption techniques: Symmetric Cipher Model (K2)
- 1.2 Substitution Techniques – Transposition Techniques – Steganography(K2)
- 1.3 Block Ciphers and the Data Encryption Standards: Principles(K2)
- 1.4 DES – Strength of DES(K2)
- 1.5 Differential and Linear Cryptanalysis(K2)
- 1.6 Block Cipher Design principles (K2)

### Unit II (16 Hours)

- 2.1 Advanced Encryption Standard: Evaluation Criteria for AES (K4)
- 2.2 AES cipher – Multiple Encryption and Triple DES (K4)
- 2.3 Block Cipher Modes of Operation. Confidentiality Using Symmetric Encryption.(K4)
- 2.4 Placement of Encryption Function – Traffic Confidentiality(K4)
- 2.5 Key Distribution(K4)
- 2.6 Random Number Generation(K4)

### Unit III (15 Hours)

- 3.1 Introduction to Number Theory – Prime numbers(K2)
- 3.2 Fermat's and Euler's Theorem – Testing for Primality (K2)
- 3.3 The Chinese Remainder Theorem Public Key Cryptography and RSA (K2)
- 3.4 Principles of Public Key Cryptosystems –RSA Algorithm(K2)
- 3.5 Elliptical Curve Algorithm - Key Management(K2)
- 3.6 Diffie -Hellman Key Exchange – Kerberos(K2)

### Unit IV (14 Hours)

- 4.1 Message Authentication and Hash functions(K2, K4)
- 4.2 Authentication Requirements – Authentication Functions(K2, K4)
- 4.3 MAC – Hash Functions(K2, K4)
- 4.4 Security of Hash functions and MACs (K2, K4)
- 4.5 Digital Signatures and Authentication Protocols: Digital Signatures (K2, K4)
- 4.6 Authentication Protocols – Digital Signature Standard (K2, K4)

### Unit V (14 Hours)

- 5.1 Intruders – Intrusion Detection (K2, K3)
- 5.2 Password Management- Malicious Software (K2, K3)
- 5.3 Viruses and Related Threats – Virus Countermeasure (K2, K3)
- 5.4 Distributed Denial Of Service Attacks (K2, K3)
- 5.5 Firewall – Design Principles (K2, K3)
- 5.6 Trusted System (K2, K3)

### Text Books:

1. William Stallings (2011). Cryptography and Network Security: Principles and Practices. Prentice Hall India, Fifth Edition.

### Reference Books:

1. Charlie Kaufman, Radia Perlman and Mike Speciner (2002). Network Security: Private Communication in a Public World, Prentice Hall India, Second Edition.
2. William Stallings (2010). Network Security Essentials: Applications and Standards. PearsonEducationAsia, Third Edition.

**Open Educational Resources (OER):**

1. [http://vssut.ac.in/lecture\\_notes/lecture1428550736.pdf](http://vssut.ac.in/lecture_notes/lecture1428550736.pdf)
2. [http://uru.ac.in/uruonlinelibrary/Cyber\\_Security/Cryptography\\_and\\_Network\\_Security.pdf](http://uru.ac.in/uruonlinelibrary/Cyber_Security/Cryptography_and_Network_Security.pdf)
3. <https://www.slideshare.net/patisa/cryptography-and-network-security-27006194>
4. [https://www.cise.ufl.edu/~nemo/crypto/slides/ch01\\_overview\\_nemo.ppt](https://www.cise.ufl.edu/~nemo/crypto/slides/ch01_overview_nemo.ppt)
5. <https://www.youtube.com/watch?v=UbwhW4Xof9E>

## SEMESTER II

### PECSD20 - ELECTIVE II B: SOFT COMPUTING

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PECSD20	<b>Title of the Course:</b> Elective II B: Soft Computing	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To Learn and Understand basics of Neural Networks.
2. Introduce and use the idea of neural networks and fuzzy logic.
3. To Learn Basics of Classification and Regression Algorithms.
4. Introduce and use the concepts of Genetic algorithm and its applications to soft computing.
5. Familiarize with soft computing concepts.

#### Course Outcomes (COs)

1. Describe Soft Computing Techniques and their roles in building Intelligent Machines
2. Analyze various fuzzy models in developing fuzzy inference system to be appropriate with specific real time problems.
3. Apply Specific Unsupervised and Supervised Neural Network to find the approximate solutions to real world Problems.
4. Use genetic algorithm to combinatorial Optimization Problems.
5. Present the feasibility of applying a Soft Computing methodology for specific problem.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	L	M	M	L	M
CO2	H	M	M	L	H	M
CO3	M	M	L	M	L	M
CO4	L	M	M	L	H	H
CO5	M	M	L	M	L	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I (13 Hours)

- 1.1 Artificial Neural Networks: Introduction-History of Artificial Neural Network(K1)
- 1.2 Knowledge Based Information processing: Neural Information Processing-Hybrid Intelligence (K1)
- 1.3 Basic Neural Computational Model: Basic Concepts of Neural Networks – Network Properties - Node Properties System Dynamics (K1)
- 1.4 Single Layer Perceptron: Multilayer Perceptron - Adalines- Competitive Learning Hebbian learning (K1)
- 1.5 Supervised and Unsupervised: Explanation Based Learning- BACON learning -meta dendral (K1)
- 1.6 Neural Network Learning: Backpropagation- Applications (K2, K5)

### Unit II (14 Hours)

- 2.1 Fuzzy System: Set Theoretic Operations MF formulation and Parametrization Compositional Rule of Interface (K1)
- 2.2 Fuzzy sets and Fuzzy reasoning: Single rule with Single Antecedent – Single rule with Multiple Antecedent – Multiple rules with Multiple Antecedent(K1)
- 2.3 Decision making under Fuzzy States and FuzzyActions (K2, K3)
- 2.4 Fuzzy function – Fuzzy Decomposition(K2, K3)
- 2.5 Fuzzy control methods: Mamdani fuzzy models - Sugeno fuzzy models - Tsukamoto fuzzy model (K4)
- 2.6 Fuzzy decision making: Input space Partitioning - Grid Partitioning - Application (K4, K5)

### Unit III (11 Hours)

- 3.1 Neuro Fuzzy modeling:Adaptative Neuro fuzzy Inference systems - Introduction -ANFIS Architecture – Hybrid Learning Algorithm (K3)
- 3.2 ANIFS As a Universal Approximation: Classification and Regression trees - Introduction Decision trees (K3)
- 3.3 CART Algorithm for Tree Introduction: Tree Growing - Classification Trees(K3)
- 3.4 Regression Trees: Tree Growing - Tree Pruning (K3)
- 3.5 Rule Based Structure Identification: Introduction Input Selection (K3)
- 3.6 Rule Based Organization: Neuro fuzzy control I - Neuro fuzzy control I(K3)

### Unit IV (12 Hours)

- 4.1 Introduction: Genetic Algorithm - Encoding Binary Encoding - Real Number Bumbing - Integer or literal Permutation encoding (K3)
- 4.2 Crossover: Single point crossover - Multi point Crossover - Uniform Crossover(K2)
- 4.3 Mutation – Single point Mutation - Multipoint Mutation (K3)
- 4.4 Selection – Roulette Wheel Selection - Rank Selection - Tournament Selection - Steady State selection (K4)
- 4.5 Generic Algorithm Parameters - Population size - Crossover rate - Mutation rate (K5)
- 4.6 Applications of Generic Algorithm - Advantages and Disadvantages of Genetic Algorithm (K5)

### Unit V (10 Hours)

- 5.1 Introduction to Neuro fuzzy and Soft computing - Soft computing Constituents and conventional AI (K1, K3)
- 5.2 Conventional AI to computational Intelligence Neuro Fuzzy and Soft computing Characteristics (K2)
- 5.3 Search Strategies for AI Production systems Backtracking Strategies - Graph Search

Strategies (K2)

- 5.4 Heuristic Graph Search Procedures -Algorithm A - The Admissibility of A\* - Comparison of AR Algorithms (K3, K4)
- 5.5 Predicate calculator in AI - Frames - Frames as sets and Instances - Semantic Nets (K4, K5)
- 5.6 Hybrid Model Applications - Fuzzy implement using Matlab (K4, K5)

**Text Books:**

1. S.N.Deepa and S.N.Sivanandham-Principles of Soft computing, Third Edition - Wiley India Pvt.Ltd., 2018.
2. N.P Padhy and S.P Simon-Soft computing with mat lab programming, oxford university press, 2015.
3. Jang J.S.R, Sun C.T and Mizutami E-Neuro Fuzzy and Soft Computing- Prentice Hall India, New Delhi, 2015.
4. Laurene Fauseett - Fundamentals of Neural Networks - Prentice Hall India, New Delhi, 2008.

**Reference Books:**

1. S Rajasekeran, G.A Vijayalakshmpai, Neural Networks, Fuzzy logic and Genetic Algorithm, Synthesis and Application, PHI learning Pvt.Ltd., 2017.
2. Timothy J.Ross - Fuzzy Logic Engineering Application - Tata McGraw Hill, 1997.

**Open Educational Resources (OER):**

1. Introduction to Artificial Intelligence - Video Tutorial - <https://youtu.be/J7LqggIEfQw>
2. Fuzzy logics and fuzzy system - Video Tutorial- <https://youtu.be/UIqrfHjXBjM>

## SEMESTER II

### PCCSJ20 - PRACTICAL III: MACHINE LEARNING

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCCSJ20	<b>Title of the Course:</b> Practical III: Machine Learning	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Objectives

1. To work on important concepts of Machine Learning.
2. Practical implementation of algorithms with sample data.
3. To develop skills of using machine learning algorithms for solving problems.
4. Developing skills in predictive analytics using ML algorithms.
5. To gain experience of doing independent research.

#### Course Outcomes (COs)

1. Be capable of confidently applying common Machine Learning algorithms in practice and Implementing their own.
2. Be capable of performing distributed computations.
3. To be capable of performing experiments in Machine Learning using sample data.
4. Understand a wide variety of learning algorithms.
5. Understand how to evaluate models generated from data

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	H	L	M	M	L
CO2	H	M	L	L	M	M
CO3	M	H	M	L	L	M
CO4	H	M	M	M	H	L
CO5	L	M	H	L	L	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Exercises**

1. Linear Regression (K1, K2)
2. Logistic Regression without CSV file (K1, K3)
3. Logistic Regression with CSV file (K2, K4)
4. Classification using SVM (K4, K5)
5. k-means algorithm (K2, K5)
6. Decision Tree Algorithm (K1, K3)
7. Random Forest Algorithm (K6)
8. Naive Bayes Algorithm to find Accuracy. (K1, K3)
9. JSP program to process credit card information(K5)

## SEMESTER II

### PCCSK20 - PRACTICAL IV- OPEN SOURCE PROGRAMMING LAB

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCCSK20	<b>Title of the Course:</b> Practical IV: Open Source Programming Lab	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. Demonstrate different open source technology like Linux, PHP & MySQL with different packages.
2. To understand the importance of the web as an effective medium of communication
3. Explore programs of PHP with MySQL connection.
4. Use PHP to access a MySQL database.
5. Illustrate Linux commands for programming.

#### Course Outcomes (COs)

1. Explore different open source technology like Linux, PHP & MySQL with different packages.
2. Implement static, dynamic and interactive web pages and web applications.
3. Develop basic skills in analyzing the usability of a web site.
4. Execute programs of PHP with MySQL connection.
5. Execute Linux commands for programming.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	H	L	M	L	L
CO2	L	M	M	L	L	M
CO3	M	L	M	L	H	M
CO4	L	M	L	M	M	L
CO5	L	M	H	M	L	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Exercises

1. Write a server side PHP program that displays marks- total- grade of a student in tabular format by accepting user inputs for name- number and marks from a HTML form. (K1, K6)
2. Write a PHP program implement Simple Calculator Operations. (K6)
3. Write a PHP program interface to create a database and to insert a table into it.
  - a. Use classes to create a table. (K2)
  - b. Create a directory - and to read contents from the directory. (K3)
4. a. Write a PHP program to display a digital clock which displays the current time of the server.(K6)  
b. Write a Program and check message passing mechanism between pages. (K2, K4)
5. Create a MYSQL table and execute queries to read – add - remove and modify a record from that table. (K6)
6. a. Write a shell script to stimulate the file commands. (K1, K2)  
b. Write a shell script program to find out the maximum and minimum number of the given series. (K6)
7. a. Write a shell script to show the system configuration. (K1, K2)  
b. Write a shell script program to check whether the given string is palindrome or not. (K6)
8. a. Write a shell script to implement the following: pipes-Redirection and tee commands.(K1,K2)  
b. Write a Shell Script program to develop a calculator application. (K6)
9. a. Write a shell script to implement the filter commands. (K1, K2)  
b. Write a shell script to print the multiplication table of the given argument using for loop. (K6)
10. a. Write a shell script to swap two numbers. (K6)  
b. Write a shell script to find greatest of given three numbers. (K6)

## SEMESTER III

### PCCSL20 - WEB SERVICES

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PCCSL20	<b>Title of the Course:</b> Web Services	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To understand Web Services and its implementation model.
2. Understand the principles of SOA, its Principles and Benefits.
3. Understand XML concepts.
4. Understand paradigms needed for testing Web Services.
5. To learn how to implement and deploy Web Services.

#### Course Outcomes (COs)

1. Efficiently use market leading environment tools to create and consume web services.
2. Identify and select the appropriate framework components in creation of web service solution.
3. Able to apply SOAP, HTTP and UDDI services in the web applications.
4. Apply SOAP principles to creation of web service solutions.
5. Able to know the structure of XML and to design and store data in XML.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	L	M	M	L	H
CO2	M	H	L	M	L	M
CO3	L	M	L	H	L	M
CO4	M	M	L	M	H	M
CO5	L	M	M	M	L	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I (18 Hours)

- 1.1 Evolution of Distributed Computing: Basics of Distributed Computing - Evolution of Middleware (K1, K2)
- 1.2 Importance of Distributed Computing (K1)
- 1.3 Web Service Architecture (K1, K3)
- 1.4 Client Server Applications – CORBA – Java RMI - Microsoft DCOM - Message Oriented Middleware (K1, K4)
- 1.5 Common Challenges in Distributed Computing - The Emergence of Web Services (K1)
- 1.6 SOA – Architecture (K1, K3)

### Unit II (16 Hours)

- 2.1 Introduction to Web Services: What are Web Services? Motivation and Characteristics – Use of Web Services (K1, K2)
- 2.2 Basic Operational Model of Web Services (K1)
- 2.3 Core Web Services Standards (K1, K2)
- 2.4 Other industry Standards Supporting Web Services (K3)
- 2.5 Challenges in Web Services (K3)
- 2.6 Web Services Software and Tools-Benefits of Web Services. (K1, K4)

### Unit III (14 Hours)

- 3.1 Web Services Architecture and Technologies: Building the Web Service Architecture – Web Service Architecture and its Core Building Blocks (K1, K2)
- 3.2 Tools of the Trade - SOAP-WSDL-UDDI (K2, K3)
- 3.3 Web Services Communication Models - RPC Based Communication Models - Messaging Based Communication Model (K3, K4)
- 3.4 Implementing Web Services (K4)
- 3.5 To develop java-based Web Services - Developing Web Services using J2EE (K4, K6)
- 3.6 Description and Discovery of Web Services: Web Services Description Language (WSDL)-Universal Description, Discovery, and Integration (UDDI)(K4)

### Unit IV (15 Hours)

- 4.1 Developing Web Services using SOAP: XML based Protocols and SOAP (K6)
- 4.2 Anatomy of a SOAP Message (K2)
- 4.3 SOAP Encoding (K1, K4)
- 4.4 SOAP Message Exchange Protocol (K4)
- 4.5 SOAP Communication - SOAP Messaging - SOAP Bindings for Transport Protocols (K4, K5)
- 4.6 SOAP Security - Building SOAP Web Services. (K3, K6)

### Unit V (12 Hours)

- 5.1 Creating .NET Interoperability: Means of Ensuring Interoperability (K6)
- 5.2 Microsoft .NET Framework: An Overview (K1, K2)
- 5.3 Challenges in Creating Web Services Interoperability. (K1, K6)
- 5.4 XML Processing and Data Binding with Java API's: XML Basics (K1, K2)
- 5.5 Java Architecture for XML Binding – Data Binding Generation - Marshalling XML - Unmarshalling Java (K1, K4)
- 5.6 Sample Code for XML Data Binding. (K6)

**Text Books:**

1. R. Nagappan, R. Skoczylas, R.P. Sriganesh (2014). Developing Java Web Services. Wiley India.
2. Michael P. Papazoglou (2011). Web Services & SOA Principles and Technology. Second Edition.

**Reference Books:**

1. F.P.Coyle (2010). XML- Web Services and the Data Revolution. Pearson Education.
2. S. Graham (2005). Building web Services with Java. Pearson Education. Second Edition.
3. D.A. Chappell & T. Jewell- O'Reilly (2012). Java Web Services. SPD.
4. McGovern- et al. (2005). Java web Services Architecture. Morgan Kaufmann Publishers.
5. Richard Monson-Haefel (2009). J2EE Web Services. Pearson Education.

**Open Educational Resources (OER):**

1. [https://www.tutorialspoint.com/webservices/what\\_are\\_web\\_services.htm#:~:text=Web%20services%20are%20built%20on,objects%2C%20messages%2C%20or%20documents.](https://www.tutorialspoint.com/webservices/what_are_web_services.htm#:~:text=Web%20services%20are%20built%20on,objects%2C%20messages%2C%20or%20documents.)
2. <https://www.javatpoint.com/web-services-tutorial>
3. [https://docs.oracle.com/cd/E17802\\_01/webservices/webservices/docs/1.6/tutorial/doc/JavaWSTutorial.pdf](https://docs.oracle.com/cd/E17802_01/webservices/webservices/docs/1.6/tutorial/doc/JavaWSTutorial.pdf)
4. [https://www.eclipse.org/webtools/community/education/web/t320/Implementing\\_a\\_Simple\\_Web\\_Service.pdf](https://www.eclipse.org/webtools/community/education/web/t320/Implementing_a_Simple_Web_Service.pdf)
5. <http://helpme.engr.scu.edu/JavaWSTutorial.pdf>
6. <https://swrdfish.github.io/assets/ssl/JavaWebServices.pdf>
7. <https://hle2ng0za0mn8ya.files.wordpress.com/2014/09/introduction-to-web-services-with-java.pdf>

## SEMESTER III

### PCCSM20 – DISTRIBUTED AND CLOUD COMPUTING

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PCCSM20	<b>Title of the Course:</b> Distributed and Cloud Computing	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To explain distributed system and cloud models.
2. To learn the cloud environment, building software systems and components that scale to millions of users in modern internet and cloud concepts .
3. To understand cloud service models including Iaas, Paas, Saas and developing cloud based software applications on top of cloud platform.
4. To distribute a single task among multiple computers and to solve it quickly by maintaining coordination between them.
5. To apply distribute computational model and understand the need for cloud computing.

#### Course Outcomes (COs)

1. Understand the concepts of cloud Architecture and its services.
2. Classify different services providers and its services, tools.
3. Demonstrate the paradigms and to map applications.
4. Analyze the best resource for cloud computing.
5. Assess virtualization in cloud.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	H	L	M	M	L
CO2	M	H	M	M	L	H
CO3	L	M	H	H	M	L
CO4	H	L	L	M	L	M
CO5	L	H	M	H	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I (16 Hours)

- 1.1 Cloud Computing Fundamentals: Motivation for Cloud Computing - Defining Cloud Computing (K1)
- 1.2 Principles of Cloud computing (K1)
- 1.3 Cloud Characteristics – Elasticity in Cloud – On-demand Provisioning (K2)
- 1.4 Cloud Computing Architecture and Management: Cloud Architecture (K2, K3)
- 1.5 Cloud Deployment Models: Private Cloud - Public Cloud - Hybrid Cloud (K2, K3)
- 1.6 NIST Applications on the Cloud (K2)

### Unit II (16 Hours)

- 2.1 Cloud Service Models: Infrastructure as a Service (K1, K3)
- 2.2 Platform as a Service (K1, K3)
- 2.3 Software as a Service (K1, K3)
- 2.4 Cloud Storage (K1, K5)
- 2.5 Advantages of Cloud Storage (K1, K2)
- 2.6 Cloud Service Providers: Google - Amazon Web Services – Microsoft – Manjrasoft – S3 (K5)

### Unit III (15 Hours)

- 3.1 Parallel and Distributed Programming Paradigms (K1, K3)
- 3.2 MapReduce, Twister and Iterative MapReduce (K1, K3)
- 3.3 Hadoop Library from Apache (K1, K3)
- 3.4 Mapping Applications (K1, K2)
- 3.5 Google App Engine, Amazon AWS (K1, K2)
- 3.6 Cloud Software Environments – CloudSim (K1, K2)

### Unit IV (14 Hours)

- 4.1 Clustering for Massive Parallelism (K1, K2)
- 4.2 Computer Clusters (K1, K3)
- 4.3 MPP Architectures (K1, K3)
- 4.4 Design Principles of Computer Clusters (K1, K4)
- 4.5 Cluster Job and Resource Management (K2)
- 4.6 Case Studies of Top Supercomputer Systems (K1)

### Unit V (14 Hours)

- 5.1 Implementation Levels of Virtualization (K4)
- 5.2 Virtualization Structures/Tools and Mechanisms (K4)
- 5.3 Virtualization of CPU, Memory, and I/O Devices (K4)
- 5.4 Virtual Clusters (K1)
- 5.5 Resource Management (K2)
- 5.6 Virtualization for Data-Center Automation (K3)

### Text Books:

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra (2012). Distributed and Cloud Computing, From Parallel Processing to the Internet of Things. Morgan Kaufmann Publishers.
2. K. Chandrasekaran (2015). Essentials of cloud computing, CRC Press.

**Reference Books:**

1. Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi (2013). Mastering Cloud Computing. Tata McGraw Hill.
2. Toby Velte, Anthony Velte, Robert Elsenpeter (2009). Cloud Computing – A Practical Approach. Tata McGraw Hill.

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=Yh3gCFG-IRI>
2. <https://www.youtube.com/watch?v=2PAVAvyj1q0>

## SEMESTER III

### PCCSN20 – PRINCIPALS OF COMPILER DESIGN

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PCCSN20	<b>Title of the Course:</b> Principals of Compiler Design	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. Understand the basic concepts of compiler.
2. Discuss the functionality of Lexical analysis.
3. Illustrate the concepts of syntax analysis through parser and its types.
4. Define and List the intermediate codes.
5. Summarize the working features of Code Generation.

#### Course Outcomes (COs)

1. Explain the concepts of compiler and discuss the Code Generation
2. Describe the functionality of Lexical analysis.
3. Describe the functionality of Syntax analysis.
4. Define the storage organization and List the intermediate codes.
5. Summarize the working features of Code Generation.
6. Apply their basic knowledge of Data Structure to design Symbol Table, Lexical Analyzer, Intermediate Code Generation, and Parser.

CO	PO					
	1	2	3	4	5	6
CO1	L	L	M	H	M	L
CO2	M	L	M	H	M	M
CO3	M	M	L	M	L	M
CO4	H	L	M	M	L	H
CO5	L	M	M	L	H	M

(Low - L, Medium – M, High - H)

#### Course Syllabus

##### Unit I

(13 Hours)

- 1.1 Introduction: The Structure of a Compiler (K2, K4)
- 1.2 Lexical Analysis – BootStrap (K4)
- 1.3 Syntax Analysis- Semantic Analysis-Intermediate Code Generation (K4)
- 1.4 Code Optimization - Code Generation (K4, K5)
- 1.5 Symbol Table Management - The Grouping of Phases into Passes (K4, K5)
- 1.6 Compiler Construction Tools - The Evolution of Programming Languages (K3, K5)

**Unit II** (14 Hours)

- 2.1 Lexical Analysis: The Role of the Lexical Analyzer (K2, K4)
- 2.2 Input Buffering - Specification of Tokens (K4)
- 2.3 Recognition of Tokens (K2)
- 2.4 Finite Automata- Nondeterministic Finite Automata (K2)
- 2.5 Conversion of an NFA to a DFA (K5)

**Unit III** (11 Hours)

- 3.1 Construction of an NFA from a Regular Expression (K6)
- 3.2 Syntax Analysis: Introduction (K2)
- 3.3 Context-Free Grammars (K3)
- 3.4 Top-Down Parsing (K6)
- 3.5 Bottom-Up Parsing (K6)

**Unit IV** (12 Hours)

- 4.1 Introduction to LR Parsing (K2)
- 4.2 Intermediate Code Generation: Variants of Syntax Trees (K2, K4)
- 4.3 Three-Address Code (K2, K4)
- 4.4 Types and Declarations (K3)
- 4.5 Translation of Expressions. (K4, K5)

**Unit V** (10 Hours)

- 5.1 Code Generation: Design of a Code Generator (K2, K4)
- 5.2 Basic Blocks and Flow Graphs- Optimization of Basic Blocks (K2, K5)
- 5.3 Peephole Optimization- the Principal Sources of Optimization (K4, K2)
- 5.4 Introduction to data flow Analysis (K2)
- 5.5 Apply their basic knowledge of Data Structure to design Symbol Table, Lexical Analyzer, Intermediate Code Generation, Parser (Top Down and Bottom Up Design) (K3)

**Text Books:**

1. Alfred V Aho - Monica S. Lam- Ravi Sethi - Jeffrey D Ullman (2007). Compilers - Principles - Techniques and Tools. Addison - Wesley. Second Edition.

**Reference Books:**

1. Charles N. Fischer, Richard. J. LeBlanc (2008). Crafting a Compiler with C.
2. Randy Allen, Ken Kennedy (2002). Optimizing Compilers for Modern Architectures: A Dependence - based Approach. Morgan Kaufmann Publishers.
3. Steven S. Muchnick (2003). Advanced Compiler Design and Implementation. Morgan Kaufmann Publishers Elsevier Science. Indian Reprint.
6. Keith D Cooper and Linda Torczon (2004). Engineering a Compiler. Morgan Kaufmann Publishers Elsevier Science.

**Open Educational Resources (OER):**

1. [https://www.tutorialspoint.com/compiler\\_design/index.htm](https://www.tutorialspoint.com/compiler_design/index.htm)
2. [https://en.wikipedia.org/wiki/Principles\\_of\\_Compiler\\_Design](https://en.wikipedia.org/wiki/Principles_of_Compiler_Design)
3. [https://www.youtube.com/watch?v=WccZQSERfCM&list=PLEbnTDJUr\\_IcPtUXFy2b1sGRPsLFMghhS&index=2](https://www.youtube.com/watch?v=WccZQSERfCM&list=PLEbnTDJUr_IcPtUXFy2b1sGRPsLFMghhS&index=2)

## SEMESTER III

### PECSE20 - ELECTIVE III A: INTERNET OF THINGS

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PECSE20	<b>Title of the Course:</b> Elective III A: Internet of Things	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To understand smart objects and IoT Architectures.
2. To learn various protocols at the different layers for IoT.
3. To develop prototype systems using Arduino.
4. To learn the design and development process involved in creating a cloud based application.
5. To apply the concept of Internet of Things in the real world scenario.

#### Course Outcomes (COs)

1. Understand the fundamentals of IoT.
2. Analyze different connectivity technologies for IoT.
3. Design a portable IoT using Arduino / equivalent boards and relevant protocols.
4. Deploy an IoT application and connect to the Fog.
5. Develop IoT applications with different platform and frameworks.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	L	M	H	L	M
CO2	L	M	H	M	H	L
CO3	M	L	L	L	L	M
CO4	M	L	L	M	L	M
CO5	L	H	M	M	L	M

(Low - L, Medium – M, High – H)

## Course Syllabus

### Unit I (17 Hours)

- 1.1 Introduction to Internet of Things: Introduction - Characteristics of IoT (K1)
- 1.2 Applications of IoT - IoT Categories - Sensors (K1, K2)
- 1.3 Actuators - IoT Components and Implementation (K1, K3)
- 1.4 Challenges of IoT - IoT Networking: Connectivity Terminologies (K2)
- 1.5 Gateway Prefix Allotment (K3, K4)
- 1.6 IoT Identification and Data Protocols (K4, K6)

### Unit II (14 Hours)

- 2.1 Connectivity Technologies: IEEE802.15.4 - ZigBee (K2, K3)
- 2.2 RFID - HART and Wireless HART - NFC - Bluetooth (K4, K6)
- 2.3 Z-Wave - Wireless Sensor Networks: Components of Sensor Nodes (K3)
- 2.4 Challenges in WSN - Applications of WSN - Wireless Multimedia Sensor Network (K2)
- 2.5 Wireless Nano sensor Networks - Under Water Acoustic Sensor Networks (K2, K4)
- 2.6 UAV Networks and M2M Communication: UAV Components - UAV Networks - M2M Communication (K2, K6)

### Unit III (15 Hours)

- 3.1 Programming with Arduino: Features of Arduino - Program Elements (K2)
- 3.2 Cloud Computing: Characteristics - Deployment Models - Service Models (K1, K2)
- 3.3 Service Management - Cloud Security (K2, K3)
- 3.4 Sensor Cloud: Comparison with WSN - Sensor Cloud Architecture (K4, K6)
- 3.5 Advantages of Sensor Cloud - Sensor Cloud Services Life Cycle Model (K3)
- 3.6 Sensor Cloud Applications - Issues and Challenges in Sensor Cloud (K1, K3)

### Unit IV (16 Hours)

- 4.1 Fog Computing: Requirements of IoT - Architecture of Fog (K1, K2)
- 4.2 Working - Advantages - Applications - Challenges in Fog (K2, K3)
- 4.3 Smart Homes: Smart Home Implementations - House Area Networks (K3, K6)
- 4.4 Smart Home benefits and Issues (K4)
- 4.5 Smart Grids: Characteristics of Smart Grid (K2, K3)
- 4.6 Components of Smart Grid - Smart Grid and Cloud (K1, K5)

### Unit V (12 Hours)

- 5.1 Smart Cities: Characteristics of Smart Cities (K1, K2)
- 5.2 Smart City Framework (K2, K6)
- 5.3 Challenges in Smart City - Data Fusion - Smart Parking (K3, K6)
- 5.4 Industrial IoT: IIoT Requirements (K3, K4)
- 5.5 Applications of IIoT (K1, K4)
- 5.6 Benefits and Challenges of IIoT (K2, K3)

#### Text Books:

1. Dr.Jeeva Jose (2018), "Internet of Things", Khanna Book Publishing Co. (P) Ltd.

#### Reference Books:

1. Jan Holler, VlasiosTsiatsis (2014)," From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence" Academic Press, First Edition.
2. Vijay Madisett, ArshdeepBahga (2014), "Internet of Things - Hands-on Approach", First Edition, VPT.

**Open Educational Resources (OER):**

1. <https://www.ibm.com/blogs/internet-of-things/what-is-the-iot/>
2. <https://www.youtube.com/watch?v=UrwbeOIlc68>

## SEMESTER III

### PECSF20 - ELECTIVE III B: MULTIMEDIA COMMUNICATION

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PECSF20	<b>Title of the Course:</b> Elective III B : Multimedia Communication	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. Understanding the Multimedia Communications Systems, Application and Basic Principles.
2. To acquire the basic knowledge of multimedia communication technologies including audio, image, video, text compression techniques and distributed multimedia system.
3. Explanation about signal processing aspects involved in multimedia including signal properties.
4. Application of coding techniques in recent applications for data storage and communication of multimedia.
5. Analysis/comparison of various coding techniques, case study and problem solving as per given data.

#### Course Outcomes (COs)

1. Understand the current state-of-the-art developments in Internet technologies for multimedia communications
2. Understand and apply the principles used in designing multimedia protocols, and standard protocols that are designed the way that they are.
3. Understand the system design principles of multimedia communications systems.
4. Solve problems and design simple networked multimedia systems
5. Think critically and learn independently.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	M	L	M	L	H
CO2	M	M	L	H	L	M
CO3	L	M	M	M	L	M
CO4	L	L	M	L	H	M
CO5	M	L	L	M	L	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I (13 Hours)**

- 1.1 Multimedia communication: Introduction Networks-Multimedia Applications(K2)
- 1.2 Multimedia Information representation: Introduction –Principles - text-Image - Audio - video (K2)
- 1.3 Broadcast Television – Digital video.Text and Image Compression: Compression principles(K2)
- 1.4 Text compression – Image compression (K2)
- 1.5 Audio and video compression: Audio compression (K2)
- 1.6 Video compression – Principles, H.261, H.263, MPEG, MPEG-1 (K2)

### **Unit II (14 Hours)**

- 2.1 Standards for Multimedia Communications: Reference Models (K1, K2)
- 2.2 Interpersonal Communications. Digital Communication Basis: Transmission Media (K1, K2)
- 2.3 Sources of Signal Impairment – Asynchronous Transmission – Synchronous Transmission (K1, K2)
- 2.4 Error Detection Methods. Circuit Switched Networks: Transmission Systems (K1, K2)
- 2.5 Analog, PSTN Modems, Digital (K1, K2)
- 2.6 Switching Systems –Signal Systems (K1, K2)

### **Unit III (11 Hours)**

- 3.1 Enterprise Networks: Introduction- Lans (K4, K6)
- 3.2 Ethernet – Token Ring – Bridges – FDDI (K4, K6)
- 3.3 High Speed Lans - LAN Protocols. The Internet: IP Datagram (K4, K6)
- 3.4 IP Address – ARP And RARP (K4, K6)
- 3.5 Routing Algorithms - Static Routing, Flooding, Vector Routing (K4, K6)
- 3.6 Shortest Path – ICMP - Ipv6 (K4, K6)

### **Unit IV (12 Hours)**

- 4.1 Transport Protocols: TCP/IP Protocol Suite - TCP (K1, K2)
- 4.2 User Service, Protocol Operations – UDP - User Service (K1, K2)
- 4.3 Protocol Operations. Application Support Functions: ASN.1-Security (K1, K2)
- 4.4 Data Encryption - Terminology (K1, K2)
- 4.5 Basics Techniques - Authentication (K1, K2)
- 4.6 Pubic Key Certification Authorities (K1, K2)

### **Unit V (10 Hours)**

- 5.1 Internet Applications: DNS - Email (K1)
- 5.2 FTP – TFTP - Internet Telephony – SNTP (K1)
- 5.3 World Wide Web: Urls And HTTP –HTML (K1)
- 5.4 Text, List, Color, Images, Tables, Forms (K1)
- 5.5 Java And Java Script- Security (K1)
- 5.6 Web Operations (K1)

### **Text Books:**

1. Fred Halsall (2013). Multimedia Communications: Applications, Protocols, and Standards. Pearson Education Asia.

### **Reference Books:**

1. SugataMitra and Gaurav Bhatnagar (2014). Introduction to Multimedia Systems (Communications, Networking and Multimedia).Pearson Publications.
2. Steinmetz (2010). Multimedia: Computing Communications & Applications”, Pearson Publications.

### **Open Educational Resources (OER):**

1. [http://www.eie.polyu.edu.hk/~enyhchan/mt\\_intro.pdf](http://www.eie.polyu.edu.hk/~enyhchan/mt_intro.pdf)
2. <https://www.semanticscholar.org/paper/Multimedia-communication-Wolf-Griwodz/495cdd5c738edd847bc965e06b9c01bfa5f336c8>
3. <https://www.slideshare.net/ayyakathir/multimedia-communication-networks-29753118>

## SEMESTER III

### PECSG20 - ELECTIVE IV A: BIG DATA ANALYTICS

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PECSG20	<b>Title of the Course:</b> Elective IV A: Big Data Analytics	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To learn more about the trends in Big Data and how they impact the business world like Risk Marketing – Healthcare - Financial Services - etc.
2. To study the basic technologies that forms the foundations of Big data.
3. Explains this new technology and how companies can use them effectively to gather the data that they need and glean critical insights.
4. To understand the Big data platform and Usecases.
5. To study different types case studies on the current research and applications of the Hadoop and big data in industry.

#### Course Outcomes (COs)

1. Define the big data, types of data and understand the need of big data analytics.
2. Describe the Hadoop architecture and File system.
3. Apply the MapReduce Programming model for real-world problems.
4. Learn the concepts of Main data streams.
5. Demonstrate the working of clusters.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	H
CO2	L	M	M	L	M	H
CO3	H	L	H	L	M	M
CO4	H	M	H	M	H	L
CO5	L	H	M	H	L	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I (13 Hours)

- 1.1 Understanding Big Data: Types of Digital Data - Classification of digital data (K2)
- 1.2 Introduction to Big data - Characteristics of data (K2)
- 1.3 Evolution of Big data - Definition of Big data (K2, K5)
- 1.4 Challenges with Big data - Sudden Hype around Big Data Analytics (K4)
- 1.5 Classification of Analytics - Data Science - Terminologies used in Big Data Environments - Few Top Analytics tools (K2, K4)
- 1.6 NoSQL - Types of NoSQL Databases - Advantages of NoSQL (K2)

### Unit II (14 Hours)

- 2.1 Basics of Hadoop: Introduction to Hadoop - Basics – RDBMS vs Hadoop (K2, K4)
- 2.2 Distributed computing challenges - History of Hadoop (K4)
- 2.3 Hadoop overview – use case of Hadoop – Hadoop distributors (K5)
- 2.4 Hadoop Distributed File system – Processing data with Hadoop (K3)
- 2.5 MongoDB: Introduction to MongoDB – Basics of MongoDB - Terms used in RDBMS and MongoDB (K2)
- 2.6 Data Types in MongoDB - MongoDB Query Language (K2, K3)

### Unit III (11 Hours)

- 3.1 Cassandra: Introduction to Cassandra - Apache Cassandra - An Introduction (K2)
- 3.2 Features of Cassandra (K2)
- 3.3 Introduction to MAPREDUCE Programming (K2)
- 3.4 Hive: Introduction to Hive - Hive Architecture (K2, K3)
- 3.5 Hive Data Types - Hive File Format - Hive Query Language (K4)
- 3.6 RCFile Implementation – User Defined Function (UDF) (K3)

### Unit IV (12 Hours)

- 4.1 Mining Data Streams: Data Model (K3)
- 4.2 Sampling Data in the Stream – Filtering Streams (K4, K5)
- 4.3 Counting Distance Elements in a Stream (K4, K5)
- 4.4 Estimating Moments (K4, K5)
- 4.5 Counting Ones in Window (K4)
- 4.6 Decaying Windows (K4)

### Unit V (10 Hours)

- 5.1 Clustering: Introduction to Clustering Techniques (K2, K5)
- 5.2 Hierarchical Clustering (K2 K5)
- 5.3 Algorithms – K - Means – CURE (K5)
- 5.4 Clustering in Non\_ Euclidean Spaces (K5)
- 5.5 Streams and Parallelism (K5)
- 5.6 Case Study: Advertising on the Web (K6)

### Text Books:

1. Jure Leskovec, Anand Rajaraman & Jeffrey David Ullman (2014). Mining of Massive Datasets. Cambridge University Press. Second Edition.
2. Seema Acharya and Subhashini Chellappan (2015). Big Data and Analytics. Wiley Publication.

**Reference Books:**

1. Michael Minelli, Michelle Chambers and Ambiga Dhiraj (2013). Big Data and Big Analytics. Wiley Publication.
2. Jiawei Han, Micheline Kamber & Jian Pei (2011). Data Mining Concepts and Techniques. Morgan Kaufman Publications. Third Edition.

**Open Educational Resources (OER):**

1. <https://www.youtube.com/watch?v=HwmEcudlv44&list=PL4OCRJojkV1jN-Ed6RkQpWfBvqe0tRd6>
2. <https://www.youtube.com/watch?v=SRTSVxUnsNI>

## SEMESTER III

### PECSH20 – ELECTIVE IV B: SOFTWARE PROJECT MANAGEMENT

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PECSH20	<b>Title of the Course:</b> Elective IV B : Software Project Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. Define and highlight importance of software project management.
2. Describe the software project management activities.
3. To highlight different techniques for software cost estimation and activity planning.
4. To discuss the notion of risks and the risk management process.
5. Train software project manager and other individuals involved in software project planning.

#### Course Outcomes (COs)

1. Estimate project cost and perform cost - benefit evaluation.
2. Projects perform project scheduling, activity network analysis and risk management
3. Apply schedule and cost control techniques for project monitoring including contract management.
4. Apply quality models in software projects for maintaining software quality and reliability.
5. Use suitable project organization structure, leadership, decision and motivation styles, proper safety and ethical practices and be responsible to the society.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	M	L	M	L	L
CO2	M	M	M	L	L	H
CO3	M	H	L	M	M	L
CO4	L	M	L	M	L	H
CO5	L	M	H	L	H	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I**

**(13 Hours)**

- 1.1 Project Definition - Software Project Basics (K1)
- 1.2 Introduction - Types of Software Project (K2, K4)
- 1.3 Classification of Software projects - Activities covered by software project management (K2, K3)
- 1.4 Methods and Methodologies (K4)
- 1.5 Stake holders - Business Case (K3, K5)
- 1.6 Management Control - Software process and process models (K2, K4)

### **Unit II**

**(14 Hours)**

- 2.1 Project Planning Infrastructure (K2, K4)
- 2.2 Process Database (K2)
- 2.3 Contents of PDB-A sample entry-the capability baseline- Process asserts and body of knowledge system (K4, K5)
- 2.4 process planning - Infosys development process (K2, K4)
- 2.5 Requirement change management (K4)
- 2.6 Process planning for the ACIC project (K3, K4)

### **Unit III**

**(11 Hours)**

- 3.1 Effort estimation and scheduling (K2, K3, K4)
- 3.2 Effort estimation models - Estimation schedule (K3, K5)
- 3.3 Effort Estimation - Scheduling (K3, K4)
- 3.4 Quality Planning - Quality Concepts-Quantitative quality management planning (K2, K4, K6)
- 3.5 Defect prevention planning (K2, K5)
- 3.6 The quality plan of the ACIC project (K2)

### **Unit IV**

**(12 Hours)**

- 4.1 Risk management - Concept of risk and risk management (K2, K4)
- 4.2 Risk assessment (K2, K3)
- 4.3 Risk Control – Examples - Measurement and Tracking planning (K3, K5)
- 4.4 Concepts in measurement - measurements (K2)
- 4.5 Project tracking (K4)
- 4.6 The ACIC measurement and tracking plan (K2, K4)

### **Unit V**

**(10 Hours)**

- 5.1 The project management plan (K2, K4)
- 5.2 Team management - customer communication and issue resolution (K5)
- 5.3 The structure of the project management plan (K2, K4)
- 5.4 The ACIC project plan (K2, K3)
- 5.5 Reviews - The Review process (K2, K3)
- 5.6 Data Collection - Monitoring and Control (K2)

### **Text Books:**

1. PankajJalote (2002). Software Project Management in Practice. Published by Pearson Education. Second Edition.
2. Bob Hughes, Mike Cotterell, Rajib Mall (2011). Software Project Management. McGraw Hill. Fifth Edition.

**Reference Books:**

1. Greg Horine (2012). Project Management Absolute Beginner's Guide. Que Publishing. Third Edition.
2. Timothy Adolfo Villafiorita (2014). Introduction to Software Project Management AuerbachPublications.
3. MuraliChemuturi, ThomasM.cagley (2012). Mastering software project management. J.ross publishing.

**Open Educational Resources (OER):**

1. <https://books.google.co.in/book?id=BDFpDwAAQBAJ&printsec=frontcover#v=onepage&q&f=false>
2. <https://www.amazon.in/Software-Project-Management-Practice-Pankaj/dp/0201737213>
3. [https://www.youtube.com/watch?v=p\\_vs7yGBKGg](https://www.youtube.com/watch?v=p_vs7yGBKGg)
4. <https://www.youtube.com/watch?v=uTECToTO9Ec>
5. [https://www.youtube.com/watch?v=HyGb\\_eaT-U8](https://www.youtube.com/watch?v=HyGb_eaT-U8)

## SEMESTER III

### PCCSO20 – PRACTICAL V: WEB SERVICES LAB

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PCCSO20	<b>Title of the Course:</b> Practical V: Web Services Lab	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 3	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. Understand the basic concepts of web services.
2. Understand how the client-server model of programming works.
3. Develop interactive, client-side, executable web applications.
4. Use WSDL Service to implement a variety of presentation effects to the web application.
5. Migrate the web applications to the other platforms like .Net

#### Course Outcomes (COs)

1. Understand, analyze and evaluate a system using web services.
2. Identify and formulate and solve web related problems.
3. Use techniques and skills to design web based applications.
4. Understand and describe Java - enabled XML technology.
5. Be able to create, deploy, and call Web services using Java, .NET

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	M	L	M	H	L
CO2	M	M	H	M	L	M
CO3	M	L	M	L	H	M
CO4	H	M	M	L	M	L
CO5	L	M	L	M	L	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### Exercises

1. Write a program to implement WSDL Service. (K2)
2. To create a simple Web application using Web services in Java.(K5)
3. To write a factorial application program using Web services in java. (K2)
4. To implement calculator (+ -\* /) web application. (K2)
5. Web Service creation using .NET. (K4)
6. Develop a J2EE client to access a .NET Web Service. (K5)
7. Write a program the service provider can be implement a single getprice(), staticbind() and getproduct() operation. (K2)
8. Write a program to implement the operation can receive request and will return a Response in two ways.
  - a) One-Way operation
  - b) Request – Response (K2, K3)

# INDEPENDENT ELECTIVES

## SEMESTER I

### PICSA20 – SOFTWARE QUALITY ASSURANCE

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PICSA20	<b>Title of the Course:</b> Software Quality Assurance	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To know the behavior of the testing techniques and to design test cases to detect the errors in the software.
2. To get insight into the levels of testing in the user environment.
3. To understand standard principles to check the occurrence of defects and its removal.
4. To learn the functionality of automated testing tools to apply in the specialized environment. To understand the models and metrics of software quality and reliability.
5. To generate and apply the test cases using the automated testing tool.

#### Course Outcomes (COs)

1. Test the software by applying various testing techniques.
2. Able to debug the project and to test the entire computer-based systems at all levels.
3. Test the applications in the specialized environment using various automation tools.
4. To evaluate the applications using software testing tools.
5. Apply quality and reliability metrics to ensure the performance of the software.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	H	L	M	L	M	L
CO2	H	L	M	L	M	L
CO3	L	L	H	M	L	M
CO4	M	L	M	L	H	M
CO5	L	L	L	M	L	H

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I**

- 1.1 Software quality Challenge(K1, K2)
- 1.2 Software quality (K3)
- 1.3 Software quality assurance (K2)
- 1.4 Software quality factors (K2, K4)
- 1.5 Components of SQA(K3)
- 1.6 Management SQA Components (K4)

### **Unit II**

- 2.1 Pre-Project Software Quality Assurance System (K1, K6)
- 2.2 Contract review (K1, K2)
- 2.3 Developing plan (K2)
- 2.4 Quality plan (K3, K4)
- 2.5 Integrating quality activities in the project life cycle(K1, K4)
- 2.6 Reviews(K2)

### **Unit III**

- 3.1 Software Testing Strategies (K1)
- 3.2 Software Testing Implementations (K2, K6)
- 3.3 Automated Testing
- 3.4 Assuring the Quality of Software Maintenance Components (K2, K3)
- 3.5 Maintenance software quality assurance tools (K3)
- 3.6 Case Tools (K4)

### **Unit IV**

- 4.1 Software Quality Infrastructure Components (K2)
- 4.2 Procedures and work instructions (K1, K2)
- 4.3 Supporting quality devices (K2, K3)
- 4.4 Staff training and certification (K4, K6)
- 4.5 Corrective action (K5)
- 4.6 Preventive action (K4)

### **Unit V**

- 5.1 Configuration Management (K1, K6)
- 5.2 Documentation control (K2, K3)
- 5.3 Project progress control (K2, K3)
- 5.4 Cost of software quality (K4, K5)
- 5.5 Auditing and Control (K3, K4)
- 5.6 Vendor control (K5)

### **Text Books:**

1. Daniel Galin - Software Quality Assurance, 2<sup>nd</sup> Edition – Pearson Education, 2011.
2. Milind Limaye – Software Quality Assurance – Tata McGraw Hill Publication, 2011.

**Reference Books:**

1. Ian Sommerville – Software Engineering, 5<sup>th</sup> Edition – Addison Wesley Publication, 2002.
2. Roger S. Pressman – Software Engineering: A Practitioner’s Approach, 5<sup>th</sup> Edition – McGraw Hill International Edition, New York, 2000.
3. Pankaj Jalote – An Integrated Approach to Software Engineering, 2<sup>nd</sup> Edition – Narosa Publication
4. Richard Fairly - Software Engineering Concepts – Tata McGraw Hill, 1997.

**Open Educational Resources (OER):**

1. [https://www.tutorialspoint.com/software\\_quality\\_management/software\\_quality\\_management\\_sqa\\_components.htm](https://www.tutorialspoint.com/software_quality_management/software_quality_management_sqa_components.htm)
2. <https://www.youtube.com/watch?v=B6pQVUmBGps&list=PLy9U5GDpYZVPYwx2SBmxsFODDnBnsfG9w>

## SEMESTER I

### PICSB20 – GREEN COMPUTING

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PICSB20	<b>Title of the Course:</b> Green Computing	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. Understand the dimensions and goals of Green IT.
2. Discuss the green enterprise architecture with environmental intelligence.
3. Analyze the Grid framework with the collaboration of cloud computing.
4. Understand the concept of Green compliance.
5. Apply Green IT strategies and applications of home appliances.

#### Course Outcomes (COs)

1. Understand the Concept of Green IT.
2. Discuss Green IT in relation to technology.
3. Evaluate IT use in relation to environmental perspectives.
4. Discuss the methods and tools to measure energy consumption.
5. Conclude with a Green IT to sustainable development and develop energy saving.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	L	M	M	L	H
CO2	M	L	M	L	H	M
CO3	L	M	L	M	L	M
CO4	M	M	L	H	M	L
CO5	M	H	M	L	M	L

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I**

- 1.1 Green IT: An Overview: Introduction - Environmental Concerns and Sustainable Development - Environmental Impacts of IT (K1)
- 1.2 Green IT: OCED Green IT Framework – Green IT 1.0 and 2.(K1)
- 1.3 Holistic Approach to Greening IT: Greening Computer’s Entire life Cycle – The Three Rs of Green IT (K1)
- 1.4 Greening IT: Green PCs, Notebooks and Servers – Green Data Centres – Green Cloud Computing – Green Data Storage – Green Software – Green Networking and Communication (K1, K2)
- 1.5 Applying IT for Enhancing Environmental Sustainability-Green IT Standards and Eco Labelling of IT - Enterprise Green IT Strategy(K1, K2)
- 1.6 Green Devices and Hardware: Introduction-Life Cycle of a Device or Hardware- Reuse, Recycle and Dispose (K1)

### **Unit II**

- 2.1 Sustainable Software Development: Introduction - Current Practices - Sustainable Software- Software Sustainability Attributes (K1)
- 2.2 Software Sustainability Metrics: Modifiability and Reusability – Portability – Supportability – Performance – Dependability – Usability – Accessibility – Predictability – Efficiency – Project’s Carbon Footprint (K1, K2)
- 2.3 Sustainable Software Methodology: Collecting Metrics – Code metrics Tools – Simplified Usability Study – Platform Analysis – Existing Project Statistics - Defining Actions (K2, K3)
- 2.4 Green Data Centres: Data Centres and Associated Energy Challenges(K1)
- 2.5 Data Centre IT Infrastructure: Servers – Networking – Storage – IT Platform Innovation - Data Centre Facility Infrastructure-Implications for Energy Efficiency: Power System – Cooling – Facilities Infrastructure Management (K1, K3)
- 2.6 IT Infrastructure Management: Server Power – Consolidation – Virtualization (K2)

### **Unit III**

- 3.1 Green Cloud Computing and Environmental Sustainability: Introduction -What is Cloud Computing? - Cloud Computing and Energy Usage Model (K1)
- 3.2 Features of Clouds Enabling Green Computing (K2)
- 3.3 Towards Energy Efficiency of Cloud Computing (K3)
- 3.4 Green Cloud Architecture (K2, K3)
- 3.5 Enterprise Green IT Strategy: Introduction-Approaching Green IT Strategies- Business Drivers of Green IT Strategy (K1, K3)
- 3.6 Business Dimensions for Green IT Transformation - Organizational Considerations in a Green IT Strategy (K3, K4,K6)

### **Unit IV**

- 4.1 Sustainable Information Systems and Green Metrics: Introduction- Multilevel Sustainable Information (K2)
- 4.2 Sustainability Hierarchy Models: Sustainability Frameworks – Sustainability Principles – Tools for Sustainability (K4, K5, K6)
- 4.3 Product Level Information: Life-Cycle Assessment – The four stages of LCA – CRT Monitors versus LCD Monitors: Life Cycle Assessment (K3, K4)
- 4.4 Individual Level Information ( K3)
- 4.5 Functional Level Information: Data Centre Energy Efficiency – Data centre Power Metrics – Emerging Data Centre Metrics (K4, K6)
- 4.6 Organizational Level Information: Reporting Greenhouse Gas Emissions (K4, K5)

## Unit V

- 5.1 Green Enterprises and the Role of IT: Introduction-Organizational and Enterprise Greening: The Green Enterprise: A value chain Perspective(K2, K3)
- 5.2 Information Systems in Greening Enterprises: Environmental Management Information systems – Software and Databases – ERP EMISs – ERP Challenges and Deficiencies with Respect to EMIS – Integrating Environmental and LCA Information with ERP – Electronic Environmental and Sustainability Reporting (K3, K4, K5, K6)
- 5.3 Greening the Enterprise-IT Usage and Hardware: Environmental Information Technology Standards – Green Management of Data Centre (K2, K3)
- 5.4 Inter-organizational Enterprise Activities and Green Issues: Electronic Commerce and Greening the Extended Enterprise – Demanufacturing and Reverse Logistics- Eco-Industrial Parks and Information Systems - Enablers and Making the Case for IT and the Green Enterprise (K4, K5,K6)
- 5.5 Managing Green IT: Introduction-Strategizing Green Initiatives: Strategic Thinking – Strategic Planning – Strategic Implementation – Enterprise Architecture Planning(K2, K4)
- 5.6 Implementation of Green IT: Return on Investment – Metrics – The Goal-Question-Metric (GQM) - Information Assurance: Risk Management -Communication and Social Media(K5, K6)

### Text Books:

1. San Murugesan, G.R. Gangadharan-Harnessing Green It Principles and Practices, A John Wiley & Sons, Ltd., Publication 2012.

### Reference Books:

1. John Lamb, “The Greening of IT”, Pearson Education, 2009.
2. Jason Harris, “Green Computing and Green IT– Best Practices on Regulations &Industry”, Lulu.com, 2008.
3. Woody Leonhard, Katherrine Murray, “Green Home Computing for Dummies”, August 2009.
4. Swarup K. Das, “Cloud Computing”, Dominant Publishers, 2015.
6. PrasantaPattnaik, ManasKabat,” Fundamentals of Cloud Computing”, S.Chand (G/L) & Company Ltd; First edition (2014).

### Open Educational Resources (OER):

1. [https://www.google.com/url?sa=t&source=web&rct=j&url=http://www.vandemataramcollege.com/app/webroot/files/NOTES\\_sem246/Green\\_IT-FYCS-Sem2.pdf&ved=2ahUKEwjYgJaM\\_IxrAhUBX30KHeNtAFcQFjAAegQIARAB&usg=AOvVaw0gQehqD562q0zVa7ulBEH3&cshid=1596721284883](https://www.google.com/url?sa=t&source=web&rct=j&url=http://www.vandemataramcollege.com/app/webroot/files/NOTES_sem246/Green_IT-FYCS-Sem2.pdf&ved=2ahUKEwjYgJaM_IxrAhUBX30KHeNtAFcQFjAAegQIARAB&usg=AOvVaw0gQehqD562q0zVa7ulBEH3&cshid=1596721284883)
2. [https://youtu.be/QYThOy\\_QiTU](https://youtu.be/QYThOy_QiTU)
3. <https://www.youtube.com/watch?v=CRdm3xEJ97E>
4. <https://youtu.be/Nc8sNUcE-yk>
5. <https://youtu.be/6dSZyDRgl1M>
6. <https://youtu.be/X43KVeWVk>

## SEMESTER I

### PICSC20 – DISTRIBUTED OPERATING SYSTEM

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PICSC20	<b>Title of the Course:</b> Distributed Operating System	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To expose students to both the abstraction and details of file systems.
2. To introduce concepts related to distributed computing systems.
3. To focus on performance and flexibility issues related to systems design decision.
4. To expose students to current literature in distributed systems.
5. To prepare students for an industrial programming environment.

#### Course Outcomes (COs)

1. Understand the architecture of distributed operating system.
2. Differentiate between centralized and distributed system.
3. Determine the difficulties of distributed memory management.
4. Analyze effective synchronization techniques to be performed to run a task in a distributed system.
5. Evaluate the best methods to follow to execute a task in remote machines.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	L	M	L	M	L
CO2	L	L	M	L	H	M
CO3	M	M	L	M	H	L
CO4	M	H	L	M	L	H
CO5	H	M	M	L	L	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I**

- 1.1 Introduction to Distributed System (K1)
- 1.2 Communication in Distributed System: Remote Procedure Call(K2)
- 1.3 Synchronization in distributed system (K4)
- 1.4 Clock Synchronization (K2)
- 1.5 Mutual Exclusion (K2)
- 1.6 Deadlocks in Distributed System (K4)

### **Unit II**

- 2.1 Process and Processors in Distributed System: Threads (K3, K4)
- 2.2 System Models (K2)
- 2.3 Processor allocation (K2)
- 2.4 Scheduling in Distributed Systems (K4)
- 2.5 Fault Tolerance (K5)
- 2.6 Real Time Distributed System (K4)

### **Unit III**

- 3.1 Distributed Object Based Systems: Architecture (K2, K4)
- 3.2 Processes-Object Servers: Communication (K2, K4)
- 3.3 Distributed Objects: Binding a client to an object – Static Versus Dynamic – Remote Method Invocations (K2)
- 3.4 Parameter Passing – Naming: CORBA Object References – Globe Object Reference - Synchronization – Consistency and Replication (K2)
- 3.5 Distributed File Systems: Distributed File System Design – Distributed File System Implementation – File Usage (K2, K4)
- 3.6 System Structure – Caching – Replication –Trends in Distributed File System (K2, K4)

### **Unit IV**

- 4.1 Distributed Shared Memory: Introduction – Shared Memory (K1, K2)
- 4.2 Consistency Models – Page based (K2, K3)
- 4.3 Distributed Shared Memory (K1, K2)
- 4.4 Shared Memory (K2)
- 4.5 Shared Variable Distributed Shared Memory (K2)
- 4.6 Object Based Distributed Shared Memory (K2)

### **Unit V**

- 5.1 Distributed Web Based Systems: Architecture – Processes (K2)
- 5.2 Communication – Naming –Synchronization (K1, K2)
- 5.3 Consistency and Replication (K2)
- 5.4 54 Case Study: AMOEBA – Introduction –Objects and Capabilities ( K2)
- 5.5 Process Management (K1, K2)
- 5.6 Memory Management – Communication (K1, K2)

### **Text Books:**

1. Andrew S.Tanenbaum (2011). Distributed Operating System, 10/e, Pearson Education.

### **Reference Books:**

1. ShubhraGarg (2013).Fundamentals of Distributed Operating Systems, S.K. Kataria& Sons.
2. YakupPaker et al (2012). Distributed Operating Systems: Theory and Practice, Springer.
3. S S Kudate, A P Kale et al (2012). Distributed Operating Systems, NiraliPrakashan.

**Open Educational Resources (OER):**

1. <http://indexof.es/Varios2/Modern%20Operating%20Systems%204th%20Edition.pdf>
2. <http://stst.elia.pub.ro/news/SO/Modern%20Operating%20System%20-%20Tanenbaum.pdf>
3. <https://www.amazon.com/Operating-Systems-Design-Implementation-3rd/dp>
4. [https://www.youtube.com/watch?v=Azyizl9w2xo&list=PLrjKTql3jnm9FEOXHA\\_qjR-TMODlalk-W&index=1](https://www.youtube.com/watch?v=Azyizl9w2xo&list=PLrjKTql3jnm9FEOXHA_qjR-TMODlalk-W&index=1)
5. [https://www.youtube.com/watch?v=wmMEbrGq\\_nU](https://www.youtube.com/watch?v=wmMEbrGq_nU)
6. <https://www.youtube.com/watch?v=ipm5hDz9zG0>
7. <https://www.youtube.com/watch?v=oKIEjKDUkAs>

## SEMESTER II

### PICSD20 – WIRELESS SENSOR NETWORKS

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PICSD20	<b>Title of the Course:</b> Wireless Sensor Networks	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. Understand the challenges and applications of WSN.
2. Analyze single node and network architecture of sensor networks.
3. Classify MAC and link layer protocols in wireless sensor networks.
4. Understand the concept of Topology control in WSN.
5. Explain routing protocols in WSN.

#### Course Outcomes (COs)

1. Understand the concepts of Wireless Technology and supporting Protocols.
2. Understand the Basic Sensor Systems and provide a survey of Sensor Technology.
3. Understand the Medium Access Control protocols and analyze various Routing Protocols at Network Layer.
4. Learn Transport Control Protocols for Sensor Networks Middleware and design requirements.
5. Understand the Sensor Management, Sensor Networks, and Operating System.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	L	M	L	H	M
CO2	L	M	H	L	M	L
CO3	M	H	L	M	H	H
CO4	H	L	M	L	L	M
CO5	L	H	M	L	M	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I**

- 1.1 Introduction and Overview of Wireless Sensor Networks (K1)
- 1.2 Introduction (K1)
- 1.3 Basic Overview of the Technology (K2, K3)
- 1.4 Applications of Wireless Sensor Networks (K3)
- 1.5 Examples of Category 1 (K4, K5)
- 1.6 Category 2 WSN Applications (K4, K5)

### **Unit II**

- 2.1 Basic Wireless Sensor Technology: Sensor Node Technology (K1)
- 2.2 Sensor Taxonomy (K1, K2)
- 2.3 WN Operating Environment (K2, K3)
- 2.4 WN Trends (K2)
- 2.5 Wireless Transmission Technology and System: Radio Technology Primer (K3, K6)
- 2.6 Available Wireless Technologies(K3, K4)

### **Unit III**

- 3.1 MAC for Wireless Sensor Networks: Fundamentals of MAC Protocols(K1, K2)
- 3.2 MAC Protocols for WSNs - Sensor MAC. (K2)
- 3.3 IEEE 802.15.4 LR WPANs. (K2, K4)
- 3.4 Routing Protocols for Wireless Sensor Networks (K3, K6)
- 3.5 Routing Challenges and Design Issues in Wireless Sensor Networks (K3, K4)
- 3.6 Routing Strategies in Wireless Sensor Networks (K4)

### **Unit IV**

- 4.1 Transport Control Protocols for Wireless Sensor Networks: Traditional Transport Control Protocol (K1, K3)
- 4.2 Examples of Existing Transport Control Protocols (K2, K4)
- 4.3 Performance of Transport Control Protocols (K3, K6)
- 4.4 Middleware for Wireless Sensor Networks: Middleware Architecture (K2, K3)
- 4.5 MiLAN - IrisNet – AMF (K3)
- 4.6 DSWare – CLMF (K3, K6)

### **Unit V**

- 5.1 Networks Management for Wireless Sensor Networks: Traditional Network Management Models (K1)
- 5.2 Network Management Issues (K1, K2)
- 5.3 Other Issues Related to Network Management (K2)
- 5.4 Operating System for WSN: TinyOS – MagnetOS (K2, K3)
- 5.5 MANTIS – OSPM (K4, K6)
- 5.6 EMERALDS – PicOS (K4, K6)

### **Text Books:**

1. Kazem Sohraby, Daniel Minoli, Taieb Znati (2010), Wireless Sensor Networks Technology, Protocols and Applications, Wiley Publications.

**Reference Books:**

1. Holger Karl and Andreas Willig (2011). Protocols and Architectures for Wireless Sensor Networks. WILEY Publication.
2. P.Nicopolitidis, M.S. Obaidat, G.I Papadimitriou, A.S. Pomportsis (2003). Wireless Network, New Delhi: John Wiley & Sons (ASIA).

**Open Educational Resources (OER):**

1. <https://www.geeksforgeeks.org/wireless-sensor-network-wsn/>
2. [https://www.youtube.com/watch?v=ycaz99NogS4&list=PLJ5C\\_6qdAvBHroAfeKCO7K4xphEF74UPc](https://www.youtube.com/watch?v=ycaz99NogS4&list=PLJ5C_6qdAvBHroAfeKCO7K4xphEF74UPc)
3. <https://www.youtube.com/watch?v=PrnNKZJj-Oc>

## SEMESTER II

### PICSE20 - DIGITAL IMAGE PROCESSING

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PICSE20	<b>Title of the Course:</b> Digital Image Processing	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To study the image fundamentals and mathematical transforms necessary for image processing.
2. To study the image enhancement techniques.
3. To understand the fundamentals of Color Image Processing.
4. To study image restoration procedures.
5. To study Region based Segmentation procedures.

#### Course Outcomes (COs)

1. Understand the basics of Graphics
2. Understand the fundamentals and applications of digital image processing and be aware about intensity transformations.
3. Explore knowledge about image processing fundamentals.
4. Know about various noise models and transformation techniques.
5. Able to know the structure of XML and to design and store data in XML

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	L	M	L	M	H
CO2	M	L	L	M	L	M
CO3	H	M	L	M	H	M
CO4	M	H	L	M	L	M
CO5	L	L	M	M	L	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I**

- 1.1 Introduction to Computer Graphics - Video Display Devices (K1, K2)
- 1.2 Raster Scan Systems -Random Scan Systems - Interactive Input Devices (K1)
- 1.3 Hard Copy Devices - Graphics Software - Output Primitives (K1, K3)
- 1.4 Line Drawing Algorithms: DDA Algorithm- Initializing Lines - Line Function.(K1, K4)
- 1.5 Two dimensional geometric transformations – Matrix representations and homogeneous coordinates (K1)
- 1.6 Three dimensional concepts; Three-dimensional object representations – Polygon surfaces (K1, K3)

### **Unit II**

- 2.1 Digital Image Processing – Introduction – The Origins of Digital Image Processing (K1, K2)
- 2.2 Classification of Digital Images – Image Types - Examples of Fields That Use Digital Image Processing (K1)
- 2.3 Fundamental Steps In Digital Image Processing – Components of An Image Processing System (K1, K2)
- 2.4 Intensity Transformation and Spatial Filtering (K3)
- 2.5 Background – Some Basic Intensity Transformation Functions (K3)
- 2.6 Different types of Transformation functions (K1, K4)

### **Unit III**

- 3.1 Histogram Processing – Fundamentals of Special Filtering (K1, K2)
- 3.2 Smoothing Spatial Filters – Sharpening Spatial Filters (K2, K3)
- 3.3 Color Image Processing – Color Fundamentals – Color Models (K3)
- 3.4 Implementing Web Services (K4)
- 3.5 To Pseudo color Image Processing – Basics of Full-Color Image Processing – Color Transformation. (K4, K5)
- 3.6 Smoothing and Sharpening (K4)

### **Unit IV**

- 4.1 Image Restoration and Reconstruction – A model of the Image Degradation/Restoration process (K5)
- 4.2 Noise Models – Spatial and Frequency properties of Noise – Some important Noise Probability Density Functions (K2)
- 4.3 Periodic Noise – Estimation of Noise Parameters – Restoration in the Presence of Noise only (K1, K3)
- 4.4 Spatial Filtering – Mean Filters – Order Statistic Filters (K3)
- 4.5 Adaptive Filters – Estimating the Degradation Function (K4)
- 4.6 Estimation by Image Observation – Estimation by Experimentation – Estimation by Modelling. (K3, K5)

### **Unit V**

- 5.1 Region Based Segmentation – Region Growing (K5)
- 5.2 Region Splitting and Merging (K1, K2)
- 5.3 Segmentation Using Morphological Watersheds. (K1)
- 5.4 Background – Dam Construction (K1, K2)
- 5.5 Watershed Segmentation Algorithm. (K1, K3)

## 5.6 The use of motion in segmentation (K5)

### **Text Books:**

1. Rafael C. Gonzalez & Richard E. Woods (2018). Digital Image Processing. Fourth Edition. Pearson Edition.

### **Reference Books:**

1. Yogesh M. Rajput (Ramesh R. Manza Dnyaneshwari D. Patil (2017). Projects in Digital Image Processing. Spd Edition.
2. Jayaraman (2012). Digital Image Processing. Tata McGraw-Hill Education.
3. Burger WilhemEt (2010). AI Principles of Digital Image Processing: Fundamental Techniques springerutics publication.

### **Open Educational Resources (OER):**

1. <https://www.tutorialspoint.com/dip/index.htm>
2. <https://www.javatpoint.com/digital-image-processing-tutorial>
3. <https://www.geeksforgeeks.org/digital-image-processing-basics/>

## SEMESTER II

### PICSF20 – STEGANOGRAPHY AND DIGITAL WATERMARKING

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PICSF20	<b>Title of the Course:</b> Steganography and Digital Watermarking	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To provide the importance of digital watermarking and Steganography.
2. To discuss the properties of watermarking and Steganography systems.
3. To discuss the different models of watermarking and Steganography.
4. To understand the various evaluation metrics.
5. To examine various applications of watermarking and Steganography.

#### Course Outcomes (COs)

1. Discuss the need for watermarking and steganography
2. Distinguish between watermarking and steganography
3. Elaborate on the various models of watermarking and steganography.
4. Point out various steganalysis algorithms.
5. Show how watermarking and steganography can be applied to various applications and evaluate them.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	L	H	L	L	M
CO2	M	L	L	H	M	L
CO3	M	H	L	M	L	M
CO4	H	M	M	M	M	L
CO5	L	M	M	H	M	L

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I**

- 1.1 Information Hiding (K1)
- 1.2 Steganography and Watermarking (K1)
- 1.3 History of Watermarking (K1)
- 1.4 History of Steganography (K1)
- 1.5 Importance of Digital Watermarking (K1)
- 1.6 Importance of Steganography (K1)

### **Unit II**

- 2.1 Steganographic Communication: The Channel - The Building Blocks - Notation and Terminology, Information (K4)
- 2.2 Theoretic Foundations of Steganography (K4)
- 2.3 Cachin's Definition of Steganographic Security - Practical Steganographic Methods (K4)
- 2.4 Statistics Preserving Steganography - Model-Based Steganography - Steganalysis Scenarios(K4)
- 2.5 Detection, Forensic Steganalysis. The Influence of the Cover Work on Steganalysis (K4)
- 2.6 Some Significant Steganalysis Algorithms, LSB Embedding and the Histogram Attack (K4)

### **Unit III**

- 3.1 Properties – Evaluating watermarking systems(K5)
- 3.2 Notation – Communications (K5)
- 3.3 Communication based models – Geometric models (K5)
- 3.4 Mapping messages into message vectors (K5)
- 3.5 Error correction coding (K5)
- 3.6 Detecting multi-symbol watermarks – Attacks (K5)

### **Unit IV**

- 4.2 Communications: Components of Communications Systems (K4)
- 4.3 Classes of Transmission Channels - Secure Transmission (K4)
- 4.4 Communication-Based Models of Watermarking Basic Model, Watermarking as Communications with Side Information at the Transmitter (K4)
- 4.5 Watermarking as Multiplexed Communications - Geometric Models of Watermarking - Distributions and Regions in Media Space (K4)
- 4.6 Marking Spaces - Modeling Watermark Detection by Correlation, Linear Correlation, Normalized Correlation, Correlation Coefficient (K4)

### **Unit V**

- 5.1 Applications of Watermarking - Broadcast Monitoring (K6)
- 5.2 Copyrights, Proof of Ownership, Transaction Tracking (K6)
- 5.3 Content Authentication, Copy Control, Device Control, Legacy Enhancement(K6)
- 5.4 Applications of Steganography (K6)
- 5.5 Steganography for Dissidents (K6)
- 5.6 Steganography for Criminals (K6)

**Text Books:**

1. Ingemar J. Cox, Mathew L. Miler, Jeffrey A. Blom, Jesica Fridrich, Ton Kalker – “Digital Watermarking and Steganography” Morgan Kaufmann Publishers, 2008.

**Reference Books:**

1. Ingemar Cox, Mathew Miler, Jeffrey Blom, Jesica Fridrich and Ton Kalker “Digital Watermarking and Steganography” Morgan Kaufmann Publishers, Nov 2007.
2. Jesica Fridrich, “Steganography in Digital Media: Principles, Algorithms, and Applications”, Cambridge University press, 2010.
3. Michael Arnold, Martin Schmucker, Stephen D. Wolthusen, “Techniques and Applications of Digital Watermarking and Content Protection”, Artech House, London, 2003.

**Open Educational Resources (OER):**

1. <https://www.elsevier.com/books/digital-watermarking-and-steganography/cox/978-0-12-372585-1>.
2. <https://books.google.co.in/books?id=wcAZ-QEThqkC&printsec=frontcover#v=onepage&q&f=false>.
3. <https://www.youtube.com/watch?v=zQ15474JACs>.
4. <https://www.youtube.com/watch?v=habrsC934-4>.
5. <https://books.google.co.in/books?hl=en&lr=&id=9R0vDwAAQBAJ&oi=fnd&pg=PR7&dq=Techniques+and+Applications+of+Digital+Watermarking+and+Content+Protection&ots=rz3UqebAHW&sig=LZ2Wfpmtsg5U2PgiMXN7WzivhP4#v=onepage&q=Techniques%20and%20Applications%20of%20Digital%20Watermarking%20and%20Content%20Protection&f=false>.
6. [https://books.google.co.in/books?id=AApEDwAAQBAJ&printsec=frontcover&dq=Digital+Watermarking+and+Steganography&hl=en&sa=X&ved=2ahUKEwi\\_trzRkJDrAhWL63MBHTeyAtcQuwUwAHoECAQQBw#v=onepage&q=Digital%20Watermarking%20and%20Steganography&f=false](https://books.google.co.in/books?id=AApEDwAAQBAJ&printsec=frontcover&dq=Digital+Watermarking+and+Steganography&hl=en&sa=X&ved=2ahUKEwi_trzRkJDrAhWL63MBHTeyAtcQuwUwAHoECAQQBw#v=onepage&q=Digital%20Watermarking%20and%20Steganography&f=false).

## SEMESTER III

### PICSG20 – CLOUD SOLUTION WITH AZURE

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PICSG20	<b>Title of the Course:</b> Cloud Solution with Azure	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To study the decision on adoption of cloud computing by a prospective cloud services consumer enterprise, including possible significant benefits of its adoption, in order to ensure informed and accountable information technology (IT) related decision-making.
2. To study the IT governance control framework was used to systematically identify and categories significant benefits of the adoption of cloud computing by an enterprise (including governmental organisations and business).
3. To apply cloud computing adoption that was discovered include scale benefits and the transformation of a capital expense to a scalable operational expense.
4. To study the benefits, framework of Azure
5. To understand the services of Azure.

#### Course Outcomes (COs)

1. Understand the basics of Cloud Computing with Azure and its services.
2. Implement the services of Azure.
3. Learn various solutions in Azure.
4. To develop application based Azure Solutions.
5. Develop and deploy applications in Azure.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	L	M	L	M	L	M
CO2	H	M	M	H	M	L
CO3	L	M	H	M	L	M
CO4	M	L	M	L	M	L
CO5	L	M	M	L	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I

- 1.1 Getting started with Azure – Technical requirements (K1, K2)
- 1.2 What is Cloud Computing? (K1, K2)
- 1.3 What problems does it solve? – What is Azure? (K2)
- 1.4 How do I start using Azure? (K2, K3)
- 1.5 Extending Directory Services to Azure (K2, K6)
- 1.6 Terminology to remember with Azure (K3, K4)

### Unit II

- 2.1 Moving Existing Apps to Azure – Technical requirements (K1, K2)
- 2.2 How I approach the discussion: Rehost, Refactor, Re-architect, Rewrite(K3, K6)
- 2.3 Creating resources in the Azure Portal (K2, K6)
- 2.4 Migrating to Azure: SaaS Migrations, Office 365(K3)
- 2.5 IaaS: PowerShell and ARM Template: Deploy- AzureResourceGroup.ps1, azure deploy Parameters json, asuredploy. json (K3, K5)
- 2.6 PaaS: Deploy-Azure-Website and Database. parameters.json, Deploy-Azure-Website and Database. template. json(K4, K5)

### Unit III

- 3.1 Building Solutions in Azure –Technical Requirements – Azure blueprints (K2)
- 3.2 Key Vault : VNet,Mobile,IoT,AI and Machine Learning(K2, K3)
- 3.3 Understanding responsibility: Infrastructure as a Service, Platform as a Service, Software as a Service, Azure Active Directory- Plan for Success (K3, K6)
- 3.4 Architecture styles: Common application Patterns ,How to make technology choices(K4, K5)
- 3.5 Designing applications in Azure:App Services (K2, K3)
- 3.6 Database Services, Storage accounts, CosmosDB,Microservices / Containers , Real-world examples (K4, K6)

### Unit IV

- 4.1 Understanding the Infrastructure behind Solutions Built in Azure – Technical requirements (K1, K2)
- 4.2 Setting up your development environment – Managing cost (K3)
- 4.3 How I approach guidance- Understanding Infrastructure as Code – Developing locally (K2, K4)
- 4.4 How I develop locally – Security center – Application authentication (K4)
- 4.5 Dependency Injection – Logging – Data Storage- Understanding service lifetimes (K2, K3)
- 4.6 Adding Intelligence to your solutions- Using Application Insights –Leveraging on-premises resources (K1, K3, K6)

### Unit V

- 5.1 Deploying Solutions to Azure- Technical requirements –Deploying solutions in Azure (K1, K2)
- 5.2 What is devOps?: Azure Boards, Azure Artifacts, Azure Pipelines, Azure Test Plans (K2, K3)
- 5.3 How I use Azure DevOps- What are deployment slots? (K3)
- 5.4 How Azure helps with DevOps – Putting it all together Technical requirements- Dashboards (K1, K2, K6)
- 5.5 Azure Advisors: High Availability Advisor,Security Advisor / Security Center, Performance Advisor, Cost Advisor (K2, K3)
- 5.6 Monitoring: Core capabilities, Shared capabilities, Infrastructure capabilities, Application capabilities (K4, K6)

**Text Books:**

1. Greg Leonardo (2018) - Hands – On Cloud Solutions With AZURE – Packt Publication.

**Reference Books:**

1. Mustafa Toroman (2018), Hands on Cloud Administration in AZURE – Packt Publication.
2. Neil Peterson (2016), Get started guide for AZURE IT Operators - Microsoft Publication.
3. David Chappell (2009), Introducing Windows AZURE –Microsoft Publication.

**Open Educational Resources (OER):**

1. <https://azure.microsoft.com/en-in/>
2. <https://www.youtube.com/watch?v=n24OBVGHufQ>

## SEMESTER III

### PICSH20 – INTRODUCTION TO BLOCK CHAIN TECHNOLOGY

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PICSH20	<b>Title of the Course:</b> Introduction to Block Chain Technology	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. Understand how blockchain systems (mainly Bitcoin and Ethereum) work
2. To securely interact with them,
3. Design, build, and deploy smart contracts and distributed applications,
4. Integrate ideas from blockchain technology into their own projects.
5. To increase trust, security, transparency, and traceability of data.

#### Course Outcomes (COs)

1. Understand design principles of Bitcoin and Ethereum.
2. Learn the Simplified Payment Verification protocol.
3. Describe and understand the differences between the most prominent block chain structures and permissioned block chain service providers.
4. Understand the crypto currency mechanism by sending and reading transactions.
5. Evaluate security, privacy, and efficiency of a given block chain system in various applications

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	M	H	L	M	L	M
CO2	M	L	M	L	M	L
CO3	M	M	L	H	M	L
CO4	L	M	H	L	H	M
CO5	M	H	L	L	L	H

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I**

- 1.1 Basics: Distributed Database (K1)
- 1.2 Two General Problem, Byzantine General Problem and Fault Tolerance (K2)
- 1.3 Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete (K1, K2)
- 1.4 Cryptography: Hash function (K1, K2)
- 1.5 Digital Signature – ECDSA (K1, K3)
- 1.6 Memory Hard Algorithm, Zero Knowledge Proof (K1, K2)

### **Unit II**

- 2.1 Blockchain: Introduction, Structure of a Block(K2)
- 2.2 Block Header (K2)
- 2.3 Block Identifiers-Block Header Hash and Block Height (K3, K4)
- 2.4 The Genesis block (K2)
- 2.5 Linking Blocks in the Blockchain (K3)
- 2.6 Merkle Trees- Simplified Payment Verification (SPV) (K3, K4)

### **Unit III**

- 3.1 Distributed Consensus: Nakamoto consensus (K2, K4)
- 3.2 Proof of Work, Proof of Stake (K2, K4)
- 3.3 Proof of Burn (K2, K4)
- 3.4 Difficulty Level (K4)
- 3.5 Sybil Attack (K2, K4)
- 3.6 Energy utilization – alternate(K5)

### **Unit IV**

- 4.1 Cryptocurrency: History (K1)
- 4.2 Distributed Ledger (K3)
- 4.3 Bitcoin protocols - Mining strategy and rewards (K1, K3)
- 4.4 Ethereum - Construction, DAO (K3)
- 4.5 Smart Contract –GHOST (K2, K3)
- 4.6 Vulnerability- attacks, Sidechain- Namecoin (K3)

### **Unit V**

- 5.1 Cryptocurrency Regulation: Stakeholders (K3, K4, K5)
- 5.2 Legal Aspects-Crypto currency Exchange (K3, K4, K5)
- 5.3 Black Market and Global Economy (K3, K4, K5)
- 5.4 Applications: Internet of Things (K3, K4, K6)
- 5.5 Medical Record Management System (K6)
- 5.6 Domain Name Service and future of Blockchain (K6)

### **Text Books:**

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).
2. Andreas M. Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies, Published by O'Reilly Media, Inc (2010)

**Reference Books:**

1. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
2. DR. Gavin Wood, “ETHEREUM: A Secure Decentralized Transaction Ledger” Yellow paper.2014.
3. Daniel Drescher,Blockchain Basics: A Non-Technical Introduction in 25 Steps, kindle Edition (13 April 2017)

**Open Educational Resources (OER):**

1. <https://unglueitfiles.s3.amazonaws.com/ebf/05db7df4f31840f0a873d6ea14dcc28d.pdf>
2. <https://www.youtube.com/watch?v=M7oDW6v8js>
3. <https://blockchainlibrary.org/2017/10/most-cited-ethereum-publications/>

## SEMESTER III

### PICSI20 – EMBEDDED SYSTEM

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PICSI20	<b>Title of the Course:</b> Embedded System	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Outcomes (COs)

1. Understand the Concepts of Embedded Systems.
2. Recognize the concepts of Network devices.
3. Gain the knowledge of Device Drivers and Interrupts Servicing Mechanism.
4. Acquire the knowledge of Real Time Operating Systems.
5. Understand Program Modeling Concepts.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	M	M	L
CO2	M	L	M	H	M	M
CO3	L	M	M	M	L	H
CO4	M	M	L	M	L	M
CO5	H	M	L	L	M	L

CO	PO					
	1	2	3	4	5	6
CO1	H	L	L	M	L	M
CO2	M	H	L	H	M	L
CO3	H	L	M	H	L	M
CO4	H	M	L	L	M	L
CO5	L	M	L	H	M	L

(Low - L, Medium – M, High - H)

#### Course Syllabus

##### Unit I

- 1.1 Introduction to Embedded Systems: Embedded Systems (K2, K4)
- 1.2 Processor Embedded into a System – Embedded Hardware and Software (K4)
- 1.3 SOC and use of VLSI Circuit design Technology (K3, K4)
- 1.4 Complex System Design and Processor (K4)
- 1.5 Design Process in Embedded System and Design Examples (K4, K5)
- 1.6 Classification of Embedded Systems (K4)

## **Unit II**

- 2.1 Devices and Communication Buses for Devices Networks: IO types ( K2)
- 2.2 Serial Communication Devices – Parallel Devices Port (K2, K4)
- 2.3 Interfacing Features in Device Ports – Wireless Devices (K2, K5)
- 2.4 Timer and Counting Devices – Watchdog Timer (K2, K4)
- 2.5 Real Time Clock - Networked Embedded Systems (K4, K6)
- 2.6 Serial Bus Communication Protocols (K2, K4)

## **Unit III**

- 3.1 Device Drivers and Interrupts Servicing Mechanism: Programmed - I/O (K2, K4)
- 3.2 Busy-wait Approach without Interrupt Service Mechanism – ISR (K2, K4)
- 3.3 Interrupt Sources - Interrupts Servicing Mechanism (K2, K5)
- 3.4 Multiple Interrupts (K4)
- 3.5 Context and the Periods for Context Switching, Interrupt Latency and Deadline (K2, K4)
- 3.6 Classification of Processors Interrupt Servicing Mechanism from Context Saving Angle (K4)

## **Unit IV**

- 4.1 Real Time Operating Systems: OS Services (K2)
- 4.2 Process Management – Timer and Event Functions (K2, K4)
- 4.3 Memory Management – Device, file and IO Subsystems Management (K2, K4)
- 4.4 Interrupt Routines in RTOS Environment and Handling of Interrupts Source Calls (K4, K5)
- 4.5 RTOS - Basic Design using RTOS (K2, K4)
- 4.6 RTOS Task Designing Models (K2, K4)

## **Unit V**

- 5.1 Program Modeling Concepts: Program and DFG Models (K2, K4)
- 5.2 Finite State Model (K2)
- 5.3 State Machine Programming Models (K2, K5)
- 5.4 Modeling of Multiprocessor Systems (K4)
- 5.5 ADL Modeling (K4)
- 5.6 Embedded Software Development Process and Tools: Introduction Embedded Software Development Process and Tools (K2, K4)

### **Text Books:**

1. Raj Kamal (2014). Embedded Systems Architecture, Programming and Design. Tata McGraw Hill Publishing Company Limited. Second Edition.

### **Reference Books:**

1. Julio Sanchez Maria P. Canton (2017). Embedded Systems Circuits and Programming's press.
2. Jack Ganssle (2012). The Art of Designing Embedded Systems. Elsevier. Second Edition.
4. David E. Simon (2010). An Embedded Software Primer. Pearson Education.

### **Open Educational Resources (OER):**

1. [https://en.wikipedia.org/wiki/Embedded\\_system](https://en.wikipedia.org/wiki/Embedded_system)
2. [https://www.tutorialspoint.com/embedded\\_systems/es\\_overview.htm](https://www.tutorialspoint.com/embedded_systems/es_overview.htm)
3. <https://www.guru99.com/embedded-systems-tutorial.html>
4. <https://www.youtube.com/watch?v=nccWuB5ypxI&list=PLcbIZiT62e1gNZ-VWPO3rpTpXkHBMZa2n>
5. <https://www.youtube.com/watch?v=RcP6cYJb0ZE>

# **Department of Electronic Media (PG)**

## **SYLLABUS AND REGULATIONS**

**Under**

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**Department of Communication Media**

**M.Sc. Electronic Media**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighboring districts.

**B) NAME OF THE PROGRAMME: M.Sc. Electronic Media**

**Vision:**

To prepare graduate for creative, challenging and productive careers in the media industry, making them committed media professionals who are socially responsible.

**C) ELIGIBILITY CRITERIA OF THE PROGRAMME**

A candidate who has qualified Bachelor's Degree in any branch of study is eligible for seeking admission to M.Sc. Degree in Electronic Media.

#### D) List of Courses:

The structure of M.Sc. Electronic Media Course and the Scheme of Examination is:

Sem	Subject Code	Title of Subject	Hours/ Week	Exam Hours		Credits	Marks
				Th	Pr		
I	PCEMA20	Mass Communication and Journalism	5	3	-	4	40+60
	PCEMB20	Broadcasting in India	5	3	-	4	40+60
	CEMC20	Videography	5	3	-	4	40+60
	PCEMD20	Practical I – Video Production	4	-	3	2	40+60
	PCEME20	Practical II - Writing for Broadcast Media	5	-	3	2	40+60
	PEEMA20	Elective I A – Script writing and Direction	5			4	40+60
	PEEMB20	Elective II B – Broadcast Journalism					
	PIEMA20	Independent Elective –Radio and Television News casting	-	-	-	2	40+60
		Value Education	1				
			<b>30</b>			<b>22</b>	<b>700</b>
II	PCEMF20	Advanced Television Production	5	3	-	4	40+60
	PCEMG20	Radio Programme Production	5	3	-	4	40+60
	PCEMH20	Media Analysis Techniques	5	3	-	4	40+60
	PCEMI20	Practical III – Non Linear Editing	6	-	3	2	40+60
	PCEMJ20	Practical IV – Project : Production	1	-	3	2	40+60
	PEEMC20	Elective II A: Inter-Cultural Communication	5	3	-	4	40+60
	PEEMD20	Elective II B: Mobile Communication					
	PIEMB20	Independent Elective Electronic Journalism				2	40+60
	PNHRA20	Human Rights	2	3	-	2	40+60
		Value Education	1				
			<b>30</b>			<b>24</b>	<b>800</b>

III	PCEMK20	Film Studies	5	3	-	4	40+60
	PCEML20	Communication Research Methods	5	3	-	4	40+60
	PCEMM20	Public Relations & Corporate Communication	5	3	-	4	40+60
	PCEMN20	Practical V – Internship	3	-	3	2	40+60
	PCEMO20	Practical VI – Basics 3D Animations	6	-	3	3	40+60
	PEEME20	Elective III A: Technical Business Communication	5	3	-	4	40+60
	PEEMF20	Elective III B: Advertising in Visual Media	-				
	PIEMC20	Independent Elective - Women And Advertising				2	40+60
	PGTRA20	Teaching and Research Aptitude		3		3	40+60
		Value Education	1				
			<b>30</b>			<b>26</b>	<b>800</b>
IV	PCEMP20	Electronic Media Management	5	3	-	4	40+60
	PCEMQ20	Development Communication	5	3	-	4	40+60
	PCEMR20	Advertising & Integrated Marketing Communication	5	3	-	4	40+60
	PCEMS20	Practical VII - Research Project	3	-	3	3	40+60
	PCEMT20	Practical VIII – Web Publishing	6	-	3	3	40+60
	PEEMG20	Elective IV A: Web Designing	5	3	-	4	40+60
	PEEMH20	Elective IVB: Women and Media					
	PIEMD20	Independent Elective- International Communication				2	40+60
			Value Education	1			2
			<b>30</b>			<b>26</b>	700
<b>Total</b>						<b>98</b>	<b>3000</b>

## **PROGRAMME SPECIFIC OUTCOME (PSO)**

On completion of the PG Programme, students will be able to;

1. To obtain wide Knowledge in the area of Electronic Media Production and demonstrate Clear and coherent communication skills.
2. To Assimilate and apply Video and Audio editing techniques, Multimedia, and Web Designing Projects towards skill development and employability.
3. To Assimilate the critical and scientific approaches to address the Research problems and Find solutions.
4. To Integrate the issues of social and Ethical relevance in the field of Documentary and Short film Production.
5. To become ethically committed media professionals and entrepreneurs by adhering to Human values, the Indian and the Global cultures.
6. To acquire primary Research skills, and understand the importance of innovations, Incubation and entrepreneurship.

## **PROGRAMME OUTCOMES (PO)**

On completion of the PG Programme, students will be able to:

**PO1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.

**PO2:** Assimilate and apply principles and concepts towards skill development And employability.

**PO3:** Apply critical and scientific approaches to address problems and find solutions.

**PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO5:** Integrate issues of social relevance in the field of study.

**PO6:** Persist in life-long learning for personal and societal progress.

<b>PSO</b>	<b>PO</b>					
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>PSO1</b>	3	3	3	3	3	3
<b>PSO2</b>	3	3	3	3	3	3
<b>PSO3</b>	3	3	3	3	3	3
<b>PSO4</b>	3	3	3	3	3	3
<b>PSO5</b>	3	3	3	3	3	3
<b>PSO6</b>	3	3	3	3	3	3

**(STRONGLY CORRELATED - 3, MODERATELY CORRELATED - 2, WEAKLY CORRELATED -1)**

## SEMESTER - I

### PCEMA20 - MASS COMMUNICATION AND JOURNALISM

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PCEMA20	Mass Communication And Journalism	Theory	Core	5	4	100

#### Course Objective

To introduce the broad field of mass communication and journalism to students including the models, theories and ethics in the field of media

#### Course Outcomes (CO)

The learners will be able to

CO1: Review the Basics of Communication and Mass Culture.

CO2: Analyze and Understand the Western Models and Theories of Communication.

CO3: Acquiring Knowledge about the inception of Journalism.

CO4: Analyse the Journalistic Values and Various News Paper Organizations.

CO5: Evaluate the Concept of Journalistic Writing and Editing.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Communication Basics (15 Hours)**

- 1.1 Communication, Need of Communication (K1, K2)
- 1.2 Functions of Communication, Levels of Communication, Patterns of Communication (K1, K2, K3)
- 1.3 The Mass concept, Mass Communication process, the Mass Audience (K1, K2, K3, K4)
- 1.4 Mass Culture and popular culture (K3, K4)
- 1.5 Barriers of Communication (K3, K4, K5)
- 1.6 Media democracy (K5, K6)

### **Unit II: Models of Communication (15 Hours)**

- 2.1 Transmission model, Ritual or Expressive model (K1, K2)
- 2.2 Publicity model., Reception model, Lass well Model (K1, K2, K3)
- 2.3 Shannon & Weaver model, Osgood and Schramm Circular model. (K2, K3, K4)
- 2.4 Two Steps flow model, Westley and Maclean model (K3, K4, K5)
- 2.5 Agenda Setting model, Spiral of Silence model (K3, K4, K5, K6)
- 2.6 Indian theories of communication (K4, K5, K6)

### **Unit III: Basics of Journalism (15 Hours)**

- 3.1 Basics of writing and editing (K1, K2)
- 3.2 News values. (K1, K2, K3)
- 3.3 Sources of news and confidentiality (K2, K3, K4)
- 3.4 Makeup, Newspaper organisation (K2, K3, K4)
- 3.5 Press council (K3, K4, K5, K6)
- 3.6 Press commission (K4, K5, K6)

### **Unit IV: Journalistic Principles (15 Hours)**

- 4.1 Journalism and the concept of news (K1, K2)
- 4.2 Journalism principles(K1, K2, K3)
- 4.3 Brief history of press in the world, India and Tamilnadu (K2, K3, K4)
- 4.4 Online Journalism (K2, K4)
- 4.5 Tabloid Journalism (K2, K4, K5, K6)
- 4.6 Yellow Journalism (K3, K4, K5, K6)

### **Unit V:Journalistic Skills (15 Hours)**

- 5.1 Art of writing a new paper story (K1, K2, K3)
- 5.2 Inverted pyramid style(K2, K3, K4)
- 5.3 Feature writing (K1, K3, K4, K5)
- 5.4 Qualities of a Reporter, (K2, K3, K4)
- 5.5 Role of Editor (K2, K4, K5, K6)
- 5.6 Copy flow, Proof reading (K4, K5, K6)

**Books for Study and Reference:**

1. Mc Quail Denis – Mass Communication Theory 5<sup>th</sup> Edition
2. Keval J Kumar – Mass Communication in India 3<sup>rd</sup> Edition – Jaico publication 1982
3. Arthur Asa Berger-Essentials of Mass Communication Theory-Sage Publication 2000
4. Alfred Laurence Lorenz John Vivian–News Reporting and Writing–Pearson education – 2005.
5. D.S. Mehta – Mass Communication and Journalism in India–Allied Publication- 2003
6. T Rejshekar – Journalism Ethics and Objectives -Sonali Publication – 2009
7. RangaswamyParthasarthy – Journalism in India – Sterling Publication -Delhi – 2005
8. Ahuja B.N. - Concise Course In Reporting For Newspaper Magazine Radio And television – Surjeet Publication, Delhi - 1988

**Web Reference:**

[Communicationtheory.org](http://Communicationtheory.org)

**SEMESTER I**  
**PCEMB20 - BROADCASTING IN INDIA**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PCEMB20	Broadcasting in India	Theory	Core	5	4	100

**Course Objective**

To initiate students to the field of broadcasting by tracing the evolution, and teaching programme formats and convergence of broadcast media

**Course Outcomes (CO)**

The Learners will be able to

**CO1:** Identify the Inception of Radio and Development of Radio in India.

**CO2:** Analyze the Evaluation of Television and its Development Process in India

**CO3:** Evaluate the Various formats and genres of Radio.

**CO4:** Compile the Various formats and genres of Television.

**CO5:** Examine the Broadcast Regulations and Convergence of Media.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## Course Syllabus

### **Unit I: Growth and development of radio** (15 Hours)

- 1.1 Early history of Radio - Invention of Radio(K1, K2)
- 1.2 Early growth of Radio and its Usage (K1, K2)
- 1.3 Indian Broadcasting - All India Radio (K1, K2, K3)
- 1.4 Underground Congress Radio –Radio Before and After Independence (K2, K3, K4)
- 1.5 FM and AM Broadcasting - AIR Services (K3, K4, K5)
- 1.6 School broadcasts – DAB (K5, K6)

### **Unit II: Growth and development of Television** (15 Hours)

- 2.1 Early years of Television (K1, K2)
- 2.2 Growth and Development of Television in India (K2, K3, K4)
- 2.3 The technology of Television (K3, K4, K5)
- 2.4 Types of transmission – cable, DTH, Satellite, terrestrial (K3, K4, K5)
- 2.5 Types of signals (K5, K6)
- 2.6 Professions in the industry (K5, K6)

### **Unit III: Formats and Genres of radio** (15 Hours)

- 3.1 Radio Formats and Genres (K1, K2)
- 3.2 News Bulletin, News reels (K1, K2, K3)
- 3.3 Documentaries, Movie trailers, Quizzers, jingles (K2, K3, K4)
- 3.4 Local radio, campus radio, Ham radio (K2, K3, K4, K5)
- 3.5 PAS, Satellite radio, Internet radio (K4, K5, K6)
- 3.6 Programme composition of AIR (K5, K6)

### **Unit IV: Formats and Genres of Television** (15 Hours)

- 4.1 TV programme composition (K1, K2, K3)
- 4.2 Formats and content: Action and adventure (K2, K3, K4)
- 4.3 Detective and mystery (K2, K3, K4, K5)
- 4.4 Documentary, fantasy (K3, K4, K5, K6)
- 4.5 Reality show, game show (K3, K4, K5, K6)
- 4.6 Talk show and science fiction(K4, K5, K6)

### **Unit V: Broadcast regulations** (15 Hours)

- 5.1 Broadcasting Ownership and Control (K1, K2, K3)
- 5.2 Broadcasting Policy - Broadcasting code (K1, K2, K3, K4)
- 5.3 Ethics of Broadcasting - Listenership survey (K2, K3, K4, K5)
- 5.4 Defining convergence (K3, K4, K5, K6)
- 5.5 Convergence of New Media and old Media (K4, K5, K6)
- 5.6 Convergence of Mass Media (K4, K5, K6)

**Books for Study and Reference:**

1. Keval J.Kumar - Mass Communication in India, 4<sup>th</sup> Edition - Jaico Publication, 2011.
2. David Miles, Robert Runstein - Modern Recording Techniques, 6<sup>th</sup> Edition - Focal Press, 2005.
3. Zettl Herbert - Video Basics 7 – Seventh Edition-Wordsworth, 2012.
4. Carl, Louis, Philip - Announcing: Broadcast Communicating Today, 4<sup>th</sup> Edition - Wardsworth Thomson Learning, 2000
5. Seema Hasan-Mass Communication Principles and Concepts-Second Edition-CBS Publishers and Distributors Pvt. Ltd-2013.
6. M.Neelamalar - Radio Programme Production-PHI Learning Pvt-Delhi-2018.

**SEMESTER I**  
**PCEMC20 - VIDEOGRAPHY**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	PCEMC20	Videography	Theory	Core	5	4	100

**Course Objective**

To acquire the knowledge and skill to select and apply those aesthetic elements to translate significant ideas into significant messages through Videography.

**Course Outcomes (CO)**

**The Learners will be able to**

CO1: Describe the Basic Parts and Functions of the Video camera.

CO2: Analyze the Characteristic of Lighting and Lighting techniques.

CO3: Acquiring Knowledge in Camera Composition Techniques and concepts of Color.

CO4: Evaluate the Camera Operation and Lighting Techniques in Indoor Production.

CO5: Elaborate Various Recording and Storage Formats of Videos.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## Course Syllabus

### Unit I: Introduction to Camera

(15 Hours)

- 1.1 Parts of the Camera Basic, Camera functions (K1, K2, K3)
- 1.2 Types of Cameras - Sony A7S III(K1, K2, K3, K4)
- 1.3 Black magic, Pocket Cinema Camera 4K (K3, K4, K5, K6)
- 1.4 Panasonic Lumix GH5S, Fujifilm X-T4(K3, K4, K5, K6)
- 1.5 Lens Characteristics(K4, K5, K6)
- 1.6 Exposure – Types of lens(K3, K4, K5, K6)

### Unit II: Introduction to Lighting

(15 Hours)

- 2.1 Nature of Light – Lighting purposes and functions (K1, K2)
- 2.2 Nature of shadows – Outer orientation functions (K1, K2, K3)
- 2.3 Inner orientation functions – Time Orientation (K1, K2, K3, K4)
- 2.4 Standard lighting techniques – Chiaroscuro, Rembrandt, cameo (K2, K3, K4)
- 2.5 Flat and silhouette lighting. Single and Multi-Camera Lighting- Aesthetics (K1, K2, K3, K4, K5, K6)
- 2.6 Lighting Instruments – Field and Studio, Lighting Control Instrument, – Types of Lamps (K2, K3, K4, K5, K6)

### Unit III: Visualization

(15 Hours)

- 3.1 Visualization – storyboard, - Camera Framing and Composition (K1, K2, K3)
- 3.2 Camera Manipulating picture depth- Two dimensional fields: Area, Field, Screen forces (K1, K2, K3)
- 3.3 Three Dimensional: Depth and volume, screen Volume (K2, K3, K4, K5)
- 3.4 Narrow angle distortion, Wide angle distortion, Spatial paradoxes (K2, K3, K4, K5)
- 3.5 The Nature of Colours – relativity of Colours (K3, K4, K5, K6)
- 3.6 Colour Function and Composition – Colour Temperature (K3, K4, K5, K6)

### Unit IV: The Camera operation

(15 Hours)

- 4.1 Camera Operation and Techniques (K1, K2, K3)
- 4.2 Camera shots, angles, movements and filters (K1, K2, K3, K4)
- 4.3 Camera support equipment: shoulder mount, monopod, tripods (K2, K3, K4)
- 4.4 Pedestals, cranes, dolly, trolley, jibs, etc (K3, K4, K5, K6)
- 4.5 Lighting for Indoor/Outdoor Shoots (K4, K5, K6)
- 4.6 Camera and Lighting for specific programmes: News, Interviews, Talk shows, Panel, etc.(K3, K4, K5, K6)

### Unit V: Retrieval and Post Production

(15 Hours)

- 5.1 Video Recording Formats (K2, K3, K4, K5)
- 5.2 Videotape Recording systems (K2, K3, K4)
- 5.3 Videotape Recording process (K1, K2, K3, K4)
- 5.4 Video Storage Systems: compact discs (K2, K3, K4)
- 5.5 DVD, Digital Memory Cards (K3, K4, K5, K6)
- 5.6 Video Streaming etc. (K4, K5, K6)

**Books for Study and Reference:**

1. Herbert Zettl - Television Production, 8<sup>th</sup> Edition - Thomson Wadworth, 2005.
2. Mitch Mitchell - Visual Effects for Film and Television - Focal Press, 2004.
3. Herbert Zettl - Video Basics – 7 - Wardsworth Thomson Learning, 2012.
4. Herbert Zettl - Sight, Sound, Motion, 9<sup>th</sup> Edition - Wadworth Publishing Company, 1999.
5. Gerald Millerson - Television Production, 13<sup>th</sup> Edition - Focal Press, 1999.

## SEMESTER I

### PCEMD20 - PRACTICAL – I: VIDEO PRODUCTION

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PCEMD20	<b>Title of the Course:</b> Video Production	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objective

To give a hands-on experience to students in the handling of video-cameras and practice the techniques of Video Production.

#### Course Outcomes (CO)

The Learners will be able to

**CO1:** Classify the various parts and function of the video camera.

**CO2:** Acquiring and applying knowledge in shots, angles and camera movements.

**CO3:** Applying the lighting and composition techniques.

**CO4:** Examine the montage recording techniques.

**CO5:** Creating the short film using proper camera techniques.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low- L, Medium - M, High - H)

## Course Syllabus

The following exercises are performed during the practical sessions.

### Exercises:

1. Shots, Angles and Camera movements (5 hours)
2. Lighting and camera techniques (5 hours)
3. Framing and Composition (10 hours)
4. Filters (8 hours)
5. Montage recording (8 hours)
6. Short story using field editing (7 hours)
7. Presentation of a short film using all the techniques with a simple concept,  
time not exceeding more than 5 minutes. (7 hours)
8. Video Magazine (10 hours)

COGNITIVE LEVEL: (K1, K2, K3, K4, K5, K6)

The internal Evaluation for 40 marks is based on these exercises and the final short film.

The semester Examination is based on the practical Examination (45 marks), Record(10 marks) and Viva Voce (5 Marks).

## SEMESTER I

### PCEME20 - PRACTICAL – II: WRITING FOR BROADCAST MEDIA

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PCEME20	<b>Title of the Course:</b> Writing For Broadcast Media	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objective:

To train the students in the basics of writing for television news; developing a clear, concise and conversational writing style. This is coupled with emphasis on accuracy, good grammar and strong leads.

#### Course Outcomes (CO)

The Learners will be able to

CO1: Explain the basic writing skills for Broadcast Media.

CO2: Creating the Advertisement, promo and PSA for Radio.

CO3: Creating the Advertisement, PSA for Television medium.

CO4: Design the Drama for the radio medium

CO5: Compile News Releases for the radio and Television medium.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Exercises: 1-4 (30 hours), 4-8 (30 hours), 9 & 10 (15 hours)**

1. Radio Jingle
2. TV Promo,
3. Radio promo
4. Commercial advertisement for Radio And Television
5. PSA for Radio
6. PSA for Television
7. Radio Drama/play
8. Radio News bulletins
9. TV news bulletins
10. News Release: Announcement, Created News, Spot News, Response Release, Bad News.
11. Hot Spot

COGNITIVE LEVEL: (K1, K2,K3, K4, K5, K6)

Internal Evaluation for 40 Marks is based on 10 exercises

Semester Examination is based on the Practical examination (45 marks), Record (10 marks) and Viva Voce (5 Marks).

### **Books for Study and Reference:**

1. Anthony Friedman - Writing for Visual Media – Focal Press, 2007.
2. Zettl Herbert - Video Basics 3 – Wodsworth, 2001.

## SEMESTER I

### PEEMA20 - ELECTIVE – I A: SCRIPT WRITING AND DIRECTION

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PEEMA20	<b>Title of the Course:</b> Script writing and Direction	<b>Course Type:</b> theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective

To learn in-depth, the writing techniques and basics of film direction

#### Course Outcomes (CO)

The Learners will be able to

CO1: Restate the basics of script and script writing process.

CO2: Analysing the various scripts formats for fiction and nonfiction programs.

CO3: Evaluating the role of director from preproduction to post production.

CO4: Acquiring in depth knowledge about the production stage and its related activities.

CO5: Analysing the various methods and techniques in direction.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Basics of Script Writing (15 hours)**

- 1.1 Script writing basics. (K1, K2, K3)
- 1.2 Script formats. (K1, K2, K3)
- 1.3 Creating concepts. (K2, K3, K4)
- 1.4 Screenplay, storyboard. (K3, K4, K5)
- 1.5 Writing a script. (K3, K4, K5, K6)
- 1.6 Writing process. (K4, K5, K6)

### **Unit II: Fiction and Nonfiction Formats (15 hours)**

- 2.1 Script writing for fiction, (K3, K4, K5, K6)
- 2.2 Script writing for non-fiction.(K3, K4, K5, K6)
- 2.3 Writing for entertainment programs (Unscripted). (K4, K5, K6)
- 2.4. Writing for special audience. (K3, K4, K5, K6)
- 2.5 Writing for documentaries. (K3, K4, K5, K6)
- 2.6 News writing, Script writing Software (K4,K5,K6)

### **Unit III: Directors Techniques (15 hours)**

- 3.1 Direction basics: Techniques of TV direction. (K1, K2, K3, K4)
- 3.2 From planning to post production. (K3, K4, K5, K6)
- 3.3 The director's role. (K4, K5, K6)
- 3.4 The director's as active observer. (K4, K5, K6)
- 3.5 Job of the director. (K5, K6)
- 3.6 Shooting script. (K4, K5, K6)

### **Unit IV: Preparation and Production (15 hours)**

- 4.1 The director prepares: benefits of rehearsing at actual location, (K4, K5,K6)
- 4.2 Before the take – after the take. (K4, K5, K6)
- 4.3 Planning coverage. (K4, K5, K6)
- 4.4 Camera placement. (K4, K5, K6)
- 4.5 Shot and scene identification. (K5, K6)
- 4.6 Daily organization. (K4, K5, K6)

### **Unit V: Direction Methods (15 hours)**

- 5.1 Direction Methods: (K2, K3, K4, K5)
- 5.2 Directing Documentaries. (K3, K4, K5, K6)
- 5.3 Directing fiction. (K3, K4, K5, K6)
- 5.4 Directing non-fiction, (K4, K5, K6)
- 5.5 Directing non-script programs. (K4, K5, K6)
- 5.6 Case studies of directing. (K4, K5, K6)

### **Books for Study and Reference:**

1. Michael Rabiger – Directing film Techniques and Aesthetics – Focal Press, 2007.
2. Ken Dancyger - The Director's Idea – Focal Press, 2006.
3. Anthony Friedmann - Writing for Visual Media, 2<sup>nd</sup> Edition - Focal Press, 2006.
4. Michael Rabiger – Directing the Documentary, Fourth Edition – Focal Press, 2004.
5. Esta De Fossard - Writing and Producing Radio Dramas, Communication for Behaviour Change, Vol. 1, 4<sup>th</sup> and 5<sup>th</sup> Edition - Sage Publications, 2000.
6. Dwight V. Swain with Joye R. Swain – Scriptwriting: Film, 2<sup>nd</sup> Edition - Focal Press, 1988.

## SEMESTER I

### PEEMB20 - ELECTIVE – I B: BROADCAST JOURNALISM

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PEEMB20	<b>Title of the Course:</b> Broadcast Journalism	<b>Course Type:</b> theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective

To learn in-depth about the various fields of broadcast journalism and the best practices

#### Course Outcomes (CO)

The Learners will be able to

CO1: Discussing the basic concepts of Journalism.

CO2: Analysing the ethical codes and ethical standards of journalism in the contemporary media.

CO3: Acquiring in depth knowledge in television news process.

CO4: Adapting the techniques of news writing process for a radio medium.

CO5: Evaluating the legal aspects and procedures of launching the Broadcast news channel.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Journalism Basics (15 hours)**

- 1.1. Introduction to journalism, Journalism basics. (K2, K3, K4)
- 1.2. Sources of News.(K2, K3, K4, K5)
- 1.3. Editorial department. (K3, K4, K5, K6)
- 1.4. What is News? News values. (K2, K3, K4, K5)
- 1.5. Construction of News, News frames. (K3, K4, K5)
- 1.6. News selection. (K4, K5, K6)

### **Unit II:Journalism Ethics (15 hours)**

- 2.1. Journalism Ethics & standards, Code of conduct. (K3, K4, K5)
- 2.2. Press council. (K3, K4, K5)
- 2.3. The journalist in the society. (K3, K4, K5)
- 2.4. Critical review of media, Democracy & Journalism. (K3, K4, K5, K6)
- 2.5. The growing importance of the press. (K4, K5, K6)
- 2.6. Current issues of journalism.(K4, K5, K6)

### **Unit III: Television News (15 hours)**

- 3.1 TV Newsroom. (K2, K3, K4)
- 3.2 TV Rundowns, TV news gathering. (K3, K4, K5)
- 3.3 TV news writing, TV features. (K4, K5, K6)
- 3.4 TV documentaries writing & shooting. (K4, K5, K6)
- 3.5 TV interviews. (K4,K5, K6)
- 3.6 Special TV programs- News, Features, Social, Cultural, Educational, Sports, Women's, Children's, Matching visuals with stories.(K4, K5, K6)

### **Unit IV: Radio News (15 hours)**

- 4.1 Reporting for radio. (K2, K3, K4)
- 4.2 News writing, News gathering. (K3, K4, K5)
- 4.3 Radio rundowns. (K3, K4, K5)
- 4.4 Use of tape recorder, Field spot. (K4, K5, K6)
- 4.5 Special reporting, Radio talks, Radio interviews. (K3, K4, K5)
- 4.6 Radio discussions, Radio conferences, Bridge radio.(K4, K5, K6)

### **Unit V: Broadcasting Journalism (15 hours)**

- 5.1 Broadcasting – Business, Legal, Financial, Commercial. (K3, K4, K5)
- 5.2 Aspects, Public, Private & global radio systems and their working program costing. (K3, K4, K5)
- 5.3 Budget & marketing. (K4, K5, K6)
- 5.4 Audience research. (K4, K5, K6)
- 5.5 TRPs in radio & TV. (K4, K5, K6)
- 5.6 Online journalism. (K4, K5, K6)

## **Books for Study & Reference**

1. Hillard - Writing for Television, Radio & New media, Seventh Edition, 2011.
2. Tony Harcup - Journalism principles & practice, Second Edition, 2009
3. Awasthy, G.C. - Broadcasting in India, Allied Publishers, 2007

## SEMESTER II

### PCEMF20 - ADVANCED TELEVISION PRODUCTION

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PCEMF20	Advanced Television Production	Theory	Core	5	4	100

#### Course Objective

To prepare students for professional challenges of today and tomorrow and to expose them to real world production scenario.

#### Course Outcomes (CO)

The Learners will be able to

**CO1:** Describing the basics of Television production and its standard formats.

**CO2:** Acquiring the knowledge on Production management and production elements.

**CO3:** Examine the basic work process in the preproduction stage.

**CO4:** Analysing the production process and production techniques.

**CO5:** Adopting the post production process and its techniques

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Understanding the Television Production (15 hours)**

- 1.1 Generating a television picture, picture scanning (K1, K2, K3)
- 1.2 Basic video signals, CMOS (K1, K2, K3)
- 1.3 CCD, Digital television (K2, K3, K4)
- 1.4 Types of Production - Production Team (K3, K4, K5)
- 1.5 Production Environment (K2, K3, K4, K5)
- 1.6 Television Standards and formats – PAL, NTSC, SECAM (K3, K4, K5, K6)

### **Unit II: Organization and Management (15 hours)**

- 2.1 Production Management: Organizing crew – Scheduling (K1, K2, K3)
- 2.2 Team work - shooting Spots (K3, K4, K5)
- 2.3 Final Package (show copy) (K3, K4, K5)
- 2.4 Audience Ratings and Feedback (K3, K4, K5)
- 2.5 Structure and working of a Television Production Centre (K2, K3, K4, K5, K6)
- 2.6 Production elements and equipment (K3, K4, K5, K6)

### **Unit III: Pre-Production Process (15 hours)**

- 3.1 Pre-Production - Planning of story (K1, K3, K4)
- 3.2 Discussion - Storyboard – Screenplay (K1, K2, K3)
- 3.3 Dialogue Writing - Selection of Characters, Costumes and Location (K2, K3, K4, K5)
- 3.4 Production planning and coordination - Background of Production (K2, K4, K5, K6)
- 3.5 Directors Role - Production practices: Single Camera (K2, K3, K4, K5, K6)
- 3.6 Multi Camera techniques (K3, K4, K5, K6)

### **Unit IV: Production Techniques (15 hours)**

- 4.1 Production Process - Planning and Management (K1, K2, K3)
- 4.2 Understanding different Production Environments (K1, K3, K4)
- 4.3 Floor Management and Studio Management (K2, K3, K4, K5)
- 4.4 Set Design background - Budgeting - Talent management (K3, K4, K5)
- 4.5 Auditions - Organizing the production Team - delivering the finished product (K2, K4, K5, K6)
- 4.6 Types of telecasting. Field Production and Big Remotes (K4, K5, K6)

### **Unit V: Post Production Techniques (15 hours)**

- 5.1 Switcher Function - Layout - Operations - Types and Functions (K3, K4, K5)
- 5.2 Video Editing - Editing modes (offline, online) - Editing systems (Linear, Non-Linear) (K2, K3, K4, K5)
- 5.3 Editing Principles - Computer Editing - Video Effects (K2, K4, K5, K6)
- 5.4 Analog, Digital, Optical, Mechanical, Graphics for Television - Graphic Equipment (K2, K3, K4, K5)
- 5.5 Titling - Special Effects - Audio Dubbing - Background Music (K2, K3, K4, K5)
- 5.6 Synchronizing Audio and Video - Voice Over - Compeering Skills - Anchoring Live Programs (K3, K4, K5, K6)

## **Note: Compulsory Media Exposure in Television Production**

### **Books for Study and Reference:**

1. Aleksandar Louis Todorovic – Television Technology Demystified – Focal Press, 2007.
2. Philippe, Brian, Lynne - Programming for TV, Radio and the Internet - Focal Press, 2005.
3. Mitch Mitchell - Visual Effects for Film and Television - Focal Press, 2004.
4. Paul Martin Lester - Visual Communication, 3<sup>rd</sup> Edition - Thomson Wadsworth, 2003.
5. Zettl Hebert - Video Basics 7 - Wadsworth, 2012.
6. Zettl Hebert - Television Production Handbook - Wadsworth Thompson Learning, 2000.
7. Gerald Millerson - Television Production, 13<sup>th</sup> Edition - Focal Press, 1999.

## SEMESTER II

### PCEMG20 - RADIO PRODUCTION

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCEMG20	<b>Title of the Course:</b> Radio Production	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective

To introduce students to the principles of sounds and the art of making audio programmes

#### Course Outcomes (CO)

The Learners will be able to

CO1: Review the basic sound principles and psychophysics of sound.

CO2: Evaluating the uses of sound equipment's and production of multichannel sounds.

CO3: Acquiring the knowledge on Acoustical requirement of ideal studio.

CO4: Analysing on the types of special audience programming on radio

CO5: Examine the innovative developments in radio communication.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Principles of Sound**

**(15 hours)**

- 1.1 Basic sound Principles - Sound wave(K1, K2, K3)
- 1.2 Psychophysics of sound – Frequency (K1, K2, K3, K4)
- 1.3 Timbre - Loudness – amplitude– velocity (K1, K3, K5)
- 1.4 Recording studio - Control room (K2, K3, K5)
- 1.5 Project studio - Portable studio. (K1, K3, K5, K6)
- 1.6 Recording Process-Audio Formats (K3, K5, K6)

### **Unit II: Sound Equipments**

**(15 hours)**

- 2.1 Sound equipment – transducers (K1, K3, K5, K6)
- 2.2 Types of Mikes - Pickup Patterns (K1, K2, K3, K4)
- 2.3 Mixers – Console - Loud speakers (K2, K3, K4)
- 2.4 Monitors - Audio meters – Dubbing (K3, K4, K5, K6)
- 2.5 Voice over - Audio Editing Procedures - sound aesthetics (K2, K3, K4, K6)
- 2.6 Production of multi-channel sound: DTS, Dolby digital, mono, stereo (K3, K4, K5, K6)

### **Unit III: Studio Acoustics**

**(15 hours)**

- 3.1 Sound design elements – Acoustics –Psychoacoustics (K1, K2, K3, K4)
- 3.2 Spatial hearing - Acoustical requirement of an ideal studio (K2, K3, K4)
- 3.3 Types and application of sound proofing (K2, K3, K4)
- 3.4 Reflection-Sound isolation (K3, K4, K6)
- 3.5 Basic of psychoacoustics (K3, K4, K5, K6)
- 3.6 Sound transmission - Sound Absorption (K4, K5, K6)

### **Unit IV: Special Audience Programming**

**(15 hours)**

- 4.1 Types of Radio programming - Radio talks (K3, K4)
- 4.2 Features – discussion (K3, K4, K5)
- 4.3 Interviews - Radio play (K2, K3, K4)
- 4.4 Special Audience programme on Radio
- 4.5 Programme for Children (K3, K4, K5, K6)
- 4.6 Women and Youth etc (K4, K5, K6)

### **Unit V: Innovative Development in Radio Communication**

**(15 hours)**

- 5.1 Field Programme Production, Live Programme Production. (K2, K3, K4, K6)
- 5.2 Final editing and mastering (K3, K4, K5, K6)
- 5.3 Producing Edutainment and Infotainment Programmes for Radio (K2, K3, K4)
- 5.4 Disaster Coverage News Bulletins – Emergency Management (K3, K4, K5, K6)
- 5.5 Community Radio; satellite radio (K5, K6)
- 5.6 Private FM Radio stations-Digital Radio Podcast (K3, K4, K5, K6)

**Books for Study and Reference:**

1. Philippe, Brian, Lynn - Programming for TV, Radio and Internet - Focal Press, 2005.
2. David Miles, Robert Runstein - Modern Recording Techniques, 6<sup>th</sup> Edition - Focal Press, 2005.
3. Carl, Philip, Firitz, Louis - Modern Radio Production, 6<sup>th</sup> Edition - Thomson Wardsworth, 2004.
4. Zettl Herbert - Video Basics 3 – Wardsworth, 2001.
5. Zettl Herbert - Television Production Handbook - Wardsworth Thompson Learning, 2000.



## SEMESTER II

### PCEMH20 - MEDIA ANALYSIS AND TECHNIQUES

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCEMH20	<b>Title of the Course:</b> Media Analysis & Techniques	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective

To introduce the basic media analysis techniques with practice applications in order to develop a critical perspective of media texts.

#### Course Outcomes (CO)

The Learners will be able to

**CO1:** Explain the Semiotic Analysis of Media.

**CO2:** Acquiring Knowledge about Marxist Analysis

**CO3:** Analysing the Psychoanalytic Criticism

**CO4:** Evaluating the Feminist Analysis.

**CO5:** Examine the Concept of Media Ethics and Laws.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Semiotic Analysis (15 hours)**

- 1.1 Problem of meaning, social aspects of semiotics (K1, K3)
- 1.2 Signs, Signifiers, Signified (K2, K4, K5)
- 1.3 Hyper reality, Connotation and Denotation (K3, K4, K5, K6)
- 1.4 Syntagmatic analysis, Paradigmatic analysis (K2, K4, K5)
- 1.5 Application: Murderers on the Orient Express, Football (K3, K4, K5)
- 1.6 Application: Murderers on the Orient Express, Football(cont.) (K2, K3, K4, K5, K6)

### **Unit II: Marxist Analysis (15 hours)**

- 2.1 Materialism, The base and the super structure (K2, K3, K4)
- 2.2 False consciousness and ideology (K2, K3, K4, K5)
- 2.3 The Frankfurt school, Class conflict, Hegemony (K2, K4, K5)
- 2.4 Marxist criticism in postmodern world, Critical Theory (K2, K3, K4, K5, K6)
- 2.5 Social learning theory, Social role theory, Cognitive dissonance theory (K2, K4, K5)
- 2.6 Application: Fiji Perfume “Snake” advertisement (K4, K5, K6)

### **Unit III: Psychoanalytic criticism (15 hours)**

- 3.1 The unconscious (K1, K2)
- 3.2 Sexuality (K2, K3)
- 3.3 Oedipus complex (K1, K2, K3, K4)
- 3.4 Id, ego, Super ego (K2, K3, K4)
- 3.5 Jungian Psychoanalytic theory (K2, K3, K4, K5, K6)
- 3.6 Application: Analyzing sexuality, violence and additive elements of video games (K3, K4, K5, K6)

### **Unit IV: Feminist Analysis (15 hours)**

- 4.1 Identity, position and authority (K1, K3, K4)
- 4.2 Social conception of knowledge, Phallogocentric theory (K2, K3, K4)
- 4.3 Liberal feminism, Social feminism, Radical feminism (K3, K4, K5)
- 4.4 Marxist feminism, Postmodern feminism (K2, K4, K5)
- 4.5 The male gaze and the female spectator (K3, K4, K5, K6)
- 4.6 Application: Analysing feminist perspectives including male gaze based on any movie (K4, K5, K6)

### **Unit V: Sociological and Discourse Analysis (15 hours)**

- 5.1 Sociological Analysis: Alienation, Anomie (K4, K5, K6)
- 5.2 Bureaucracy (K2, K3)
- 5.3 Discourse analysis: Spoken and Written discourse (K2, K4, K5)
- 5.4 Styles and written discourse, Pragma techniques (K3, K4, K5, K6)
- 5.5 meta-Analysis, Business Analysis (K3, K4, K5)
- 5.6 Critical Review (K5, K6)

**Books for Study and Reference:**

1. Arthur Asa Berger , Media Analysis Techniques 4th and 6<sup>th</sup> Edition, Sage publications, 2012
2. Meire Gillespie and Jason Tonnbee, Analysing Media Texts, Tata-McGraw Hill, 2010
3. Arthur Asa Berger, Media and Communication Research Methods, Sage publications, 2000
4. Angharad N. Valdivia, A Companion to Media Studies, Blackwell, 2003
5. Mary Celeste Kearney, The Gender and the Media Reader, Routledge, 2012.
6. Paranjy Guha Thakurta - Media Ethics, 2nd Edition - Oxford, 2012.
7. Devesh Kishore, Ganga Sagar Singh - Media Law, Har-Anand Publication, 2012.
8. Clifford, Kim, Mark, Kathy and Robert - Media Ethics, 7th Edition - Pearson Education, 2005.
9. Roger S. Sadler - Electronic Media Law - Sage Publications, 2005.
10. Monaco, J. ,How to read a Film: Movies, Media, Multimedia, Oxford University Press, London, 2000
11. Butler J., Gender Trouble, Rutledge, London, 1992.

## SEMESTER II

### PCEMI20 - PRACTICAL III: NON LINEAR EDITING

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCEMI20	<b>Title of the Course:</b> Non-Linear Editing	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objective

To teach students the art of editing audio and video through Nuendo/ Adobe Audio Editing and Final Cut Pro software respectively and to complete basic exercises in editing.

#### Course Outcomes (CO)

The Learners will be able to

**CO1:** Identify the Final Cut Pro Tools and Techniques.

**CO2:** Acquiring Knowledge about the Radio Programming.

**CO3:** Elaborating the Key features of News Production.

**CO4:** Creating the titling and end credits and Dubbing for Video Production.

**CO5:** Develop the various formats of Programme Production.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

The students should use all the techniques while doing the exercises:

- Introducing Keyboard
- Import the clip
- Timeline
- 3 point editing
- EDL
- Transitions (Cut, Wipe, Fade, Dissolve, Digital effect)
- Audio
- Lip Synchronization
- Titling
- Creating a master out

**Exercises: 1-3 (30 hours), 2-6 (30 hours), 7 & 8 (15 hours), 9 & 10 (15 hours)**

1. Creating sound effects creatively with suitable objects
2. Producing a Radio drama with suitable music and special effects
3. Create a signature tune or a Radio jingle
4. Compilation of a News production
5. Dubbing for a part of animation movie with appropriate music and special effects
6. Remix of a film song with visuals taken from multiple films
7. Dubbing in a different language for part of a feature film and adding subtitles
8. Compilation of a travel episode with suitable video transition and voice-over recording
9. Titling and end credits for a Video presentation
10. Produce programmes in different formats (Talk, comparing, announcement, anchoring, interviews using Chroma key technique).

**COGNITIVE LEVEL: (K1, K2, K3, K4, K5, K6)**

The Internal Evaluation for 40 marks is based on these 10 exercises.

The Semester Examination is based on the practical examination (45 marks), Viva (5 marks) and the Record (10 marks)

## SEMESTER II

### PCEMJ20 - PRACTICAL IV: PROJECT WORK

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: II</b>	PCEMJ20	Project	Practical	Core	1	2	100

#### Course Objective

To train students in shooting and directing a short-film or documentary, by putting into practice the various techniques learned in Video and Audio production and Script writing and Direction.

#### Course Outcomes (CO)

##### The Learners will be able to

CO1: Analysing the Concepts of Documentary/Short film production

CO2: Implementing the Pre-Production process of Documentary/short film

CO3: Executing the Production process of Documentary/short film

CO4: Compile the Post Production Activities according to the Script.

CO5: Creating the Documentation with Master Copy.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

Students will specialize in Television / Radio Production and prepare an individual project on any chosen theme. The master copy of the production must be submitted along with the script.

- Proposal (10 minutes)
- Script Approval
- Story board
- Rehearsal
- Final out

COGNITIVE LEVEL: (K1, K2, K3, K4, K5, K6)

The Internal Evaluation for 40 marks is based on the production process and the model viva. The Semester Evaluation is based on the Viva-Voce (20 marks) and the quality of the production (40 marks).

## SEMESTER II

### PEEMC20 - ELECTIVE II A: INTER-CULTURAL COMMUNICATION

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PEEMC20	<b>Title of the Course:</b> Inter-Cultural Communication	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

- To initiate students to the challenges in global communication in the age of cross-culture communication

#### Course Outcomes (CO)

The Learners will be able to

**CO1:** Discuss the Concept of Inter Culture Communication.

**CO2:** Acquiring Knowledge in the aspects of inter cultural Business Communication.

**CO3:** Analysing the Concepts of Intra Cultural Communication.

**CO4:** Acquiring the Knowledge about Global Communication

**CO5:** Evaluating the Relationship Between Intercultural Communications in News Media Production.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction to ICC (15 hours)**

- 1.1. Introduction to Communication.(K2, K3, K4)
- 1.2. Culture and Inter-cultural Communication.(K3, K4)
- 1.3. Dimensions of culture.(K2, K3, K4)
- 1.4. Enculturation.(K2, K3, K4)
- 1.5. Acculturation. (K2, K3, K4)
- 1.6. Cultural barriers, Relevance of Inter-cultural communication to Journalism and Mass communication. (K3, K4, K5, K6)

### **Unit II: Inter-cultural Business Communication (15 hours)**

- 2.1. Work attitudes.(K1,K2, K3)
- 2.2. Individualism vs Collectivism.(K2, K3, K4)
- 2.3. Global etiquette in business introductions. (K2, K4, K5)
- 2.4. Electronic communication, and travel and dining. (K3, K4)
- 2.5. Business and social customs. (K2, K3, K4)
- 2.6. Cultural difference in communication. (K2, K4, K5)

### **Unit III: Intra-cultural Communication (15 hours)**

- 3.1. Inter-cultural versus Intra-cultural communication.(K1,K2, K3,K5)
- 3.2. Nature and Characteristics. (K2, K3, K4)
- 3.3. Indian and South Indian contexts of Inter-cultural communication.(K2, K3, K4)
- 3.4. Role of mass media in bridging cultural divides.(K2, K4, K5)
- 3.5. Cultural Identities and loss of cultural identity. (K2, K3, K4)
- 3.6. Problem of ethnocentrism. (K2, K3, K4)

### **Unit IV: Global Communication (15 hours)**

- 4.1. Global communication. (K1,K2, K3)
- 4.2. Growth of International Communication.(K2, K3, K4)
- 4.3. Cultural shock, Language and Inter-cultural communication. (K2, K3, K4)
- 4.4. High and low context languages.(K2, K3, K4)
- 4.5. Subjective interpretation.(K1,K2, K3)
- 4.6. Language and cultural interaction, Cross Cultural Communication. (K2, K4, K5)

### **Unit V: ICC and News (15 hours)**

- 5.1. Implications of inter cultural barriers in News media production.(K1,K2, K3)
- 5.2. Public sphere, LPG.(K2, K3, K4)
- 5.3. Cultural hegemony. (K2, K3, K4)
- 5.4. Influence in media production.(K3, K4, K5, K6)
- 5.4. International news flow patterns.(K2, K4, K5)
- 5.6. Offline and online. (K1,K2, K3,K5)

**Books for Study and Reference:**

1. Stanley J .Baran – Introduction to Mass Communication – Media Literacy and Culture, Tata McGraw-Hill, 2010.
2. Yahya R. Kamalipour – Global Communication – Wadsworth Thomson Learning, 2007.
3. William B. Gudykunst – Theorizing about Intercultural Communication, Sage Publication, 2005.
4. Hamid Mowlana – Global Communication in Transition – Sage Publications, 1996.

**SEMESTER II**  
**PEEMD20 - ELECTIVE II B: MOBILE COMMUNICATION**

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PEEMD20	<b>Title of the Course:</b> <b>Mobile Communication</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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**Objective:**

It is particularly aimed at equipping with Wireless Communication students with advanced communication theory and technologies, vital for a successful career in digital economy.

**Course Outcomes (CO)**

**The Learners will be able to**

CO1: Explain the concepts of Wireless communication.

CO2: Analysing the work process of Analog and digital signal transmission.

CO3: Explain the components of radio system and radio frequency.

CO4: Evaluating the various kinds of wireless network and its uses.

CO5: Analysing the advantages and challenges of wireless communication.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	(Low- L)	(H)	(Medium- M)	(M)	(High- H)	(H)
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction**

**(15 hours)**

- 1.1. Wireless technology. (K1,K2, K3)
- 1.2. Blue tooth. (K1,K2, K3)
- 1.3. Satellite network. (K2, K3, K4)
- 1.4.cellular network. (K3, K4)
- 1.5. Wireless Applications. (K2, K3, K4)
- 1.6. Wireless advantages and disadvantages. (K3, K4, K5, K6)

### **Unit II: Transmission**

**(15 hours)**

- 2.1. Data representation. (K2, K3, K4)
- 2.2. Binary numbers – wireless signals. (K3, K4)
- 2.3. Radio waves. (K1,K2, K3)
- 2.4. Analog and digital signal – frequency. (K2, K3, K4)
- 2.5. Analog Modulation – AM, FM, PM. (K2, K4, K5)
- 2.6. Digital Modulation. (K2, K4, K5)

### **Unit III: Radio Frequency**

**(15 hours)**

- 3.1. Components of a Radio system. (K1,K2, K3)
- 3.2. Filters, mixers. (K2, K4, K5)
- 3.3. Amplifiers, antennas. (K2, K3, K4)
- 3.4. Design of a radio system. (K3, K4, K5)
- 3.5. Transmission direction. (K2, K4, K5)
- 3.6. Radio frequency spectrum. (K3, K4, K5, K6)

### **Unit IV: Wireless Network**

**(15 hours)**

- 4.1. Metropolitan Area Network – Broadband. (K2, K3, K5)
- 4.2 Free Space Optics. (K2, K3, K4)
- 4.3 Local multipoint Distribution. (K2, K3, K4)
- 4.4 Multi channel multi point. (K3, K4, K5)
- 4.5 Wide Area Network – Cellular phone application. (K2, K3, K4)
- 4.6 Cellular challenges and outlook – Satellite broadband. ( K4, K5, K6)

### **Unit V: Wireless Communication**

**(15 hours)**

- 5.1. Advantages of wireless technology. (K2, K3, K5)
- 5.2. Challenges of using wireless technology. (K3, K4, K5)
- 5.3. Building a wireless infrastructure. (K2, K3, K4)
- 5.4.Overview of Wifi, Wimax and ff basic features and specifications. (K3, K4, K5, K6)
- 5.5. Ethical aspects of social media. (K2, K4, K5)
- 5.6. The Pros and Cons of Social media and its impact on the society. (K3, K4, K5, K6)

**Books for Study and Reference:**

1. Mark Ciampa& Jorge Olenewa – Wireless Communication – Cengage Learning, 2007
2. H.Labioud,H. Afifi,C.D. Santis- Wifi, Bluetooth, Zigbee and Wimax –Springer-2007
3. Raj Kamal – Mobile Computing – Oxford, 2007
4. Asoke & Roopa – Mobile Computing – Tata McGraw Hill, 2005
5. Theodore S.Rappaport – Wireless Communications: Principles and practice- PHI Publication, 1996.

## SEMESTER III

### PCEMK20 - FILM STUDIES

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: III</b>	PCEMK20	Film Studies	Theory	Core	5	4	100

#### Course Objective:

To provide in-depth knowledge on films, to develop a critically informed sense of the history and development of film conventions, both mainstream and alternative, and understand the language and use of films.

#### Course Outcomes (CO)

##### The Learners will be able to

CO1:Classify the inception of world cinema and history of Indian cinema.

CO2: Analysing the concept of film as an art and characteristics of films.

CO3:Acquiring the knowledge on various concepts of film theories.

CO4:Making an in-depth analysis on Genres of cinema.

CO5:Elaborate the recent trends in film industry.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## Course Syllabus

### **Unit I: History of Cinema** (15 hours)

- 1.1 History of Indian Cinema(K1, K2)
- 1.2 Early Silent era – talkies – Modern Cinema(K1, k2)
- 1.3 A brief account of World Cinema (K1, K2, K4)
- 1.4 Film makers: Indian, Hollywood, European, and South Asian(K1, K2, K3)
- 1.5 Study of some Indian classics (K1, K2, K3)
- 1.6 Main stream and Alternate cinema (K1, K2, K3)

### **Unit II: Characteristics of Films** (15 hours)

- 2.1 Film as an art - Film as a social document (K2, K3, K4)
- 2.2 Film as a medium of communication - conceptual issues (K2, K3, K4)
- 2.3 Film language, Macro and Micro structure (K3, K4, K5)
- 2.4 Process and aspects of film making - Film forms - content - narratives –narrative forms - styles - text and grammar (K2, K3, K4, K5)
- 2.5 Critical and technical terns used in film production (K4, K5, K6)
- 2.6 Types of Films – fiction and Non-fiction, Mis-en-scene (K2, K3, K4, K5)

### **Unit III: Film theories** (15 hours)

- 3.1 Soviet theories – European theories (K4, K5)
- 3.2 German Expressionism – Neo-realist, Classical (K3, K4, K5)
- 3.3 New Wave in cinema, Film Theories (K2, K3, K4, K5)
- 3.4 Post Modernism, Auteur, Apparatus, Feminist, Marxist (K4, K5, K6)
- 3.5 Recent approaches to – Cine structuralism, cine feminism, cine semiotics (K3, K4, K5)
- 3.6 Film analysis –technical, psychoanalytical, social analysis, techniques, reviews (K3,K4,K5)

### **Unit IV: Genres of Cinema** (15 hours)

- 4.1 Genres - Documentary Films – Films Division (K4, K5, K6)
- 4.2 Study of leading Documentary film maker in the world and India Western Genres (K4,K5,K6)
- 4.3 Indian film genres, South Indian film genres (K2, K3, K4)
- 4.4 Diaspora films (K4, K5)
- 4.5 Animation movies (K4, K5, K6)
- 4.6 Women and Children, Film and Politics in India (K5, K6)

### **Unit V: Trends in Film Industry** (15 hours)

- 5.1 Film Awards and festivals (K4, K5)
- 5.2 New developments in film industry (K3, K4, K5)
- 5.3 Computer Graphics –Digital film making (K2, K4, K5 K6)
- 5.4 Future of Cinema in India (K4, K5, K6)
- 5.5 Film Management (K4, K5, K6)
- 5.6 Multi languages release -Budgeting and schedules (K2, K4, K5)

**Exercise:** Watching award winning movies of particular directors

**Books for Study and Reference:**

1. Mary Celeste Kearney – The Gender and Media Reader, Routledge, New York, 2012.
2. Robert Edgar- Hunt, John Marland, Steven Rawle - The Language of Film, Ava Publication, 2010.
3. Susan Hayward - Key Concepts in Cinema Studies - Routledge, 2004.
4. Michael Rabiger - Directing Film Techniques and Aesthetics, 3<sup>rd</sup> Edition - Focal Press, 2003.
5. Thomas A.Ohanian, Michael E. Philips - Digital Film Making, 2<sup>nd</sup> Edition - Focal Press, 2000.
6. Yves Thorval - The Cinema of India (1896-2000) - Macmillan Press, 2000.

### SEMESTER III

#### PCEML20 - COMMUNICATION RESEARCH METHODS

<b>Year:</b> II	<b>Course Code:</b> PCEML20	<b>Title of the Course:</b> Communication Research Methods	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

To teach in detail the need for communication research and the techniques and process of research studies in the field of Media

#### Course Outcomes (CO)

The Learners will be able to

CO1: Explain the basic concepts of research and research process.

CO2: Assessing the concepts of qualitative and quantitative research.

CO3: Making an in-depth analysis on sampling methods and sampling techniques.

CO4: Analysing the various statistics methods and Analysis.

CO5: Acquiring the knowledge on research report writing and presentation.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Basics of Research (15 hours)**

- 1.1 Nature and Scope of Communication Research(K2, K3)
- 1.2 Research: a way of thinking (K3, K4)
- 1.3 Applications of Research–Definition of Research – Characteristics of Research (K2, K3, K4)
- 1.4 Types of Research – Paradigms of Research (K2, K3, K4)
- 1.5 Research Proposal (K4, K5, K6)
- 1.6 Research Process (an eight step model) (K5, K6)

### **Unit II: Content Analysis (15 hours)**

- 2.1 Qualitative Research: Historical Analysis (K2, K3)
- 2.2 Ethno Methodological Research (K2, K3, K4)
- 2.3 Participant Observation – Interview and Depth interview – FGD (K2, K3, K4)
- 2.4 Content Analysis – Action Research – Case Study -Textual Analysis: Semiotic Analysis - Rhetorical Analysis – Ideological Criticism – Psycho Analytical Criticism, Online Research method (K3, K4, K5)
- 2.5 Issues in Audience Research (K2, K3, K4, K5)
- 2.6 SPSS Application-Social media as a Research Tool (K4, K5, K6)

### **Unit III: Sampling (15 hours)**

- 3.1 Sampling Methods (K2, K3, K4)
- 3.2 Sampling Techniques (K3, K4, K5)
- 3.3 Probability Sampling - Non Probability Sampling (K2, K3, K4, K5)
- 3.4 Sample Size – Sample Error (K4, K5, K6)
- 3.5 Sample Frame (K3, K4)
- 3.6 Testing Hypothesis (K4, K5, K6)

### **Unit IV: Statistics and reliability (15 hours)**

- 4.1 Primary Data – Secondary Data (K1, K2, K3)
- 4.2 Data Presentation (K2, K3, K4)
- 4.3 Levels of Measurement – Measurement Scales (K3, K4, K5)
- 4.4 Reliability and Validity Analysis – Measures of Central Tendency (K2, K3, K4, K5)
- 4.5 Dispersion, Measures of Variation – Measures of Skewness – Analysis of Variance – Chi Square Test (K4, K5, K6)
- 4.6 Data collection Software-Team Scope, Open data kid, Red cap (K5, K6)

### **Unit V: Thesis writing (15 hours)**

- 5.1 Report Writing and Presentation (K3, K4, K5)
- 5.2 Types of Report: Informational, Analytical, persuasive (K4, K5)
- 5.3 Components of research thesis- Decision Oriented report – Survey Based Report – Algorithmic Research Report (K4, K5, K6)
- 5.4 A Research Report Format – MLA format –APA Style format (K4, K5, K6)
- 5.5 Typing Instructions (K4, K5)
- 5.6 Oral Presentation (K5, K6)

## **Practical Exposure:**

Pilot Study Research (Should be done by the students on their desired topic) SPSS workshop.

## **Books for Study and Reference:**

1. Johnny Saldana-The Coding Manual for qualitative Researchers-Sage publication-2009.
2. R. Panneer Selvam – Research Methodology, Prentice Hall, 2006.
3. Roger D. Wimmer, Joseph R Dominic – Mass Media Research: Process, Approaches and Applications, Cengage Learning, 2006.
4. Jean Folkerts, Stephen Lacy – An Introduction to Mass Communication: The Media in your Life, 3<sup>rd</sup> Edition, Pearson Education, 2004.
5. Anders Hansen, Simon Cottle, Ralph Negrine, Chris Newbold – Mass Communication Research Methods – Macmillan Press, 2004.
6. Roger D. Wimmer, Joseph R Dominic – Mass Media Research: An Introduction, Thomson Wadsworth, 2003.
7. Delbert C. Miller, Neil J. Salkind – Handbook of Research Design and Social Measurement, 6<sup>th</sup> Edition, Sage Publications, 2002.
8. Nick Stevenson – Understanding Media Cultures, 2<sup>nd</sup> Edition, Sage Publications, 2002
9. Arthur Asa Berger – Media and Communication Research Methods: Introduction to Qualitative and Quantitative Approaches, Sage Publications, 2000.
10. Ranjit Kumar – Research Methodology: a step by step guide for beginners, Sage Publications, 1999.

**SEMESTER III**  
**PCEMM20 - PUBLIC RELATIONS AND CORPORATE COMMUNICATION**

<b>Year:</b> II	<b>Course Code:</b>	<b>Title of the Course:</b> Public Relations and Corporate Communication	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
<b>Sem:</b> III	PCEMM20						

**Course Objective:**

To initiate students to the field of Public Relations and Corporate Communication by giving them a background, trends and techniques in PR

**Course Outcomes (CO)**

**The Learners will be able to**

CO1: Review the concepts of public relations and different models of PR.

CO2: Evaluating the functions of PR and PR Writing.

CO3: Analysing the role of PR in press and other media relations.

CO4: Acquiring the knowledge on corporate communication.

CO5: Elaborate the PR profession and PR in the digital Era.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction to Public Relations (15 hours)**

- 1.1 Brief History of Public Relations – Definition of PR (K2, K3)
- 1.2 Public relations and Communication (K2, K3, K4)
- 1.3 Functions of Public Relations (K4, K5)
- 1.4 Benefits of PR - Models of PR – PR and Politics (K3, K4, K5)
- 1.5 Government PR – The Lobby – Spin and Image Management (K4, K5, K6)
- 1.6 Political Communication and the Public Sphere – Triads of PR (K3, K4, K5)

### **Unit II: Functions of PR (15 hours)**

- 2.1 Publics – Internal and External(K3, K4)
- 2.2 Tools and activities for Internal PR(K4, K5)
- 2.3 Necessity and Goals of Employee Communication (K3, K4, K5)
- 2.4 Tools for External PR, (K2, K3, K4)
- 2.5 PR Writing, writing speeches, scripts, features, Newsletters, annual reports, direct mail, brochures, proposals (K3, K4, K5)
- 2.6 Writing for the web (K4, K5, K6)

### **Unit III: Press and PR (15 hours)**

- 3.1 Press Releases and its Types (K2, K3, K4)
- 3.2 Writing Tips and Distribution(K3, K4, K5)
- 3.3 Audio News Release, Video News Release, Press Conferences (K3, K4, K5)
- 3.4 Prime-time/ National, Photo-op and Joint PC (K2, K3, K4)
- 3.5 Press Briefing, Embargoes, Background Briefings (K3, K4, K5)
- 3.6 Media Relations (K3, K4, K5)

### **Unit IV: Corporate Communication (15 hours)**

- 4.1 Corporate Communication (K3, K4)
- 4.2 Corporate Image and Identity (K3, K4, K5)
- 4.3 House Magazines and Newsletters (K3, K4, K5)
- 4.4 Risk, Issues and Crisis Management (K3, K4, K5, K6)
- 4.5 Corporate Social Responsibility, Corporate Community Involvement and cause-related marketing (K2, K3, K4, K5)
- 4.6 Business to Business PR, Financial PR (K4, K5, K6)

### **Unit V: Digital PR and PR Profession (15 hours)**

- 5.1 PR in the Digital Era (K2, K3, K4)
- 5.2 Revolution or evolution (K2, K3, K4)
- 5.3 Social media influences, writing for websites (K4, K5, K6)
- 5.4 Futures challenges for PR and Corporate Communication (K4, K5, K6)
- 5.5 PR Agencies, Structure and Hierarchy, Professional Organisations (K5, K6)
- 5.6 Ethics in PR practice and writing, Codes of Practice (K4, K5, K6)

**Books for Study and Reference:**

1. Alison Theaker - The Public Relations Handbook - Routledge Publishers, 2012.
2. J. V. Vilanilam - Public Relations in India - Sage Publications, 2011.
3. K. M Shrivastava - Public Relations in the Digital Era - Pilgrims Publishing, 2007.
4. Donald Treadwell, Jill B. Treadwell - Public Relations Writing - Sage Publications, 2005.
5. Dr. G.C. Banik - PR and Media Relations - Jaico Publishing House, 2005.
6. Doug Newsom, Bob Carrell - Public Relations Writing Form and Style - Wadsworth, 2001.
7. Scott M. Cutlip, Allen H. Center, Glen M. Broom - Effective Public Relations – Pearson Education, 2000.

### SEMESTER III

#### PCEMN20 - PRACTICAL – V: INTERNSHIP

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: III</b>	PCEMN20	Internship	Practical	Core	3	3	100

#### Course Objective:

One-month training in media will expose the students to actual working conditions in any Reputed Production House. This internship is intended to enable students acquire field experience. Students will be required to maintain a journal recording their daily events in detail and submit a report on their activities at the end of the training.

#### Course Learning Outcomes (CO)

##### The Learners will be able to

- CO 1: Discuss the concepts of production house in Television Medium.
- CO 2: Acquiring an in-depth knowledge in the Respective Media Industry.
- CO 3: Compiling the Types of Work done in the Production house.
- CO 4: Evaluating the Experience gained in Production house.
- CO 5: Substantiate the Report with proper documents.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Order of details expected in the Internship Report**

College Certificate

Certificate from Media Industry

Acknowledgements

Table of Contents

List of Figures

Synopsis

### 1. Introduction

1.1 About the Media Industry

1.2 About the Team

1.3 Areas of Field Experience (asst. Director, Script writer, time keeper, helper etc..)

1.4 Outstanding Individual Works

2. (Divide the successive Chapters based on Issue/Type of Work/Chronological Events, giving a detailed account of the work done, substantiating it with scripts, photographs, clippings of the telecast, etc.)

3. (Second Last Chapter) About the experiences and lessons learnt from them, categorized according to content.

### 4. Conclusion

Appendix A (Photographs: Workplace, Team)

Appendix B (Notices, Ads, Script samples, etc)

Cognitive Level: K1,K2,K3,K4,K5,K6

The Internal Evaluation (40 Marks) is based on the preparation of the final report.

The Semester examination is based on the evaluation of the Internship Report (20 marks) and Viva-Voce (40 marks).

### SEMESTER III

#### PCEMO20 - PRACTICAL – VI: BASIC 3D GRAPHICS AND ANIMATION

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PCEMO20	<b>Title of the Course:</b> Basic 3D Graphics and Animation	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Objective:

1. To enable students to learn the art of 3D animation and modelling using 3D graphics software.

#### Course Outcomes (CO)

##### The Learners will be able to

CO1: Locating the Various tools and workspace of 3D Studio Max.

CO2: Acquiring the knowledge in basic Animation Techniques.

CO3: Analyze and usage of Character Animation Techniques.

CO4: Creating a Product and Architecture Design.

CO5: Compile the Concept of Lighting and Camera effect in 3d Animation.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

**Software: 3D Studio Max**

- ✓ Standard & Extended Primitives- Household Objects- Sofa, Clock & Dining Table
- ✓ Editable Poly- Creating an Object & Adjusting the Segment, Logo, Architecture & Titling
- ✓ Material Editor- Applying on Objects & Giving Effects
- ✓ Modifier- Bend, Smooth, Special Feature; UV Map & Effects
- ✓ Modeling- Logo, Architecture & Titling
- ✓ Special Effect- Bomb & Particles
- ✓ Video Posting- Special Effects in Video, Photo, Object; Comparing Video & Particles 8.  
Lighting- Photometric & Standard Lighting
- ✓ Camera- Target & Free
- ✓ Animation- Rendering in Photocopy & Rendering Setup

**Exercises: (Each exercise 15 hours)**

1. Animated 3D titling
3. Multiple objects with different lightings
4. Character Animation
6. Product Animation
7. Architecture (interior & exterior)
8. Walk through using camera

Cognitive level:K1,K2,K3,K4,K5,K6

**Books for Study and Reference:**

1. 3D Modeling and Animation: Synthesis and Analysis Techniques for the Human Body by Nikos Sarris and Michael G. Strintzis, 2005
2. Maya Character Animation, Jaejin Choi, Dec 16, 2002.
3. Peter Ratner - 3D Human Modeling and Animation, third Edition - 2009

The Internal Evaluation for 40 marks is based on the process of development of the project.

The Semester Evaluation is based on the practical Examination (50) marks, Viva (5) marks and the record (5 marks).

## SEMESTER III

### PEEME20 - ELECTIVE III A: TECHNICAL BUSINESS COMMUNICATION

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PEEME20	<b>Title of the Course:</b> <b>Business Communication</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

To initiate students to the types and techniques of organisational communication

#### Course Outcomes (CO)

##### The Learners will be able to

CO1: Describe the concepts of Business communication.

CO2: Analysing the theories of organizational group communication.

CO3: Assessing the importance of business correspondence and the writing skills.

CO4: Applying and presenting the visual aids in oral presentation.

CO5: Evaluating the ethics and business communication in the global context.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction to Business Communication (15 hours)**

- 1.1. Business Communication – need and importance. (K1,K2, K3)
- 1.2. Patterns of business communication. (K1,K2, K3)
- 1.3. Main categories of business communication. (K3, K4, K5, K6)
- 1.4. Communication networks of an organisation. (K2, K3, K4)
- 1.5. Business communication process. (K2, K4, K5)
- 1.6. Marketing, sales and persuasive communication. (K3, K4, K5, K6)

### **Unit II: Organisational Group Communication (15 hours)**

- 2.1. Group communication. (K1,K2, K3)
- 2.2. Working and communication in teams, Teamwork theory. (K3, K4, K5, K6)
- 2.3. Theories of small group communication. (K2, K3, K4)
- 2.4. Functional theory – Symbolic convergence theory. (K2, K4, K5)
- 2.5. Structuration theory, Conflict management, Negotiation, Meetings. (K1,K2, K3)
- 2.6. Types of group decision making. (K3, K4, K5, K6)

### **Unit III: Business Correspondence and writing skills: (15 hours)**

- 3.1. Definition, meaning and importance of Business Correspondence. (K1,K2, K3)
- 3.2. Parts of a business letter and its layout. (K2, K3, K4)
- 3.3. Letters – Circular, Sales, Bank correspondence. (K1,K2, K3)
- 3.4. Memorandums, Email, Text Messaging. (K3, K4, K5, K6)
- 3.5. Instant Messaging, Reports – contents. (K2, K3, K4)
- 3.6. Types and format, Technical writing. (K3, K4, K5, K6)

### **Unit IV: Forms of Technical Communication: (15 hours)**

- 4.1. Technical Report: Definition & importance. (K1,K2, K3)
- 4.2. Thesis/Project writing: structure & importance. (K3, K4, K5)
- 4.3. Synopsis writing: Methods; Technical research Paper writing: Methods & style. (K2, K4, K5)
- 4.4. Seminar & Conference paper writing: Key-Note Speech: Introduction & Summarization. (K2, K3, K4)
- 4.5. Expert Technical Lecture: Theme clarity; Analysis & Findings. (K2, K3, K4)
- 4.6. 7 Cs of effective business writing: concreteness, completeness, clarity, conciseness, courtesy, correctness, consideration. (K3, K4, K5, K6)

### **Unit V: Technical Presentation: Strategies & Techniques (15 hours)**

- 5.1. Presentation: Forms; interpersonal Communication. (K1,K2, K3)
- 5.2. Class room presentation; style; method. (K2, K3, K4)
- 5.3. Individual conferencing: essentials: Public Speaking: method; Techniques. (K3, K4, K5)
- 5.4. Clarity of substance; emotion; Humour; Modes of Presentation. (K2, K3, K4)
- 5.5. Overcoming Stage Fear: Confident speaking; Audience Analysis & Retention of audience interest. (K3, K4, K5, K6)
- 5.6. Methods of Presentation: Interpersonal; Impersonal; Audience Participation: Quizzes & Interjections. (K3, K4, K5, K6)

**Practical Exercises:**

Exercise 1: Oral presentations using visual aids (charts, flip cards, presentation, objects)

Exercise 2: Audience awareness (attention, response, interaction)

Exercise 3: Public speaking - Informative and persuasive (following etiquette)

**Practical:** Making a visual aided presentation to a large audience

**Books for Study and Reference**

1. Uma Bhushan, Introduction to Business Communication, Jaico Publishing House,2012
2. N.C Jain and Saakshi, Essentials of Business Communication, AITBS Publishers,2012
3. Raymond V. Lesikar,, Business Communication Making Connections in a Digital World, Tata-McGraw-Hill, 2009
4. R.C. Bhatia, Business Communication, Ane books Pvt. Ltd., 2008

### SEMESTER III

#### PEEMF20 - ELECTIVE IV B: ADVERTISING IN VISUAL MEDIA

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PEEMF20	<b>Title of the Course:</b> <b>Advertising in Visual Media</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

To teach in-depth about the field of advertising and the develop basic skills required to be an advertising professional.

#### Course Outcomes (CO)

The Learners will be able to

**CO1:** Identify the basic purpose and functions of Advertising.

**CO2:** Analysing the economic and social issues in advertising.

**CO3:** Elaborating about Advertising in marketing mix and process.

**CO4:** Acquiring the knowledge on advertising strategy planning.

**CO5:** Making and presenting of print and radio Ads.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Purpose & function**

**(15 hours)**

- 1.1 Advertising – Definition. (K1,K2, K3)
- 1.2 History of advertising. (K2, K3)
- 1.3 Benefits of advertising. (K1,K2, K3)
- 1.4 Ads in India, Role of advertising. (K2, K3, K4)
- 1.5 Types of Ads, Non commercial advertising. (K2, K3, K4)
- 1.6 Ethical issues in advertising. (K3, K4, K5, K6)

### **Unit II: Economic & social implication**

**(15 hours)**

- 2.1 Social issues in advertising. (K1,K2, K3)
- 2.2 Criticism of advertising. (K2, K3, K4)
- 2.3 Ad campaign, visualization. (K2, K3)
- 2.4 Copywriting. (K3, K4, K5, K6)
- 2.5 The advertising department. (K3, K4, K5, K6)
- 2.6 Message & creativity. (K4, K5, K6)

### **Unit III: Advertising in marketing mix & process**

**(15 hours)**

- 3.1 Market segmentation, marketing concept. (K2, K3, K4)
- 3.2 Marketing mix. (K2, K3)
- 3.3 Digital Marketing, Target audience. (K3, K4, K5, K6)
- 3.4 Advertising & buyer behaviour. (K1,K2, K3)
- 3.5 Advertising & psychology. (K2, K3, K4)
- 3.6 Sales promotion. (K2, K4, K5)

### **Unit IV: Advertising strategy planning**

**(15 hours)**

- 4.1 Support media. (K2, K3)
- 4.2 Advertising strategy. (K2, K3, K4)
- 4.3 Advertising planning, advertising situation. (K1,K2, K3)
- 4.4 Pre-budget thinking. (K3, K4, K5, K6)
- 4.5 Allocation of advertising, evaluation of advertising message. (K3, K4, K5, K6)
- 4.6 Pros and cons of social media advertising. (K2, K3, K4, K6)

### **Unit V: Practical**

**(15 hours)**

- 5.1 Preparation of print(K2, K3, K4)
- 5.2 Radio Ads. (K2, K3)
- 5.3 Preparing ads for specific target group. (K2, K3, K4)
- 5.4 Commercialism in advertising. (K2, K3)
- 5.5 Social aspects. (K3, K4, K5, K6)
- 5.6 Current issues. (K4, K5, K6)

**Books for Study and Reference:**

1. S.N. Murthy, U. Bhojanna – Advertising – Anurag Jain publication, 2009
2. Manendra Mohan –Advertising Management Concepts & cases – Tata McGraw-Hill publishing, 2008
3. Frank Jefkins, Daniel Yadin– Advertising – Dorling Kindersley publication, 2006
4. J.V.Vilaniam /A.K.Varghese – Advertising Basics – Sage Publication, 2004
5. June A. Valladares – The Craft of copywriting – Sage Publication, 2004

## SEMESTER IV

### PCEMP20 - ELECTRONIC MEDIA MANAGEMENT

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCEMP20	<b>Title of the Course:</b> Electronic Media Management	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

To offer an in-depth understanding of the working of media organizations and the function and ethics of media professionals in electronic media.

#### Course Outcomes(CO)

The Learners will be able to

**CO1:** Explain the basic responsibilities of media and journalism.

**CO2:** Analysing theories and modern approaches to Management.

**CO3:** Acquiring the knowledge about Human Resources Management.

**CO4:** Evaluating the Marketing strategies of Media Management.

**CO5:** Formulating the Programme budget process of Television and radio

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Responsibilities of Media and Journalism (15 hours)**

- 1.1 Historical perspective on media (K2, K3, K4)
- 1.2 Public ownership of media (K3, K4)
- 1.3 New media world(K2, K3, K4)
- 1.4 Managing electronic Media, Television, cable, telecommunication(K3, K4, K5)
- 1.5 Levels of Management, Management skills (K3, K4, K5)
- 1.6 Management function and Management roles (K3, K4, K5)

### **Unit II: Theories in Management (15 hours)**

- 2.1 Unionism in media companies (K2, K3, K4)
- 2.2 Approached to managing employees (K3, K4, K5)
- 2.3 Scientific management, Humanistic management. (K3, K4, K5)
- 2.4 Maslow's Hierarchy of needs, Management objectives (K4, K5, K6)
- 2.5 Modern approaches to management – System approaches to Management (K3, K4, K5)
- 2.6 Total quality management (K4, K5, K6)

### **Unit III: Human Resource Management (15 hours)**

- 3.1 Leadership practices – exercise of power (K4, K5, K6)
- 3.2 Characteristics of a leader, effective manager (K3, K4, K5)
- 3.3 Personnel management (K4, K5)
- 3.4 Hiring process – Interviewing orientation (K4, K5, K6)
- 3.5 Performance reviews – Legal issues in personal management (K4, K5, K6)
- 3.6 Labour issues: working with unions, other labour laws, structure, communication and personnel (K4, K5, K6)

### **Unit IV: Marketing (15 hours)**

- 4.1 Media Organization – culture and structure (K3, K4, K5)
- 4.2 The ethics of media (K3, K4, K5, K6)
- 4.3 Partnership, corporation, structure of media companies (K3, K4, K5)
- 4.4 Entrepreneurship and managers, traits of entrepreneurship, secrets of business success (K4, K5, K6)
- 4.5 Marketing structure, Market analysis, Marketing strategies (K3, K4, K5, K6)
- 4.6 Sales Management, Promotions as form of marketing (K4, K5)

### **Unit V: Programming and Budgeting (15 hours)**

- 5.1 Radio programming (K2, K3, K4)
- 5.2 Television programming (K3, K4, K5)
- 5.3 Cable programming (K3, K4, K5)
- 5.4 Issues in programming (K2, K3, K4, K5)
- 5.5 Brand development and brand extension(K3, K4, K5, K6)
- 5.6 Budget and planning, Financial analysis (K4, K5, K6)

**Books for Study and Reference:**

1. Dennis F. Herrick – Media Management in the Age of Giants: Business Dynamics of Journalism – Surjeet Publication, 2005.
2. Roger L. Sadha – Electronic Media Law – Sage Publication, 2005.
3. Alan B. Albarra – Management of Electronic Media – Thomson Learning, 2002.
4. John Craft, Frederic Leigh, Donald G. Godray-Electronic Media- Thomson Learning, 2001.

## SEMESTER IV

### PCEMQ20 - DEVELOPMENT COMMUNICATION

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCEMQ20	<b>Title of the Course:</b> Development Communication	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

To enable students to understand the use of media in furthering development of society and the contributions of media professionals in democracy

#### Course Outcomes (CO)

The Learners will be able to

CO1: Review the various approaches for Development communication.

CO2: Analysing the Development communication in the global perspectives.

CO3: Acquiring the knowledge about the key concepts in development communication.

CO4: Assessing the policies of government on development perspectives.

CO5: Evaluating the role communication and empowerment strategies for development communication.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus**

### **Unit I: Approaches to Development (15 hours)**

- 1.1 Development communication. (K2, K3)
- 1.2 Critical perspective on communication and development. (K3, K4, K5, K6)
- 1.3 Modernization Models of development communication. (K3, K4, K5)
- 1.4 Kheda communications project. (K4, K5, K6)
- 1.5 Information and Communication technologies for rural development. (K4, K5)
- 1.6 Recent Projects. (K4, K5, K6)

### **Unit II: The world of development communication (15 hours)**

- 2.1 The modernization paradigm. (K3, K4, K5)
- 2.2 Mainstream Development Discourse. (K3, K4, K5)
- 2.3 The Challenges. (K4, K5, K6)
- 2.4 Communication order. (K4, K5, K6)
- 2.5 Role of a communicator in the process of social change. (K3, K4, K5, K6)
- 2.6 Use of Media. (K4, K5, K6)

### **Unit III: Key Concepts**

- 3.1 Key concepts in development. (K3, K4)
- 3.2 Complexities of development efforts. (K4, K5)
- 3.3 Development support communication. (K3, K4, K5)
- 3.4 Alternate path to development, Impact of Electronic media on Development. (K3, K4, K5)
- 3.5 Media Functions, structure of media companies. (K4, K5, K6)
- 3.6 Diffusion of innovation theory, 2 step flow. (K3, K4, K5, K6)

### **Unit IV: Policies of Government (15 hours)**

- 4.1 e-Governance, e-Resource (ERP). (K3, K4, K5)
- 4.2 Electronic Records, Digital Signature. (K3, K4, K5)
- 4.3 Bridging Digital Divide, Demonetization. (K4, K5, K6)
- 4.4 Aathar, Digital wallet, LPG Subsidiary. (K4, K5, K6)
- 4.5 Cashless transactions, Electronic voting machine. (K4, K5, K6)
- 4.6 New Schemes of the Government. (K4, K5, K6)

### **Unit V: Communication and Empowerment (15 hours)**

- 5.1 Communication strategies for development, communitarian theory. (K2, K3)
- 5.2 Communication effects approach. (K3, K4, K5, K6)
- 5.3 Mass media and modernization. (K4, K5, K6)
- 5.4 Social marketing (family, health, agriculture, HIV awareness). (K4, K5, K6)
- 5.5 ICT for social development. (K4, K5, K6)
- 5.6 ICT for Educational development. (K2, K3, K4, K5, K6)

**Books for Study and Reference:**

1. Dipankar Sinha – Development Communication , contexts for the Twenty – first Century – Orient BlackSwan, 2013.
2. Kevel J. Kumar – Mass Communication in India, 4<sup>th</sup> Edition – Jaico Publications, 2011.
3. Roger L. Sadha – Electronic Media Law – Sage Publication, 2005.
4. Srinivas R. Melkote, H. Leslie Steeves – Communication for Development in the Third World: Theory and Practice for Empowerment, 2<sup>nd</sup> Edition – Sage Publications, 2001.

## SEMESTER IV

### PCEMR20 - ADVERTISING & INTERGRATED MARKETING COMMUNICATION

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCEMR20	<b>Title of the Course:</b> Advertising and Integrated Marketing Communication	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

- To introduce students to the field of Advertising in detail and the nature and challenges in the growing area of Integrated Marketing Communication

#### Course Outcomes (CO)

##### The Learners will be able to

CO1: Discuss the inception of advertising and its benefits.

CO2: Analysing the Branding and market segmentation of advertisement.

CO3: Examining the advertising agencies and Elements of Ad layout.

CO4: Compiling the concepts of integrated marketing communication.

CO5: Evaluating the concepts of Corporate advertising.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction to Advertising (15 hours)**

- 1.1. Advertising Definition. (K2, K3)
- 1.2. Brief history of advertising, (K2, K3, K4)
- 1.3. Role of advertising. (K3, K4)
- 1.4. Types of advertising, Benefits of advertising. (K3, K4, K5)
- 1.5. DAGMAR, AIDA and DRIP advertising models. (K4, K5, K6)
- 1.6. Economic and social effects of advertising - women, children, non-ethical practices. (K4, K5)

### **Unit II: Creating the Advertisement (15 hours)**

- 2.1. Unique Selling Proposition. (K3, K4, K5)
- 2.2. Product and Brand, Brand Equity, Brand Image. (K2, K3, K4, K5)
- 2.3. Product Life Cycle. (K3, K4, K5, K6)
- 2.4. Target Audience, Market Segmentation. (K4, K5, K6)
- 2.5. Types, Advertising Media. (K3, K4, K5)
- 2.6. Advertising Campaign, Advertising appeals (K4, K5, K6)

### **Unit III: Advertising Agency (15 hours)**

- 3.1. Ad agencies.(K2, K3, K4)
- 3.2. Structure and types. (K3, K4, K5)
- 3.3. Brief, Accounts Executive. (K4, K5,)
- 3.4. Elements of Ad Layout. (K4, K5, K6)
- 3.5. Visualization and Copy Writing – Headlines, Subheads, Captions, Taglines, Slogans, Jingles. (K3, K4, K5, K6)
- 3.6. Use of Illustrations and photographs. (K4, K5, K6)

### **Unit IV: Advertising & Integrated Marketing Communication (15 hours)**

- 4.1. Marketing Mix. (K2, K3, K4)
- 4.2. Meaning of Integrated Marketing Communication.(K2, K3, K4)
- 4.3. Media Planning, Importance of IMC.(K3, K4, K5)
- 4.4. Elements of IMC – Advertising, Direct Marketing, Sales Promotion, Publicity, Public Relations, Personal Selling, Internet Advertising.(K3, K4, K5)
- 4.5. Digital Marketing Methods.(K3, K4, K5)
- 4.6. Social media advertising. (K4, K5, K6)

### **Unit V: Advertising for Corporate (15 hours)**

- 5.1. IMC & Corporate Advertising. (K3, K4, K5)
- 5.2. Prestige, Issue based.(k3, k4, k5)
- 5.3. Diversification and Crisis Advertising. (K3, K4, K5)
- 5.4. IMC & Corporate Social Responsibility.(K3, K4, K5)
- 5.5. International and Intercultural Advertising.(K3, K4, K5)
- 5.6. Social and professional Ethics in advertising.(K3, K4, K5, K6)

**(Practical:** Preparation of print and radio ads, prepare ad for specific target audience)

## **Books for Study and Reference**

1. Iain Macpury – Advertising – Routledge Publication, 2009
2. Sangeetha Sharma, Raghuvir Singh - Advertising Planning and Implementation – PHI Learning Pvt. Ltd, 2009
3. Manendra Mohan – Advertising Management Concept and Cases – Tata McGraw-Hill, 2008
4. S.N. Murthy, U. Bhojanna– Advertising An IMC Perspective – Excel Books, 2007
5. S.A. Chunawalla -Advertising, Sales and Promotion Management – Himalaya Publishing House, 2006
6. R.C. Bhatia - Marketing Communication and Advertising – Galgotia Publishing Company – 2003
7. Frank Jefkins, Daniel Yadin – Advertising – Dorling Kindersley Publishing Inc, 2000

## SEMESTER IV

### PCEMS20 - PRACTICAL – VII: RESEARCH PROJECT

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCEMS20	<b>Title of the Course:</b> <b>Research Project</b>	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 3	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

To put to practice the methods of research by undertaking a study in a relevant field of media

#### Course Syllabus:

The students will independently work on a research project. It will emphasize on literature review, theory-building skills, matching theory to methods and developing appropriate instruments. It will provide an orientation to database search techniques and also using Internet effectively for research. Students will work on any area of their choice within the broad field of electronic media and communications subjected to approval of their guide. They are expected to undertake a thorough study/research of the chosen subject, systematically and rigorously. They are expected to read relevant journals (some available on-line and of line) and books. Students should consult the respective guide at every stage of the research work. At the end of summer holidays, students are expected to submit a research proposal containing the following: Topic, Complete Literature Review, Research Design-Hypothesis/Research Questions, unit of Analysis, Variables/Issues to be Studied, Methods, Sampling Design Data Analysis Techniques, Questionnaire/ instrument to be used for analysis. Students can also carry out the fieldwork. The project report will have to be submitted at the end of the semester.

#### Course Outcomes (CO)

The Learners will be able to

**CO1:** Describe the Basic concepts of Qualitative and Quantitative Research Methods.

**CO2:** Analysing the topic and choosing the topic related to their rate of interest.

**CO3:** Evaluating the Research and choosing the desired methodology for conducting research.

**CO4:** Compiling the data collected and pointing the Key findings.

**CO5:** Constructing the desired conclusion and writing the Research Report.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

**From 1 - 2 (20 hours), 3 - 4 (15 hours), 5 - 6 (10 hours)**

**Order of details expected in the Project Report**

College Certificate

Acknowledgements

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1. Introduction

1.1. Objective

1.2. Scope and Limitations

1.3. Sources of Data

1.4. Sampling Characteristics

2. Review of Literature

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4. Data Analysis and Interpretation

5. Key Findings

6. Conclusion

Appendix

Bibliography

Cognitive Level:K1,K2,K3,K4,K5,K6

The Internal Evaluation for 40 Marks is based on the completion of work at each stage of the project, PowerPoint presentation of the project details and a model viva.

The Semester Evaluation is based on the final Project Report (20 Marks) and the Viva-Voce (40 Marks).

## SEMESTER IV

### PCEMT20 - PRACTICAL – VIII: WEB PUBLISHING

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCEMT20	<b>Title of the Course:</b> <b>Web Publishing</b>	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 3	<b>Marks</b> 100
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#### Course Objective:

To teach students the art of designing advanced and dynamic websites using Adobe Dreamweaver software and Java Scripts

#### Course Outcomes(CO)

The Learners will be able to

**CO1:** Acquiring the Basic Knowledge about Adobe Dreamweaver.

**CO2:** Locating the Various Tags used for Creating web pages.

**CO3:** Designing the Navigation Structure for Web Pages.

**CO4:** Creating the Web pages and Making Links.

**CO5:** Compose Various Effects and transitions to Web pages.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

**Exercises:** Developing the following web pages and preparing a record which explains the steps followed to develop.

### **Each Exercise: 18 hours**

1. Developing a webpage using basic HTML tags and hyperlinks.
2. Creating web pages with transition and visual effects.
3. Programs related to Window and Document objects.
4. Constructing a webpage using FORM tag to enter student bio-data.
5. Constructing an instructional website in Dreamweaver with at least 5 pages and adding Javascript in suitable places to make the above website as dynamic site. Programs related to Event handling, Events, and Error handlings

Cognitive Level: K1,K2,K3,K4,K5,K6

### **Book for References:**

1. Rajkumar Shrivastavan - A Textbook of Internet and Webpage Design – Dominant Publisher and Distributors Pvt. Ltd., 2014.
2. Betsy Bruce, John Ray, Robyn Ness - Adobe Dreamweaver CS5 – Dorling Kindersley India Pvt. Ltd., 2011.
3. Mathew MacDonald - Creating Websites - Pogue Press, 2005.
4. Raywest Tom Muck – Dreamweaver MX: The Complete Reference - Tata McGraw Hill, 2002.
5. Joel Sklar - Principles of web Design - Thomson Learning, 2000.

The Internal Evaluation for 40 marks is based on the process of development of the web.

The Semester Evaluation is based on the Practical examination on development of a small website with a minimum of 5 web pages (45 marks), Viva Voce (5 marks), Record (10 marks).

## SEMESTER IV

### PEEMG20 - ELECTIVE IV A: WEB DESIGNING

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PEEMG20	<b>Title of the Course:</b> <b>Web Designing</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

To enable students to learn the basic html coding and layout design skills required for creating websites

#### Course Outcomes (CO)

The Learners will be able to

CO1: Review the concepts of web Design and Web browsers.

CO2: Acquiring knowledge about Dreamweaver and making Hyperlinks.

CO3: Analysing the HTML Tags and its Attributes.

CO4: Evaluating the Concept for planning the Website.

CO5: Constructing the Webpages by using Cascading Style sheet and preview it in Browsers.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction to Web Design (15 hours)**

- 1.1. Introduction: The Web and the Internet, Evolution of WWW.(K2,K3)
- 1.2. Features of WWW, WWW Servers and Browsers. (K2.K3, K4)
- 1.3. HTTP, URL WWW and Hypertext. (K3, K4, K5)
- 1.4. Web Workings, Search Engines (K3, K4)
- 1.5. Basic Features of Web Browser, Web page Design Consideration (K4, K5, K6)
- 1.6. Principles for Designing a Web site, Web site Hosting. (K3, K4, K5, K6)

### **Unit II: Dreamweaver (15 hours)**

- 2.1. Dreamweaver CC, New features in Dreamweaver.(K2, K3)
- 2.2. Basics Webpage Elements, Working with Dreamweaver (K3, K4)
- 2.3 Adding Text and Lists, Displaying Image.(K2,K3)
- 2.4. Adding Flash and other Multimedia (K3, K4)
- 2.5. Making Hyperlinks (K2, K3)
- 2.6. Anchors and Mailto links, Frames. (K4, K5, K6)

### **Unit III: HTML (15 hours)**

- 3.1. TML, HTML Documents (K2, K3)
- 3.2. Document Layout of an HTML page (K2, K3)
- 3.3. Creating and Saving HTML Document (K3, K4, K5.K6)
- 3.4. HTML Elements, Formatting Styles (K2, K3)
- 3.5. Hypertext links, Images (K2, K3, K4)
- 3.6. HTML Tables, Table properties. (K3, K4, K5, K6)

### **Unit IV: Planning the Site (15 hours)**

- 4.1. Create the site Specification (K4, K5)
- 4.2. Identify the Content Goal (K3, K4)
- 4.3. Analyze the Audience (K4, K5)
- 4.4. Build a Web site Development team, filenames and URLs, Directory Structure (K4, K5)
- 4.5. Diagram the site, managing site files (K4, K5,K6)
- 4.6. Creating page templates – Creating page from templates, user experience.( K3, K4, K5, K6)

### **Unit V: Cascading Style Sheet (15 hours)**

- 5.1. Cascading style sheet, styling texts with CSS (K3, K4)
- 5.2.Creating external style sheets (K4, K5, K6)
- 5.3. CSS page layout, Positioning DIV (K4, K5)
- 5.4. Floating page element (K3, K4)
- 5.5. Centering your design on the page (K3, K4, K5)
- 5.6. Previewing with browser lab. (K2, K3)

**Books for Study Reference:**

1. Raj Kumar Shrivastava – A Textbook of Internet and Web Design - Dominant Publishers and Distributors, 2014.
2. Betsy Bruce, John Ray, Robyn Ness – Adobe Dreamweaver CS5 - Dorling Kindersley, 2011.
3. Research and Development Wing – Internet and Web Design, Macmillan India, 2008.
4. Ramesh Bangia – Internet and Web Design, 2<sup>nd</sup> Edition - Firewall Media, 2008.
5. Ray West, Tom Muck - Dreamweaver MX: The Complete Reference - Tata McGraw Hill, 2002.
6. Harley Hahn – The Internet: Complete Reference, 2<sup>nd</sup> Edition - Tata McGraw Hill, 2005.
7. Joel Sklar – Principles of Web Design - Thomson Learning, 2000.

## SEMESTER IV

### PEEMH20 - ELECTIVE IV B: WOMEN AND MEDIA

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PEEMH20	<b>Title of the Course:</b> <b>Women and Media</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objective:

- To enlighten students on the role of media in empowering women in society and the contributions of women in growing the media field

#### Course Outcomes (CO)

##### The Learners will be able to

CO1: Discuss the Concept of Portrayal of women in Media.

CO2: Analysing the concept of Media for Development.

CO3: Examining the portrayal of women in Media

CO4: Acquiring Knowledge about Development of women in Media.

CO5: Evaluating the role of Women in Media.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Portrayal of women in Media (15 hours)**

- 1.1. Types of media, Portrayal of women in India (K2, K3, K4)
- 1.2. Mythology vs. Media (K4, K5)
- 1.3. Theories of Media Effects and Media uses: Limited effect theory (K3, K4, K5)
- 1.4. Catharsis and Narcissistic Incidental effects (K3, K4, K5)
- 1.5. Uses and gratification, cultivation theory, Reflects effect (K3, K4, K5)
- 1.6. Representation of Women in Social media (K3, K4, K5, K6)

### **Unit II: Media for Development (15 hours)**

- 2.1. Communication Research on Women and Children (K3, K4, K5)
- 2.2. Television research in India (K2, K3)
- 2.3. Family and Television (K3, K4)
- 2.4. Use of Television for women Development (K4, K5)
- 2.5. Effect of Media on Education (K4, K5, K6)
- 2.6. Mass Media and Indian Family (K4, K5, K6)

### **Unit III: Women Empowerment (15 hours)**

- 3.1. Women in Print Media, Magazine (K3, K4)
- 3.2. Women in Radio (K4, K5)
- 3.3. Women in Films (K4, K5)
- 3.4. Role of New Media in Women's Development (K4, K5, K6)
- 3.5. Children and Mass Media (K3, K4, K5)
- 3.6. Representation of women in Mass Media, Women behind Camera. ( K3, K4, K5, K6)

### **Unit IV: Development of Women (15 hours)**

- 4.1. Media & Women's Development (K3, K4)
- 4.2. Image of Women in Media (K4, K5)
- 4.3. Women Journalist in the Globe (K4, K5, K6)
- 4.4. Women Journalist in India (K4, K5, K6)
- 4.5. Famous Women Directors in the Globe (K4, K5, K6)
- 4.6. Famous Women Directors in India. (K3, K4, K5, K6)

### **Unit V: Women role in Media (15 hours)**

- 5.1. Women in Doordharshan vs. other channels (K3, K4, K5, and K6)
- 5.2. Women in Radio Program (K3, K4, K5, K6)
- 5.3. Women in Print Media (K3, K4, K5, K6)
- 5.4. Women in Media Profession (K3, K4, K5, K6)
- 5.5. Women in Media Violence (K3, K4, K5, K6)
- 5.6. Women empowerment in Social Media. (K3, K4, K5, K6)

**Book for Study and Reference:**

1. Jaya Chakravarthy – Women in Journalism, Media and Women's Development – Sarup & Sons, New Delhi – 2007.
2. Annu Joseph and Kalpana Sharma, Whose News, Sage Publication, 2006
3. Leela Gulati and Jasodhara Bagchi, A Space of her own, Sage Publication, 2005
4. Asha Hans and Annie Patri, Women, Disability and Identity, Sage Publication 2002
5. Sakuntala Narasimhan, Empowering Women, Sage Publication, 1999
6. Bhargavi V. Davar, Mental Health of Indian Women, Sage Publication, 1998

## SEMESTER - I

### PIEMA20 - INDEPENDENT ELECTIVE-RADIO & TELEVISION NEWSCASTING

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>Sem: I</b>	<b>PIEMA20</b>	<b>Radio and Television News casting</b>	Theory	Independent Elective		2	100

#### Course Objectives:

To specialize in Radio and Television and gain analytical, technical and practical skills and be equipped in the broadcast marketplace.

#### Course Outcomes (CO)

##### The Learners will be able to

CO1: Identify the basic radio production fundamentals and radio programming formats

CO2: Analysing the structure of news story and its presentation methods

CO3: Evaluating the components of television news and the role of Media professionals

CO4: Acquiring the knowledge about requirements for news production

CO5: Elaborating the role of news production teams and risk management in news casting

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Fundamentals of Radio formats**

- 1.1. Radio production fundamentals (K2, K3)
- 1.2. Purpose of production and type, Information and scripting.(K2,K3)
- 1.3. Interviewing, Methods of interviews.(K3,K4)
- 1.4. Location of recording, Narration Styles, Music recording, Magazines and sequences. Remote broadcasts. (K3, K4, K5)
- 1.5. Evolution of radio broadcast in India. (K3, K4)
- 1.6. Radio as an educational tool, Radio programmes and formats.(K3, K4, K5, K6)

### **Unit II: News Analysis and Structure**

- 2.1. News policy and practice. (K2, K3)
- 2.2. Structure of News Story. (K2, K3)
- 2.3. 5 Ws and 1 H of news. Inverted Pyramid style. Hard and Soft Leads.(K3,K4,K5)
- 2.4. News reading and presentation methods, Pronunciation, Vocal stressing, Inflection, Quotation marks.(K3,K4,K5,K6)
- 2.5. Errors and emergencies, Headphones, Trails and promos.(K3,K4,K5)
- 2.6. Phone-in programmes, Listener's letters. (K4, K5, K6)

### **Unit III: Role of Media persons**

- 3.1. Components of TV news. (K3, K4)
- 3.2. Live Telecast environment and its significance. (K4, K5)
- 3.3. Work elements, Video and Audio Elements, Interactive Elements, Technical elements. (K4, K5, K6)
- 3.4. Types and Importance of news items.(K3,K4)
- 3.5. Priority Issues, Catchy items, Sequencing of TV news bulletins. (K4,K5)
- 3.6. Role of TV News editors. Role of Studio and media Professionals in TV News casting.(K4, K5, K6)

### **Unit IV: Acquiring the News productions**

- 4.1. News production and requirement (K2, K3)
- 4.2. Electronic still, Electronic news gathering, satellite news gathering.(K3,K4)
- 4.3. Role of OB vans (K4, K5)
- 4.4. Webcasting Video Clips for News (K3, K4)
- 4.5. Breaking News, Headlines, and Repetitive cycles of news. (K4, K5)
- 4.6. Importance of archive and stock shots for news editing. (K4, K5, K6)

### **Unit V: Role of the News production**

- 5.1. Newsproduction teams & their roles. (K2, K3, K4)
- 5.2. Television News Language – Pronunciation, voice delivery (inflation and deflation), accent.(K3,K4,K5)
- 5.3. TVnews as compared to news in Print Media, news for Interval, news portals.(K3,K4,K5)
- 5.4. Flash news scrolling. (K2, K3)
- 5.5. Logo and Weather updates. (K2, K3)
- 5.6. Risk Management in News casting. (K4, K5, K6)

**Books for Study and Reference Books:**

1. Film Cultures, Janet Harbord, Sage Publications, 2003
2. News and News Sources, Paul Manning, Sage Publications, 2001.
3. Standard handbook of Video and Television Engineering, Jerry Whitaker and Blair Benson, McGraw-Hill, New York, 2000.
4. The Globalisation of News, Oliver Boyd Barret, Sage Publications, New Delhi, 1998.
5. Multimedia and Virtual Reality Engineering, Richard Brice, Newnes Pub., 1997.
6. Radio Production, Robert McLeisch , third edition, Reed Elsevier, Oxford, 1994.

## SEMESTER - II

### PIEMB20 - INDEPENDENT ELECTIVE-ELECTRONIC JOURNALISM

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PIEMB20	<b>Title of the Course:</b> <b>Electronic Journalism</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b>	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives:

To provide the insight knowledge about the electronic news production and Produce the competent journalists and news producers for the current information world.

#### Course Outcomes (CO)

The Learners will be able to

CO1: Indicating the origin and development of electronic journalism

CO2: Analysing the concept of radio news production and its genres

CO3: Applying the concept of television news production techniques and live news

CO4: Elaborating the features and development of online journalism

CO5: Compiling the technologies used for electronic journalism

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Introduction to Electronic Journalism**

- 1.1. Origin and Development of Electronic News Broadcasting (K2, K3)
- 1.2. Differences between Print and Electronic Journalism (K3, K4)
- 1.3. Citizen Journalism (K2, K3, K4)
- 1.4. Consumption pattern of news in Television, Radio and Online (K3, K4, K5, K6)
- 1.5. Importance of Sound and visuals (K3, K4)
- 1.6. Emergence of electronic news gathering tools and practice. ( K3, K4, K5, K6)

### **Unit II: Radio News Production**

- 2.1. Basics of Radio News (K2, K3)
- 2.2. Components of News (K3, K4)
- 2.3. Radio news room set-up, Radio News Reporting (K3, K4, K5)
- 2.4. News writing and presentation, Elements of editing, (K3, K4)
- 2.5. Integrating audio bytes (K2, K3)
- 2.6. Radio talks and discussions, radio interviews. (K3, K4, K5, K6)

### **Unit III: Television News Production**

- 3.1. TV News room work process (K3, K4, K5)
- 3.2. Basics of TV News, sources and contacts (K4, K5, K6)
- 3.3. News research and planning, hour glass structure (K4, K5, K6)
- 3.4. TV interviewing techniques (K4, K5, K6)
- 3.5. Piece - to - camera, Process of Live inputs (K3, K4, and K5)
- 3.6. News anchoring. (K3, K4)

### **Unit IV: Online Journalism**

- 4.1. Development of the online news media (K2, K3)
- 4.2. Features of online media: interactivity and hypertextuality, online storytelling (K3, K4, K5)
- 4.3. Presentation with audio recording and editing, photo shooting and editing, slide show, character driven narrative (K4, K5, K6)
- 4.4. Identification of relative stories for hyper linking (K2, K3)
- 4.5. Search engine optimization (SEO) (K2, K3, K4)
- 4.6. User engagement, user generated content, Use of Twitter, Face book, YouTube, Flicker, LinkedIn, blog.( K2, K3, K4, K5, K6)

### **Unit V: Technologies for Electronic Journalism**

- 5.1. Outside Broadcast van and its functions (K2, K3, K4)
- 5.2. Mobile technology and its role in aiding news coverage (K3, K4, K5)
- 5.3. Bi-media reporting (K3, K4)
- 5.4. Convergence newsroom (K4, K5, K6)
- 5.5. Multi-skilling (K4, K5)
- 5.6. Broadcasting software's (K3, K4)

**Text Books:**

1. Andrew Boyd, Broadcast Journalism, Focal Press, 2007
2. Mitchell Stephens and Beth M. Olson, Broadcast News, Fourth Edition, Thomson Wordsworth, 2005.
3. Eric K. Gormly, Writing and Producing Television News, 2nd Edition, Surjeet Publications, New Delhi, 2005.
4. Singh PP., Jonge De., Hakemulder, Jan 'Broadcast Journalism' – Anmol Publication, New Delhi, India, 2005.

**References:**

1. Alfred Lawrence Lorenz and John Vivian, News Reporting and Writing, Pearson. 2006
2. Lynette Sheridan Burns, Understanding Journalism, Vistaar Publications, 2006
3. Robert L. Hilliard, Writing for TV, Radio and New Media, Thomson Publications, 2003
4. N.C Pant, Modern Journalism, Kanishka Publishers, 2002
5. R.K. Ravindran, Radio, TV, Broadcast Journalism, Anmol Publications, 2000

### SEMESTER - III

#### PIEMC20 - INDEPENDENT ELCTIVE -WOMEN AND ADVERTISING

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> <b>PIEMC20</b>	<b>Title of the Course:</b> <b>Women and Advertising</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b>	<b>Credits</b> 2	<b>Marks</b> 100
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**Course Objective:** To provide the basic understanding about the role of women in the field of advertisement and to develop career opportunities.

#### Course Outcomes(CO)

The Learners will be able to

CO1:Describing the role of women in Advertising

CO2:Analysing the portrayal of women in advertising

CO3:Evaluating the ethical codes of advertising

CO4:Exploring on the women entrepreneurship in India

CO5:Compiling the notable emerging women leaders in Advertising

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit I: Women in Advertising**

- 1.1. Commoditization of women in advertising (K2, K3, K4)
- 1.2. Commodity Feminism-feminist and Advertising (K3, K4,K5)
- 1.3. Advertisement as gender scripts (K3,K4,K5)
- 1.4. Textually and Mediated Identities (K4.K5)
- 1.5. Representation: Role, Character Traits and body Types (K4,K5,K6)
- 1.6. Trends in Advertisements - Advertising false ideals.(K1, K2, K3, K4, K5, K6)

### **Unit II: Projection of Women in Advertisements**

- 2.1. Sexism in advertising (K2, K3)
- 2.2. Female objectification of women (K3, K4)
- 2.3. Women through the lens of commercial advertising (K3, K4, K5)
- 2.4. Women- be sexualized case Study (K4, K5, K6)
- 2.5. Modern Advertisement-women as consumers, women as objects (K3, K4, K5, K6)
- 2.6. Changing the portrayal of women in advertisement in Social transformations.( K2, K3, K4, K5, K6)

### **Unit III: Ethics in Advertising**

- 3.1. Ethical issues in advertising (K2, K3, and K4)
- 3.2. NARB-ASCI-ASCI Codes & Guidelines (K2, K3,K4)
- 3.3. Case study on-Decisions by ASCI for unethical Ads(K4,K5,K6)
- 3.4. Laws Governing Advertisements-(K2,K3)
- 3.5. Drugs and cosmetics act 1940, Drugs and Magic Remedies Act 1954, (K4, K5, K6)
- 3.6. Indecent representation of women act 1986, Patent Act 1970, Copy right act 1957, Trademarks Act 1999.( K2, K3, K4, K5, K6)

### **Unit IV: Women as Entrepreneurs**

- 4.1. Creative women: Their potential (K2, K3, K4)
- 4.2. Creative women: Their personality (K2, K3, K4)
- 4.3. Creative women: Their Productivity (K2, K3, K4)
- 4.4. Evolution of women entrepreneurship in India (K4, K5, K6)
- 4.5. Skills & requirements for women (K4, K5, K6)
- 4.6. Role of women entrepreneurship in economic development. (K2, K3, K4, K5, K6)

### **Unit V: Careers in Advertising**

- 5.1. Growth of Advertising Industry in India (K3, K4, K5)
- 5.2.Careers in Advertising- Content Writers, Content Managers, creative development, marketing, (K4, K5, K6)
- 5.3. Management - SEO (Search Engine optimization)(K2,K3,K4)
- 5.4. Digital Media Designer (K3, K4)
- 5.5. Social Media Marketing-(K4, K5, K6)
- 5.6. Emerging women leader and notable women in Advertising field. (K2, K3, K4, K5, K6)

**Books for study and Reference:**

1. John Philip Jones- International Advertising: Realities and Myths –Sage Publications,2000
2. Robert Cluley- Essential of advertising –Kogan Publishers, Fenruary,2017.
3. S. N. Murthy, U. Bhojana - Advertising an IMC perspective –Excel Books ,2007.
4. S.A. Chunawalla - Advertising, sales and promotion Management –Himalaya Publishing House, 2006.
5. Frank Jefkins,DanielYadin - Advertising ,4<sup>th</sup> Edition - Pearse Education, 2006
6. J.V. Vilanilam, A.K. Varghese - Advertising Basics: A resource Guide for Beginners- Response Books, 2004.
7. Sandage, Fryburger, Rotzoll-Advertising Theory and Practice,11<sup>th</sup> Edition –AITBS publishers,2004.
8. R.C. Bhatia –Marketing Communication and advertising –Galgotia Publishers,2003
9. John Philip Jones –How Advertising works –Sage publications ,1998
10. Courtland L. Bovee- Advertising Excellence-McGraw hill,1995.

## SEMESTER - IV

### PIEMD20 - INDEPENDENT ELECTIVE-INTERNATIONAL COMMUNICATION

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> <b>PIEMD20</b>	<b>Title of the Course:</b> <b>International Communication</b>	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b>	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives:

To study the global communication to learn about its effects and influence on Globalization.

#### Course Outcomes (CO)

The Learners will be able to

**CO1:** Explain the concept of international communication and balanced information flow

**CO2:** Analysing the approaches and theories related to international communication

**CO3:** Exploring about the international media organization

**CO4:** Evaluating the concept of disappearing borders of empowerment

**CO5:** Identifying the key figures of international communication

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

(Low- L, Medium - M, High - H)

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	M	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	M	H	H

(Low- L, Medium - M, High - H)

## **Course Syllabus:**

### **Unit 1: Introduction to International Communication**

- 1.1. What is international Communication? (K1, K2)
- 1.2. International communication in the Internet age (K2, K3)
- 1.3. (Imbalance in) International Information flows (K3, K4, K5)
- 1.4. The New World Information and Communication Order (NWICO)-(K2, K3)
- 1.5. NWICO and its objective (K4, K5)
- 1.6. Towards an integrative view of balanced information flow. (K3, K4, K5, K6)

### **Unit 2: Approaches to theorizing international communication**

- 2.1. Free flow of Information (K2, K3)
- 2.2. World system theory, Electronic colonialism theory (K3, K4)
- 2.3. Modernization Theory-Dependency Theory, Social Learning Theory (K3, K4, K5)
- 2.4. World Systems-Structural Imperialism, Hegemony, Propaganda-(K3, K4, K5)
- 2.5. Global Village, Technological Determinism, Globalization (K3, K4, K5)
- 2.6. Cultural Imperialism-Theories of information society ( K3, K4, K5, K6)

### **Unit 3: International/transnational media organizations**

- 3.1. News Agencies (K2, K3)
- 3.2. Evolution-Functions (K2,K3)
- 3.3. Typology (K3, K4)
- 3.4. Broadcast Networks, Cable News Network's - (CNN)(K3,K4,K5,K6)
- 3.5. British Broadcasting Service (BBC) (K3, K4, K5, K6)
- 3.6. Al Jazeera Networks (K2, K3, K4, K5, K6)

### **Unit 4: Disappearing borders of empowerment**

- 4.1. Global Homogenization (K2, K3)
- 4.2. Cultural Hybridity (K3, K4, K5)
- 4.3. Cultural Imperialism (K2, K3)
- 4.4. Revised Cultural Imperialism (K3, K4, K5)
- 4.5. Spaces of Empowerment ((K3, K4, K5
- 4.6. Remote Working Culture. (K2, K3, K4, K5, K6)

### **Unit 5: Important Personalities in International Communication**

- 5.1. Ralph Akin feleye – (K2, K3)
- 5.2. Marshall McLuhan-Ted Warner- (K3, K4, K5)
- 5.3. Bill Gates-Noam Chomsky-Herbert Schiller (K3, K4, K5)
- 5.4. Walter Lippmann-Edward Herman-John Merrill (K3, K4, K5, K6)
- 5.5. Cees Hamelink-Annabelle Sreberny (K3, K4, K5)
- 5.6. Hamid Mowlana-Sean Mcbrid (K3, K4, K5, K6)

### **Books for study and Reference:**

1. Akinfeleye, R., Amobi, T. I., & Sunday, O. Unending imbalance in global news flow, direction and intensity: Comparing global media coverage of 2008 US and Ghana presidential elections. Saarbruken, Germany: LAP Lambert Academic Publishing, 2011.
2. Mojaye, E. M., Oyewo, O. O., M'Bayo, R. T. & Sobowale, I. A. Globalization and development communication in Africa, Ibadan: University Press, 2008.
3. Thusu, D. K. International Communication: Continuity and change, New York, New York; Oxford University Press, 2006.
4. Morley, M How to manage global reputation: A guide to the dynamics of international public relations, New York, NY New York: University Press, 2002.
5. Alleyne M. O News revolution: Political and economic decisions about global information. New York: St Martins Press. 1997.
6. Mowlana, H. Global information and world communication: New frontiers in international relations, New York: Longman, 1986.

**M.SC. ELECTRONIC MEDIA**  
**PATTERN OF THEORY QUESTION PAPER**  
(With effect from 2020– 2021)

**(i) Continuous Assessment (2 Hours, 50 Marks)**

**SECTION A - 7 x 2 = 14 Marks**

Answer **ALL** Questions

1. CLO3      K1
2. CLO3      K2
3. CLO3      K3
4. CLO3      K6
5. CLO4      K1
6. CLO4      K2
7. CLO4      K3

**SECTION B - 3 x 7 = 21 Marks**

Answer any **THREE** out of five Questions

8. CLO3      K3
9. CLO3      K4
10. CLO3     K5
11. CLO4     K4
12. CLO4     K5

**SECTION C - 1 x 15 = 15 Marks**

Answer any **ONE** out of two Questions

13. CLO3     K4
14. CLO4     K5

**(ii) Semester Examination (3 Hours, 100 Marks)**

**SECTION A - 10 x 2 = 20 Marks**

Answer **ALL** Questions

Two Questions from each unit

1. Unit I      CLO1 K3
2. Unit I      CLO1 K4
3. Unit II     CLO2 K1
4. Unit II     CLO2 K2
5. Unit III    CLO3 K3
6. Unit III    CLO3 K4
7. Unit IV    CLO4 K5
8. Unit IV    CLO4 K1
9. Unit V      CLO5 K6

10. Unit V CLO5 K1

**SECTION B** - 5 x 7 = 35 Marks

Answer **ALL** Questions (Either or type)

One Question from each unit

11. A) Unit I CLO1 K2

11. B) Unit I CLO1 K2

12. A) Unit II CLO2 K3

12. B) Unit II CLO2 K3

13. A) Unit III CLO3 K4

13. B) Unit III CLO3 K4

14. A) Unit IV CLO4 K5

14. B) Unit IV CLO4 K5

15. A) Unit V CLO5 K2

15. B) Unit V CLO5 K2

**SECTION C** - 3 x 15 = 45 Marks

Answer **THREE** out of Five Questions

At least one question from each unit.

16. Unit I CLO1 K2

17. Unit II CLO2 K3

18. Unit III CLO3 K4

19. Unit IV CLO4 K5

20. Unit V CLO5 K6

**AUXILIUM COLLEGE (Autonomous)**  
*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> Cycle)*  
**Gandhi Nagar, Vellore - 632006**

**Department of Mathematics (PG)**

**OUTCOME BASED EDUCATION - 2020**

**List of courses:**

Sem	Course Code	Title of the Course	Hours	Exam Hours		Credits	Marks
				Th	Pr		
I	PCMAA20	Modern Algebra	6	3	-	5	40+60
	PCMAB20	Real Analysis – I	6	3	-	5	40+60
	PCMAC20	Complex Analysis	6	3	-	4	40+60
	PCMAD20	Differential Equations	6	3	-	4	40+60
	PEMAA20	Elective – I A: Differential Geometry	6	3	-	4	40+60
	PEMAB20						
	PIMAA20	Independent Elective 1 A : Fundamentals of Group Theory				2	100
	PIMAB20	Independent Elective 1 B : Quantitative Aptitude for Competitive Examination- I					
<b>Total</b>			<b>30</b>			<b>24</b>	<b>600</b>
II	PCMAE20	Linear Algebra	5	3	-	4	40+60
	PCMAF20	Real Analysis – II	6	3	-	4	40+60
	PCMAG20	Partial Differential Equations and Integral Partial Differential Equations	6	3	-	4	40+60
	PCMAH20	Mechanics	6	3	-	4	40+60
	PEMAC20	Elective II A: LaTeX and MATLAB	5	3	-	4	40+60
	PEMAD20						
	PIMAC20	Independent Elective 2 A: Fundamentals of Ring Theory				2	100
	PIMAD20	Independent Elective 2 B: Quantitative Aptitude for Competitive Examination- II					
	PNHRA16	Human Rights	2	3	-	2	40+60
<b>Total</b>			<b>30</b>			<b>24</b>	<b>700</b>

Sem	Course Code	Title of the Course	Hours	Exam Hours		Credits	Marks
				Th	Pr		
III	PCMAI20	Topology	6	3	-	4	40+60
	PCMAJ20	Numerical Analysis	6	3	-	4	40+60
	PCMAK20	Probability Theory	6	3	-	4	40+60
	PCMAL20	Operations Research	6	3	-	4	40+60
	PEMAE20	Elective III A: Programming with Java	4	3	-	3	40+60
	PEMAG20	Elective III B: Programming with R					
	PEMAF20	Elective Practical : Java	2		3	1	40+60
	PEMAH20	Elective Practical : R					
	PIMAE20	Independent Elective 3 A: Skill Enhancement in Real and Complex Analysis – I				2	100
	PIMAF20	Independent Elective 3 B: Fundamentals of Research Methodology and Statistics - I					
	PGTRA15	Teaching and Research Aptitude	-	3	-	3	40+60
<b>Total</b>			<b>30</b>			<b>25</b>	<b>700</b>
IV	PCMAM20	Functional Analysis	6	3	-	5	40+60
	PCMAN20	Calculus of Variations	6	3	-	5	40+60
	PCMAO20	Mathematical Statistics	6	3	-	5	40+60
	PCMAP20	Project	6	-	-	4	100
	PEMAI20	Elective IV A: Graph Theory	6	3	-	4	40+60
	PEMAJ20	Elective IV B: Fuzzy Set Theory					
	PIMAG20	Independent Elective 4 A: Skill Enhancement in Real and Complex Analysis – II				2	100
	PIMAH20	Independent Elective 4 B: Fundamentals of Research Methodology and Statistics – II					
<b>Total</b>			<b>30</b>			<b>25</b>	<b>700</b>
<b>Grand Total</b>						<b>98</b>	<b>2700</b>

## **PROGRAMME OUTCOMES (PO)**

On completion of the PG Programme, students will be able to:

**PO1:** Attain an in-depth knowledge in the respective domains augmented through self learning.

**PO2:** Assimilate and apply principles and concepts towards skill development and employability.

**PO3:** Apply critical and scientific approaches to address problems and find solutions.

**PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO5:** Integrate issues of social relevance in the field of study.

**PO6:** Persist in life-long learning for personal and societal progress.

## **PROGRAMME SPECIFIC OUTCOMES (PSO)**

On completion of the PG Programme, students will be able to:

**PSO1:** Attain in-depth knowledge in Pure Mathematics through theorems and Applied Mathematics using real-life examples and simulation results.

**PSO2:** Develop a deep interest in Advanced Mathematics and have the capability to understand the outcomes in various branches of Mathematics.

**PSO3:** Have the capability to apply the programming concepts of JAVA, MATLAB, and R language to model, formulate and solve real-life problems.

**PSO4:** Acquire profound knowledge in Mathematics to develop a range of generic skills to qualify for the fellowship examinations approved by UGC like CSIR-NET, JRF, GATE, and SET.

**PSO5:** Inculcate research-level thinking in the field of pure and applied mathematics and apply theoretical knowledge to write the dissertation using the Mathematical software LaTeX.

**PSO6:** Develop teaching, research, and technical skills in Mathematics for employment in different sectors and enhance self-learning & life-long learning to compete at the global level and meet social needs.

PSO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>PSO1</b>	H	H	H	H	M	H
<b>PSO2</b>	H	M	H	H	M	H
<b>PSO3</b>	H	H	H	H	H	H
<b>PSO4</b>	H	H	H	H	L	M
<b>PSO5</b>	H	H	H	H	M	H
<b>PSO6</b>	H	H	H	H	L	H

**(L-Low (1), M-Moderate (2), H-High (3))**

**SEMESTER – I**  
**PCMAA20 - MODERN ALGEBRA**

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code:</b> PCMAA20	<b>Title of the Course:</b> Modern Algebra	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>MARKS</b> 100
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**Course Objectives**

1. To know about the concepts of extension field.
2. To learn the concepts of Galois Theory.

**Course Outcomes (CO)**

The Learners will be able to

1. Assess the properties of Groups and Sylow's theorem.
2. Apply field extension property in Algebraic extensions.
3. Get the knowledge of Transcendence e and roots of polynomial.
4. Know about the Galois Theory.
5. Have the knowledge on the concepts of solvability by radicals.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	H	M	H
CO2	H	H	H	H	L	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	L	M
CO5	H	H	H	H	L	M

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Group Theory

(18 Hours)

- 1.1 Conjugacy (K1,K2,K3,K4,K5,K6)
- 1.2 Cauchy's theorem (K1,K2,K3,K4,K5,K6)
- 1.3 Partitions (K1,K2,K3,K4,K5,K6,)
- 1.4 First part of Sylow's Theorem (K1,K2,K3,K4,K5,K6)
- 1.5 Second part of Sylow's Theorem (K1,K2,K3,K4,K5,K6)
- 1.6 Third part of Sylow's Theorem (K1,K2,K3,K4,K5,K6)  
(Sylow's Theorem First part: first version of the proof)  
(Chapter 2: Sections 2.11, 2.12 Omit: Lemma 2.12.1, Lemma 2.12.2)

### Unit II: Group Theory and Fields

(18 Hours)

- 2.1 External direct product (K1,K2,K3,K4,K5,K6)
- 2.2 Internal direct product (K1,K2,K3,K4,K5,K6)
- 2.3 Finite Abelian group (K1,K2,K3,K4,K5,K6)
- 2.4 Invariants (K1,K2,K3,K4,K5,K6)
- 2.5 Finite extension, Algebraic over the field (K1,K2,K3,K4,K5,K6)
- 2.6 Algebraic extensions (K1,K2,K3,K4,K5,K6)  
(Chapter 2: Sections: 2.13, 2.14, Chapter 5:Section5.1)

### Unit III: Fields (Contd.)

(18 Hours)

- 3.1 Transcendence e (K1,K2,K3,K4,K5,K6)
- 3.2 Remainder theorem (K1,K2,K3,K4,K5,K6)
- 3.3 Factor theorem (K1,K2,K3,K4,K5,K6)
- 3.4 Splitting field (K1,K2,K3,K4,K5,K6)
- 3.5 Derivative of a polynomial (K1,K2,K3,K4,K5,K6)
- 3.6 Simple extension (K1,K2,K3,K4,K5,K6)  
(Chapter 5: Sections: 5.2, 5.3 and 5.5)

### Unit IV: Galois Theory

(18 Hours)

- 4.1 Galois group (K1,K2,K3,K4,K5,K6)
- 4.2 Subfield (K1,K2,K3,K4,K5,K6)
- 4.3 Group of Automorphism (K1,K2,K3,K4,K5,K6)
- 4.4 Elementary symmetric functions (K1,K2,K3,K4,K5,K6)
- 4.5 Normal Extensions (K1,K2,K3,K4,K5,K6)
- 4.6 Fundamental theorem on Galois theory (K1,K2,K3,K4,K5,K6)  
(Chapter 5: Section: 5.6)

### Unit V: Solvability by Radicals

(18 Hours)

- 5.1 Solvable (K1,K2,K3,K4,K5,K6)
- 5.2 Abel's theorem (K1,K2,K3,K4,K5,K6)
- 5.3 Introduction to Galois group over the rationals (K1,K2,K3,K4,K5,K6)
- 5.4 Galois group over the rationals (K1,K2,K3,K4,K5,K6)
- 5.5 Polynomial rings (K1,K2,K3,K4,K5,K6)

## 5.6 Polynomial rings continued (K1,K2,K3,K4,K5,K6)

(Chapter 5: Sections: 5.7 and 5.8. Chapter 3: Sections: 3.9)

### **Books for study and reference:**

#### **Text Book:**

1. I.N. Herstein - Topics in Algebra, 2<sup>nd</sup> Edition - H.S. Polai for Wiley Eastern Limited, New Delhi –1993.

#### **Books for Reference:**

1. John B. Fraleigh – A First Course in Abstract Algebra, 5<sup>th</sup> Edition - Addison Wesley Longman, Mexico City, Inc., 1999.
2. Kenneth Hoffman and Ray Kunze – Linear Algebra, 2<sup>nd</sup> Edition – Prentice Hall of India, New Delhi, 2005.
3. Surjeeth Singh and Quazi Zameeruddin, Modern Algebra, 2-e, Vikas Publishing House Pvt. Ltd., New Delhi, 1975.
4. M. Artin, Abstract Algebra, 2nd Ed., Pearson, 2011.
5. S. Arumugam and A. Thandapani, Modern Algebra, SciTech Publications Pvt. Ltd, 1985.

#### **E- Resources:**

1. <https://marinazahara22.files.wordpress.com/2013/10/i-n-herstein-topics-in-algebra-2nd-edition-1975-wiley-international-editions-john-wiley-and-sons-wie-1975.pdf>
2. <http://abstract.ups.edu/download/aata-20110810.pdf>
3. [https://greggrant.org/hoffman\\_and\\_kunze.pdf](https://greggrant.org/hoffman_and_kunze.pdf)
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwweb/Mathematics>
6. <http://www.opensource.org>
7. [www.algebra.com](http://www.algebra.com)
8. <https://nptel.ac.in>
9. [www.coursera.org](http://www.coursera.org)
10. <https://swayam.gov.in>

**SEMESTER – I**  
**REAL ANALYSIS - I**

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code:</b> PCMAB20	<b>Title of the Course:</b> Real Analysis – I	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce some of the Abstract thinking that pervades Modern Analysis.
2. To deepen the knowledge of certain topics in Real Analysis such as Functions of bounded variations, R-S integral and Lebesgue integral.

**Course Outcomes (CO)**

The learners will be able to

1. Understand n-dimensional space  $R^n$  and the metric space whose topology is uniquely determined by the algebraic structure.
2. Deal with the functions of bounded variations and some of their properties.
3. Know about the Riemann-Stieltjes integral and its properties which is a generalization of the Riemann integral.
4. Recognize the necessary and sufficient conditions for the existence of the R-S integral.
5. Grasp the class of Lebesgue integrable functions which is defined in terms of upper and lower bounds using the Lebesgue measure of a set.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	H	M	H
CO2	H	H	L	H	M	H
CO3	H	H	L	H	M	H
CO4	H	H	L	H	M	H
CO5	H	H	L	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Euclidean Space $\mathbb{R}^n$

(18 Hours)

- 1.1 Euclidean space  $\mathbb{R}^n$ , Open balls and open sets in  $\mathbb{R}^n$ , The structure of open sets in  $\mathbb{R}^1$  (K1,K2,K3,K4,K5,K6)
  - 1.2 Closed sets, Adherent and Accumulation points, Closed sets and Adherent points (K1,K2,K3,K4,K5,K6)
  - 1.3 Bolzano – Weierstrass Theorem, Cantor Intersection theorem (K1,K2,K3,K4,K5,K6)
  - 1.4 Lindelof Covering theorem, Heine Borel Covering theorem (K1,K2,K3,K4,K5,K6)
  - 1.5 Compactness in  $\mathbb{R}^n$ , Metric spaces (K1,K2,K3,K4,K5,K6)
  - 1.6 Point set topology in metric spaces, Compact subsets of a metric space, Boundary of a set (K1,K2,K3,K4,K5,K6)
- (Chapter 3: Sections 3.2– 3.16)

### Unit II: Functions of bounded variation and Rectifiable Curves

(18 Hours)

- 2.1 Properties of Functions, Functions of bounded variation (K1,K2,K3,K4,K5,K6)
  - 2.2 Total variation, Additive property of total variation (K1,K2,K3,K4,K5,K6)
  - 2.3 Total variation on  $[a,x]$  as a function of  $x$ , Functions of bounded variation expressed as the difference of increasing functions (K1,K2,K3,K4,K5,K6)
  - 2.4 Continuous functions of bounded variation (K1,K2,K3,K4,K5,K6)
  - 2.5 Curves and paths, Rectifiable paths and arc length (K1,K2,K3,K4,K5,K6)
  - 2.6 Additive and continuity properties of arc length, Equivalence of paths, Change of Parameter (K1,K2,K3,K4,K5,K6)
- (Chapter 6: Sections 6.2– 6.12)

### Unit III: Riemann Stieltjes' Integral

(18 Hours)

- 3.1 Notation, Definition of the Riemann Stieltjes integral, Linear properties (K1,K2,K3,K4,K5,K6)
  - 3.2 Integration by parts, Change of variable in a Riemann Stieltjes integral (K1,K2,K3,K4,K5,K6)
  - 3.3 Reduction to a Riemann integral, Step functions as integrators (K1,K2,K3,K4,K5,K6)
  - 3.4 Reduction of a Riemann Stieltjes integral to a finite sum, Euler's summation formula (K1,K2,K3,K4,K5,K6)
  - 3.5 Monotonically increasing integrators, Additive and linearity properties of upper and lower Integrals (K1,K2,K3,K4,K5,K6)
  - 3.6 Riemann's condition, Comparison theorems (K1,K2,K3,K4,K5,K6)
- (Chapter 7: Sections 7.2 –7.14)

### Unit IV: Riemann Stieltjes' Integral (Contd...)

(18 Hours)

- 4.1 Integrators of bounded variation (K1,K2,K3,K4,K5,K6)
- 4.2 Sufficient conditions for Existence of Riemann Stieltjes integral, Necessary conditions for Existence of Riemann Stieltjes integral (K1,K2,K3,K4,K5,K6)

- 4.3 Mean Value Theorem for Riemann Stieltjes integrals, The Integrals as a function of the Interval (K1,K2,K3,K4,K5,K6)
- 4.4 Second fundamental Theorem of Integral Calculus, Change of variable in a Riemann Integral (K1,K2,K3,K4,K5,K6)
- 4.5 Second Mean Value Theorem for Riemann integral, Riemann Stieltjes integrals depending on a parameter (K1,K2,K3,K4,K5,K6)
- 4.6 Differentiation under the integral sign, Interchanging the order of integration (K1,K2,K3,K4,K5,K6)
- (Chapter 7: Sections 7.15 - 7.25)

### Unit V: Lebesgue Integral

(18 Hours)

- 5.1 The integral of a step function, Monotonic sequences of step functions (K1,K2,K3,K4,K5,K6)
- 5.2 Upper functions and their integrals (K1,K2,K3,K4,K5,K6)
- 5.3 Riemann integrable functions as examples of upper functions, The class of Lebesgue integrable functions on a general interval (K1,K2,K3,K4,K5,K6)
- 5.4 Basic properties of the Lebesgue integral (K1,K2,K3,K4,K5,K6)
- 5.5 Lebesgue integration and sets of measure zero (K1,K2,K3,K4,K5,K6)
- 5.6 The Levi monotone convergence theorems (K1,K2,K3,K4,K5,K6)
- (Chapter 10: Sections 10.2-10.9)

### Books for study and reference:

#### Text Book:

1. Tom M. Apostol – Mathematical Analysis, 2<sup>nd</sup> Edition, Narosa Publishing House, New Delhi, 1997.

#### Books for Reference:

1. Walter Rudin – Principles of Mathematical Analysis, 3<sup>rd</sup> Edition – McGraw Hill Company, New York, 1976.
2. R.R. Goldberg - Methods of Real Analysis, Indian Edition - Oxford and IBH Publishing Company, 1970.
3. S.C. Malik and Savita Arora – Mathematical Analysis, 2<sup>nd</sup> Edition – New Age International (P) Limited Publishers, New Delhi, 1991.

#### E-Resources:

1. <http://webpages.iust.ac.ir/amtehrani/files/Addison%20Wesley%20-%20Mathematical%20Analysis%20-%20Apostol%20%285Th%20Ed%29%20%281981%29.pdf>
2. <https://web.math.ucsb.edu/~agboola/teaching/2021/winter/122A/rudin.pdf>
3. <https://alansinyal.files.wordpress.com/2012/08/method-of-real-analysis.pdf>
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwweb/Mathematics>
6. <http://www.opensource.org>

7. [www.mathpages.com](http://www.mathpages.com)
8. <https://nptel.ac.in>
9. [www.coursera.org](http://www.coursera.org)
10. <https://swayam.gov.in>

**SEMESTER – I**  
**PCMAC20 - COMPLEX ANALYSIS**

<b>Year : I</b>	<b>Course Code :</b>	<b>Title Of The Course :</b>	<b>Course Type :</b>	<b>Course Category :</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM : I</b>	PCMAC20	Complex Analysis	Theory	Core	6	4	100

**Course Objectives**

1. To introduce the fundamental ideas of the functions of complex variables.
2. To enable the use of concepts of analyticity, Cauchy-Riemann relations and harmonic functions.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the elementary theory of power series and conformality to perform the linear transformation.
2. Solve the integration in the complex plane by using the fundamental theorems.
3. Be familiar with Cauchy's Integral Formula and the properties of analytical functions.
4. Determine the local mapping and learn the general form of Cauchy's theorem.
5. Deal with the concept of Calculus of Residues and Harmonic Functions.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	H	M	M
CO2	H	M	L	H	H	M
CO3	H	M	L	H	M	M
CO4	H	M	L	H	M	L
CO5	H	M	L	H	H	L

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Elementary Theory of Power Series, Conformality and Linear transformations (18 Hours)

- 1.1 Sequences, Series (K1,K2,K3,K4,K5,K6)
- 1.2 Uniform Convergence, Power Series (K1,K2,K3,K4,K5,K6)
- 1.3 Abel's Limit Theorem, Arcs and Closed Curves(K1,K2,K3,K4,K5,K6)
- 1.4 Analytic Functions in Regions(K1,K2,K3,K4,K5,K6)
- 1.5 Conformal Mapping, Length and Area(K1,K2,K3,K4,K5,K6)
- 1.6 The Linear Group, The Cross Ratio, Symmetry (K1,K2,K3,K4,K5,K6)  
(Chapter 2: Section 2.1 -2.5 and Chapter 3 : Section 2.1- 2.4, 3.1-3.3)

### Unit II: Complex Integration – Fundamental Theorems (18Hours)

- 2.1 Line Integrals (K1,K2,K3,K4,K5,K6)
- 2.2 Rectifiable arcs (K1,K2,K3,K4,K5,K6)
- 2.3 Line integrals as functions of arcs (Theorems)(K1,K2,K3,K4,K5,K6)
- 2.4 Line integrals as functions of arcs (Problems)(K1,K2,K3,K4,K5,K6)
- 2.5 Cauchy's Theorem for a Rectangle(K1,K2,K3,K4,K5,K6)
- 2.6 Cauchy's Theorem in a Disk (K1,K2,K3,K4,K5,K6).  
(Chapter 4: Sections 1.1-1.5)

### Unit III: Cauchy's Integral formula and Local Properties of Analytical functions (18 Hours)

- 3.1 Index of a point with respect to a closed curve (K1,K2,K3,K4,K5,K6)
- 3.2 Integral formula (K1,K2,K3,K4,K5,K6)
- 3.3 Higher Derivatives (K1,K2,K3,K4,K5,K6)
- 3.4 Removable Singularities(K1,K2,K3,K4,K5,K6)
- 3.5 Taylor's Theorem (K1,K2,K3,K4,K5,K6)
- 3.6 Zeroes and poles(K1,K2,K3,K4,K5,K6)  
(Chapter 4: Sections 2.1 - 2.3 and 3.1 - 3.2)

### Unit IV: Local Mapping and the General form of Cauchy's Theorem (18 Hours)

- 4.1 Local Mapping (K1,K2,K3,K4,K5,K6)
- 4.2 Maximum Principle(K1,K2,K3,K4,K5,K6)
- 4.3 Chains and Cycles (K1,K2,K3,K4,K5,K6)
- 4.4 Simple Connectivity(K1,K2,K3,K4,K5,K6)
- 4.5 Homology (K1,K2,K3,K4,K5,K6)
- 4.6 General statement of Cauchy's Theorem, Proof of Cauchy's Theorem (K1, K2, K3, K4, K5, K6)  
(Chapter 4: Sections 3.3, 3.4 and 4.1 - 4.5)

### Unit V: The Calculus of Residues and Harmonic functions (18 Hours)

- 5.1 The Residue Theorem, The Argument Principle (K1,K2,K3,K4,K5,K6)
- 5.2 Evaluation of Definite Integrals (K1,K2,K3,K4,K5,K6)
- 5.3 Definition and Basic properties, The Mean value property(K1,K2,K3,K4,K5,K6)

5.4 Poisson's Formula, Schwarz's Theorem (K1,K2,K3,K4,K5,K6)

5.5 Weierstrass's Theorem, The Taylor Series, The Laurent Series(K1,K2,K3,K4,K5,K6)

5.6 Partial Fractions , Infinite Products(K1,K2,K3,K4,K5,K6)

(Chapter 4: Sections 5.1 - 5.3 and 6.1 - 6.4, Chapter 5: Sections 1.1 -1.3)

### **Books for study and reference:**

#### **Text Book:**

1. Lars V. Ahlfors – Complex Analysis, 3<sup>rd</sup> Edition–McGraw Hill International Editions, Tokyo, 1979.

#### **Books for Reference:**

1. John B. Conway – Functions of one Complex Variable, 2<sup>nd</sup> Edition – Springer International Student Edition, 1987.
2. S. Ponnusamy - Foundation of Complex Analysis, 2<sup>nd</sup> Edition - Narosa Publishing House, New Delhi, 2012.
3. S. Arumugam, A. Thangapandi Isaac, A. Somasundram - Complex Analysis- Scitech Publications Pvt.Ltd., New Delhi, 2009.
4. Serge Lang- Complex Analysis, 2<sup>nd</sup> Edition- Springer-Verlag, New York, 1993.

#### **E- Resources:**

1. [https://mccuan.math.gatech.edu/courses/6321/lars-ahlfors-complex-analysis-third-edition-mcgraw-hill-science\\_engineering\\_math-1979.pdf](https://mccuan.math.gatech.edu/courses/6321/lars-ahlfors-complex-analysis-third-edition-mcgraw-hill-science_engineering_math-1979.pdf)
2. <https://www-users.cse.umn.edu/~arnold/502.s97/complex.pdf>
3. <https://perso.univ-rennes1.fr/guy.casale/enseignement/cours/FHFS/references/lang.pdf>
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwweb/Mathematics>
6. <http://www.opensource.org>
7. [www.mathpages.com](http://www.mathpages.com)
8. <https://nptel.ac.in>
9. [www.coursera.org](http://www.coursera.org)
10. <https://swayam.gov.in>

**SEMESTER – I**  
**PCMAD20 - DIFFERENTIAL EQUATIONS**

<b>Year : I</b> <b>SEM : I</b>	<b>Course Code :</b> PCMAD20	<b>Title Of The Course :</b> Differential Equations	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce mathematical techniques for analyzing and solving ordinary differential equations.
2. To apply ordinary differential equations to dynamical problems of practical interest.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand ordinary differential equations of various type, their solutions, and fundamental concepts about their existence.
2. Obtain solutions of the Homogeneous equation with constant coefficient and Homogeneous equation with analytic coefficient.
3. Comprehend the Bessel functions, Legendre equation, Legendre polynomials and Regular singular points.
4. Know Picard's method of obtaining successive approximations of solutions of first order differential equations.
5. Understand Eigen values and Eigen functions of Strum-Lioville systems, and obtain the solutions of initial and boundary value problems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	L	H	M
CO2	H	H	H	M	H	M
CO3	H	H	M	H	M	L
CO4	H	M	H	H	M	H
CO5	H	M	H	H	H	L

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Linear Differential Equations of Higher Order

(18 Hours)

- 1.1 Introduction – Definition – Example – Higher order equations (K1,K2,K3,K4,K5,K6)
  - 1.2 A mathematical model (K1,K2,K3,K4,K5,K6)
  - 1.3 Linear Dependence- Wronskian (K1,K2,K3,K4,K5,K6)
  - 1.4 Basic Theory for Linear Equations (K1,K2,K3,K4,K5,K6)
  - 1.5 Two useful formulae (K1,K2,K3,K4,K5,K6)
  - 1.6 Homogeneous linear equations with constant co-efficient (K1,K2,K3,K4,K5,K6)
- (Chapter 4: Sections 4.1 – 4.6)

### Unit II: Solutions in Power Series

(18 Hours)

- 2.1 Introduction - Example (K1,K2,K3,K4,K5,K6)
  - 2.2 Second order linear equations with ordinary points (K1,K2,K3,K4,K5,K6)
  - 2.3 Legendre equation (K1,K2,K3,K4,K5,K6)
  - 2.4 Legendre polynomials (K1,K2,K3,K4,K5,K6)
  - 2.5 Second order equations with regular singular points (K1,K2,K3,K4,K5,K6)
  - 2.6 Bessel's functions (K1,K2,K3,K4,K5,K6)
- (Chapter 6: Sections 6.1 – 6.5)

### Unit III: Systems of Linear Differential Equations

(18 Hours)

- 3.1 Introduction - Systems of first order equations (K1,K2,K3,K4,K5,K6)
  - 3.2 Model for Arms Competition between two nations (K1,K2,K3,K4,K5, K6)
  - 3.3 Existence and uniqueness theorems (K1,K2,K3,K4,K5,K6)
  - 3.4 Fundamental matrix (K1,K2,K3,K4,K5,K6)
  - 3.5 Non-homogeneous linear systems (K1,K2,K3,K4,K5,K6)
  - 3.6 Linear systems with constant co-efficient (K1,K2,K3,K4,K5,K6)
- (Chapter 5: Sections 5.1 – 5.7)

### Unit IV: Existence and Uniqueness of Solutions

(18 Hours)

- 4.1 Introduction (K1,K2,K3,K4,K5,K6)
  - 4.2 Preliminaries (K1,K2,K3,K4,K5,K6)
  - 4.3 Picard's Successive approximations (K1,K2,K3,K4,K5,K6)
  - 4.4 Picard's Theorem (K1,K2,K3,K4,K5,K6)
  - 4.5 Some examples (K1,K2,K3,K4,K5,K6)
  - 4.6 Continuation and dependence on initial conditions (K1, K2, K3, K4, K5,K6)
- (Chapter 2: Sections 2.1 –2.6)

### Unit V: Boundary- value problems

(18 Hours)

- 5.1 Introduction- Definition- Example (K1, K2, K3, K4, K5,K6)
  - 5.2 Sturm Liouville problem (K1, K2, K3, K4, K5,K6)
  - 5.3 Green's functions (K1, K2, K3, K4, K5,K6)
  - 5.4 Application of BVP's (K1,K2,K3,K4,K5, K6)
  - 5.5 Picard's theorem (K1, K2, K3, K4, K5,K6)
  - 5.6 Problems based on BVP's (K1, K2, K3, K4, K5, K6)
- (Chapter 8: Sections 8.1 –8.5)

## Books for study and reference:

### Text Book:

1. S.G. Deo, V. Raghavendra, Rasmitakar and V. Lakshmikantham- Ordinary Differential Equations, 3rd Edition - Tata McGraw Hill Publishing Company Ltd., New Delhi, 2015.

### Books for Reference:

1. Earl A. Coddington - An Introduction to Ordinary Differential Equations - Prentice Hall of India Pvt. Ltd., New Delhi, 1992.
2. M.D. Raisinghania - Advanced Differential Equations, 8th Edition – S. Chand and Co. Ltd., New Delhi, 2001.
3. M.D. Raisinghania - Ordinary and Partial Differential Equations - S. Chand and Co., Ltd., New Delhi, 1974.

### E- Resources:

1. <https://efaidnbmnnnibpcajpcgglefindmkaj/https://users.math.msu.edu/users/gnagy/teaching/ode.pdf>
2. <https://books.google.com.bd/books?id=vaorDAAAQBAJ&printsec=copyright#v=onepage&q&f=false>
3. [https://efaidnbmnnnibpcajpcgglefindmkaj/https://content.kopykitab.com/ebooks/2016/07/8107/sample/sample\\_8107.pdf](https://efaidnbmnnnibpcajpcgglefindmkaj/https://content.kopykitab.com/ebooks/2016/07/8107/sample/sample_8107.pdf)
4. [https://fb.marliesdekkers.com/fulldisplay?redir\\_esc=51681&FileName=Ordinary%20And%20Partial%20Differential%20Equations%20By%20M%20D%20Raisinghania%20Pdf%20Free%20Download.pdf](https://fb.marliesdekkers.com/fulldisplay?redir_esc=51681&FileName=Ordinary%20And%20Partial%20Differential%20Equations%20By%20M%20D%20Raisinghania%20Pdf%20Free%20Download.pdf)
5. <http://mathforum.org>
6. <http://ocw.mit.edu/ocwweb/Mathematics>
7. <http://www.opensource.org>
8. [www.mathpages.com](http://www.mathpages.com)
9. <https://nptel.ac.in>
10. [www.coursera.org](http://www.coursera.org)
11. <https://swayam.gov.in>

**SEMESTER – I**  
**PEMAA20 – ELECTIVE I A: DIFFERENTIAL GEOMETRY**

<b>Year: I</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: I</b>	PEMAA20	Elective I A: Differential Geometry	Theory	Elective	6	4	100

**Course Objectives**

1. To understand the concept of curvature of a space curve and signed curvature of a plane curve.
2. To compute the curvature and torsion of space curves.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the line integrals, deal with differential forms and calculate arc length, curvature of surfaces.
2. Analyze involutes, evolutes and fundamental existence theorem for space curves.
3. Apply problem solving with differential geometry to diverse situations in physics, engineering and in other mathematical contexts.
4. Evaluate the fundamental forms of a surface.
5. Compute the Gaussian curvature, the mean curvature, the curvature lines and the asymptotic lines.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	H
CO4	H	H	L	H	M	H
CO5	H	H	M	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Theory of Space Curves

(18 Hours)

- 1.1 Introduction – Representation of space curves (K1, K2, K3, K4, K5, K6)
- 1.2 Unique parametric representation of a space curve – Arc length (K1, K2, K3, K4, K5, K6)
- 1.3 Tangent and osculating plane – Principal normal and binormal (K1, K2, K3, K4, K5, K6)
- 1.4 Curvature and torsion – Behaviour of a curve near one of its points (K1, K2, K3, K4, K5, K6)
- 1.5 The curvature and torsion of a curve as the intersection of two surfaces (K1, K2, K3, K4, K5, K6)
- 1.6 Contact between curves and surfaces. (K1, K2, K3, K4, K5, K6)  
(Chapter 1: Section 1.1 – 1.10)

### Unit II: Theory of Space Curves (Contd...)

(18 Hours)

- 2.1 Osculating circle and osculating sphere (K1, K2, K3, K4, K5, K6)
- 2.2 Locus of centres of spherical curvature (K1, K2, K3, K4, K5, K6)
- 2.3 Tangent surfaces, involutes and Evolutes – Bertrand curves (K1, K2, K3, K4, K5, K6)
- 2.4 Spherical indicatrix – Intrinsic equations of space curves (K1, K2, K3, K4, K5, K6)
- 2.5 Fundamentals existence theorem for space curves (K1, K2, K3, K4, K5, K6)
- 2.6 Helices. (K1, K2, K3, K4, K5, K6)  
(Chapter 1: Section 1.11- 1.18)

### Unit III: The 1<sup>st</sup> Fundamental Form and Local Intrinsic Properties of a Surface

(18 Hours)

- 3.1 Introduction – Definition of a surface (K1, K2, K3, K4, K5, K6)
- 3.2 Nature of points on a surface – Representation of a surface (K1, K2, K3, K4, K5, K6)
- 3.3 Curves on surfaces – Tangent plane and surface normal (K1, K2, K3, K4, K5, K6)
- 3.4 The general surfaces of revolution – Helicoids (K1, K2, K3, K4, K5, K6)
- 3.5 Metric on a surface – The 1<sup>st</sup> fundamental form (K1, K2, K3, K4, K5, K6)
- 3.6 Direction coefficients on a surface. (K1, K2, K3, K4, K5, K6)  
(Chapter 2: Section 2.1 - 2.10)

### Unit IV: The 1<sup>st</sup> Fundamental Form and Local Intrinsic Properties of a Surface (Contd...)

(18 Hours)

- 4.1 Families of curves – Orthogonal trajectories (K1, K2, K3, K4, K5, K6)
- 4.2 Double family of curves – Isometric correspondence (K1, K2, K3, K4, K5, K6)
- 4.3 Intrinsic properties – Geodesics and their differential equations (K1, K2, K3, K4, K5, K6)
- 4.4 Canonical geodesic equations – Geodesics on surfaces of revolution (K1, K2, K3, K4, K5, K6)
- 4.5 Normal property of geodesic (K1, K2, K3, K4, K5, K6)
- 4.6 Differential equations of geodesics using normal property. (K1, K2, K3, K4, K5, K6)  
(Chapter 2: Section 2.11 - 2.15 & Chapter 3: Section 3.1 – 3.6)

### Unit V: Geodesics on a Surface

(18 Hours)

- 5.1 Existence theorems – Geodesic parallels (K1, K2, K3, K4, K5, K6)
- 5.2 Geodesic polar coordinates – Geodesic curvature (K1, K2, K3, K4, K5, K6)

- 5.3 Gauss – Bonnet theorem (K1, K2, K3, K4, K5, K6)
- 5.4 Gaussain Curvature (K1, K2, K3, K4, K5, K6)
- 5.5 Surfaces of constant curvature – Conformal mapping (K1, K2, K3, K4, K5, K6)
- 5.6 Geodesic mapping(K1, K2, K3, K4, K5, K6)  
(Chapter 3: Section: 3.7 – 3.15)

**Books for study and reference:**

**Text Book:**

1. D. Somasundaram - Differential Geometry, Second reprint, Narosa publishing house, 2008.

**Books for Reference:**

1. M. L. Khanna - Differential Geometry, 6<sup>th</sup>Edition - Jai Prakash Nath and Co., Garh Road, Meerut City,1998.
2. T.J Wilmore - An Introduction to Differential Geometry, 2<sup>nd</sup>Edition - Oxford at the Clarendon Press, First Reprint –2000.
3. Dirk JStruik- Lectures on Classical Differential geometry, 2<sup>nd</sup> edition, Dover publications, Inc, New York, 1961.

**E-Resources:**

1. [https://math.libretexts.org/Bookshelves/Calculus/Calculus\\_\(OpenStax\)/13%3A\\_Vector-Valued\\_Functions/13.03%3A\\_Arc\\_Length\\_and\\_Curvature](https://math.libretexts.org/Bookshelves/Calculus/Calculus_(OpenStax)/13%3A_Vector-Valued_Functions/13.03%3A_Arc_Length_and_Curvature)
2. <https://books.google.gm/books?id=dbIAAQAAQBAJ&lpg=PR4&pg=PP1#v=onepage&q&f=false>
3. [https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/3/PG\\_M.Sc.\\_Mathematics\\_31131%20DIFFERENTIAL%20GEOME TRY.pdf](https://mis.alagappauniversity.ac.in/siteAdmin/dde-admin/uploads/3/PG_M.Sc._Mathematics_31131%20DIFFERENTIAL%20GEOME TRY.pdf)
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwwweb/Mathematics>
6. <http://www.opensource.org>
7. [www.mathpages.com](http://www.mathpages.com)
8. <https://nptel.ac.in>
9. [www.coursera.org](http://www.coursera.org)
10. <https://swayam.gov.in>

**SEMESTER – I**  
**PEMAB20 - ELECTIVE I B: MATHEMATICAL MODELLING**

<b>Year : I</b>	<b>Course Code :</b>	<b>Title Of The Course :</b>	<b>Course Type :</b>	<b>Course Category :</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM : I</b>	PEMAB20	Elective I B:Mathematical Modelling	Theory	Elective	6	4	100

**Course Objectives**

1. Demonstrate the ability to solve problems, including applications outside of mathematics, by means of intuition, creativity, guessing and the experience gained through the study of particular examples and mathematical models.
2. To determine the validity of a given case study and be able to construct mathematical models independently.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the mathematical basis of common algorithms, and the ability to calculate accurately and efficiently.
2. Demonstrate the use of mathematical reasoning by justifying and generalizing patterns and relationships between the variables in the mathematical models.
3. Formulate and qualitatively analyze mathematical models of a wide range of systems and processes.
4. Recognize the types of Mathematical models and the complexity in each system.
5. Recognize the power of mathematical modelling and analysis and be able to apply their understanding to their further studies.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	L	H
CO3	H	H	M	H	M	H
CO4	H	H	L	H	M	H
CO5	H	H	M	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	H
CO2	H	H	H	M	L	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	L	H
CO5	H	H	H	M	L	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit 1: What is Modelling?

(18 Hours)

- 1.1 Models and Reality, Properties of Models(K1,K2,K3,K4,K5,K6)
- 1.2 Building a Model, Examples(K1,K2,K3,K4,K5,K6)
- 1.3 Effects of size(K1,K2,K3,K4,K5,K6)
- 1.4 Dimensional Analysis(K1,K2,K3,K4,K5,K6)
- 1.5 Using graphs in Modeling(K1,K2,K3,K4,K5,K6)
- 1.6 Comparative statics(K1,K2,K3,K4,K5,K6)  
(Chapter 1: Section 1.1-1.6, Chapter 3: Section 3.1 – 3.2)

### Unit II: Systems Modelling

(18 Hours)

- 2.1 Modelling method for Complex systems(K1,K2,K3,K4,K5,K6)
- 2.2 Classification of Models(K1,K2,K3,K4,K5,K6)
- 2.3 Mathematical Modeling of Physical Systems(K1,K2,K3,K4,K5,K6)
- 2.4 Modeling of electrical systems(K1,K2,K3,K4,K5,K6)
- 2.5 Modeling of mechanical and electromechanical systems(K1,K2,K3,K4,K5,K6)
- 2.6 Modeling of fluid systems(K1,K2,K3,K4,K5,K6)  
(Chapter 2: Section 2.3,2.4,2.7.1-2.7.4)

### Unit III: Stability and Optimization of Mathematical Models

(18 Hours)

- 3.1 Cobweb models in economics(K1,K2,K3,K4,K5,K6)
- 3.2 Small group dynamics(K1,K2,K3,K4,K5,K6)
- 3.3 Optimization by differentiation: Maintaining Inventories(K1,K2,K3,K4,K5,K6)
- 3.4 Geometry of Blood Vessels(K1,K2,K3,K4,K5,K6)
- 3.5 Fighting forest fires(K1,K2,K3,K4,K5,K6)
- 3.6 Problems in Optimization(K1,K2,K3,K4,K5,K6)  
(Chapter 3: Section 3.3, Chapter 4: Section 4.1 – 4.2)

### Unit IV: Basic Probability

(18 Hours)

- 4.1 Sex preference and sex ratio(K1,K2,K3,K4,K5,K6)
- 4.2 Making simple choices(K1,K2,K3,K4,K5,K6)
- 4.3 Monte Carlo simulation(K1,K2,K3,K4,K5,K6)
- 4.4 Example: Doctor's waiting room(K1,K2,K3,K4,K5,K6)
- 4.5 Stream Network(K1,K2,K3,K4,K5,K6)
- 4.6 Problems in Probability(K1,K2,K3,K4,K5,K6)  
(Chapter 5: Section 5.1-5.2)

### Unit V: Approaches to Differential Equations and Quantitative Differential Equations (18 Hours)

- 5.1 Limitations of Analytical solutions(K1,K2,K3,K4,K5,K6)
- 5.2 Alternative approaches(K1,K2,K3,K4,K5,K6)
- 5.3 Analytical Methods and examples(K1,K2,K3,K4,K5,K6)
- 5.4 Problems in Analytical Methods(K1,K2,K3,K4,K5,K6)
- 5.5 Numerical Methods and examples(K1,K2,K3,K4,K5,K6)

5.6 Problems in Numerical Methods(K1,K2,K3,K4,K5,K6)  
(Chapter 7: Section 7.1 – 7.4, Chapter 8: Section 8.1 – 8.2)

**Books for Study and Reference:**

**Text Book:**

1. Edward A. Bender, An introduction to mathematical modelling, Dover Publications, 1978.

**Books for Reference:**

1. Amos Gilat, MATLAB- An Introduction with Applications, John Wiley and Sons Inc., 2007.
2. Devendra K. Chaturvedi, Modeling and Simulation of Systems using MATLAB and Simulink, CRC press, 2010.
3. Edward A. Bender, An Introduction to Mathematical Modelling, Wiley Press, 1978.

**E- Resources:**

1. [https://people.maths.bris.ac.uk/~madjl/course\\_text.pdf](https://people.maths.bris.ac.uk/~madjl/course_text.pdf)  
<https://repository.ung.ac.id/get/kms/16993/referensi-mata-kuliah-an-introduction-to-mathematical-modelling.pdf>
2. <https://repository.ung.ac.id/get/kms/16993/referensi-mata-kuliah-an-introduction-to-mathematical-modelling.pdf>
3. <http://mathforum.org>
4. <http://ocw.mit.edu/ocwwweb/Mathematics>
5. <http://www.opensource.org>
6. [www.mathpages.com](http://www.mathpages.com)
7. <https://nptel.ac.in>
8. [www.coursera.org](http://www.coursera.org)
9. <https://swayam.gov.in>

**SEMESTER – I**  
**PIMAA20 – INDEPENDENT ELECTIVE 1 A: FUNDAMENTALS OF GROUP THEORY**

<b>Year: I</b> <b>SEM: I</b>	<b>Course Code:</b> PIMAA20	<b>Title of the Course:</b> Independent Elective 1 A: Fundamentals of Group Theory	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To get the basic knowledge about groups, subgroups, normalizer of subgroups.
2. To develop the ability to solve basic objective problems in group theory.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the importance of various types of Groups.
2. Extend the knowledge in some important groups (Homomorphism and Isomorphism)
3. Understand the concepts of fundamentals of finite abelian groups.
4. Acquire benefits of Sylow's theorem and classify the Class equations.
5. Solve various objective type problems using simple concepts.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	H	M	H
CO2	H	M	L	H	M	H
CO3	H	M	L	H	M	H
CO4	H	M	L	H	M	H
CO5	H	M	L	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Groups

Introduction to Groups - Sub Groups – Coset – Abelian Group – Normal Sub Groups – Cyclic Groups. (K1, K2, K3, K4, K5, K6)  
(Chapter 15: 15.1-15.3, 15.6)

### Unit II: Groups (Continued)

Quotient Groups – Direct Products – Some important Groups – Homomorphism and isomorphism – centre of a Groups. (K1, K2, K3, K4, K5, K6)  
(Chapter 15: 15.4-15.5)

### Unit III: Groups (Continued)

Normalizer of Subgroups – Centralizer of an Element or Normalizer of an Element – Commutator Subgroups – Fundamental theorem of Finite Abelian groups – Number of Non isomorphic Abelian Groups. (K1, K2, K3, K4, K5, K6)  
(Chapter 15: 15.4-15.5)

### Unit IV: Permutations

Permutations – Symmetric Groups  $S_n$  – Alternating Groups  $A_n$  – Conjugacy Classes and Conjugacy Relations. (K1, K2, K3, K4, K5, K6)  
(Chapter 15: 15.7)

### Unit V: Sylows Theorem

Class Equation – Sylows theorem – Results on simple Group – Solvable Groups and Jordan - Holder theorem. (K1, K2, K3, K4, K5, K6)  
(Chapter 15: 15.8-15.10)

### Books for study and reference:

#### Text Book:

1. R. Gupta's - Joint CSIR - UGC-NET Mathematical Sciences Previous Year's Solved Paper, 2014.

#### Books for Reference:

1. Dr. A. P. Singh - Modern Algebra – Infostudy Publication, 2018.
2. Dr. A . Kumar - CSIR-UGC NET/JRF/SLET Mathematical Sciences (Paper I & II) – UPKAR Prakashan Publications, 2010.
3. Pawan Sharma, Neha Sharma, Suraj Singh, Mathematical Sciences, UGC CSIR NET/SET (JRF & LS), Arihant Publications(India) Ltd, 2016.

4. S.K. Shrivastava & M.K. Malik - CSIR-UGC NET/JRF MATHEMATICAL SCIENCES Previous Years Solved Papers Including Model Papers With Explanation – JBC Press,2019.

**E - Resources:**

1. <https://unacademy.com/content/csir-ugc/study-material/mathematical-sciences/>
2. <https://nptel.ac.in/>
3. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
4. <https://www.coursera.org/>
5. <https://testbook.com/csir-net/mathematical-science-study-material>

**SEMESTER – I**  
**PIMAB20 - INDEPENDENT ELECTIVE 1 B: QUANTITATIVE APTITUDE FOR**  
**COMPETITIVE EXAMINATIONS I**

<b>Year : I</b> <b>SEM : I</b>	<b>Course Code :</b> PIMAB20	<b>Title Of The Course :</b> Independent Elective 1 B: Quantitative Aptitude for Competitive Examinations I	<b>Course Type :</b> Theory	<b>Course Category :</b> Independent Elective	<b>H/W</b> -	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To enhance the problem solving abilities and improve the basic mathematical skills
2. To help students who are preparing for any type of competitive examinations and acquire satisfactory competency in use of verbal reasoning

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the concepts of Number System and aptitude problems.
2. Recollect the formulae and solve problems on profit and loss, Interest and Time and Work.
3. Demonstrate basic understanding on data interpretation and exhibit eloquence in verbal reasoning.
4. Identify and respond effectively to questions on clerical ability.
5. Recognize the type of questions and answer them confidently with efficiency in grammar.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	L	H	M	H
CO4	H	H	M	H	M	H
CO5	H	H	M	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	M	M	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## **Course Syllabus**

### **Unit I: General Aptitude**

Number System- HCF and LCM- Simplification- Fractions and Decimals- Powers and roots- Average- Percentage- Ratio and Proportion.(K1,K2,K3,K4,K5,K6)  
(Section 2: 2.1-2.7)

### **Unit II: General Aptitude (Contd..)**

Profit and Loss- Simple Interest- Compound Interest- Time and Work- Time and Distance- Clocks- Calendar- Area and Volume.(K1,K2,K3,K4,K5,K6)  
(Section 2: 2.8-2.16)

### **Unit III: Data Interpretation and Verbal Ability Test**

Data Interpretation- Series Completion- Analogy Questions- Odd man out/ Classification- Coding/ Decoding- Blood and Family Relationships- Direction questions- Questions about age, time and Calendar.(K1,K2,K3,K4,K5,K6)  
(Section 2B, 3.1-3.7)

### **Unit IV: Test of Clerical Ability**

Address(Common and Uncommon)- Questions based on Tables- Word Arrangement- Category/Classification- Marketing – Psychometry – Computer- Descriptive English.(K1,K2,K3,K4,K5,K6)  
(Section 5: A-E)

### **Unit V: Test of English Language**

Test of spotting the errors- Test of Sentence Improvement- Test of Synonyms and Antonyms- Test of reading comprehension-Test of selecting words in a running paragraph- Fill in the blanks- Test of spelling- Jumbled Sentences.(K1,K2,K3,K4,K5,K6)  
(Section 4)

### **Books for study and reference:**

#### **Text Book:**

1. Showick Thorpe, The Pearson Guide to the Bank Clerical Recruitment Examination, Second Edition,Publisher: Pearson, 2010.

#### **Books for Reference:**

1. R.S Agarwal, Quantitative Aptitude for Competitive Examinations, S.Chand Publications, 2017.
2. Khattar, Quantitative Aptitude for Competitive Exams 3ed, Pearson Publications, 2015.

3. B.S. Sijwalii, InduSijwali, A New Approach to REASONING Verbal & Non-Verbal, Arihant Publications, 2014.

**E -Resources:**

1. <https://www.indiabix.com>
2. <https://www.indiabix.com/aptitude/questions-and-answers>
3. [https://myupsc.com/wp-content/uploads/2020/11/Quantitative-Aptitude-for-Competitive-Examinations-by-Dinesh-Khattar-z-lib.org\\_.pdf](https://myupsc.com/wp-content/uploads/2020/11/Quantitative-Aptitude-for-Competitive-Examinations-by-Dinesh-Khattar-z-lib.org_.pdf)
4. <http://mathforum.org>,
5. <http://ocw.mit.edu/ocwweb/Mathematics>,
6. <http://www.opensource.org>,
7. [www.coursera.org](http://www.coursera.org)
8. <https://swayam.gov.in>

**SEMESTER – II**  
**PCMAE20 – LINEAR ALGEBRA**

<b>Year:I</b> <b>SEM:II</b>	<b>Course Code:</b> PCMAE20	<b>Title of the Course:</b> Linear Algebra	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the concepts of linear transformations.
2. To learn about finite fields.

**Course Outcomes (CO)**

The Learners will be able to

1. Have knowledge on Modules and Canonical form.
2. Analyze Jordan and Rational canonical form.
3. Understand the concepts of linear transformation and apply it on linear operators.
4. Understand the concepts of finite division ring.
5. Know about division rings having the field in their centers.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	L
CO2	H	H	H	H	L	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	L	M
CO5	H	H	H	H	L	M

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

**Course Syllabus**

**Unit I: Modules and Canonical form**

**(15 Hours)**

- 1.1 Module, Direct sum, Sub module, Cyclic (K1,K2,K3,K4,K5,K6)
- 1.2 Fundamental theorem on finitely generated R- modules (K1,K2,K3,K4,K5,K6)
- 1.3 Similar (K1,K2,K3,K4,K5,K6)
- 1.4 Triangular form (K1,K2,K3,K4, K5,K6)

- 1.5 Nilpotent transformation (K1,K2,K3,K4,K5,K6)  
1.6 Invariant and Cyclic (K1,K2,K3,K4,K5,K6)  
(Chapter 4: Sections 4.5; Chapter 6: Sections 6.4 and 6.5)

**Unit II: Canonical Forms (Contd...)**

**(15 Hours)**

- 2.1 Introduction (K1,K2,K3,K4,K5,K6)  
2.2 Jordan Canonical form (K1,K2,K3,K4,K5,K6)  
2.3 Jordan Block (K1,K2,K3,K4,K5,K6)  
2.4 Rational canonical form, Cyclic sub modules (K1,K2,K3,K4,K5,K6)  
2.5 Companion matrix(K1,K2,K3,K4,K5,K6)  
2.6 Elementary Divisors and Characteristic polynomial (K1,K2,K3,K4,K5,K6)  
(Chapter 6: Sections 6.6 and 6.7)

**Unit III: Linear transformations**

**(15 Hours)**

- 3.1 Unitary (K1,K2,K3,K4,K5,K6)  
3.2 Hermitian (K1,K2,K3,K4,K5,K6)  
3.3 Normal transformation (K1,K2,K3,K4,K5,K6)  
3.4 Quadratic form (K1,K2,K3,K4,K5,K6)  
3.5 Congruence (K1,K2,K3,K4,K5,K6)  
3.6 Sylvester's law (K1,K2,K3,K4,K5,K6)  
(Chapter 6: Sections 6.10 and 6.11)

**Unit IV: Finite fields**

**(15 Hours)**

- 4.1 Finite field (K1,K2,K3,K4,K5,K6)  
4.2 Properties of finite fields (K1,K2,K3,K4,K5,K6)  
4.3 The existence of solutions of certain equations in a finite field(K1,K2,K3,K4,K5,K6)  
4.4 Division ring (K1,K2,K3,K4,K5,K6)  
4.5 Wedderburn's theorem (First proof only ) (K1,K2,K3,K4,K5,K6)  
4.6 Jacobson theorem (K1,K2,K3,K4,K5,K6)  
(Chapter 7: Sections 7.1 and 7.2)

**Unit V: Finite fields (Contd.)**

**(15 Hours)**

- 5.1 Division Algebra, Algebraic over a field (K1,K2,K3,K4,K5,K6)  
5.2 Frobenius theorem (K1,K2,K3,K4,K5,K6)  
5.3 Adjoint, Norm (K1,K2,K3,K4,K5,K6)  
5.4 Lagrange's Identity (K1,K2,K3,K4,K5,K6)  
5.5 Left Division algorithm (K1,K2,K3,K4,K5,K6)  
5.6 Lagrange's theorem (K1,K2,K3,K4,K5,K6)  
(Chapter 7: Sections 7.3 and 7.4)

**Books for study and reference:**

**Text Book:**

1. I.N. Herstein - Topics in Algebra, 2<sup>nd</sup> Edition - H.S. Polai for Wiley Eastern Limited, New Delhi, 1993.

**Books for Reference:**

1. John B. Fraleigh - A First Course in Abstract Algebra, 5<sup>th</sup> Edition – Addison Wesley Longman Inc., Mexico City, 1999.
2. Kenneth Hoffman and Ray Alden Kunze, Linear Algebra, Second Edition, Prentice Hall of India Private Limited, New Delhi, 1975.
3. Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, Linear Algebra, Fourth Edition, Prentice Hall of India Private Limited, New Delhi, 2007.
4. P. P Gupta, S. K. Sharma, Linear Algebra, S.Chand and Company Ltd, New Delhi, 1982.
5. V. Krishnamurthy, V. P. Mainra, J. L. Arora, Introduction to Linear Algebra, EastWest Press Ltd, 1985.

**E- Resources:**

1. <https://marinazahara22.files.wordpress.com/2013/10/i-n-herstein-topics-in-algebra-2nd-edition-1975-wiley-international-editions-john-wiley-and-sons-wie-1975.pdf>
2. <http://abstract.ups.edu/download/aata-20110810.pdf>
3. [https://greggrant.org/hoffman\\_and\\_kunze.pdf](https://greggrant.org/hoffman_and_kunze.pdf)
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwwweb/Mathematics>
6. <http://www.opensource.org>
7. [www.algebra.com](http://www.algebra.com)
8. <https://nptel.ac.in>
9. [www.coursera.org](http://www.coursera.org)
10. <https://swayam.gov.in>

**SEMESTER – II**  
**PCMAF20 - REAL ANALYSIS- II**

<b>Year: I</b> <b>SEM: II</b>	<b>Course Code:</b> PCMAF20	<b>Title of the Course:</b> Real Analysis – II	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Course Objectives**

1. To introduce the concepts of double sequences, double series, and Fourier series.
2. To provide students with a strong foundation in sequence of functions, implicit functions, and multivariable differential calculus.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the theory of double sequences and double series which is an extension of the single or ordinary sequences and series and identify the convergence and divergence of infinite product.
2. Determine the properties of the Fourier coefficient and solve the problem for the orthonormal system of functions.
3. Identify the Convergence of a sequence and series of functions.
4. Link the multiplication of power series, reciprocal of power series, and real power series.
5. Deal with the concepts of Directional derivative, Total derivative, Chain rule, Inverse function, and Implicit function theorems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	H	M	H
CO2	H	H	L	H	M	H
CO3	H	H	L	H	M	H
CO4	H	H	L	H	M	H
CO5	H	H	L	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Double Sequences and Infinite Products

(18 Hours)

- 1.1 Double sequences, Double Series (K1,K2,K3,K4,K5,K6)
  - 1.2 Rearrangement theorem for double series (K1,K2,K3,K4,K5,K6)
  - 1.3 A sufficient condition for equality of Iterated series (K1,K2,K3,K4,K5,K6)
  - 1.4 Multiplication of series (K1,K2,K3,K4,K5,K6)
  - 1.5 Cesaro summability (K1,K2,K3,K4,K5,K6)
  - 1.6 Infinite products (K1,K2,K3,K4,K5,K6)
- (Chapter 8: Sections 8.20 - 8.26)

### Unit II: Sequences of Functions

(18 Hours)

- 2.1 Pointwise convergence of sequences of functions, Examples of sequences of real valued functions (K1,K2,K3,K4,K5,K6)
  - 2.2 Definition of uniform convergence, Uniform convergence and Continuity(K1,K2,K3,K4,K5,K6)
  - 2.3 Cauchy condition for uniform convergence, Uniform convergence of infinite series of functions (K1,K2,K3,K4,K5,K6)
  - 2.4 Uniform convergence and Riemann Stieltjes Integration, Non uniformly convergent sequences that can be integrated term by term (K1,K2,K3,K4,K5,K6)
  - 2.5 Uniform convergence and differentiation, Sufficient condition for Uniform convergence of a series (K1,K2,K3,K4,K5,K6)
  - 2.6 Uniform convergence and double sequences, Mean convergence (K1,K2,K3,K4,K5,K6)
- (Chapter 9: Sections 9.1– 9.13, Omit 9.7 and theorem 9.12)

### Unit III: Sequences of Functions (Contd...)

(18 Hours)

- 3.1 Multiplication of power series (K1,K2,K3,K4,K5,K6)
  - 3.2 The Substitution Theorem (K1,K2,K3,K4,K5,K6)
  - 3.3 The Reciprocal of Power series, Real Power series, The Taylor's Series generated by a Function (K1,K2,K3,K4,K5,K6)
  - 3.4 Bernstein's Theorem(K1,K2,K3,K4,K5,K6)
  - 3.5 Abel's Limit Theorem (K1,K2,K3,K4,K5,K6)
  - 3.6 Tauber's Theorem (K1,K2,K3,K4,K5,K6)
- (Chapter 9: Sections 9.15– 9.23, Omit 9.21)

### Unit IV: Fourier series

(18 Hours)

- 4.1 Orthogonal systems of functions, The theorem on best approximation (K1,K2,K3,K4,K5,K6)
  - 4.2 The fourier series of a function relative to an ortho normal system, Properties of the Fourier Coefficients(K1,K2,K3,K4,K5,K6)
  - 4.3 The Riesz Fischer theorem, The convergence and representation problems for Trigonometric series(K1,K2,K3,K4,K5,K6)
  - 4.4 The Riemann Lebesgue lemma(K1,K2,K3,K4,K5,K6)
  - 4.5 The Dirichlet integrals (K1,K2,K3,K4,K5,K6)
  - 4.6 An integral representation for the partial sums of a Fourier series, Riemann's localization Theorem (K1,K2,K3,K4,K5,K6)
- (Chapter 11: Sections 11.2-11.11)

## Unit V: Multivariable Differential Calculus and Implicit Functions

(18 Hours)

- 5.1 Introduction, Directional derivative, Directional derivatives and continuity (K1,K2,K3,K4,K5,K6)
  - 5.2 Total derivative, Total derivative expressed in terms of partial derivatives (K1,K2,K3,K4,K5,K6)
  - 5.3 Matrix of a linear function, Jacobian Matrix, Chain rule (K1,K2,K3,K4,K5,K6)
  - 5.4 Matrix form of the chain rule, Mean value theorem for differentiable functions (K1,K2, K3,K4,K5,K6)
  - 5.5 Introduction, Functions with non-zero Jacobian determinant, Inverse function theorem (K1, K2,K3,K4,K5,K6)
  - 5.6 Implicit function theorem, Extrema of real valued functions of one variable (K1,K2,K3,K4,K5,K6)
- (Chapter 12: Sections 12.1 - 12.11, Omit 12.6 & Chapter 13: Sections 13.1 to 13.5)

### Books for study and reference:

#### Text Book:

1. Tom M. Apostol - Mathematical Analysis, 2<sup>nd</sup> Edition - Narosa Publishing House, New Delhi, 1997.

#### Books for Reference:

1. Walter Rudin – Principles of Mathematical Analysis, 3<sup>rd</sup> edition – McGraw Hill Company, New York, 1988.
2. R.R. Goldberg - Methods of Real Analysis, Indian Edition - Oxford and IBH Publishing Company, 1970.
3. S.C. Malik and Savita Arora – Mathematical Analysis, 2<sup>nd</sup> Edition – New Age International (P) Limited Publishers, New Delhi, 1992.

#### E-Resources:

1. [http://webpages.iust.ac.ir/amtehrani/files/Addison%20Wesley%20-%20Mathematical%20Analysis%20\\_%20Apostol%20%285Th%20Ed%29%20%281981%29.pdf](http://webpages.iust.ac.ir/amtehrani/files/Addison%20Wesley%20-%20Mathematical%20Analysis%20_%20Apostol%20%285Th%20Ed%29%20%281981%29.pdf)
2. <https://web.math.ucsb.edu/~agboola/teaching/2021/winter/122A/rudin.pdf>
3. <https://alansinyal.files.wordpress.com/2012/08/method-of-real-analysis.pdf>
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwweb/Mathematics>
6. <http://www.opensource.org>
7. [www.mathpages.com](http://www.mathpages.com)
8. <https://nptel.ac.in>
9. [www.coursera.org](http://www.coursera.org)
10. <https://swayam.gov.in>

**SEMESTER – II**  
**PCMAG20 - PARTIAL DIFFERENTIAL EQUATIONS AND INTEGRAL PARTIAL DIFFERENTIAL EQUATIONS**

<b>Year: I</b> <b>SEM: II</b>	<b>Course Code:</b> PCMAG20	<b>Title of the Course:</b> Partial Differential Equations and Integral Partial Differential Equations	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To derive heat and wave equations.
2. To apply partial derivative equation techniques to predict the behavior of certain phenomena.

**Course Outcomes (CO)**

The Learners will be able to

1. Apply specific methodologies, techniques and resources to conduct research and produce innovative results.
2. Solve problems of heat conduction equation by using initial and boundary conditions.
3. Use the knowledge of PDEs, to solve one dimensional wave equation by canonical equation.
4. Solve practical PDE and integral PDE problems with finite difference methods.
5. Develop mathematical skills to solve problems involving convolutions.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	L	H	M	H
CO4	H	H	M	H	M	H
CO5	H	H	M	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Elliptic Differential Equations (18 Hours)

- 1.1 Occurrence of the Laplace and Poisson equations (K1, K2, K3, K4, K5, K6)
  - 1.2 Boundary value problems (K1, K2, K3, K4, K5, K6)
  - 1.3 Some important mathematical tools (K1, K2, K3, K4, K5, K6)
  - 1.4 Properties of harmonic functions (K1, K2, K3, K4, K5, K6)
  - 1.5 Separation of variables (K1, K2, K3, K4, K5, K6)
  - 1.6 Problems (K1, K2, K3, K4, K5, K6)
- (Chapter 2: Sections 2.1 – 2.5 and related examples in 2.13)

### Unit II: Parabolic Differential Equations (18 Hours)

- 2.1 Occurrence of the diffusion equation (K1, K2, K3, K4, K5, K6)
  - 2.2 Boundary conditions (K1, K2, K3, K4, K5, K6)
  - 2.3 Elementary solutions of the diffusion equations (K1, K2, K3, K4, K5, K6)
  - 2.4 Dirac delta function (K1, K2, K3, K4, K5, K6)
  - 2.5 Separation of variables method (K1, K2, K3, K4, K5, K6)
  - 2.6 Problems (K1, K2, K3, K4, K5, K6)
- (Chapter 3: Sections 3.1 – 3.5 and related examples in 3.9)

### Unit III: Hyperbolic Differential Equations (18 Hours)

- 3.1 Occurrence of the wave equation (K1, K2, K3, K4, K5, K6)
  - 3.2 Derivation of one dimensional wave equation (K1, K2, K3, K4, K5, K6)
  - 3.3 Solution of one dimensional wave equation by canonical equation (K1, K2, K3, K4, K5, K6)
  - 3.4 Initial value problem - D'Alembert's solution (K1, K2, K3, K4, K5, K6)
  - 3.5 Vibration string – Variable separable solution (K1, K2, K3, K4, K5, K6)
  - 3.6 Forced vibration – Solution of non-homogeneous equation (K1, K2, K3, K4, K5, K6)
- (Chapter 4: Sections 4.1–4.6 and related examples in 4.13)

### Unit IV: Classification of Integral Equations and Connection with DE. (18 Hours)

- 4.1 Historical Introduction - Linear Integral equations (K1, K2, K3, K4, K5, K6)
  - 4.2 Special type of kernel - Square integrable functions and kernels (K1, K2, K3, K4, K5, K6)
  - 4.3 Singular integral equations (K1, K2, K3, K4, K5, K6)
  - 4.4 Nonlinear equations (K1, K2, K3, K4, K5, K6)
  - 4.5 Linear differential equations (K1, K2, K3, K4, K5, K6)
  - 4.6 Green's function (K1, K2, K3, K4, K5, K6)
- (Chapter 1: Sections 1.1 – 1.6 and Chapter 2: Sections 2.1 - 2.2)

### Unit V: Integral equations of the convolution type and Integral equations with singular kernels (18 Hours)

- 5.1 Integral transforms - Fredholm equation of the first kind (K1, K2, K3, K4, K5, K6)
- 5.2 Volterra equation of the first kind - Fredholm equation of the second kind (K1, K2, K3, K4, K5, K6)
- 5.3 Stieltjes integral equation (K1, K2, K3, K4, K5, K6)

- 5.4 Volterra equation of the second kind - Abel's integral equation (K1, K2, K3, K4, K5, K6)  
5.5 Fox's integral equation – Generalization to higher dimensions (K1, K2, K3, K4, K5, K6)  
5.6 Green's functions in two and three dimensions (K1, K2, K3, K4, K5, K6)  
(Chapter 3: Sections 3.1-3.6 and Chapter 5: Sections 5.1 and 5.2)

**Books for study and reference:**

**Text Book:**

1. Sankara Rao K - Introduction to Partial Differential Equations, 5<sup>th</sup> Edition - Prentice Hall of India, New Delhi, 2004. (for units I, II, III).
2. B.L. Moiseiwitsch - Integral Equation, 1<sup>st</sup> Edition - Longman Group limited, London, 1977. (for units IV and V).

**Books for Reference:**

1. Snedon I.N. - Elements of Partial Differential Equations, First edition - Tata McGraw Hill, New Delhi, 1957.
2. M.D. Raisingania - Advanced Differential Equations, 4<sup>th</sup> Edition, Tata McGraw Hill Publishing Company, New Delhi, 2001.
3. Amarnath T - An Elementary Course in Partial Differential Equations, 2<sup>nd</sup> edition - Narosa Publishing House, 1997.

**E- Resources:**

1. <http://ndl.ethernet.edu.et/bitstream/123456789/78639/2/Introduction%20to%20Partial%20Differential%20Equations%20%20By%20K.%20Sankara%20Rao.pdf>
2. <http://103.62.146.201:8081/xmlui/bitstream/handle/1/9075/Introduction%20to%20Partial%20Differential%20Equations%20%28%20PDFDrive%20%29.pdf?sequence=1&isAllowed=y>
3. <https://gauravtiwari.org/solving-integral-equations-1-definitions-and-types/>
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwweb/Mathematics>
6. <http://www.opensource.org>
7. [www.coursera.org](http://www.coursera.org)
8. <https://swayam.gov.in>

**SEMESTER – II**  
**PCMAH20 – MECHANICS**

<b>Year : I</b>	<b>Course Code:</b>	<b>Title Of The Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM : II</b>	PCMAH20	Mechanics	Theory	Core	6	4	100

**Course Objectives**

1. To know about the Physics concepts and its applications to Mathematics.
2. To enhance the basic concepts of mechanical system.

**Course Outcomes (CO)**

The Learners will be able to

1. Define and understand basic mechanical concepts related to discrete and continuous mechanical systems.
2. Describe and understand the motion of a mechanical system using Lagrange's equation.
3. Use Euler-Lagrange equation to find stationary paths and understanding the theory of variational principles.
4. Acquire knowledge on Hamilton's principle and Hamilton's equation.
5. Study the concepts of canonical transformations and solve the transformations by using Lagrange and Poisson brackets.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	L
CO2	H	H	M	H	M	L
CO3	H	H	M	H	M	L
CO4	H	H	M	H	M	L
CO5	H	H	M	H	M	L

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## **Course Syllabus**

### **Unit I: Introductory Concepts (18 Hours)**

- 1.1 Mechanical system (K1,K2,K3,K4,K5,K6)
  - 1.2 Generalized co-ordinates (K1,K2,K3,K4,K5,K6)
  - 1.3 Constraints (K1,K2,K3,K4,K5,K6)
  - 1.4 Virtual Work (K1,K2,K3,K4,K5,K6)
  - 1.5 Energy (K1,K2,K3,K4,K5,K6)
  - 1.6 Momentum. (K1,K2,K3,K4,K5,K6)
- (Chapter 1: Sections 1.1 – 1.5)

### **Unit II: Lagrange's Equations (18 Hours)**

- 2.1 Derivation of Lagrange's equations (K1,K2,K3,K4,K5,K6)
  - 2.2 Forms of the equations of motion (K1,K2,K3,K4,K5,K6)
  - 2.3 Examples based on forms of the equations of motion (K1,K2,K3,K4,K5,K6)
  - 2.4 Integrals of Motion (K1,K2,K3,K4,K5,K6)
  - 2.5 Liouville's system (K1,K2,K3,K4,K5,K6)
  - 2.6 Examples based on integrals of motion (K1,K2,K3,K4,K5,K6)
- (Chapter 2: Sections 2.1- 2.3)

### **Unit III: Hamilton's Equations (18 Hours)**

- 3.1 Hamilton's Principle (K1,K2,K3,K4,K5,K6)
  - 3.2 Brachistochrone problem – Geodesic problem (K1,K2,K3,K4,K5,K6)
  - 3.3 Hamilton's principle – Multiplier Rule (K1,K2,K3,K4,K5,K6)
  - 3.4 Hamilton's Equations (K1,K2,K3,K4,K5,K6)
  - 3.5 Other variational principles (K1,K2,K3,K4,K5,K6)
  - 3.6 Examples (K1,K2,K3,K4,K5,K6)
- (Chapter 4: Sections 4.1 – 4.3)

### **Unit IV: Hamilton - Jacobi Theory (18 Hours)**

- 4.1 Introduction (K1,K2,K3,K4,K5,K6)
  - 4.2 Hamilton's principal function (K1,K2,K3,K4,K5,K6)
  - 4.3 Hamilton – Jacobi Equation (K1,K2,K3,K4,K5,K6)
  - 4.4 Conservative systems and Ignorable coordinates (K1,K2,K3,K4,K5,K6)
  - 4.5 Separability (K1,K2,K3,K4,K5,K6)
  - 4.6 Kepler problem on separability (K1,K2,K3,K4,K5,K6)
- (Chapter 5: Sections 5.1-5.3)

### **Unit V: Canonical Transformations (18 Hours)**

- 5.1 Differential Forms and Generating Functions (K1,K2,K3,K4,K5,K6)
  - 5.2 Special Transformations (K1,K2,K3,K4,K5,K6)
  - 5.3 Problems based on canonical transformations (K1,K2,K3,K4,K5,K6)
  - 5.4 Lagrange Brackets (K1,K2,K3,K4,K5,K6)
  - 5.5 Poisson Brackets (K1,K2,K3,K4,K5,K6)
  - 5.6 Bilinear covariant (K1,K2,K3,K4,K5,K6)
- (Chapter 6: Sections 6.1 - 6.3)

## **Books for study and reference:**

### **Text Book:**

1. T. Greenwood - Classical Dynamics, 2<sup>nd</sup> Edition – Prentice Hall of India Pvt. Ltd., New Delhi, 1985.

### **Books for Reference:**

1. Goldstein - Classical Mechanics - Narosa Publishing House, New Delhi, 17th Reprint, 1998.
2. N.C. Ran and P.S. Joag - Classical Mechanics - Tata McGraw Hill Publishing Company Limited, New Delhi, 2004.
3. J. L. Synge and P. S. C. Joag - Classical Mechanics - Tata McGraw Hill, New Delhi, 1991.
4. P. G. Bergmann- Introduction to Theory of Relativity- Prentice Hall of India, Eddington, New Delhi, 1969.

### **E- Resources:**

1. <https://books.google.com.na/books?id=x7rj83I98yMC&printsec=frontcover#v=onepage&q&f=false>
2. [https://efaidnbmnnnibpcajpcgclefindmkaj/http://www.stet.edu.in/SSR\\_Report/Study%20Material/PDF/MATHS/PG/II%20Year/1.pdf](https://efaidnbmnnnibpcajpcgclefindmkaj/http://www.stet.edu.in/SSR_Report/Study%20Material/PDF/MATHS/PG/II%20Year/1.pdf)
3. [http://poincare.matf.bg.ac.rs/~zarkom/Book\\_Mechanics\\_Goldstein\\_Classical\\_Mechanics\\_optimized.pdf](http://poincare.matf.bg.ac.rs/~zarkom/Book_Mechanics_Goldstein_Classical_Mechanics_optimized.pdf)
4. <https://efaidnbmnnnibpcajpcgclefindmkaj/https://www.physics.rutgers.edu/~shapiro/507/book.pdf>
5. <https://nptel.ac.in/>
6. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
7. <https://www.coursera.org/>

**SEMESTER – II**  
**PEMAC20 - Elective II A: LaTeX and MATLAB**

<b>Year : I</b> <b>SEM : II</b>	<b>Course Code :</b> PEMAC20	<b>Title Of The Course :</b> Elective II A : LaTeX and MATLAB	<b>Course Type :</b> Theory	<b>Course Category :</b> Elective	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. Demonstrate the ability to type research papers in Latex software in a fluent manner.
2. To use and write script files (MATLAB programs) and enable the students to learn and use MATLAB software.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the mathematical basis of common algorithms in Latex.
2. Demonstrate the use of mathematical equations, tables and figures in Latex.
3. Demonstrate understanding and use of MATLAB software
4. Construct one dimensional array, two dimensional arrays and basic functions in MATLAB.
5. Recognize the power of mathematical modelling and analysis using MATLAB and be able to apply their understanding to their further studies.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	H	L	H	M
CO2	M	H	H	L	H	M
CO3	H	H	H	L	H	M
CO4	H	L	H	L	H	L
CO5	H	H	H	L	H	M

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	H	H	H	L	M
CO4	H	H	H	H	L	M
CO5	H	H	H	H	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Creating text using LATEX (15 Hours)

- 1.1 Fonts and Paragraphs(K1,K2,K3,K4,K5,K6)
- 1.2 Lists(K1,K2,K3,K4,K5,K6)
- 1.3 Tables, Special Characters(K1,K2,K3,K4,K5,K6)
- 1.4 Line and page breaks, spacing(K1,K2,K3,K4,K5,K6)
- 1.5 Bibliography with Bibtex (K1,K2,K3,K4,K5,K6)
- 1.6 Create a document file to prepare a Chapter in a Book. (K1,K2,K3,K4,K5,K6)

### Unit II: Math Mode, Graphics and special parts (15 Hours)

- 2.1 Mathematical symbols, Fractions (K1,K2,K3,K4,K5,K6)
- 2.2 Equations and arrays, Derivatives and Integrals (K1,K2,K3,K4,K5,K6)
- 2.3 Theorems and definitions (K1,K2,K3,K4,K5,K6)
- 2.4 Graphics (K1,K2,K3,K4,K5,K6)
- 2.5 Making special parts, front matter and back matter(K1,K2,K3,K4,K5,K6)
- 2.6 Create a Document file to prepare a research article.(K1,K2,K3,K4,K5,K6)

### Unit III: Starting with MATLAB (15 Hours)

- 3.1 Starting MATLAB, MATLAB Windows (K1,K2,K3,K4,K5,K6)
- 3.2 Working in the command window (K1,K2,K3,K4,K5,K6)
- 3.3 Arithmetic operation with scalars, Using MATLAB as Calculator (K1,K2,K3,K4,K5,K6)
- 3.4 Display Formats, Elementary Math Built in Functions (K1,K2,K3,K4,K5,K6)
- 3.5 Defining Scalar Variables, Useful commands for managing variables (K1,K2,K3,K4,K5,K6)
- 3.6 Script Files (K1,K2,K3,K4,K5,K6)

### Unit IV: Creating Arrays and Mathematical operations with Arrays (15 Hours)

- 4.1 Creating one dimensional array (K1,K2,K3,K4,K5,K6)
- 4.2 Creating two dimensional array (K1,K2,K3,K4,K5,K6)
- 4.3 The transpose operator, Addressing array as vector and matrix (K1,K2,K3,K4,K5,K6)
- 4.4 Using a colon in addressing arrays, Addition and Subtraction(K1,K2,K3,K4,K5,K6)
- 4.5 Array Multiplication, Array Division (K1,K2,K3,K4,K5,K6)
- 4.6 Element by element operations, using arrays in MATLAB built in MATLAB functions (K1,K2,K3,K4,K5,K6)

### Unit V: Introduction to Systems (15 Hours)

- 5.1 System, System Boundary (K1,K2,K3,K4,K5,K6)
- 5.2 System components and their interactions, Environment (K1,K2,K3,K4,K5,K6)
- 5.3 Classification of systems (K1,K2,K3,K4,K5,K6)
- 5.4 According to complexity of system, nature and type of components (K1,K2,K3,K4,K5,K6)
- 5.5 Linear systems, Superposition theorem.(K1,K2,K3,K4,K5,K6)
- 5.6 Solution to linear non- homogeneous equations (4 unknowns). (K1,K2,K3,K4,K5,K6)

## **Books for study and reference:**

### **Text Books:**

1. Greenberg, Harvey J. "A simplified introduction to LATEX." University of Colorado at Denver, (2010).(Unit I and II)
2. Amos Gilat, MATLAB- An Introduction with Applications, John Wiley and Sons Inc., 2007.(Unit III -V)

### **Books for Reference:**

1. Devendra K. Chaturvedi, Modeling and Simulation of Systems using MATLAB and Simulink, CRC press, 2010.
2. Edward A. Bender, An Introduction to Mathematical Modelling, Wiley Press, 1978.
3. Grätzer, G. Math into LATEX: An introduction to LATEX and AMS-LATEX. Springer Science & Business Media, 2013.

### **E- Resources:**

1. <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=ab4433ddb03085867fca6b70547c33b638bdad42>
2. [http://www.os.ac.me/MS\\_kn.pdf](http://www.os.ac.me/MS_kn.pdf)
3. [https://people.maths.bris.ac.uk/~madjl/course\\_text.pdf](https://people.maths.bris.ac.uk/~madjl/course_text.pdf)
4. <https://spoken-tutorial.org/>
5. <https://nptel.ac.in/>
6. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
7. <https://www.coursera.org/>

**SEMESTER – II**  
**PEMAD20 - Elective II B: FLUID DYNAMICS**

<b>Year : I</b> <b>SEM : II</b>	<b>Course Code:</b> PEMAD20	<b>Title Of The Course :</b> Elective II B : Fluid Dynamics	<b>Course Type :</b> Theory	<b>Course Category :</b> Elective	<b>H/W</b> 5	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the fundamental concepts of Fluid Dynamics
2. To understand the concepts of fluid motion, equations of motion of a fluid, three dimensional flows and viscous flows and apply it in practical situations.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the concepts of fluid flow
2. Identify pressure of fluid in different kind of Motion
3. Analyse the topics of Axi-Symmetric Flows, Stoke's Stream Function
4. Determine the Stream Function, the Complex Potential for Two-Dimensional, Irrotational, Incompressible Flow.
5. Explain the concepts the Rate of Strain Quadric and Principal Stresses, Stress Analysis in Fluid Motion, the Coefficient of Viscosity and Laminar Flow, the Navier-Stokes Equations of Motion of a Viscous Fluid.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	L	M	H	M
<b>CO2</b>	H	H	L	M	H	M
<b>CO3</b>	H	H	L	M	H	M
<b>CO4</b>	H	M	L	M	H	L
<b>CO5</b>	H	H	L	M	H	M

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	H	L	M
<b>CO2</b>	H	H	H	H	L	M
<b>CO3</b>	H	H	H	H	L	M
<b>CO4</b>	H	H	H	H	L	M
<b>CO5</b>	H	H	H	H	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Kinematics of Fluids in Motion

(15 Hours)

- 1.1 Real fluids and Ideal fluids (K1, K2, K3, K4, K5, K6)
- 1.2 Velocity of a Fluid at a Point-Streamlines and Path lines (K1, K2, K3, K4, K5, K6)
- 1.3 Steady and Unsteady flows (K1, K2, K3, K4, K5, K6)
- 1.4 The Velocity Potential – The Vorticity Vector(K1, K2, K3, K4, K5, K6)
- 1.5 The Equation of Continuity – Worked Examples (K1, K2, K3, K4, K5, K6)
- 1.6 Acceleration of a Fluid.(K1, K2, K3, K4, K5, K6)  
(Chapter 2, Sections: 2.1 to 2.9)

### Unit II: Equations of Motion of a Fluid

(15 Hours)

- 2.1 Pressure at a Point in a Fluid at Rest (K1, K2, K3, K4, K5, K6)
- 2.2 Pressure at a Point in a Moving Fluid (K1, K2, K3, K4, K5, K6)
- 2.3 Conditions at a Boundary of Two Inviscid immiscible Fluids(K1, K2, K3, K4, K5, K6)
- 2.4 Euler's Equations of Motion (K1, K2, K3, K4, K5, K6)
- 2.5 Bernoulli's Equation(K1, K2, K3, K4, K5, K6)
- 2.6 Some Worked examples (K1, K2, K3, K4, K5, K6)  
(Chapter 3, Sections: 3.1 to 3.6)

### Unit III: Some Three Dimensional Flows

(15 Hours)

- 3.1 Introduction-Sources(K1, K2, K3, K4, K5, K6)
- 3.2 Sinks(K1, K2, K3, K4, K5, K6)
- 3.3 Doublets(K1, K2, K3, K4, K5, K6)
- 3.4 Images in a rigid infinite plane(K1, K2, K3, K4, K5, K6)
- 3.5 Axi-Symmetric Flows(K1, K2, K3, K4, K5, K6)
- 3.6 Stokes's Stream Function.(K1, K2, K3, K4, K5, K6)  
(Chapter 4, Sections: 4.1, 4.2, 4.5)

### Unit IV: Some Two Dimensional Flows

(15 Hours)

- 4.1 Meaning of Two-Dimensional Flow (K1, K2, K3, K4, K5, K6)
- 4.2 Use of Cylindrical Polar Coordinates (K1, K2, K3, K4, K5, K6)
- 4.3 The Stream Function(K1, K2, K3, K4, K5, K6)
- 4.4 The Complex Potential for Two-Dimensional, Irrotational, Incompressible Flow (K1, K2, K3, K4, K5, K6)
- 4.5 Complex Velocity Potentials for Standard Two-Dimensional Flows(K1, K2, K3, K4, K5, K6)
- 4.6 Some Worked Examples.(K1, K2, K3, K4, K5, K6)  
Chapter 5, Sections: 5.1 to 5.6)

## Unit V: Viscous Flows

(15 Hours)

- 5.1 Stress Components in Real Fluid (K1, K2, K3, K4, K5, K6)
- 5.2 Relations between Cartesian Components of Stress (K1, K2, K3, K4, K5, K6)
- 5.3 Translation Motion of Fluid Element (K1, K2, K3, K4, K5, K6)
- 5.4 The Rate of Strain Quadric and Principal Stresses (K1, K2, K3, K4, K5, K6)
- 5.5 Relation between Stress and Rate of Strain (K1, K2, K3, K4, K5, K6)
- 5.6 The Coefficient of Viscosity and Laminar Flow (K1, K2, K3, K4, K5, K6)  
(Chapter 8, Sections: 8.1 to 8.9)

### Books for study and reference:

#### Text Book:

1. F. Chorlton, Text book of Fluid Dynamics, CBS Publishers & Distributors Pvt. Ltd, New Delhi, Reprint 2004.

#### Books for Reference:

1. A. R. Paterson, A First Course in Fluid Dynamics, Cambridge University Press, New York, 1987.
2. G.K. Batchelor, An Introduction of Fluid Mechanics, Foundation Books, New Delhi, 1993.
3. R. K. Rathy, An Introduction to Fluid Dynamics, IBH Publishing Company, New Delhi, 1976.
4. E. Krause, Fluid Mechanics with problems and solutions, Springer, 2005

#### E- Resources:

1. <https://pdfcoffee.com/fluid-dynamics-by-chorlton-pdf-free.html>
2. <https://kanchiuniv.ac.in/coursematerials/Fluid%20Dynamics%20MMAF183T40-course%20material.pdf>
3. <https://handoutset.com/wp-content/uploads/2022/07/A-First-Course-in-Fluid-Dynamics-A.-R.-Paterson.pdf>
4. <https://nptel.ac.in/>
5. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
6. <https://www.coursera.org/>

**SEMESTER – II**  
**PIMAC20 -INDEPENDENT ELECTIVE 2 A: FUNDAMENTALS OF RING THEORY**

<b>Year:I</b> <b>SEM:II</b>	<b>Course Code:</b> PIMAC20	<b>Title of the Course:</b> Independent Elective 2 A: Fundamentals of Ring Theory	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To get the basic knowledge about Rings, Sub rings and Types of Rings.
2. To engage them in self independent study of the Lecture notes and enable the students to workout unsolved problems using various tricks.

**Course Outcomes (CO)**

The Learners will be able to

1. Demonstrate various characteristic of Rings.
2. Extend the knowledge in Ideals, Fields of Quotients and polynomial rings.
3. Validate primitive polynomials and Irreducible Polynomials.
4. Acquire the knowledge in Field theory.
5. Solve various types of problems in finite fields.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	L	H	M	H
CO2	H	M	L	H	M	H
CO3	H	M	L	H	M	H
CO4	H	M	L	H	M	H
CO5	H	M	L	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## **Course Syllabus**

### **Unit I: Ring Theory**

Ring – Sub Ring – Types of Ring – Zero Divisors – Integral Domain – Unit of Ring – Boolean Ring – Characteristic of a Ring – Equivalence Relation on Ring. (K1,K2,K3,K4,K5,K6)  
(Chapter 16: 16.1)

### **Unit II: Ring Theory (Contd...)**

Ideals – Quotient Ring – Ring Homomorphism – Field of Quotients – Polynomial Rings – Some Definitions.(K1,K2,K3,K4,K5,K6)  
(Chapter 16: 16.2)

### **Unit III: Ring Theory (Contd...)**

Principle Ideal Domain (PID) – Euclidean Domain (ED) – Unique Factorization Domain (UFD) - Content of Polynomial – Primitive Polynomial – Irreducible Polynomial. (K1,K2,K3,K4,K5,K6)  
(Chapter 16: 16.3-16.7)

### **Unit IV: Field Theory**

Definition of Field – Some Definitions – Simple Extension – Algebraic Extension – Monic polynomial – minimal polynomial – Factor Theorem – Splitting Field. (K1,K2,K3,K4,K5,K6)  
(Chapter 16: 16.8)

### **Unit V: Field Theory (Contd...)**

Conjugate Elements – Separable Polynomial – Separable Element – Purely Inseparable Extension – Normal Extension – Galois Extension – Fundamental Theorem of Galois Theory. (K1,K2,K3,K4,K5,K6)  
(Chapter 16: 16.9-16.10)

### **Books for study and reference:**

#### **Text Book:**

1. R. Gupta's - Joint CSIR - UGC-NET Mathematical Sciences Previous Year's Solved Paper, 2014.

#### **Books for Reference:**

1. Dr. A. P. Singh - Modern Algebra – Infostudy Publication, 2018.
2. Edward A. Bender, An Introduction to Mathematical Modelling, Wiley Press, 1978.
3. Grätzer, G. Math into LATEX: An introduction to LATEX and AMS-LATEX. Springer Science & Business Media,2013.

4. S.K. Shrivastava & M.K. Malik - CSIR-UGC NET/JRF MATHEMATICAL SCIENCES Previous Years Solved Papers Including Model Papers With Explanation – JBC Press, 2019.

**E- Resources:**

1. <https://unacademy.com/content/csir-ugc/study-material/mathematical-sciences/>
2. <https://nptel.ac.in/>
3. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
4. <https://www.coursera.org/>
5. <https://testbook.com/csir-net/mathematical-science-study-material>

**SEMESTER – II**  
**PIMAD20 -INDEPENDENT ELECTIVE 2 B: QUANTITATIVE APTITUDE FOR**  
**COMPETITIVE EXAMINATIONS II**

<b>Year :I</b> <b>SEM :II</b>	<b>Course Code :</b> PIMAD20	<b>Title Of The Course :</b> Independent Elective 2 B: Quantitative aptitude for competitive examinations II	<b>Course Type :</b> Theory	<b>Course Category :</b> Independent Elective	<b>H/W</b> -	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce quantitative methods and techniques for effective decisions-making and provide a detailed knowledge about Mathematical, Transportation and Assignment models.
2. To analyze any real life system with limited constraints and depict it in a model form and examine the aspects of business and marketing with respect to operations research.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand and solve aptitude problems.
2. Identify and develop the techniques to solve the problems using different methods.
3. Demonstrate procedural fluency with real number arithmetic operations and use those operations to represent real-world scenarios and to solve stated problems.
4. Solve linear equations, graph and interpret linear models, and read and apply formulas.
5. Ability to face the competitive examinations with a clear approach.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	L	M	M	H
CO4	H	H	M	M	M	H
CO5	H	H	M	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	M	M	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## **Course Syllabus**

### **Unit I: Reasoning Ability**

Series Completion- Arranging of figures in series- Classification- Pattern Comparison- Analogies- Analytical reasoning- Practical exercises- Critical Reasoning- Practical exercises.(K1,K2,K3,K4,K5,K6)  
(Section: 3 : Part B and C)

### **Unit II: Arithmetical Ability**

Surds and indices- Pipes and Cisterns- Problem on Trains- Boats and streams- Logarithms- Alligation or Mixture- Area- Volume and surfaces.(K1,K2,K3,K4,K5,K6)  
(Section 1:1.9, 1.16, 1.18-1.20, 1.23-1.25)

### **Unit III: Arithmetic Ability (Contd...)**

Partnership- Permutations and Combinations- Probability- True Discount- Banker's Discount- Heights and Discount- Odd man out and series.(K1,K2,K3,K4,K5,K6)  
(Section 1:1.30-1.35, 1.13)

### **Unit IV: General Awareness**

Banks Information- Socio economic status of India- Government schemes- Agriculture- National- Dateline-Art and Culture - News papers in India and Abroad- Awards- Space- International- Sports- Politics.(K1,K2,K3,K4,K5,K6)  
(Section: 5)

### **Unit V: Current Affairs and Computers**

International Affairs- Important days- Science and Medicine- Current Affairs- Social Banking- Real Banking- Glossary of Computer- Short Keys.(K1,K2,K3,K4,K5,K6)  
(Section: 5)

### **Books for study and reference:**

#### **Text Books:**

1. IBPS Clerks, Frontline Publication, 2012.
2. R.S. Agarwal, Quantitative Aptitude for Competitive Examinations, Revised Edition, S. Chand Publications, 2017.

#### **Books for Reference:**

1. R.S. Agarwal, Quantitative Aptitude for Competitive Examinations, S.Chand Publications, 2017.
2. Khattar, Quantitative Aptitude for Competitive Exams 3ed, Pearson Publications, 2015.
3. B.S. Sijwali, InduSijwali, A New Approach to REASONING Verbal & Non-Verbal, Arihant Publications, 2014.

**E-Resources:**

1. <https://www.indiabix.com>
2. [https://myupsc.com/wp-content/uploads/2020/11/Quantitative-Aptitude-for-Competitive-Examinations-by-Dinesh-Khattar-z-lib.org\\_.pdf](https://myupsc.com/wp-content/uploads/2020/11/Quantitative-Aptitude-for-Competitive-Examinations-by-Dinesh-Khattar-z-lib.org_.pdf)
3. <https://www.studocu.com/in/document/national-institute-of-technology-kurukshetra/applied-statistical-methods/1-rs-aggarwal-quantitative-aptitude-pdfdrivecom/44016064>
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwweb/Mathematics>
6. <http://www.opensource.org>
7. [www.coursera.org](http://www.coursera.org)

**SEMESTER – III**  
**PCMAI20 - TOPOLOGY**

<b>Year: II</b> <b>SEM: III</b>	<b>Course Code:</b> PCMAI20	<b>Title of the Course:</b> Topology	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To generalize the concepts that the students have learnt in Real analysis and to train the students to develop analytical thinking.
2. To introduce the topological spaces which provide a general framework for the study of convergence, continuity and compactness.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand basis as a collection of basic open sets and the concepts of continuous functions and their properties in topological spaces.
2. Determine the topology generated by the given basis, connectedness, path connectedness of the product of an arbitrary family of spaces.
3. Grasp the concept of compactness which is the generalization to topological spaces of the property of closed and bounded subsets of the real line.
4. Deal with the countability and separation axioms
5. Know the theorems with the conditions under which a topological space can be embedded in metric space.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	H	M	H
CO2	H	H	L	H	M	H
CO3	H	H	L	H	M	H
CO4	H	H	L	H	M	H
CO5	H	H	L	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Topological Spaces (18 Hours)

- 1.1 Topological spaces (K1,K2,K3,K4,K5,K6)
  - 1.2 Basis for a topology (K1,K2,K3,K4,K5,K6)
  - 1.3 Ordered topology, Product topology on  $X \times Y$  (K1,K2,K3,K4,K5,K6)
  - 1.4 Subspace topology (K1,K2,K3,K4,K5,K6)
  - 1.5 Closed sets (K1,K2,K3,K4,K5,K6)
  - 1.6 Limit points (K1,K2,K3,K4,K5,K6)
- (Chapter 2: Sections 12 – 17)

### Unit II: Metric space topology and Connectedness (18 Hours)

- 2.1 Continuous Functions (K1,K2,K3,K4,K5,K6)
  - 2.2 The product topology (K1,K2,K3,K4,K5,K6)
  - 2.3 The metric topology (K1,K2,K3,K4,K5,K6)
  - 2.4 The metric topology (continued) (K1,K2,K3,K4,K5,K6)
  - 2.5 Connected spaces (K1,K2,K3,K4,K5,K6)
  - 2.6 Connected subspaces of the Real line (K1,K2,K3,K4,K5,K6)
- (Chapter 2: Sections 18 - 21 and Chapter 3: Sections 23 - 24)

### Unit III: Connectedness and Compactness (18 Hours)

- 3.1 Components (K1,K2,K3,K4,K5,K6)
  - 3.2 Local connectedness (K1,K2,K3,K4,K5,K6)
  - 3.3 Compact spaces (K1,K2,K3,K4,K5,K6)
  - 3.4 Compact subspaces of the Real Line (K1,K2,K3,K4,K5,K6)
  - 3.5 Limit point compactness (K1,K2,K3,K4,K5,K6)
  - 3.6 Local compactness (K1,K2,K3,K4,K5,K6)
- (Chapter 3: Sections 25 - 29)

### Unit IV: Separation Axioms (18 Hours)

- 4.1 The Countability Axioms (K1,K2,K3,K4,K5,K6)
  - 4.2 The Countability Axioms (continued) (K1,K2,K3,K4,K5,K6)
  - 4.3 The Separation Axioms (K1,K2,K3,K4,K5,K6)
  - 4.4 The Separation Axioms (continued) (K1,K2,K3,K4,K5,K6)
  - 4.5 Normal spaces (K1,K2,K3,K4,K5,K6)
  - 4.6 Normal spaces (continued) (K1,K2,K3,K4,K5,K6)
- (Chapter 4: Sections 30 – 32)

### Unit V: Complete Metric Spaces (18 Hours)

- 5.1 The Urysohn Lemma (K1,K2,K3,K4,K5,K6)
- 5.2 Regular Space (K1,K2,K3,K4,K5,K6)

5.3 The Urysohn Metrization Theorem (K1,K2,K3,K4,K5,K6)

5.4 Imbedding Theorem (K1,K2,K3,K4,K5,K6)

5.5 The Tietze Extension Theorem (K1,K2,K3,K4,K5,K6)

5.6 The Tychonoff Theorem (K1,K2,K3,K4,K5,K6)

(Chapter 4: Sections 33 – 35, Chapter 5: Section 37)

### **Books for study and reference:**

#### **Text Books:**

1. James R. Munkres – Topology, 2<sup>nd</sup> Edition – Prentice Hall of India Pvt. Ltd., New Delhi, 2003.
2. James Munkres – Topology, 2<sup>nd</sup> Edition – Pearson New International Edition, Pearson Education Limited, USA, 2014.

#### **Books for Reference:**

1. George F. Simmons – Introduction to Topology and Modern Analysis – McGraw Hill Education (India) Private Limited, New Delhi, 2004 (26<sup>th</sup> Reprint 2016).
2. Nanda S. - General Topology, 2<sup>nd</sup> Edition – Oxford and IBH Publishing Co. Pvt. Ltd., 2014.
3. Sharma J.N. - Krishna's Topology (for Honours and Post Graduate Students of All Indian Universities), Thirty Seventh Edition – Krishna Prakashan Media (P) Ltd., Meerut, U.P, India, 2010.

#### **E-Resources:**

1. <http://www.alefenu.com/libri/topologymunkres.pdf>
2. [https://www.mymathscloud.com/api/download/modules/University/Textbooks/topology/3\)Topology%20A%20First%20Course%20Munkres.pdf?id=48928264](https://www.mymathscloud.com/api/download/modules/University/Textbooks/topology/3)Topology%20A%20First%20Course%20Munkres.pdf?id=48928264)
3. [https://qcpages.qc.cuny.edu/~jdodziuk/320-s2019/Seymour%20Lipschutz%20-%20Schaum's%20Outline%20of%20General%20Topology-McGraw-Hill%20\(1968\).pdf](https://qcpages.qc.cuny.edu/~jdodziuk/320-s2019/Seymour%20Lipschutz%20-%20Schaum's%20Outline%20of%20General%20Topology-McGraw-Hill%20(1968).pdf)
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwweb/Mathematics>
6. <http://www.opensource.org>
7. <http://en.wikipedia.org>
8. <https://nptel.ac.in>
9. [www.coursera.org](http://www.coursera.org)
10. <https://swayam.gov.in>

**SEMESTER – III**  
**PCMAJ20 - NUMERICAL ANALYSIS**

<b>Year: II</b> <b>SEM: III</b>	<b>Course Code:</b> PCMAJ20	<b>Title of the Course:</b> Numerical Analysis	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To develop the skills in solving the Numerical problems and apply in other disciplines.
2. To implement various methods to apply in wider area of research.

**Course Outcomes (CO)**

The Learners will be able to

1. Find the solution in Numerical, Algebraic and transcendental equations.
2. Solve the set of algebraic equations by direct and iterative methods.
3. Analyze the values of a function for any intermediate value of the independent variable.
4. Compute the numerical solution of various types of ordinary differential equations.
5. Acquire the numerical solution of Partial Differential Equations.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	H	M	L
CO2	H	M	H	H	M	L
CO3	H	M	H	H	M	L
CO4	H	M	H	H	M	L
CO5	H	M	H	H	M	L

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

**Course Syllabus**

**Unit I: Solution to Numerical, Algebraic and Transcendental Equations (18 Hours)**

- 1.1 Introduction - Definition (K1,K2, K3,K4,K5,K6)
- 1.2 Bisection Method (K1,K2,K3,K4,K5,K6)

- 1.3 Method of successive approximation, False position (K1,K2,K3,K4,K5,K6)
- 1.4 Newton's Iteration Method (K1,K2,K3,K4,K5,K6)
- 1.5 Convergence of Newton- Horner's Method (K1,K2,K3,K4,K5,K6)
- 1.6 Descartes Rule of Signs- Graeffes Root Squaring Method (K1,K2,K3,K4,K5,K6)  
(Chapter 3: Section 3.1 – 3.11)

**Unit II: Solving Sets of Equations (18 Hours)**

- 2.1 Introduction (K1,K2, K3,K4,K5,K6)
- 2.2 Types and algorithm for solving algebraic sets of equation (K1,K2, K3,K4,K5,K6)
- 2.3 The Gaussian Elimination (K1,K2,K3,K4,K5,K6)
- 2.4 Gauss Jordan Method (K1,K2,K3,K4,K5,K6)
- 2.5 Type I : Iterative Method (K1,K2,K3,K4,K5,K6)
- 2.6 Type II: Iterative Method (K1,K2,K3,K4,K5,K6)  
(Chapter 4: 4.2- 4.10)

**Unit III: Interpolation and Curve Fitting (18 Hours)**

- 3.1 Introduction (K1,K2, K3,K4,K5,K6)
- 3.2 Problems solving in Lagrangian Polynomials(K1,K2,K3,K4,K5,K6)
- 3.3 Analyze data in Divided Differences (K1,K2,K3,K4,K5,K6)
- 3.4 Problems solving in Evenly Spaced Data (K1,K2,K3,K4,K5,K6)
- 3.5 Problems solving in Polynomial Approximation of Surfaces(K1,K2,K3,K4,K5,K6)
- 3.6 Finding solution of Getting Derivatives and Integrals Numerically  
(K1,K2,K3,K4,K5,K6)  
(Chapter 5, Section 5.2 – 5.5)

**Unit IV: Numerical Solution of Ordinary Differential Equations (18 Hours)**

- 4.1 Introduction – Basic Definitions (K1,K2, K3,K4,K5,K6)
- 4.2 Basic steps and algorithm of Solving ordinary differential equations (K1,K2, K3,K4,K5,K6)
- 4.3 Solving ODE using Taylor's Series method (K1,K2,K3,K4,K5,K6)
- 4.4 Find solutions of ODE using Runge – Kutta Methods (K1,K2,K3,K4,K5,K6)
- 4.5 Milne's methods (K1,K2,K3,K4,K5,K6)
- 4.6 Compute ODE using Adam's Moulton Method (K1,K2,K3,K4,K5,K6)  
(Chapter 11: 11.4-11.6 and 11.13 to 11.20)

**Unit V: Numerical solution to Partial Differential Equations (18 Hours)**

- 5.1 Introduction – Difference Quotients(K1,K2, K3,K4,K5,K6)
- 5.2 Geometrical Representation of Partial Difference Quotients(K1,K2,K3,K4,K5,K6)
- 5.3 Classification of Partial Differential Equations – Elliptic Equations(K1,K2,K3,K4,K5,K6)
- 5.4 Solution to Laplace's Equation by Liebmann's iteration process(K1,K2,K3,K4,K5,K6)

5.5 Poisson's Equation and its solutions – Crank – Nicholson method  
(K1,K2,K3,K4,K5,K6)

5.6 Hyperbolic equations(K1,K2,K3,K4,K5,K6)  
(Chapter 12: 12.1-12.7, 12.8.2, 12.9)

### **Books for study and reference:**

#### **Text Book:**

1. V.N. Vedamurthy N. Ch. S. N. Iyengar – Numerical Methods – Vikas Publishing House Pvt. Ltd, 2000.

#### **Books for Reference:**

1. R.L. Burden, J. Douglas Faires – Numerical Analysis – Thompson Books, USA, 2005.
2. S.S. Sastry – Introductory Methods of Numerical Analysis – Prentice Hall of India Pvt. Ltd., New Delhi, 2001.
3. M.K. Jain, S.R.K.Iyengar, R.K.Jain – Numerical Methods for Scientific and Engineering Computation, 3rd Edition – Wiley Eastern Ltd, New Delhi 1993.
4. M.K. Jain, S.R.K. Iyengar, R.K.Jain – Numerical Methods for Scientific and Engineering Computation, 3rd Edition – Wiley Eastern Ltd, New Delhi 1993.

#### **E- Resources:**

1. <https://powersystemfreebooks.blogspot.com/2019/09/pdf-complete-book-numerical-methods-by.html>
2. <https://pdf.wecabrio.com/numerical-methods-by-p-kandaswamy.pdf>
3. <https://efaidnbmnnnibpcajpcglclefindmkaj/https://gdcboysang.ac.in/About/Droid/uploads/Numerical%20Methods.pdf>
4. <https://nptel.ac.in/>
5. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
6. <https://www.coursera.org/>

**SEMESTER – III**  
**PCMAK20 - PROBABILITY THEORY**

<b>Year :II</b>	<b>Course Code :</b>	<b>Title Of The Course :</b>	<b>Course Type :</b>	<b>Course Category :</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM :III</b>	PCMAK20	Probability Theory	Theory	Core	6	4	100

**Course Objectives**

1. Apply problem solving technique to solve real world event.
2. Understand the concept of random variables.

**Course Outcomes (CO)**

The Learners will be able to

1. Characterize probability models and function of random variables based on single and multiple random variables.
2. Evaluate and apply expected value, moments and understand the concept of Chebyshev inequality.
3. Analyze the concepts of characteristic functions and its properties.
4. Apply probability distribution to solve the real world problems.
5. Understand the concept of limit theorem and its applications.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	H	M	H	H	M
CO3	H	H	M	H	H	L
CO4	H	H	M	H	H	L
CO5	H	H	M	H	H	L

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Random Variables

(18 Hours)

- 1.1 The concept of a random variable (K1,K2,K3,K4,K5,K6)
- 1.2 The distribution function-Random variables of the discrete type and the continuous type (K1,K2,K3,K4,K5,K6)
- 1.3 Function of random variables (K1,K2,K3,K4,K5,K6)
- 1.4 Multidimensional random variable (K1,K2,K3,K4,K5,K6)
- 1.5 Marginal and Conditional distributions (K1,K2,K3,K4,K5,K6)
  
- 1.6 Independent random variables - Functions of Multi dimensional random variables (K1,K2,K3,K4,K5,K6)  
(Chapter 2: Sections 2.1 to 2.9)

### Unit II: Parameters of the Distribution of a Random Variable

(18 Hours)

- 2.1 Expected values (K1,K2,K3,K4,K5,K6)
- 2.2 Moments (K1,K2,K3,K4,K5,K6)
- 2.3 The Chebyshev Inequality (K1,K2,K3,K4,K5,K6)
- 2.4 Absolute moments (K1,K2,K3,K4,K5,K6)
- 2.5 Order parameters (K1,K2,K3,K4,K5,K6)
- 2.6 Moments of random vectors (K1,K2,K3,K4,K5,K6)  
(Chapter 3: Sections 3.1 - 3.6)

### Unit III: Characteristic Functions

(18 Hours)

- 3.1 Properties of Characteristic function (K1,K2,K3,K4,K5,K6)
- 3.2 The characteristic function and moments (K1,K2,K3,K4,K5,K6)
- 3.3 Semi-invariants (K1,K2,K3,K4,K5,K6)
- 3.4 The characteristic function of the sum of independent random variables (K1,K2,K3,K4,K5,K6)
- 3.5 Determination of the distribution function by the characteristic function (K1,K2,K3,K4,K5,K6)
- 3.6 The characteristic function of multidimensional random vectors – Probability generating functions (K1,K2,K3,K4,K5,K6)  
(Chapter 4: Sections 4.1 - 4.7)

### Unit IV: Probability Distributions

(18 Hours)

- 4.1 One – point and two - point distributions (K1,K2,K3,K4,K5,K6)
- 4.2 The Bernoulli scheme : The binomial distribution (K1,K2,K3,K4,K5,K6)
- 4.3 The Poisson scheme :The Generalized binomial distribution (K1,K2,K3,K4,K5,K6)
- 4.4 The Polya and Hypergeometric distributions (K1,K2,K3,K4,K5,K6)
- 4.5 The Poisson distribution – The uniform distribution (K1,K2,K3,K4,K5,K6)
- 4.6 The normal distribution – The gamma distribution (K1,K2,K3,K4,K5,K6)  
(Chapter 5: Sections 5.1 - 5.8)

## Unit V: Limits Theorems

(18 Hours)

- 5.1 Preliminary remarks - Stochastic convergence (K1,K2,K3,K4,K5,K6)
- 5.2 Bernoulli's law of large numbers (K1,K2,K3,K4,K5,K6)
- 5.3 The convergence of a sequence of distribution functions (K1,K2,K3,K4,K5,K6)
- 5.4 The Riemann - Stieltjes integral (K1,K2,K3,K4,K5,K6)
- 5.5 The Levy - Cramer theorem (K1,K2,K3,K4,K5,K6)
- 5.6 The De Moivre - Laplace theorem - The Lindeberg - Levy theorem (K1,K2,K3,K4,K5,K6)  
(Chapter 6: Sections 6.1 - 6.8)

### Books for study and reference:

#### Text Book:

1. Marek Fisz - Probability Theory and Mathematical Statistics, 3<sup>rd</sup> Edition – John Wiley and Sons Inc, 1963.

#### Books for Reference:

1. Suddhenda Biswas and G. L. Sriwastav – Mathematical Statistics – Narosa Publishing House, 2011.
2. Alexander M. Mood, Franklin A. Graybill and Duane C. Bose – Introduction to Theory of Statistics, 3<sup>rd</sup> Edition - Tata McGraw Hill, 1974.
3. P. Kandasamy, K. Thilagavathy and K. Gunavathy - Probability, Statistics and Queuing Theory, 2nd Edition - Sultan Chand and Sons, 2005.

#### E-Resources:

1. <https://www.scribd.com/document/294762054/Probability-Theory-and-Mathematical>
2. <http://mathforum.org>
3. <http://ocw.mit.edu/ocwweb/Mathematics>
4. <http://www.opensource.org>
5. <https://nptel.ac.in>
6. <https://www.probability.net>
7. [www.coursera.org](http://www.coursera.org)
8. <https://swayam.gov.in>

**SEMESTER – III**  
**PCMAL20 - OPERATIONS RESEARCH**

<b>Year : II</b> <b>SEM : III</b>	<b>Course Code :</b> PCMAL20	<b>Title Of The Course :</b> Operations Research	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To develop the knowledge of the students in the field of Operations Research which plays an important role in the Business Management.
2. To understand the mathematical tools that is used to solve optimization problems and to learn the concepts of queuing system and non-linear programming.

**Course Outcomes (CO)**

The Learners will be able to

1. Determine the feasible solution using Revised simplex method, Duality and bounded variable algorithm.
2. Understand the theoretical background of queuing systems and solve the real world problems.
3. Analyze the Inventory models and solve EOQ models.
4. Apply dynamic programming to solve real world problems.
5. Solve constrained and unconstrained optimization problems using Hookes and Jeeves algorithm, Gradient projection, Lagrange multipliers, Kuhn-Tucker conditions etc.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	H
CO3	H	H	H	H	L	M
CO4	H	H	H	H	M	H
CO5	H	H	H	H	L	M

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Advanced topics in Linear Programming

(18 Hours)

- 1.1 Simplex method fundamentals(K1,K2,K3,K4,K5,K6)
  - 1.2 From Extreme points to basic solutions – Examples – Generalized simplex tableau in matrix form (K1,K2,K3,K4,K5,K6)
  - 1.3 The Revised simplex method (K1,K2,K3,K4,K5,K6)
  - 1.4 Computational issues in the revised simplex method(K1,K2,K3,K4,K5,K6)
  - 1.5 Bounded –variable algorithm (K1,K2,K3,K4,K5,K6)
  - 1.6 Duality (K1,K2,K3,K4,K5,K6)
- (Chapter 7: Sections 7.1-7. 4)

### Unit II: Queuing System

(18 Hours)

- 2.1 Introduction(K1,K2,K3,K4,K5,K6)
  - 2.2 Elements of a Queuing model (K1,K2,K3,K4,K5,K6)
  - 2.3 Role of exponential distribution (K1,K2,K3,K4,K5,K6)
  - 2.4 Pure Birth and Death models (Relationship between the Exponential and Poisson distributions) (K1,K2,K3,K4,K5,K6)
  - 2.5 Generalized Poisson Queuing Model (K1,K2,K3,K4,K5,K6)
  - 2.6 Specialized Poisson Queues. (K1,K2,K3,K4,K5,K6)
- (Chapter 18: Sections 18.1 - 18.6)

### Unit III: Inventory Models

(18 Hours)

- 3.1 Inventory problem : A supply chain perspective(K1,K2,K3,K4,K5,K6)
  - 3.2 Role of demand in the development of Inventory models (K1,K2,K3,K4,K5,K6)
  - 3.3 Static Economic-Order-Quantity (EOQ) models (K1,K2,K3,K4,K5,K6)
  - 3.4 EOQ with price breaks (K1,K2,K3,K4,K5,K6)
  - 3.5 Multi – item EOQ with shortage limitation (K1,K2,K3,K4,K5,K6)
  - 3.6 Dynamic EOQ Models (K1,K2,K3,K4,K5,K6)
- (Chapter 13: Sections 13.1 - 13.4)

### Unit IV: Dynamic Programming

(18 Hours)

- 4.1 Recursive Nature of Dynamic Programming Computation (K1,K2,K3,K4,K5,K6)
  - 4.2 Forward and Backward Recursion (K1,K2,K3,K4,K5,K6)
  - 4.3 Selected Dynamic Programming Applications (K1,K2,K3,K4,K5,K6)
  - 4.4 Equipment Replacement model(K1,K2,K3,K4,K5,K6)
  - 4.5 Investment model(K1,K2,K3,K4,K5,K6)
  - 4.6 Problem of dimensionality(K1,K2,K3,K4,K5,K6)
- (Chapter 12: 12.1 – 12.4)

### Unit V: Non Linear Programming

(18 Hours)

- 5.1 Basic concepts (K1,K2,K3,K4,K5,K6)
- 5.2 constrained Optimization –Direct search method(K1,K2,K3,K4,K5,K6)
- 5.3 Gradient method(K1,K2,K3,K4,K5,K6)
- 5.4 Constrained Optimization Problems – Separable programming(K1,K2,K3,K4,K5,K6)

- 5.5 Quadratic programming(K1,K2,K3,K4,K5,K6)  
5.6 Chance constrained programming(K1,K2,K3,K4,K5,K6)  
(Chapter21:21.1- 21.2.3)

**Books for study and reference:**

**Text Book:**

1. Hamdy A. Taha - Operations Research an Introduction, 10<sup>th</sup>Edition – Pearson-2017.

**Books for Reference:**

1. Hiller F.S. and Liberman G.J. - Introduction to Operations Research, 2<sup>nd</sup>Edition - CBS Publishers and Distributors, 1999.
2. S.D. Sharma - Operations Research, 15th Edition Kedarnath and Ramnath and Co. Publishers, 2003.
3. Ravindran A. Phillips D.T and Solberg J. - Operations Research: Principles and Practice, 2<sup>nd</sup>Edition - John Wiley and Sons Private Limited, 1987.

**E- Resources:**

1. <https://www.scribd.com/document/490106553/Operations-Research-Kanti-swarup-pdf#>
2. <http://zalamsyah.staff.unja.ac.id/wp-content/uploads/sites/286/2019/11/9-Operations-Research-An-Introduction-10th-Ed.-Hamdy-A-Taha.pdf>
3. [https://www.amirajcollege.in/wp-content/uploads/2020/10/3151910-operations-research-theory-and-applications-by-j.-k.-sharma-z-lib.org\\_.pdf](https://www.amirajcollege.in/wp-content/uploads/2020/10/3151910-operations-research-theory-and-applications-by-j.-k.-sharma-z-lib.org_.pdf)
4. <https://nptel.ac.in>
5. [www.coursera.org](http://www.coursera.org)
6. <https://swayam.gov.in>

**SEMESTER – III**  
**PEMAE20 – ELECTIVE III A: PROGRAMMING WITH JAVA**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: III</b>	PEMAE20	Elective III A: Programming With Java	Theory	Elective	4	3	100

**Course Objectives**

1. To learn a new platform independent language
2. To utilize Java in a variety of technologies and on different platforms.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the benefits and applications of OOP and distinguish C++ and JAVA.
2. Gain knowledge about operators and its types.
3. Define decision making statements and solve problems based on it.
4. Develop the program by manipulating classes and methods in the Java programming language.
5. Explore the Java programming by using arrays.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	H	L	M	H
CO2	M	H	H	L	M	H
CO3	M	H	H	L	M	H
CO4	M	M	H	L	M	H
CO5	H	H	H	L	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	H	H	H	L	M
CO4	H	H	H	H	L	M
CO5	H	H	H	H	L	M

(L-Low, M-Moderate, H-High)

**Course Syllabus**

**Unit I: Fundamentals of Object - Oriented Programming**

**(12 Hours)**

- 1.1 Basic Concepts of Object Oriented Programming – Benefits of OOP (K1, K2, K3, K4, K5, K6)
- 1.2 Applications of OOP - Features of Java (K1, K2, K3, K4, K5, K6)

- 1.3 Java Differs from C and C++ - Java environment (K1, K2, K3, K4, K5, K6)
  - 1.4 Java program structure (K1, K2, K3, K4, K5, K6)
  - 1.5 Tokens – Statements (K1, K2, K3, K4, K5, K6)
  - 1.6 Java programming style(K1, K2, K3, K4, K5, K6)
- (Chapter 1:1.3 – 1.5, Chapter 2: 2.2-2.3 and 2.9, Chapter 3:3.5 – 3.7 and 3.12)

**Unit II: Constants, Variables and Data Types, Operators and Expressions (12 Hours)**

- 2.1 Constants – Variables – Data types – Declaration of variables (K1, K2, K3, K4, K5, K6)
  - 2.2 Giving values to variables – Scope of variables – Symbolic constants (K1,K2,K3,K4,K5,K6)
  - 2.3 Type casting – Getting values of variables – Standard default values (K1,K2,K3,K4,K5,K6)
  - 2.4 Operators: Arithmetic, relational, logical, assignment, increment and decrement, conditional bitwise and special – Arithmetic expressions (K1, K2, K3, K4, K5, K6)
  - 2.5 Evaluation of expressions – Operator precedence and associativity (K1, K2, K3, K4,K5,K6)
  - 2.6 Mathematical functions (K1, K2, K3, K4, K5,K6)
- (Chapter 4: 4.2 – 4.11, Chapter 5: 5.2 – 5.11, 5.14 – 5.15)

**Unit III: Decision Making, Branching, Looping (12 Hours)**

- 3.1 Decision making statements: if, simple if, if ... else (K1, K2, K3, K4, K5,K6)
  - 3.2 Nesting of if ... else, else if ladder (K1, K2, K3, K4, K5,K6)
  - 3.3 Switch statements and conditional operator (K1, K2, K3, K4, K5,K6)
  - 3.4 Loop statements: while, do, for loops (K1, K2, K3, K4, K5,K6)
  - 3.5 Jumps in loops (K1, K2, K3, K4, K5,K6)
  - 3.6 Labeled loops.(K1, K2, K3, K4, K5,K6)
- (Chapter 6: 6.2 – 6.8, Chapter 7: 7.2 – 7.6)

**Unit IV: Classes, Objects and Methods (12 Hours)**

- 4.1 Defining a class – Fields declaration – Methods declaration (K1, K2, K3, K4, K5,K6)
  - 4.2 Creating objects – Accessing class members – Constructors (K1, K2, K3, K4, K5,K6)
  - 4.3 Methods overloading – Static members – Nesting of methods (K1, K2, K3, K4, K5,K6)
  - 4.4 Inheritance – overriding methods (K1, K2, K3, K4, K5,K6)
  - 4.5 Final variables, methods and classes, Finalizer methods (K1, K2, K3, K4, K5,K6)
  - 4.6 Abstract methods and classes - Methods with varargs – Visibility control.(K1, K2, K3, K4, K5,K6)
- (Chapter 8: 8.2 – 8.18)

**Unit V: Arrays, Strings and Vectors and Interfaces (12 Hours)**

- 5.1 One and two dimensional arrays (K1, K2, K3, K4, K5,K6)
  - 5.2 Strings – Vectors (K1, K2, K3, K4, K5,K6)
  - 5.3 Wrapper classes – Enumerated types (K1, K2, K3, K4, K5,K6)
  - 5.4 Annotations – Defining interfaces (K1, K2, K3, K4, K5,K6)
  - 5.5 Extending interfaces – Implementing interfaces (K1, K2, K3, K4, K5,K6)
  - 5.6 Accessing interface variables (K1, K2, K3, K4, K5,K6)
- (Chapter 9: 9.2 – 9.9, Chapter 10: 10.2 – 10.5)

## **Books for study and reference:**

### **Text Book:**

1. E. Balagurusamy – Programming with Java – Tata McGraw Hill Publication, 5<sup>rd</sup> Edition, 2014.

### **Books for Reference:**

1. K. Arnold and J. Gosling – The Java Programming Language – Ed. 2, Publication 2000.
2. Cays Horstmann and Gary Cornell – Core Java Volume II, Publications 2001.
3. Phil Hanna – JSP 2.0: The Complete Reference – TMH, Edition 2, Publications 2003.

### **E- Resources:**

1. <https://www.acs.ase.ro/Media/Default/documents/java/ClaudiuVinte/books/ArnoldGoslingHolmes06.pdf>
2. <https://ptgmedia.pearsoncmg.com/images/9780137081608/samplepages/013708160X.pdf>
3. <https://nitikesh.yolasite.com/resources/JSP%20complete%20reference.pdf>
4. <https://mu.ac.in/wp-content/uploads/2022/09/Core-JAVA.pdf>
5. <https://nptel.ac.in/>
6. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
7. <https://www.coursera.org/>

## SEMESTER – III

### PEMAG20– ELECTIVE III B: PROGRAMMING WITH R

<b>Year : II</b> <b>SEM : III</b>	<b>Course Code :</b> PEMAG20	<b>Title Of The Course :</b> Elective III B:Programming with R	<b>Course Type :</b> Theory& Practical	<b>Course Category :</b> Elective	<b>H/W</b> 4	<b>CREDITS</b> 3	<b>MARKS</b> 100
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#### Course Objectives

1. To master the use of R interactive environment with an understanding of the use of R documentation.
2. To use R for descriptive statistics and write multivariate models in R.

#### Course Outcomes (CO)

The Learners will be able to

1. Familiarize with basics of R software and built in function of R.
2. Identify the characteristics of datasets and plot the datasets in R using graphical methods.
3. Demonstrate understanding and use of for loop, if statement and break.
4. Implement the learning techniques and computing environment that are suitable for the applications under consideration.
5. Compute vectors and matrices, matrix inverse, eigen values and eigen vectors.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	H	L	M	H
CO2	M	H	H	L	M	H
CO3	M	H	H	L	M	H
CO4	M	M	H	L	M	H
CO5	M	H	H	L	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	H	H	H	L	M
CO4	H	H	H	H	L	M
CO5	H	H	H	H	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### **Unit 1: Introduction to R language (12 Hours)**

- 1.1. Starting and quitting in R, Basic features in R(K1,K2,K3,K4,K5,K6)
- 1.2. Built in functions and online help(K1,K2,K3,K4,K5,K6)
- 1.3. Logical vectors (K1,K2,K3,K4,K5,K6)
- 1.4. Rational operators.(K1,K2,K3,K4,K5,K6)
- 1.5. Changing Directories, redirecting R output, Lists(K1,K2,K3,K4,K5,K6)
- 1.6. Data frames (K1,K2,K3,K4,K5,K6)

### **Unit II: Programming Statistical Graph (12 Hours)**

- 2.1 Plotting bar charts, dot charts(K1,K2,K3,K4,K5,K6)
- 2.2 Plotting Pie charts (K1,K2,K3,K4,K5,K6)
- 2.3 Plotting Histograms (K1,K2,K3,K4,K5,K6)
- 2.4 Plotting Box plot(K1,K2,K3,K4,K5,K6)
- 2.5 Plotting scatter plot (K1,K2,K3,K4,K5,K6)
- 2.6 Plotting QQ plots(K1,K2,K3,K4,K5,K6)

### **Unit III: Programming with R (12 Hours)**

- 3.1 For loop(K1,K2,K3,K4,K5,K6)
- 3.2 If statement(K1,K2,K3,K4,K5,K6)
- 3.3 while loop(K1,K2,K3,K4,K5,K6)
- 3.4 Newton's method for finding root(K1,K2,K3,K4,K5,K6)
- 3.5 Repeat loop, break and next statements(K1,K2,K3,K4,K5,K6)
- 3.6 Problems and Exercises(K1,K2,K3,K4,K5,K6)

### **Unit IV: Simulation in R (12 Hours)**

- 4.1 Monte Carlo simulation(K1,K2,K3,K4,K5,K6)
- 4.2 Generation of pseudo random numbers(K1,K2,K3,K4,K5,K6)
- 4.3 Bernoulli random variables(K1,K2,K3,K4,K5,K6)
- 4.4 Binomial random variables(K1,K2,K3,K4,K5,K6)
- 4.5 Poisson random variables(K1,K2,K3,K4,K5,K6)
- 4.6 Exponential random numbers(K1,K2,K3,K4,K5,K6)

### **Unit V: Computational Linear Algebra in R (12 Hours)**

- 5.1 Vectors and matrices in R(K1,K2,K3,K4,K5,K6)
- 5.2 Constructing matrix objects(K1,K2,K3,K4,K5,K6)
- 5.3 Accessing matrix elements(K1,K2,K3,K4,K5,K6)
- 5.4 Row and column names(K1,K2,K3,K4,K5,K6)
- 5.5 Matrix properties, Matrix multiplication and inversion(K1,K2,K3,K4,K5,K6)
- 5.6 Eigen values and Eigen vectors.(K1,K2,K3,K4,K5,K6)

## **Books for study and reference:**

### **Text Book:**

1. W. John Braun, Duncan J. Murdoch, A first course in statistical programming with R, Cambridge University Press, 2007.

### **Books for Reference:**

1. Gardener, M. Beginning R: The statistical programming language, John Wiley & Sons 2012.
2. Martin, T. The Undergraduate Guide to R. A beginner's introduction to R programming Language, 2009.
3. Chambers, J. Software for data analysis: programming with R. Springer Science & Business Media, 2008.

### **E- Resources:**

1. [http://assets.cambridge.org/97805218/72652/frontmatter/9780521872652\\_frontmatter.pdf](http://assets.cambridge.org/97805218/72652/frontmatter/9780521872652_frontmatter.pdf)
2. [http://students.aiu.edu/submissions/profiles/resources/onlineBook/A7E7d8\\_Beginning%20R%20statistics.pdf](http://students.aiu.edu/submissions/profiles/resources/onlineBook/A7E7d8_Beginning%20R%20statistics.pdf)
3. <https://www.cs.upc.edu/~robert/teaching/estadistica/rprogramming.pdf>
4. <https://www.cs.upc.edu/~robert/teaching/estadistica/TheRBook.pdf>
5. <https://nptel.ac.in/>
6. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
7. <https://www.coursera.org/>
8. <https://spoken-tutorial.org/>

**SEMESTER – III**  
**PEMAF20 – ELECTIVE PRACTICAL: JAVA**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: III</b>	PEMAF20	Elective Practical: Java	Practical	Elective	2	1	100

**Course Objectives**

1. To gain knowledge of object-oriented paradigm in the Java programming language.
2. To design & program stand-alone Java applications.

**Course Outcomes (CO)**

The Learners will be able to

1. Implement programs with classes.
2. Write programs that perform operations using arrays.
3. Develop the program by decision making statements and solve problems based on it.
4. Illustrate basic programming concepts such as program flow and syntax of a high-level general purpose language.
5. Take a problem, figure out the algorithm to solve it and write the code.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	H	L	M	H
CO2	M	H	H	L	M	H
CO3	M	H	H	L	M	H
CO4	M	M	H	L	M	H
CO5	H	H	H	L	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	H	H	H	L	M
CO4	H	H	H	H	L	M
CO5	H	H	H	H	L	M

(L-Low, M-Moderate, H-High)

**Course Syllabus**

**PROGRAMS:**

1. Solution of linear equations.(K1,K2,K3,K4,K5,K6)
2. Number and sum of integers between two given integers which are divisible by a

- number. (K1,K2,K3,K4,K5,K6)
3. Multiplication table. (K1,K2,K3,K4,K5,K6)
  4. Verifying whether a given number is a palindrome. (K1,K2,K3,K4,K5,K6)
  5. Generation of Fibonacci sequence. (K1,K2,K3,K4,K5,K6)
  6. Sorting an array. (K1,K2,K3,K4,K5,K6)
  7. Merging two sorted arrays. (K1,K2,K3,K4,K5,K6)
  8. Product of two matrices. (K1,K2,K3,K4,K5,K6)
  9. Transpose of a matrix. (K1,K2,K3,K4,K5,K6)
  10. Replacing a substring with another. (K1,K2,K3,K4,K5,K6)

### **Books for study and reference:**

#### **Text Book:**

1. E. Balagurusamy – Programming with Java – Tata McGraw Hill Publication 5<sup>th</sup> Edition, 2014.

#### **Books for Reference:**

1. K. Arnold and J. Gosling – The Java Programming Language – Ed. 2, Publication, 2000.
2. Cays Horstmann and Gary Cornell – Core Java Volume II, Publications, 2001.
3. Phil Hanna – JSP 2.0: The Complete Reference – TMH, Edition 2, Publications, 2003.

#### **E- Resources:**

1. <https://www.acs.ase.ro/Media/Default/documents/java/ClaudiuVinte/books/ArnoldGoslingHolmes06.pdf>
2. <https://ptgmedia.pearsoncmg.com/images/9780137081608/samplepages/013708160X.pdf>
3. <https://nitikesh.yolasite.com/resources/JSP%20complete%20reference.pdf>
4. <https://nptel.ac.in/>
5. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
6. <https://www.coursera.org/>

**SEMESTER – III**  
**PEMAH20 - ELECTIVE PRACTICAL: R**

<b>Year : II</b> <b>SEM : III</b>	<b>Course Code:</b> PEMAH20	<b>Title Of The Course :</b> Elective Practical: R	<b>Course Type :</b> Theory & Practical	<b>Course Category :</b> Elective	<b>H/W</b> 2	<b>CREDITS</b> 1	<b>MARKS</b> 100
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**Course Objectives**

1. To master the use of R interactive environment with an understanding of the use of R documentation.
2. To use R for descriptive statistics and write simple programs in R.

**Course Outcomes (CO)**

The Learners will be able to

1. Familiarize with basics of R software and built in function of R.
2. Identify the characteristics of datasets and plot the datasets in R using graphical methods.
3. Demonstrate understanding and use data frames.
4. Implement the learning techniques and computing environment that are suitable for the applications under consideration.
5. Compute vectors and matrices, matrix inverse, eigen values and eigen vectors.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	H	H	L	M	H
CO2	M	H	H	L	M	H
CO3	M	H	H	L	M	H
CO4	M	M	H	L	M	H
CO5	M	H	H	L	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	H	H	H	L	M
CO4	H	H	H	H	L	M
CO5	H	H	H	H	L	M

(L-Low, M-Moderate, H-High)

**Course Syllabus**

**PROGRAMS:**

1. Create a sequence and find the mean of numbers.(K1,K2,K3,K4,K5,K6)

2. Find the first 10 Fibonacci Numbers. (K1,K2,K3,K4,K5,K6)
3. Find the factors of a given number. (K1,K2,K3,K4,K5,K6)
4. Find the maximum and minimum of a given vector.(K1,K2,K3,K4,K5,K6)
5. Read the CSV file and display the content.(K1,K2,K3,K4,K5,K6)
6. Create m x n matrix and perform matrix operations.(K1,K2,K3,K4,K5,K6)
7. Create a bar plot of five subject marks.(K1,K2,K3,K4,K5,K6)
8. Create a data frame and display the details.(K1,K2,K3,K4,K5,K6)
9. Extract rows and columns from data frame(K1,K2,K3,K4,K5,K6)
10. Create a list containing strings, numbers and vectors(K1,K2,K3,K4,K5,K6)

### **Books for study and reference:**

#### **Text Book:**

1. W. John Braun, Duncan J. Murdoch, A first course in statistical programming with R, Cambridge University Press, 2007.

#### **Books for Reference:**

1. Gardener, M. Beginning R: The statistical programming language, John Wiley & Sons, 2012.
2. Martin, T. The Undergraduate Guide to R. A beginner's introduction to R programming Language, 2009.
3. Chambers, J. Software for data analysis: programming with R. Springer Science & Business Media, 2008.

### **E- Resources:**

1. [http://assets.cambridge.org/97805218/72652/frontmatter/9780521872652\\_frontmatter.pdf](http://assets.cambridge.org/97805218/72652/frontmatter/9780521872652_frontmatter.pdf)
2. [http://students.aiu.edu/submissions/profiles/resources/onlineBook/A7E7d8\\_Beginning%20R%20statistics.pdf](http://students.aiu.edu/submissions/profiles/resources/onlineBook/A7E7d8_Beginning%20R%20statistics.pdf)
3. <https://www.cs.upc.edu/~robert/teaching/estadistica/rprogramming.pdf>
4. <https://www.cs.upc.edu/~robert/teaching/estadistica/TheRBook.pdf>
5. <https://nptel.ac.in/>
6. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
7. <https://www.coursera.org/>
8. <https://spoken-tutorial.org/>

## SEMESTER – III

### PIMAE20 - INDEPENDENT ELECTIVE 3 A: SKILL ENHANCEMENT IN REAL AND COMPLEX ANALYSIS -I

<b>Year: II</b> <b>SEM:III</b>	<b>Course Code:</b> PIMAE20	<b>Title of the Course:</b> Independent Elective 3 A: Skill Enhancement in Real and Complex Analysis -I	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>CREDITS</b> 2	<b>MARKS</b> 100
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#### Course Objectives

1. To develop the in-depth knowledge in Analysis and problem solving skills.
2. To engage them in self independent study of the Lecture notes and to enable the students to workout unsolved problems using various tricks.

#### Course Outcomes (CO)

The Learners will be able to

1. Utilize the basics of set theory and number system.
2. Acquire the knowledge of Sequences and Series.
3. Compute the Limit, Continuity and Differentiation of functions.
4. Analyze the Transcendental functions such as Exponential, Trigonometric and Hyperbolic Functions.
5. Evaluate the integral by Cauchy's Integral formula.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	M	H	L	M
<b>CO2</b>	H	H	M	H	L	M
<b>CO3</b>	H	H	M	H	L	M
<b>CO4</b>	H	H	M	H	H	M
<b>CO5</b>	H	H	M	H	H	M

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	L	H
<b>CO2</b>	H	H	H	M	L	H
<b>CO3</b>	H	H	H	M	L	H
<b>CO4</b>	H	H	H	M	H	H
<b>CO5</b>	H	H	H	M	H	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Set theory and Real Number System

Elementary Set Theory – Finite Countable and Uncountable Sets – Real Number System as a Complete Ordered Field – Archimedean Property – Supremum – Infimum.  
(K1,K2,K3,K4,K5,K6)  
(Chapter 1: 1.1- 1.6)

### Unit II: Sequences and Series

Sequences and Series – Convergence –  $\lim \sup$  –  $\lim \inf$  – Bolzano Weierstrass Theorem – Heine Boral Theorem.(K1,K2,K3,K4,K5,K6)  
(Chapter 2: 2.1-2.5)

### Unit III: Limit, Continuity and Differentiability and Mean Value Theorem

Continuity – Uniform Continuity – Discontinuity – Types of Discontinuity – Differentiability– Mean Value Theorem.(K1,K2,K3,K4,K5,K6)  
(Chapter 3: 3.1-3.4)

### Unit IV: Complex Numbers and Analytic Function

Algebra of Complex Number – The Complex Plane – Polynomials – Power Series – Transcendental Functions Such as Exponential, Trigonometric and Hyperbolic Functions– Analytic Function.(K1,K2,K3,K4,K5,K6)  
(Chapter 11: 11.1-11.5)

### Unit V: Complex Integration and Calculus of Residues

Contour integral – Cauchy's Theorem – Cauchy's Integral Formulae – Liouville's Theorem – Maximum Modulus Principle. (K1,K2,K3,K4,K5,K6)  
(Chapter 12: 12.1-12.4)

### Books for study and reference:

#### Text Book:

1. Pawan Sharma, Neha Sharma, Suraj Singh, Mathematical Sciences, UGC CSIR NET/SET (JRF & LS), Arihant Publications (India) Ltd, 2016.

#### Books for Reference:

1. Dr. A. P. Singh - Modern Algebra – Infostudy Publication, 2018.
2. R. Gupta's - Joint CSIR - UGC-NET Mathematical Sciences Previous Year's Solved Paper, 2014.
3. Dr. A . Kumar - CSIR-UGC NET/JRF/SLET Mathematical Sciences (Paper I & II) – UPKAR Prakashan Publications, 2010.

4. S.K. Shrivastava & M.K. Malik - CSIR-UGC NET/JRF MATHEMATICAL SCIENCES Previous Years Solved Papers Including Model Papers with Explanation – JBC Press, 20

**E-Resources:**

1. [https://r.search.yahoo.com/\\_ylt=Awr1Td7ugLVkU4YA5ADnHgx.;\\_ylu=Y29sbwMEcG9zAzgEdnRpZAMEc2VjA3Ny/RV=2/RE=1689645423/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f1dPIW3INU5shOVzs-XNO0oKENEZIIe4gR%2fview/RK=2/RS=OnsX9HtilpGstujshULBSKrgEKY-](https://r.search.yahoo.com/_ylt=Awr1Td7ugLVkU4YA5ADnHgx.;_ylu=Y29sbwMEcG9zAzgEdnRpZAMEc2VjA3Ny/RV=2/RE=1689645423/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f1dPIW3INU5shOVzs-XNO0oKENEZIIe4gR%2fview/RK=2/RS=OnsX9HtilpGstujshULBSKrgEKY-)
2. [https://r.search.yahoo.com/\\_ylt=Awr1QQutgrVkW1Q\\_AUnnHgx.;\\_ylu=Y29sbwMEcG9zAzgEdnRpZAMEc2VjA3Ny/RV=2/RE=1689645869/RO=10/RU=https%3a%2f%2fuobabylon.edu.iq%2feprints%2fpublication\\_2\\_24266\\_1569.pdf/RK=2/RS=HlnOY14vos37u6WUo\\_j0uu057AE-](https://r.search.yahoo.com/_ylt=Awr1QQutgrVkW1Q_AUnnHgx.;_ylu=Y29sbwMEcG9zAzgEdnRpZAMEc2VjA3Ny/RV=2/RE=1689645869/RO=10/RU=https%3a%2f%2fuobabylon.edu.iq%2feprints%2fpublication_2_24266_1569.pdf/RK=2/RS=HlnOY14vos37u6WUo_j0uu057AE-)
3. <https://nptel.ac.in>
4. [www.coursera.org](http://www.coursera.org)
5. <https://swayam.gov.in>

**SEMESTER – III**  
**PIMAF20 - INDEPENDENT ELECTIVE 3 B: FUNDAMENTALS OF RESEARCH**  
**METHODOLOGY AND STATISTICS - I**

<b>Year:II</b> <b>SEM:III</b>	<b>Course Code:</b> PIMAF20	<b>Title of the Course:</b> Independent Elective 3 B: Fundamentals of Research Methodology and Statistics – I	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To provide a clear understanding of basic concepts of the research methodology.
2. To motivate them in self- independent study of the Lecture notes and online materials and to analyse the real life problems using Statistics concepts.

**Course Outcomes (CO)**

The Learners will be able to

1. Utilize the basic concepts of Research.
2. Prepare the review of literature.
3. Plan the various types of survey studies and sampling design.
4. Study the case of Historical methods and Philosophical methods.
5. Classify the experimental procedure and case study of various groups.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	H
CO2	H	H	M	H	L	H
CO3	H	H	M	H	L	H
CO4	H	H	M	H	L	H
CO5	H	H	M	H	L	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	H
CO2	H	H	H	M	L	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	L	H
CO5	H	H	H	M	L	H

(L-Low, M-Moderate, H-High)

## **Course Syllabus**

### **Unit I: Perception of Research and Assortment of Problem**

Meaning of Research – General Characteristics of Research – Specific Characteristics of Research – Objectives of Research – Classification of Research – Types of Research – Reflective Thinking – Scientific Thinking – Characteristic of a Good Researcher – Characteristic of a Problem. (K1, K2, K3, K4, K5, K6)  
(Chapter 1 and 2)

### **Unit II: Appraise of related literature and foundation of hypothesis**

Meaning of review of Literature – Objective of review of literature – Sources of review of Literature – How to conduct of the review of the literature – Meaning of hypothesis – Observation versus specific Land general hypothesis – Variables in a hypothesis – Formal conditions for testing hypothesis. (K1, K2, K3, K4, K5, K6)  
(Chapter 3 and 4)

### **Unit III: Research Planning and Sampling, Survey Method**

Meaning of Research plan/ Design – Meaning and definitions of Sampling – Functions of Population and sampling – Types of sampling design – Scientific Method – Types of Survey Studies. (K1, K2, K3, K4, K5, K6)  
(Chapter 5, 6 and 7)

### **Unit IV: Historical Method and Philosophical Method**

Approaches of Historical Research – Functional History of Education – Writing the Report – Meaning of Philosophy – Philosophy of education – Procedure of Philosophy research in social sciences. (K1, K2, K3, K4, K5, K6)  
(Chapter 8 and 9)

### **Unit V: Experimental method and Case study**

Meaning and definition of experiment – the basic assumptions behind the experiment – Types of variables – Classification of experiment or experimental procedures – definition of case study – Types of Case study – Case study of group. (K1, K2, K3, K4, K5, K6)  
(Chapter 9 and 10)

### **Books for study and reference:**

#### **Text Book:**

1. Yogesh Kumar Singh - Fundamental of Research of Methodology and Statistics - New Age International Publishers, 2007.

### **Books for Reference:**

1. Bernard Beins and Maureen A. McCarthy - Research Methods and Statistics- Cambridge University Press Publications, 2017.
2. C. R. Kothari - Research Methodology: Methods and Techniques - New Delhi: New Age International (P) Ltd., ©2004, 1985.
3. Ian Walker - Research Methods and Statistics - Palgrave Macmillan Publisher, 2010.
4. Sherri L. Jackson - Research Methods and Statistics: A Critical Thinking Approach - Thomson Learning EMEA, Limited, 2008.

### **E-Resources:**

1. [https://r.search.yahoo.com/\\_ylt=AwrKAnTbybVkMwADhQLnHgx.;\\_ylu=Y29sbwMEcG9zAzIEdnRpZAMEc2VjA3Ny/RV=2/RE=1689664091/RO=10/RU=https%3a%2f%2fimgs.mkcl.org%2fimages%2febook%2fFundamental%2520of%2520Research%2520Methodology%2520and%2520Statistics%2520by%2520Yogesh%2520Kumar%2520Singh.pdf/RK=2/RS=34nLQrRAfg3K6OC0qscqOhl3HLM-](https://r.search.yahoo.com/_ylt=AwrKAnTbybVkMwADhQLnHgx.;_ylu=Y29sbwMEcG9zAzIEdnRpZAMEc2VjA3Ny/RV=2/RE=1689664091/RO=10/RU=https%3a%2f%2fimgs.mkcl.org%2fimages%2febook%2fFundamental%2520of%2520Research%2520Methodology%2520and%2520Statistics%2520by%2520Yogesh%2520Kumar%2520Singh.pdf/RK=2/RS=34nLQrRAfg3K6OC0qscqOhl3HLM-)
2. [https://r.search.yahoo.com/\\_ylt=Awr1Td55z7VkTLMCEAznHgx.;\\_ylu=Y29sbwMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1689665529/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f1XBslFv864x-k2kG-gGxlc35IIDL8\\_3Z1%2fview%3fusp%3dsharing/RK=2/RS=NIJctXhwacALzFiAfbxuc2xubrA-](https://r.search.yahoo.com/_ylt=Awr1Td55z7VkTLMCEAznHgx.;_ylu=Y29sbwMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1689665529/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f1XBslFv864x-k2kG-gGxlc35IIDL8_3Z1%2fview%3fusp%3dsharing/RK=2/RS=NIJctXhwacALzFiAfbxuc2xubrA-)
3. <https://nptel.ac.in/>
4. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
5. <https://www.coursera.org/>

**SEMESTER – IV**  
**PCMAM20 -FUNCTIONAL ANALYSIS**

<b>Year:II</b> <b>SEM: IV</b>	<b>Course Code :</b> PCMAM20	<b>Title of the Course:</b> Functional Analysis	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>CREDITS</b> 5	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the main structure theorems of functional analysis and to study the concepts of Banach and Hilbert spaces.
2. To instigate the concept of Banach algebra and the structure of commutative Banach algebra.

**Course Outcomes (CO)**

The Learners will be able to

1. Gain the knowledge of complete normed linear space and the Hahn Banach theorem.
2. Understand the open mapping theorem, closed graph theorem, and uniform boundedness theorem and determine the concept of complete inner product space and its properties.
3. Classify the operators into adjoint, self-adjoint, unitary and normal.
4. Know the basic properties of Banach Algebra and the spectrum of an element in a Banach algebra.
5. Represent commutative Banach algebras as algebras of continuous functions.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	H	M	H
CO2	H	H	L	H	M	H
CO3	H	H	L	H	M	H
CO4	H	H	L	H	M	H
CO5	H	H	L	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Banach Spaces

(18 Hours)

- 1.1 The Definition (K1,K2,K3,K4,K5,K6)
  - 1.2 Some examples (K1,K2,K3,K4,K5,K6)
  - 1.3 Continuous Linear Transformations (K1,K2,K3,K4,K5,K6)
  - 1.4 The Hahn Banach theorem (K1,K2,K3,K4,K5,K6)
  - 1.5 The Natural imbedding of  $N$  in  $N^{**}$  (K1,K2,K3,K4,K5,K6)
  - 1.6 The Natural imbedding of  $N$  in  $N^{**}$  (continued) (K1,K2,K3,K4,K5,K6)
- (Chapter 9: Sections 46 - 49)

### Unit II: Banach Spaces and Hilbert Spaces

(18 Hours)

- 2.1 The Open Mapping Theorem (K1,K2,K3,K4,K5,K6)
  - 2.2 The Conjugate of an Operator (K1,K2,K3,K4,K5,K6)
  - 2.3 Definition of Hilbert Space (K1,K2,K3,K4,K5,K6)
  - 2.4 Some simple properties (K1,K2,K3,K4,K5,K6)
  - 2.5 Orthogonal complements (K1,K2,K3,K4,K5,K6)
  - 2.6 Orthonormal Sets (K1,K2,K3,K4,K5,K6)
- (Chapter 9: Sections 50 and 51 and Chapter 10: Sections 52-54)

### Unit III: Hilbert Spaces

(18 Hours)

- 3.1 The Conjugate spaces  $H^*$  (K1,K2,K3,K4,K5,K6)
  - 3.2 The Adjoint of an operator (K1,K2,K3,K4,K5,K6)
  - 3.3 Self adjoint operators (K1,K2,K3,K4,K5,K6)
  - 3.4 Normal operator (K1,K2,K3,K4,K5,K6)
  - 3.5 Unitary operator (K1,K2,K3,K4,K5,K6)
  - 3.6 Projections (K1,K2,K3,K4,K5,K6)
- (Chapter 10: Sections 55-59)

### Unit IV: Banach Algebras

(18 Hours)

- 4.1 The definition and some examples (K1,K2,K3,K4,K5,K6)
  - 4.2 Regular and singular elements (K1,K2,K3,K4,K5,K6)
  - 4.3 Topological divisors of zero (K1,K2,K3,K4,K5,K6)
  - 4.4 The spectrum (K1,K2,K3,K4,K5,K6)
  - 4.5 The formula for the spectral radius (K1,K2,K3,K4,K5,K6)
  - 4.6 The radical and semi-simplicity (K1,K2,K3,K4,K5,K6)
- (Chapter 12: Sections 64-69)

### Unit V: The Structure of Commutative Banach Algebras

(18 Hours)

- 5.1 The Gelfand Mapping (K1,K2,K3,K4,K5,K6)
- 5.2 The Gelfand Mapping (continued) (K1,K2,K3,K4,K5,K6)
- 5.3 Applications of the formula  $r(x) = \lim_{n \rightarrow \infty} \|x^n\|^{\frac{1}{n}}$  (K1,K2,K3,K4,K5,K6)
- 5.4 Applications of the formula  $r(x) = \lim_{n \rightarrow \infty} \|x^n\|^{\frac{1}{n}}$  (continued) (K1,K2,K3,K4,K5,K6)

- 5.5 Involutions in Banach Algebras (K1,K2,K3,K4,K5,K6)  
5.6 The Gelfand Neumark theorem (K1,K2,K3,K4,K5,K6)  
(Chapter 13: Sections 70-73)

**Books for study and reference:**

**Text Book:**

1. George F. Simmons - Introduction to Topology and Modern Analysis – McGraw Hill Education (India) Private Limited, New Delhi, 2004 (26<sup>th</sup> Reprint 2016).

**Books for Reference:**

1. Somasundaram D. – A first course in Functional Analysis –Narosa Publishing House Pvt. Ltd., 2006, Reprint 2008.
2. Ovchinnikov S. – Functional Analysis, 1<sup>st</sup> Edition – Springer, 2018.
3. Kumar S. – Functional Analysis, 1<sup>st</sup> Edition - CBS, 2005.

**E-Resources:**

1. <https://people.math.ethz.ch/~salamon/PREPRINTS/funcana.pdf>
2. <https://docs.ufpr.br/~eidam/2019/2/CM075/Kreyszig.pdf>
3. [https://59clc.files.wordpress.com/2012/08/functional-analysis-\\_-rudin-2th.pdf](https://59clc.files.wordpress.com/2012/08/functional-analysis-_-rudin-2th.pdf)
4. <http://mathforum.org>
5. <http://ocw.mit.edu/ocwweb/Mathematics>
6. <http://www.opensource.org>
7. <http://en.wikipedia.org>
8. <https://nptel.ac.in>
9. [www.coursera.org](http://www.coursera.org)
10. <https://swayam.gov.in>

**SEMESTER – IV**  
**PCMAN20 – CALCULUS OF VARIATIONS**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: IV</b>	PCMAN20	Calculus of Variations	Theory	Core	6	5	100

**Course Objectives**

1. To find the maxima and minima of functions.
2. To develop an understanding of variational problems with fixed boundaries and moving boundaries.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the functional and its applications. Also use the Euler-Lagrange equation to find the differential equations for stationary paths.
2. Describe Du Bois-Reymond problem and solve it.
3. Solve differential equations for stationary paths subject to boundary conditions
4. Give an account of the foundations of calculus of variations and its applications in Mathematics and Physics.
5. Apply direct methods to solve variational problems.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	H	M	L
CO2	H	M	H	H	M	L
CO3	H	M	H	H	M	L
CO4	H	M	H	H	M	L
CO5	H	M	H	H	M	L

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	M
CO2	H	H	H	M	L	M
CO3	H	H	H	M	L	M
CO4	H	H	H	M	L	M
CO5	H	H	H	M	L	M

(L-Low, M-Moderate, H-High)

**Course Syllabus**

**Unit I: Variational Problems with Fixed Boundaries**

**(18 Hours)**

- 1.1 The Concept of Variation and Its Properties.(K1,K2,K3,K4,K5,K6)
- 1.2 Euler's Equation.(K1,K2,,K3,K4,K5,K6)

- 1.3 Variational Problems for Functionals of the Form  $\int_a^b F(x, y_1(x), y_2(x), \dots, y_1'(x), y_1''(x), \dots, y_n'(x)) dx$  (K1,K2,K3,K4,K5,K6)
- 1.4 Functionals Dependent On Higher-Order Derivatives.(K1,K2,K3,K4,K5,K6)
- 1.5 Functionals Dependent on Functions of Several Independent Variables. (K1,K2,K3,K4,K5,K6)
- 1.6 Variational Problems in Parametric Form.(K1,K2,K3,K4,K5,K6)  
(Chapter 1: Sections 1.1-1.6)

**Unit II: Variational Problems with Fixed Boundaries (Continued) (18 Hours)**

- 2.1 Some Applications to Problems of Mechanics.(K1,K2,K3,K4,K5,K6)
- 2.2 Variational Problems Leading to an Integral Equation or a Differential-Difference Equation. (K1,K2,K3,K4,K5,K6)
- 2.3 Theorem of du Bois-Reymond. (K1,K2,K3,K4,K5,K6)
- 2.4 Stochastic Calculus of Variations. (K1,K2,K3,K4,K5,K6)
- 2.5 Supplementary Remarks. (K1,K2,K3,K4,K5,K6)
- 2.6 Problems. (K1,K2,K3,K4,K5,K5)  
(Chapter 1: Sections 1.7-1.11)

**Unit III: Variational Problems with Moving Boundaries (18 Hours)**

- 3.1 Functional of the form  $I [y(x)] = \int_{x_1}^{x_2} F(x, y, y') dx$ . (K1,K2,K3,K4,K5,K6)
- 3.2 Variational Problem with a Movable Boundary for a Functional Dependent on Two Functions. (K1,K2,K3,K4,K5,K6)
- 3.3 One-Sided Variations.(K1,K2,K3,K4,K5,K6)
- 3.4 Reflection and Refraction of Extremals. (K1,K2,K3,K4,K5,K6)
- 3.5 Diffraction of Light Rays.(K1,K2,,K3,K4,K5,K6)
- 3.6 Problems. (K1,K2,K3,K4,K5,K6)  
(Chapter 2: Sections 2.1-2.5)

**Unit IV: Sufficient Conditions for an Extremum (18 Hours)**

- 4.1 Field of Extremals. (K1,K2,K3,K4,K5,K6)
- 4.2 Jacobi Condition. (K1,K2,K3,K4,K5,K6)
- 4.3 Weirstrass Function. (K1,K2,K3,K4,K5,K6)
- 4.4 Legendre Condition. (K1,K2,K3,K4,K5,K6)
- 4.5 Second Variation. (K1,K2,K3,K4,K5,K6)
- 4.6 Canonical Equations and Variational Principles. (K1,K2,K3,K4,K5,K6)  
(Chapter 3: Sections 3.1-3.6)

**Unit V: Sufficient Conditions for an Extremum (Continued) (18 Hours)**

- 5.1 Complementary Variational Principles.(K1,K2,,K3,K4,K5,K6)
- 5.2 Poisson Bracket .(K1,K2,,K3,K4,K5,K6)
- 5.3 Contact Transformations.(K1,K2,,K3,K4,K5,K6)
- 5.4 The Hamilton-Jacobi Equation.(K1,K2,,K3,K4,K5,K6)
- 5.5 Clairaut's Theorem.(K1,K2,,K3,K4,K5,K6)
- 5.6 Noether's Theorem.(K1,K2,,K3,K4,K5,K6)  
(Chapter 3: Sections 3.7 – 3.12)

## **Books for study and reference:**

### **Text Book:**

1. A.S. Gupta- Calculus of Variations with Applications-10<sup>th</sup> Printing –PHI Learning Private Limited,1997.

### **Books for Reference:**

1. Gelfand, J.M. and Fomin S.V.- Calculus of Varians - Prentice hall - New Jessy- 1963.
2. Weinstock - Calculus of Variation - McGraw Hall. 1952.
3. Bernard Dacorogna – Introduction to the calculus of variations – 3<sup>rd</sup> edition, Imperial college press, Switzerland, 2004.

### **E- Resources:**

1. [https://books.google.co.in/books/about/CALCULUS\\_OF\\_VARIATIONS\\_WITH\\_APPLICATIONS.html?id=90UvngEACAAJ&redir\\_esc=y](https://books.google.co.in/books/about/CALCULUS_OF_VARIATIONS_WITH_APPLICATIONS.html?id=90UvngEACAAJ&redir_esc=y)
2. [https://efaidnbmnnnibpcajpcgclefindmkaj/http://users.uoa.gr/~pjioannou/mech2/READING/Gelfand\\_Fomin\\_Calculus\\_of\\_Variations.pdf](https://efaidnbmnnnibpcajpcgclefindmkaj/http://users.uoa.gr/~pjioannou/mech2/READING/Gelfand_Fomin_Calculus_of_Variations.pdf)
3. <https://emineter.files.wordpress.com/2014/02/mathematics-calculus-of-variations-with-applications-to-physics-engineering-robert-weinstock-dover-publications-djvu.pdf>
4. <https://efaidnbmnnnibpcajpcgclefindmkaj/http://kgut.ac.ir/useruploads/1569312462937qai.pdf>
5. <https://nptel.ac.in/>
6. [https://swayam.gov.in/nc\\_details/NPTEL](https://swayam.gov.in/nc_details/NPTEL)
7. <https://www.coursera.org/>

**SEMESTER – IV**  
**PCMAO20 - MATHEMATICAL STATISTICS**

<b>Year : II</b>	<b>Course Code :</b>	<b>Title Of The Course :</b>	<b>Course Type :</b>	<b>Course Category :</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM : IV</b>	PCMAO20	Mathematical Statistics	Theory	: Core	6	5	100

**Course Objectives**

1. To know about Statistics, its scope and importance in various areas such as Medical, Engineering, Agricultural etc.
2. To apply problem solving technique to solve real world event and acquire knowledge about hypothesis testing and the significance test.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the sample moments and their functions and analyze chi-square, Student-t, Fishers-Z distributions.
2. Demonstrate the knowledge of the properties of parametric testing procedures.
3. Construct tests and estimators, and derive their properties. Estimate population parameters from data sets and use the sampling distributions to compute confidence intervals for these population parameters.
4. Learn the basic components of hypothesis testing and perform hypothesis test on population means.
5. Understand the basic terms used in design of experiments and use appropriate experimental designs to analyze the experimental data.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	L	H	M	L
CO4	H	H	L	H	H	M
CO5	H	H	H	H	H	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Sample moments and their functions (18 Hours)

- 1.1 The notion of a sample (K1,K2,K3,K4,K5,K6)
- 1.2 The notion of a statistic (K1,K2,K3,K4,K5,K6)
- 1.3 The distribution of the arithmetic mean of independent normally distributed random variables(K1,K2,K3,K4,K5,K6)
- 1.4 The chi-square distribution (K1,K2,K3,K4,K5,K6)
- 1.5 The distribution of the statistic (K1,K2,K3,K4,K5,K6)
- 1.6 Student's t-distribution –Fisher's Z-distribution (K1,K2,K3,K4,K5,K6)  
(Chapter 9: Sections 9.1 to 9.7)

### Unit II: Significance Test (18 Hours)

- 2.1 The concept of a statistical test (K1,K2,K3,K4,K5,K6)
- 2.2 Parametric test for small samples (K1,K2,K3,K4,K5,K6)
- 2.3 Parametric tests for large samples (K1,K2,K3,K4,K5,K6)
- 2.3 Examples based on Small and large samples(K1,K2,K3,K4,K5,K6)
- 2.5 The chi – square test (K1,K2,K3,K4,K5,K6)
- 2.6 Independence tests by contingency tables. (K1,K2,K3,K4,K5,K6)  
(Chapter 12: Sections 12.1 to 12.4 and 12.7)

### Unit III: Theory of Estimation (18 Hours)

- 3.1 Preliminary notions (K1,K2,K3,K4,K5,K6)
- 3.2 Consistent estimate (K1,K2,K3,K4,K5,K6)
- 3.2 Unbiased estimate (K1,K2,K3,K4,K5,K6)
- 3.4 Sufficiency – efficiency (K1,K2,K3,K4,K5,K6)
- 3.5 Asymptotically most efficient estimate.(K1,K2,K3,K4,K5,K6)
- 3.6 Methods of finding estimates. (K1,K2,K3,K4,K5,K6)  
(Chapter 13: Sections 13.1 to 13.7)

### Unit IV: Theory of Hypotheses testing (18 Hours)

- 4.1 Preliminary remarks (K1,K2,K3,K4,K5,K6)
- 4.2 The Power function and the OC. (K1,K2,K3,K4,K5,K6)
- 4.3 Most Powerful tests (K1,K2,K3,K4,K5,K6)
- 4.4 Uniformly most powerful test (K1,K2,K3,K4,K5,K6)
- 4.5 Unbiased tests (K1,K2,K3,K4,K5,K6)
- 4.6 The power and consistency of nonparametric test. (K1,K2,K3,K4,K5,K6)  
(Chapter 16: 16.1 to 16.6)

### Unit V: Design of Experiments (18 Hours)

- 5.1 Aim of the Design of experiments. (K1,K2,K3,K4,K5,K6)
- 5.2 Basic Principles of Experimental Design.(K1,K2,K3,K4,K5,K6)
- 5.3 Some Basic Designs of Experiment. (K1,K2,K3,K4,K5,K6)
- 5.4 Analysis of variance (K1,K2,K3,K4,K5,K6)

- 5.5 Comparison of RBD and LSD. (K1,K2,K3,K4,K5,K6)  
5.6 Examples based on analysis of variance (K1,K2,K3,K4,K5,K6)  
(Chapter 10: 10.1 to 10.11)

**Books for study and reference:**

**Text Books:**

1. Marek Fisz - Probability Theory and Mathematical Statistics, 3<sup>rd</sup> Edition – John Wiley and Sons Inc, 1963. (Unit I to IV)
2. Veerarajan T – Probability, Statistics and Random Processes , 2<sup>nd</sup> Edition – Tata McGraw-Hill, 2006.( Unit V)

**Books for Reference:**

1. Suddhenda Biswas and G. L. Sriwastav – Mathematical Statistics – Narosa Publishing House, 2011.
2. Alexander M. Mood, Franklin A.Graybill and Duane C.Bose – Introduction to Theory of Statistics, 3<sup>rd</sup> Edition - Tata McGraw Hill, 1974.
3. P. Kandasamy, K. Thilagavathy and K. Gunavathy - Probability, Statistics and Queuing Theory, 2nd Edition - Sultan Chand and Sons, 2005.

**E- Resources:**

1. <https://www.scribd.com/document/294762054/Probability-Theory-and-Mathematical>
2. [https://r.search.yahoo.com/\\_ylt=AwrKAnSkarVk9P8.liPnHgX.;\\_ylu=Y29sbwMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1689639716/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f0B3ouU3Ur4aahVy13TzBfYjdUN3c%2fedit%3fusp%3dsharing/RK=2/RS=cZtZhaJAGtGLVB\\_.TFsHTEJhluc-](https://r.search.yahoo.com/_ylt=AwrKAnSkarVk9P8.liPnHgX.;_ylu=Y29sbwMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1689639716/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f0B3ouU3Ur4aahVy13TzBfYjdUN3c%2fedit%3fusp%3dsharing/RK=2/RS=cZtZhaJAGtGLVB_.TFsHTEJhluc-)
3. <http://mathforum.org>
4. <http://ocw.mit.edu/ocwwweb/Mathematics>
5. <http://www.opensource.org>
6. <https://nptel.ac.in>
7. <https://www.probability.net>
8. [www.coursera.org](http://www.coursera.org)
9. <https://swayam.gov.in>

**SEMESTER – IV**  
**PCMAP20 - PROJECT**

<b>Year: II</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W</b>	<b>CREDITS</b>	<b>MARKS</b>
<b>SEM: IV</b>	PCMAP20	Project	-	-	6	4	100

It should be done individually under the guidance of one of the Faculty members. The Dissertation should be submitted before 31<sup>st</sup> March. The students should present their research work during the viva-voce.

**SEMESTER – IV**  
**PEMAI20 - ELECTIVE IV A: GRAPH THEORY**

<b>Year : II</b> <b>SEM : IV</b>	<b>Course Code :</b> PEMAI20	<b>Title Of The Course :</b> Elective IV A:Graph Theory	<b>Course Type :</b> Theory	<b>Course Category :</b> Elective	<b>H/W</b> 6	<b>CREDITS</b> 4	<b>MARKS</b> 100
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**Course Objectives**

1. To introduce the fundamental concepts of graph theory
2. To understand the concepts of graph theory and apply it in practical situations.

**Course Outcomes (CO)**

The Learners will be able to

1. Identify subgraphs, cycles, paths and connection in graphs.
2. Analyse the cut vertices, cut edges and bonds in trees.
3. Distinguish between the Hamiltonian and Eulerian graph.
4. Explain the concepts of matchings and coverings in bipartite graphs.
5. Understand the concepts of colouring and planar graphs.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	M	H
CO3	H	H	H	H	L	M
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	M

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### **Unit I: Graphs and Subgraphs (18 Hours)**

- 1.1 Graphs and Simple Graphs (K1, K2, K3, K4, K5, K6)
  - 1.2 Graph Isomorphism (K1, K2, K3, K4, K5, K6)
  - 1.3 Incidence and adjacency Matrices (K1, K2, K3, K4, K5, K6)
  - 1.4 Subgraphs - Vertex degrees (K1, K2, K3, K4, K5, K6)
  - 1.5 Paths and connection - Cycles (K1, K2, K3, K4, K5, K6)
  - 1.6 The shortest path problem. (K1, K2, K3, K4, K5, K6)
- (Chapter1: Sections 1.1 – 1.8)

### **Unit II: Trees and Connectivity (18 Hours)**

- 2.1 Trees (K1, K2, K3, K4, K5, K6)
  - 2.2 Cut Edges and Bonds (K1, K2, K3, K4, K5, K6)
  - 2.3 Cut Vertices (K1, K2, K3, K4, K5, K6)
  - 2.4 Cayley's Formula (K1, K2, K3, K4, K5, K6)
  - 2.5 Connectivity (K1, K2, K3, K4, K5, K6)
  - 2.6 Blocks (K1, K2, K3, K4, K5, K6)
- (Chapter2: Sections 2.1 - 2.5 and Chapter3: Sections 3.1- 3.2)

### **Unit III: Euler Tours and Hamilton Cycles (18 Hours)**

- 3.1 Euler Tours (K1, K2, K3, K4, K5, K6)
  - 3.2 Theorems on Euler Tours (K1, K2, K3, K4, K5, K6)
  - 3.3 Hamilton Cycles (K1, K2, K3, K4, K5, K6)
  - 3.4 Theorems on Hamilton Cycles (K1, K2, K3, K4, K5, K6)
  - 3.5 The Chinese postman problem (K1, K2, K3, K4, K5, K6)
  - 3.6 The travelling salesman problem (K1, K2, K3, K4, K5, K6)
- (Chapter 4: Sections 4.1 - 4.4)

### **Unit IV: Matchings, Independent sets and Cliques (18 Hours)**

- 4.1 Matchings (K1, K2, K3, K4, K5, K6)
  - 4.2 Theorems on Matchings. (K1, K2, K3, K4, K5, K6)
  - 4.3 Coverings in bipartite graphs (K1, K2, K3, K4, K5, K6)
  - 4.4 Perfect matching (K1, K2, K3, K4, K5, K6)
  - 4.5 The personnel problem (K1, K2, K3, K4, K5, K6)
  - 4.6 Independent Sets (K1, K2, K3, K4, K5, K6)
- (Chapter5: Sections 5.1 - 5.4 and Chapter7: Section7.1)

### **Unit V: Vertex colouring and Planar graphs (18 Hours)**

- 5.1 Chromatic Number- Brook's theorem (K1, K2, K3, K4, K5, K6)
- 5.2 Chromatic Polynomials (K1, K2, K3, K4, K5, K6)
- 5.3 Plane and planar graphs (K1, K2, K3, K4, K5, K6)
- 5.4 Dual graphs (K1, K2, K3, K4, K5, K6)

5.5 Euler's formula (K1, K2, K3, K4, K5, K6)

5.6 The Five Colour theorem and the Four-Colour Conjecture (K1, K2, K3, K4, K5, K6)  
(Chapter 8: Section 8.1, 8.2 and 8.4, Chapter 9: Sections 9.1 - 9.3 and 9.6)

**Books for study and reference:**

**Text Book:**

1. J. A. Bondy and U.S.R.Murty - Graph theory and Applications, Macmillan 5<sup>th</sup> edition 1982.

**Books for Reference:**

1. Douglas B. West - Introduction to Graph Theory, 2<sup>nd</sup> Edition – Urbana, 2006.
2. Harary - Graph Theory, 1<sup>st</sup> Edition – Narosa Publishing House, 1988.
3. S.Arumugam and S. Ramachandran - Invitation to Graph Theory – SciTech Publications Pt. Ltd., 2001.

**E-Resources:**

1. <https://www.zib.de/groetschel/teaching/WS1314/BondyMurtyGTWA.pdf>
2. [https://www.researchgate.net/publication/336915761\\_APPLICATIONS\\_OF\\_GRAPH\\_THEORY\\_IN\\_HUMAN\\_LIFE](https://www.researchgate.net/publication/336915761_APPLICATIONS_OF_GRAPH_THEORY_IN_HUMAN_LIFE)
3. <https://www.hamilton.ie/oilie/Downloads/Graph.pdf>
4. <https://nptel.ac.in>
5. [www.coursera.org](http://www.coursera.org)
6. <https://swayam.gov.in>

**SEMESTER – IV**  
**PEMAJ20 –ELECTIVE IV B: FUZZY SET THEORY**

Year :II SEM : IV	Course Code : PEMAJ20	Title Of The Course : Elective IV B:Fuzzy Set Theory	Course Type : Theory	Course Category : Elective	H/W 6	CREDITS 4	MARKS 100
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**Course Objectives**

1. To develop a research approach that can deal with problems relating to ambiguous situations.
2. To make use of a special fuzzy set to model reality better than traditional theories.

**Course Outcomes (CO)**

The Learners will be able to

1. Distinguish between crisp set and fuzzy set through bi-valued logic and infinite-valued logic.
2. Know about the most widely used standard fuzzy set operations.
3. Formulate the fuzzy number which is a special case of a convex, normalized fuzzy set of the real line.
4. Explore the fuzzy relation and its operations which is the generalization of crisp relation.
5. Analyze the methods of decision making in fuzzy environment and their applications in LPP.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	L	M
CO2	H	M	H	H	L	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Crisp Sets and Fuzzy Sets (18 Hours)

- 1.1 Crisp sets: An Overview (K1,K2,K3,K4,K5,K6)
  - 1.2 Fuzzy sets: Basic Types (K1,K2,K3,K4,K5,K6)
  - 1.3 Fuzzy sets: Basic Concepts (K1,K2,K3,K4,K5,K6)
  - 1.4 Additional properties of alpha cuts (K1,K2,K3,K4,K5,K6)
  - 1.5 Representations of fuzzy sets (K1,K2,K3,K4,K5,K6)
  - 1.6 Extension Principle for fuzzy sets (K1,K2,K3,K4,K5,K6)
- (Chapter 1: 1.2-1.4 and Chapter 2: 2.1-2.3)

### Unit II: Operations on Fuzzy Sets (18 Hours)

- 2.1 Types of operations (K1,K2,K3,K4,K5,K6)
  - 2.2 Fuzzy Complements (K1,K2,K3,K4,K5,K6)
  - 2.3 Fuzzy Intersection: t-Norms (K1,K2,K3,K4,K5,K6)
  - 2.4 Fuzzy Union: t-Conorms (K1,K2,K3,K4,K5,K6)
  - 2.5 Combinations of operations (K1,K2,K3,K4,K5,K6)
  - 2.6 Aggregation Operations (K1,K2,K3,K4,K5,K6)
- (Chapter 3: 3.1-3.6)

### Unit III: Fuzzy Arithmetic (18 Hours)

- 3.1 Fuzzy numbers(K1,K2,K3,K4,K5,K6)
  - 3.2 Linguistic variables (K1,K2,K3,K4,K5,K6)
  - 3.3 Arithmetic operations on intervals (K1,K2,K3,K4,K5,K6)
  - 3.4 Arithmetic operations on fuzzy numbers (K1,K2,K3,K4,K5,K6)
  - 3.5 Lattice of fuzzy numbers (K1,K2,K3,K4,K5,K6)
  - 3.6 Fuzzy equations (K1,K2,K3,K4,K5,K6)
- (Chapter 4: 4.1-4.6)

### Unit IV: Fuzzy Relations (18 Hours)

- 4.1 Crisp versus Fuzzy Relations (K1,K2,K3,K4,K5,K6)
  - 4.2 Projections and Cylindric extensions (K1,K2,K3,K4,K5,K6)
  - 4.3 Binary fuzzy relations. (K1,K2,K3,K4,K5,K6)
  - 4.4 Binary relations on a single set (K1,K2,K3,K4,K5,K6)
  - 4.5 Fuzzy equivalence relations (K1,K2,K3,K4,K5,K6)
  - 4.6 Fuzzy compatibility relations, Fuzzy ordering relations (K1,K2,K3,K4,K5,K6)
- (Chapter 5: 5.1 - 5.7)

### Unit V: Fuzzy Decision Making (18 Hours)

- 5.1 Individual Decision Making (K1,K2,K3,K4,K5,K6)
- 5.2 Multi-person Decision Making (K1,K2,K3,K4,K5,K6)
- 5.3 Multi criteria Decision Making (K1,K2,K3,K4,K5,K6)
- 5.4 Multi-stage Decision Making (K1,K2,K3,K4,K5,K6)

5.5 Fuzzy Ranking Methods (K1,K2,K3,K4,K5,K6)  
5.6 Fuzzy linear programming (K1,K2,K3,K4,K5,K6)  
(Chapter 15: 15.2-15.7)

**Books for study and reference:**

**Text Book:**

1. George J. Klir and Bo Yuan, Fuzzy sets and fuzzy logic – Theory and Applications, Prentice Hall of India Private limited, New Delhi, 2005.

**Books for Reference:**

1. Kwang H. Lee – First Course on Fuzzy Theory and Applications – Springer, 2005.
2. Sudhir K. Pundir and Rimple Pundir - Fuzzy Sets and their Applications –Pragati Prakashan Educational Publisher, First Edition, 2006.
3. S. Nanda and N. R. Das – Fuzzy Mathematical Concepts– Narosa Publishing House, 2010.

**E-Resources:**

1. <http://www.pzs.dstu.dp.ua/logic/bibl/yuan.pdf>
2. <https://cours.etsmtl.ca/sys843/REFS/Books/ZimmermannFuzzySetTheory2001.pdf>
3. <https://nptel.ac.in>
4. [www.coursera.org](http://www.coursera.org)
5. <https://swayam.gov.in>

**SEMESTER – IV**  
**PIMAG20 - INDEPENDENT ELECTIVE 4 A: SKILL ENHANCEMENT IN REAL**  
**AND COMPLEX ANALYSIS – II**

<b>Year: II</b> <b>SEM:IV</b>	<b>Course Code:</b> PIMAG20	<b>Title of the Course:</b> Independent Elective 4 A: Skill Enhancement in Real and Complex Analysis – II	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To develop the in-depth knowledge in real and complex analysis problem solving skills.
2. To enhance the knowledge of the students to workout unsolved problems using various tricks and to encourage them to clear CSIR NET, SET, JRF and GATE examinations.

**Course Outcomes (CO)**

The Learners will be able to

1. Analyze the theory of Partial derivatives.
2. Compute Riemann Sum and Riemann integral.
3. Evaluate the concepts of Lebesgue measure and Lebesgue integral.
4. Identify the Connectedness and Compactness.
5. Calculate the Residues of functions and improve the knowledge of conformal mappings

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	M
CO2	H	H	M	H	L	M
CO3	H	H	M	H	L	M
CO4	H	H	M	H	H	M
CO5	H	H	M	H	H	M

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	H
CO2	H	H	H	M	L	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	L	H
CO5	H	H	H	M	L	H

(L-Low, M-Moderate, H-High)

## **Course Syllabus**

### **Unit I: Functions of Several Variables**

Functions of Several Variables – Directional Derivative – Partial Derivative – Derivative as a Linear Transformation. (K1,K2,K3,K4,K5,K6)  
(Chapter 4: 4.1- 4.4)

### **Unit II: The Riemann Integral and Improper Integral**

Riemann Sum and Riemann Integral - Improper Integral – Sequences and Series of Function-Uniform Convergence. (K1,K2,K3,K4,K5,K6)  
(Chapter 5: 5.1-5.2)

### **Unit III: Function of Bounded Variation, Lebesgue Measure and Metric Space**

Function of Bounded Variation – Lebesgue Measure – Lebesgue Integral – Metric Space – Connectedness – Compactness – Normal Linear Space.(K1,K2,K3,K4,K5,K6)  
(Chapter 7: 7.1-7.6)

### **Unit IV: Complex Integration and Calculus of Residues**

Schwartz Lemma – Open Mapping Theorem – Taylor Series – Laurents Theorem Calculus of Residues.(K1,K2,K3,K4,K5,K6)  
(Chapter 12: 12.5-12.7)

### **Unit V: Conformal Mapping**

Conformal Mapping – Mobious Transformation. (K1,K2,K3,K4,K5,K6)  
(Chapter 13: 13.1-13.2)

### **Books for study and reference:**

#### **Text Book:**

1. Pawan Sharma, Neha Sharma, Suraj Singh, Mathematical Sciences, UGC CSIR NET/SET (JRF & LS), Arihant Publications (India) Ltd, 2016.

#### **Books for Reference:**

1. Dr. A. P. Singh - Modern Algebra - Infostudy Publication, 2018.
2. R. Gupta's - Joint CSIR - UGC-NET Mathematical Sciences Previous Year's Solved Paper, 2014.
3. Dr. A. Kumar - CSIR-UGC NET/JRF/SLET Mathematical Sciences (Paper I & II) – UPKAR Prakashan Publications, 2010.

4. S.K. Shrivastava & M.K. Malik - CSIR-UGC NET/JRF MATHEMATICAL SCIENCES Previous Years Solved Papers Including Model Papers With Explanation – JBC Press, 2019.

**E- Resources:**

1. [https://r.search.yahoo.com/\\_ylt=Awr1Td7ugLVkU4YA5ADnHgX.;\\_ylu=Y29sbwMEcG9zAzgEdnRpZAMEc2VjA3Ny/RV=2/RE=1689645423/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f1dPIW3INU5shOVzs-XNO0oKENEZIIe4gR%2fview/RK=2/RS=OnsX9HtilpGstujshULBSKrgEKY-](https://r.search.yahoo.com/_ylt=Awr1Td7ugLVkU4YA5ADnHgX.;_ylu=Y29sbwMEcG9zAzgEdnRpZAMEc2VjA3Ny/RV=2/RE=1689645423/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f1dPIW3INU5shOVzs-XNO0oKENEZIIe4gR%2fview/RK=2/RS=OnsX9HtilpGstujshULBSKrgEKY-)
2. <https://books.google.co.in/books/publisher/content?id=nz6iBQAAQBAJ&pg=PP30&img=1&zoom=3&hl=en&bul=1&sig=ACfU3U2qb9AhU719M44MtGUoDAcM-UY6Q&w=1280>
3. <https://nptel.ac.in>
4. [www.coursera.org](http://www.coursera.org)
5. <https://swayam.gov.in>

**SEMESTER – IV**  
**PIMAH20 - INDEPENDENT ELECTIVE 4 B: FUNDAMENTALS OF RESEARCH**  
**METHODOLOGY AND STATISTICS – I**

<b>Year: II</b> <b>SEM:IV</b>	<b>Course Code:</b> PIMAH20	<b>Title of the Course:</b> Independent Elective 4 B: Fundamentals of Research Methodology and Statistics - II	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>CREDITS</b> 2	<b>MARKS</b> 100
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**Course Objectives**

1. To provide a clear understanding of basic concepts of the research methodology.
2. To plan the Questionnaire in research and survive works.

**Course Outcomes (CO)**

The Learners will be able to

1. Analyze the needs and purpose of Experimental design.
2. Prepare and Analyze the Questionnaire and compute the Statistical analysis of data.
3. Analyze the statistical data and research report.
4. Acquire the knowledge of Action research and Educational research.
5. Understand the basic measures of variability, dispersion and correlation.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	H
CO2	H	H	M	H	L	H
CO3	H	H	M	H	L	H
CO4	H	H	M	H	H	H
CO5	H	H	M	H	H	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	L	H
CO2	H	H	H	M	L	H
CO3	H	H	H	M	L	H
CO4	H	H	H	M	L	H
CO5	H	H	H	M	L	H

(L-Low, M-Moderate, H-High)

## **Course Syllabus**

### **Unit I: Genetic method and Design of Experiments**

Meaning of Genetic Research – Types of Genetic research – Problems of Genetic research– Diagnosis and Prognosis– Needs and Purpose of Experimental design– Types of basic experimental design. (K1,K2,K3,K4,K5,K6)  
(Chapter 11 and 12)

### **Unit II: Tools of Research and collection of Data**

Questionnaire – Preparing and administering the questionnaire – Characteristics of a Good questionnaire – Characteristic of a Good schedule – Need for data collection – Difference between facts and data – Characteristics of quantitative data.(K1,K2,K3,K4,K5,K6)  
(Chapter 13 and 14)

### **Unit III: Analysis of data and Research report**

Need for analysis of data or Treatment of data – Statistical analysis of data – Planning for data analysis – Level of significance – The research report – General format of research report.(K1,K2,K3,K4,K5,K6)  
(Chapter 15 and 16)

### **Unit IV: Action Research and Presentation of Statistical data**

Meaning of Action Research – Objective of educational research – Types of education research – Steps of research – Method of organizing and presenting data - The graphical presenting of ungrouped data. (K1,K2,K3,K4,K5,K6)  
(Chapter 17 and 18)

### **Unit V: Measurement of central Tendency and measures of variability**

Arithmetic Mean – Median – Mode – Different measures of variability of dispersion – Standard deviation – Correlation. (K1,K2,K3,K4,K5,K6)  
(Chapter 19 and 20)

### **Books for study and reference:**

#### **Text Book:**

1. Yogesh Kumar Singh - Fundamental of Research of Methodology and Statistics - New Age International Publishers, 2007.

### Books for Reference:

1. Bernard Beins and Maureen A. McCarthy - Research Methods and Statistics- Cambridge University Press Publications, 2017.
2. C. R. Kothari - Research Methodology: Methods and Techniques - New Delhi: New Age International (P) Ltd., ©2004, 1985.
3. Ian Walker - Research Methods and Statistics - Palgrave Macmillan Publisher, 2010.
4. Sherri L. Jackson - Research Methods and Statistics: A Critical Thinking Approach - Thomson Learning EMEA, Limited, 2008.

### E- Resources:

1. [https://r.search.yahoo.com/\\_ylt=AwrKAnTbybVkJMwADhQLnHgX.;\\_ylu=Y29sbwMEcG9zAzIEdnRpZAMEc2VjA3Ny/RV=2/RE=1689664091/RO=10/RU=https%3a%2f%2fimgs.mkcl.org%2fimages%2febook%2fFundamental%2520of%2520Research%2520Methodology%2520and%2520Statistics%2520by%2520Yogesh%2520Kumar%2520Singh.pdf/RK=2/RS=34nLQrRAfg3K6OC0qscqOhl3HLM-](https://r.search.yahoo.com/_ylt=AwrKAnTbybVkJMwADhQLnHgX.;_ylu=Y29sbwMEcG9zAzIEdnRpZAMEc2VjA3Ny/RV=2/RE=1689664091/RO=10/RU=https%3a%2f%2fimgs.mkcl.org%2fimages%2febook%2fFundamental%2520of%2520Research%2520Methodology%2520and%2520Statistics%2520by%2520Yogesh%2520Kumar%2520Singh.pdf/RK=2/RS=34nLQrRAfg3K6OC0qscqOhl3HLM-)
2. [https://r.search.yahoo.com/\\_ylt=Awr1Td55z7VkJMCEAzHgX.;\\_ylu=Y29sbwMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1689665529/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f1XBsIFv864x-k2kG-gGxlc35IIDL8\\_3Z1%2fview%3fusp%3dsharing/RK=2/RS=NIJctXhwacALzFiAfbxuc2xubrA-](https://r.search.yahoo.com/_ylt=Awr1Td55z7VkJMCEAzHgX.;_ylu=Y29sbwMEcG9zAzEEdnRpZAMEc2VjA3Ny/RV=2/RE=1689665529/RO=10/RU=https%3a%2f%2fdrive.google.com%2ffile%2fd%2f1XBsIFv864x-k2kG-gGxlc35IIDL8_3Z1%2fview%3fusp%3dsharing/RK=2/RS=NIJctXhwacALzFiAfbxuc2xubrA-)
3. <https://nptel.ac.in>
4. [www.coursera.org](http://www.coursera.org)
5. <https://swayam.gov.in>

**For MBA Programme  
SEMESTER –I**

**PCBAD20- STATISTICAL METHODS FOR RESEARCH**

<b>Year:</b> I <b>SEM:</b> I	<b>Course Code:</b>  PCBAD20	<b>Title Of The Course :</b> Statistical Methods for Research	<b>Course Type:</b> Theory	<b>Course Category:</b> Allied	<b>H/W</b> 6	<b>Credits</b> 3	<b>Marks</b> 100
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**Course Objectives**

1. To introduce the basic concepts of research in business.
2. To make decisions based on scientific methods.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the basic concepts in statistics.
2. Solve different statistical concepts related to management.
3. Acquire wide knowledge of different statistical analysis.
4. Understand and apply different ethics in business research.
5. Get a basic knowledge about data collection and report writing.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	M	H	M	H
CO4	H	H	L	H	M	H
CO5	H	H	M	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO 6
CO1	H	H	H	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### Unit I: Introduction and Ethics in Business Research

(18 Hours)

- 1.1 Business Research – Definition and Significance (K1, K2,K3, K4,K5,K6)
- 1.2 Ethics in Research- Ethical Behavior of Research- Subjectivity and Objectivity in Research (K1, K2,K3, K4,K5,K6)
- 1.3 Research Process- Types of Research (K1, K2,K3, K4,K5,K6)
- 1.4 Research Design- Definition – Types of Research Design(K1, K2,K3, K4,K5,K6)
- 1.5 Validity of Findings- Variables in Research- Measurement and Scaling (K1, K2,K3, K4,K5,K6)
- 1.6 Different Scales-Construction of Instruments- Validity and Reliability of Instruments(K1, K2,K3, K4,K5,K6)

### Unit II: Data Collection and Report Writing

(18 Hours)

- 2.1 Types of Data- Primary and Secondary Data- Methods of Data Collection (K1, K2,K3, K4,K5,K6)
- 2.2 Sampling Plan – Sampling Size – Sampling Techniques and Methods (K1, K2,K3, K4,K5,K6)
- 2.3 Data Preparation- Validity of Data –Qualitative Vs Quantitative Data Analysis (K1, K2,K3, K4,K5,K6)
- 2.4 Bivariate and Multivariate Statistical Techniques - Factor Analysis- Discriminant Analysis – Cluster Analysis (K1, K2,K3, K4,K5,K6)
- 2.5 Multidimensional Scaling- Application of Statistical Software for Data Analysis ( K1,K2, K3, K4,K5,K6)
- 2.6 Research report – Different types – Contents of reports – need of executive summary – Chapterization – contents of chapter – report writing(K1, K2,K3, K4,K5,K6)

### Unit III: Statistics- Sampling Distribution and Testing of Hypothesis

(18 Hours)

- 3.1 Statistics- Definition- Sampling Distributions, Mean, Median, Mode (K1, K2,K3, K4,K5,K6)
- 3.2 Standard Deviation and Proportion(K1, K2,K3, K4,K5,K6)
- 3.3 Sampling Techniques- Hypothesis Testing : Single Sample and Double Sample Test for Means and Proportions of Large Samples (Z- Test) ( K1,K2, K3, K4, K5, K6)
- 3.4 Single Sample and Double Sample Tests for Means of Small (T- Test) ( K1,K2, K3, K4, K5,K6)
- 3.5 F-Test for Two Sample Standard Deviation ( K1,K2, K3, K4, K5, K6)
- 3.6 ANOVA One and Two Way – Design of Experiments( K1,K2, K3, K4, K5, K6)

### Unit IV: Non Parametric Methods, Correlation and Regression Analysis

(18 Hours)

- 4.1 Chi- Square Tests – Sign Test for Paried Data ( K1,K2, K3, K4, K5, K6)
- 4.2 Rank Sum Test ( K1,K2, K3, K4, K5, K6)
- 4.3 Mann-Whitney U Test and Kruskal Wallis Test ( K1,K2, K3, K4, K5, K6)
- 4.4 One Sample Run Test ( K1,K2, K3, K4, K5, K6)
- 4.5 Rank Correlation- Correlation Analysis ( K1,K2, K3, K4, K5, K6)

4.6 Estimation of Regression Line. ( K1,K2, K3, K4, K5, K6)

### **Unit V: Time Series Analysis**

**(18 Hours)**

5.1 Time Series Analysis – Introduction (K1, K2,K3, K4,K5,K6)

5.2 Variation in Time Series( K1,K2, K3, K4, K5, K6)

5.3 Trend Analysis( K1,K2, K3, K4, K5, K6)

5.4 Cyclical Variations( K1,K2, K3, K4, K5, K6)

5.5 Seasonal Variations ( K1,K2, K3, K4, K5, K6)

5.6 Irregular Variations( K1,K2, K3, K4, K5, K6)

### **Books for study and reference:**

#### **Text Books:**

1. Donald R. Cooper and Pamela S. Schindler – Business Research Methods – Tata McGraw Hill, 2006.
2. Srivatsav TN, Shailajarago - Statistics for Management - Tata McGraw Hill, 2008.

#### **Books for Reference:**

1. S.P. Gupta – Statistical Methods – Sultan Chand & Sons, 2011.
2. Gupta S. C. and Kapoor V.K – Fundamentals of Mathematical Statistics – Sultan Chand & Sons, 2020.
3. Uma Sekaran – Research Methods of Business – Wiley India limited, 2006.
4. Levin R.I and Rubin D.s – Statistics for Management – 7<sup>th</sup> edition, Prentice Hall of India Pvt, Ltd., Delhi, 2001.
5. K.N. Krishnamoorthy, AppalyerSivakumar and M. Mathirajan –Management Research Methodology – Pearson Education, 2006.

#### **E- Resources:**

1. <https://ccsuniversity.ac.in/bridge-library/pdf/Research-Methodology-CR-Kothari.pdf>
2. <https://theengineeringmaths.com/wp-content/uploads/2018/03/sampling.pdf>
3. [https://influentialpoints.com/Training/nonparametric\\_correlation\\_and\\_regression-principles-properties-assumptions.htm](https://influentialpoints.com/Training/nonparametric_correlation_and_regression-principles-properties-assumptions.htm)
4. <http://www.mim.ac.mw/books/Donald%20R%20Cooper's%20Business%20Research%20Methods,%2012th%20Edition.pdf>
5. <http://mathforum.org>
6. <http://ocw.mit.edu/ocwweb/Mathematics>
7. <http://www.opensource.org>
8. [www.coursera.org](http://www.coursera.org)
9. <https://swayam.gov.in>

**For MBA Programme  
SEMESTER –II**

**PCBAK20 - RESOURCE MANAGEMENT TECHNIQUES**

<b>Year :</b> I <b>SEM :</b> II	<b>Course Code</b> :PCBAK20	<b>Title Of The Course :</b> Resource Management Techniques	<b>Course Type :</b> Theory	<b>Course Category :</b> Allied	<b>H/W</b> 6	<b>Credits</b> 3	<b>Marks</b> 100
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**Course Objectives**

1. To learn and understand the methodical approach of solving problem in the field of industries, marketing, finance and so on
2. To create awareness about optimization in utilization of resources.

**Course Outcomes (CO)**

The Learners will be able to

1. Understand the basic Operation Research concepts related to management.
2. Analyse the real life situation using Transportation and Assignment problems.
3. Acquire wide knowledge in Game Theory and replacement models that are used in management.
4. Solve any practical issues using Queuing Theory and decision making.
5. Impart the knowledge in Network Analysis that are used in Management.

CO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	M	H	M	H
<b>CO2</b>	H	H	M	H	M	H
<b>CO3</b>	H	H	L	H	M	H
<b>CO4</b>	H	H	M	H	M	H
<b>CO5</b>	H	H	M	H	M	H

(L-Low, M-Moderate, H-High)

CO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	H	H	H	M	M	H
<b>CO2</b>	H	H	H	M	M	H
<b>CO3</b>	H	H	H	M	M	H
<b>CO4</b>	H	H	H	M	M	H
<b>CO5</b>	H	H	H	M	M	H

(L-Low, M-Moderate, H-High)

## Course Syllabus

### **Unit I: Introduction to Linear Programming (18 Hours)**

- 1.1 Introduction to applications of OR in functional areas of management (K1,K2, K3, K4,K5,K6)
- 1.2 Linear Programming – formulation( K1,K2, K3, K4,K5,K6)
- 1.3 Solution by graphical Method ( K1,K2, K3, K4,K5,K6)
- 1.4 Solution by Simplex method ( K1,K2, K3, K4,K5,K6)
- 1.5 Artificial variable techniques (Big M method only) ( K1,K2, K3, K4,K5,K6)
- 1.6 Dual simplex method ( K1,K2, K3, K4,K5,K6)

### **Unit II: Linear Programming Extensions (18 Hours)**

- 2.1 Transportation Models (Minimizing and Maximizing cases) – Balanced and unbalanced cases( K1,K2, K3, K4,K5,K6)
- 2.2 Initial Basic feasible solution by N-W Corner Rule, Least cost Method ( K1,K2, K3, K4,K5,K6)
- 2.3 Vogel's approximation methods ( K1,K2, K3, K4,K5,K6)
- 2.4 Check for optimality, solution by MODI / stepping stone method( K1,K2, K3, K4,K5,K6)
- 2.5 Causes of degeneracy ( K1, K2, K3, K4, K5, K6)
- 2.6 Assignment Models (Minimizing and Maximizing Cases) – Balanced and Unbalanced cases, solution by Hungarian( K1,K2, K3, K4,K5,K6)

### **Unit III: Game Theory and Replacement Models (18 Hours)**

- 3.1 Game Theory – Two person Zero sum games – Saddle point ( K1,K2, K3, K4,K5,K6)
- 3.2 Dominance Properties ( K1,K2, K3, K4,K5,K6)
- 3.3 Matrix Methods ( K1,K2, K3, K4,K5,K6)
- 3.4 Graphical Method ( K1,K2, K3, K4,K5,K6)
- 3.5 LPP Solutions ( K1,K2, K3, K4,K5,K6)
- 3.6 Replacement models- Individuals replacement models (With and without time value of money) ( K1,K2, K3, K4,K5,K6)

### **Unit IV: Queuing Theory, Decision Theory and Decision Trees (18 Hours)**

- 4.1 Queuing Theory – introduction ( K1, K2, K3, K4, K5, K6)
- 4.2 Single and multi channel models I single server system( K1,K2, K3, K4,K5,K6)
- 4.3 Decision making under risk (Expected value criterion, Expected value combined with variance criterion) ( K1,K2, K3, K4,K5,K6)
- 4.4 Decision making under risk( EMV, EOL models) ( K1,K2, K3, K4,K5,K6)
- 4.5 Decision trees ( K1,K2, K3, K4,K5,K6)
- 4.6 Decision making under uncertainty( K1,K2, K3, K4,K5,K6)

### **Unit V: Network analysis: CPM and PERT Computations(18 Hours)**

- 5.1 CPM-construction( K1,K2, K3, K4,K5,K6)
- 5.2 Different time calculation ( K1,K2, K3, K4,K5,K6)
- 5.3 Calculation of critical path and project duration ( K1,K2, K3, K4,K5,K6)

5.4 PERT ( K1, K2, K3, K4, K5, K6)

5.5 Difference between CPM and PERT ( K1,K2, K3, K4,K5,K6)

5.6 Probability of meeting the scheduled dates( K1,K2, K3, K4,K5,K6)

Note: 80% problems and 20% Theory

### **Books for study and reference:**

#### **Text Book:**

1. Prem Kumar Gupta, Hira D.S., “Operations Research” S. Chand & Company Pvt. Limited: New Delhi, Seventh Revised Edition, 2014.

#### **Books for Reference:**

1. Kanti Swarup, P.K. Gupta and Man Mohan, Introduction to Management Science - Operations Research, Sultan Chand and Sons, 2014.
2. P.R.Vittal, Introduction to Operations Research, Margham Publications,2008.
3. V. Sundaresan, K.S. Ganapathy Subramanian,and K. Ganesan, Resource Management Techniques, A.R. Publications, 2009.
4. Pannerselvam, R. Operations Research, Prentice Hall of India, 4<sup>th</sup> Edition, 2008.
5. SankarIyer .P, Operations Research, Tata McGraw Hill, 2008.

#### **E-Resources:**

1. <https://www.shivajicollege.ac.in/sPanel/uploads/econtent/33dfc039a8d88fa01d763d5abcd1df20.pdf>
2. [https://www.acsce.edu.in/acsce/wp-content/uploads/2020/03/1585041316993\\_Module-4.pdf](https://www.acsce.edu.in/acsce/wp-content/uploads/2020/03/1585041316993_Module-4.pdf)
3. <https://kanchiuniv.ac.in/coursematerials/Game%20theory.pdf>
4. <https://www.acsce.edu.in/acsce/wp-content/uploads/2020/03/MODULE-4-Queueing-Theory.pdf>
5. <https://www.srividyaengg.ac.in/coursematerial/CSE/104745.pdf>
6. <https://nptel.ac.in>
7. [www.coursera.org](http://www.coursera.org)
8. <https://swayam.gov.in>

## ASSESSMENT METHODS

### 1. For Core Papers /Elective Papers/ Independent Elective Papers 3 B and 4 B

#### Semester Examination

**Total: 100 Marks**

**Time: 3 Hours**

#### **Section A (10 x 2 Marks = 20 Marks)**

Answer **ALL** the following

10 Questions (2 Questions from each Unit)

#### **Section B (5 x 7 Marks = 35 Marks)**

Answer **ALL** the following

5 Questions with Internal Choice (1 Question from each Unit)

#### **Section C (3 x 15 Marks = 45 Marks)**

Answer any **THREE** of the following

3 Questions out of 5 Questions (1 Question from each Unit)

#### CA Examination

**Total: 50 Marks**

**Time: 1 Hour 30 Minutes**

#### **Section A (7 x 2 Marks = 14 Marks)**

Answer **ALL** the following

7 Questions

#### **Section B (3 x 7 Marks = 21 Marks)**

Answer any **THREE** of the following

3 Questions out of 5 Questions

#### **Section C (1 x 15 M = 15 marks)**

Answer any **ONE** of the following

1 Question out of 2 Questions (1 Question from each Unit)

## 2. For Elective Practical: JAVA and R

PEMAF20	Elective Practical : Java
PEMAH20	Elective Practical : R

### External Assessment

**Total: 60 Marks**

**Time: 3 Hours**

Record – 10Marks

Viva – 5 Marks

Semester Practical – 45Marks

### Internal Assessment

**Total: 40 Marks**

**Time: 1 Hour 30 Minutes**

Observation – 10 marks

Perfection – 5 marks

CA Practical – 25 marks

## 3. For Project: PCMAP20

### Assessment of Viva and Content

Content	Presentation	Answering Questions	Total Marks for Viva
10 Marks	5 Marks	5 Marks	<b>20 Marks</b>

External Examiner (for Project)	Internal Examiner (for Project)	Viva	Total
40 Marks	40 Marks	20 Marks	<b>100 Marks</b>

#### 4. For Independent Elective Papers

PIMAA20	Independent Elective 1 A : Fundamentals of Group Theory
PIMAB20	Independent Elective 1 B : Quantitative Aptitude for Competitive Examination- I
PIMAC20	Independent Elective 2 A: Fundamentals of Ring Theory
PIMAD20	Independent Elective 2 B: Quantitative Aptitude for Competitive Examination- II
PIMAE20	Independent Elective 3 A: Skill Enhancement in Real and Complex Analysis – I
PIMAG20	Independent Elective 4 A: Skill Enhancement in Real and Complex Analysis – II

**Semester Examination**  
**Total: 100 Marks**  
**Time: 3 Hours**

**Section A (50 x 2 Marks =100 Marks)**  
Answer **ALL** the following

50 Questions

**CA Examination**  
**Total: 50 Marks**  
**Time: 1 Hour 30 Minutes**

**Section A (25 x 2 Marks =50 Marks)**  
Answer **ALL** the following

25 Questions

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## **PROGRAMME OUTCOMES (PO)**

**On completion of the M.Phil., Programme, scholars will be able to:**

**PO1:** Develop research aptitude in the respective discipline.

**PO2:** Master the framework of research process.

**PO3:** Acquire technical and writing skills to communicate research findings.

**PO4:** Engage in ethically oriented original research for the benefit of the society.

**PO5:** Design innovative research techniques and find probable solutions to socially relevant research problems.

**PO6:** Commit to life-long learning with the intellectual interest created.

## **PROGRAMME SPECIFIC OUTCOMES (PSO)**

**On completion of the M.Phil., Programme, scholars will be able to:**

**PSO1:** Have the ability to identify potential research areas in Mathematical Sciences.

**PSO2:** Identify, formulate, and review research literature to create new concepts in Mathematics.

**PSO3:** Have the ability to identify unethical behavior in research report writing and develop a skill to bring out plagiarism-free articles for a chosen area of research.

**PSO4:** Acquire presentation skills and effectively communicate research through conference presentations at the National and International level.

**PSO5:** Have the capability to write the research articles using the mathematical softwares and publish it in a reputed journal.

**PSO6:** Have the ability to build up precise skills helpful for employment in the Educational Sectors and engage in lifelong learning to facilitate a progressive career in research.

PSO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	H	H	M	M	L	H
PSO2	H	H	M	M	M	H
PSO3	H	H	H	M	M	H
PSO4	H	H	H	M	M	H
PSO5	H	H	H	L	L	H
PSO6	H	H	H	M	L	H

(L-Low (1), M-Moderate (2), H-High (3))

### PROGRAMME OUTCOMES (PO)

**On completion of the Ph.D. Programme, scholars will be able to:**

**PO1:** Acquire expertise in specific areas of study.

**PO2:** Formulate, analyze and apply theories and design methodologies.

**PO3:** Focus on socially relevant research and follow research ethics.

**PO4:** Gain skills to write research and project proposals for grants.

**PO5:** Network and offer consultancy at national and international levels.

**PO6:** Strive to obtain Intellectual Property Rights for inventions and innovations.

### PROGRAMME SPECIFIC OUTCOMES (PSO)

**On completion of the Ph.D. Programme, scholars will be able to:**

**PSO1:** Have a strong knowledge of their specialization area.

**PSO 2:** Have the ability to communicate long-standing unsolved problems in their area of research and provide new solutions using the domain knowledge of Mathematics.

**PSO3:** Develop the skills to design a real life model using the theoretical and computational mathematics to solve social issues following research ethics.

**PSO4:** Have the capability to prepare socially relevant research project proposal in their chosen area of research.

**PSO5:** Effectively communicate research, through Journal publications to the mathematics community at the National and International level.

**PSO6:** Enrich with integrity and ethical values to be a responsible Academician and produce next-generation Researchers in Mathematics.

<b>PSO</b>	<b>PO</b>					
	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>PSO1</b>	H	H	M	H	L	M
<b>PSO2</b>	H	H	M	H	L	M
<b>PSO3</b>	H	H	H	H	M	M
<b>PSO4</b>	H	H	H	H	H	M
<b>PSO5</b>	H	H	M	H	L	L
<b>PSO6</b>	H	H	M	H	H	M

**(L-Low (1), M-Moderate (2), H-High (3))**

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# **Department of Physics (PG)**

## **SYLLABUS AND REGULATIONS**

**Under**

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**Department of Physics (PG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision**

The vision of the college is to educate young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighbouring districts.

**B) NAME OF THE PROGRAMME: PG PHYSICS**

**Vision**

To empower the young women by offering higher education which promotes interest and thirst for research in the field of Physical sciences.

**Mission**

- To provide quality education through well designed programs
- To impart knowledge in various areas of Physical sciences related to research.
- To undertake research oriented projects.

**C) ELIGIBILITY CRITERIA OF THE PROGRAMME:**

**Students who have completed B.Sc., Physics are eligible.**

D) LIST OF COURSES

Sem.	Part	Code	Title of the Paper	Hours/ Week	Exam		Credits	Marks
					Th	Pr		
I		PCPHA20	Mathematical Physics – I	6	3	-	5	40+60
		PCPHB20	Classical Mechanics	6	3	-	5	40+60
		PCPHC20	Statistical Mechanics	6	3	-	4	40+60
		PCPHG20	Practical I: General	3	-	-	-	-
		PCPHH20	Practical II: Electronics	3	-	-	-	-
		PEPHA20	Elective I A: Electronic Devices and Applications	6	3	-	4	40+60
		PEPHB20	Elective I B: Electronic Communication Systems.					
		PIPHA20	IEP: Physics For Set/Net – Paper I	-	3	-	2	40+60
		PIPHB20	IEP: Astro Physics					
<b>Total</b>				<b>30</b>			<b>20</b>	<b>500</b>
II		PCPHD20	Mathematical Physics – II	6	3	-	5	40+60
		PCPHE20	Electromagnetic Theory	6	3	-	5	40+60
		PCPHF20	Quantum Mechanics – I	6	3	-	4	40+60
		PCPHG20	Practical I: General	3	-	4	4	40+60
		PCPHH20	Practical II: Electronics	3	-	4	4	40+60
		PEPHC20	Elective II A: Crystal Growth, Nano Science and Research Methodology	4	3	-	4	40+60
		PEPHD20	Elective II B: Electronic Instrumentation					
		PNHRA16	Human Rights	2	3	-	2	40+60
		PIPHC20	IEP: Physics For Set/Net - Paper II	-	3	-	2	40+60
	PIPHD20	IEP: Medical Physics and Instrumentation Techniques						
<b>Total</b>				<b>30</b>			<b>30</b>	<b>800</b>
III		PCPHI20	Spectroscopy	6	3	-	4	40+60
		PCPHJ20	Quantum Mechanics –II	6	3	-	4	40+60
		PCPHK20	Microprocessor and Micro-controller	6	3	-	4	40+60
		PCPHO20	Practical III: General	4	-	-	-	-

		PCPHP20	Practical IV: Microprocessor, Microcontroller & C-Programming	4	-	-	-	-
		PEPHE20	Elective III A: Numerical Methods and C Programming	4	3	-	4	40+60
		PEPHF20	Elective III B: Advanced Optics					
		PGTRA16	Teaching and Research Aptitude		3	-	3	40+60
		PIPHE20	IEP: Physics For Set/Net - Paper III	-	3	-	2	40+60
		PIPHF20	IEP: Numerical Methods & Research Methodology					
		PSPHA20	Summer Project – Viva Voce				3	40+60
		<b>Total</b>		<b>30</b>			<b>24</b>	<b>700</b>
IV		PCPHL20	Material Science and Laser Physics	6	3	-	5	40+60
		PCPHM20	Nuclear Physics and Particle Physics	6	3	-	4	40+60
		PCPHN20	Condensed Matter Physics	6	3	-	4	40+60
		PCPHO20	Practical III: General	4	-	4	4	40+60
		PCPHP20	Practical IV: Microprocessor, Microcontroller & C-Programming	4	-	4	4	40+60
		PEPHG20	Elective IV A: Fibre Optics and Non-Linear Optics	4	3	-	4	40+60
		PEPHH20	Elective IV B: Advanced Material Science					
		PIPHG20	IEP: Physics For Set/Net - Paper IV	-	3	-	2	40+60
		PIPHH20	IEP: Advanced Nuclear Physics & Spectroscopy					
		<b>Total</b>		<b>30</b>			<b>27</b>	<b>700</b>
		<b>Grand Total</b>					<b>101</b>	<b>2700</b>

**E) Program Objectives (POs) (After 3-5 years of graduation)**

**PO1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.

**PO2:** Assimilate and apply principles and concepts towards skill development and employability.

**PO3:** Apply critical and scientific approaches to address problems and find solutions.

**PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO5:** Integrate issues of social relevance in the field of study.

**PO6:** Persist in life-long learning for personal and societal progress.

**F) Program Specific Outcomes (PSOs):**

**PSO1:** Attain in depth knowledge on various areas of Physics.

**PSO2:** Understand the various methods in the respective field.

**PSO3:** Inculcate the mathematical concepts for solving problems.

**PSO4:** Gain knowledge about various applications.

**PSO5:** Become Skilled to face competitive examinations.

**PSO6:** Attain interest for higher education and research.

PSO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	H	H	M	H	H	M
PSO2	H	H	M	H	H	H
PSO3	H	H	M	H	H	H
PSO4	H	H	M	H	H	H
PSO5	H	H	H	H	H	M
PSO6	H	H	H	H	M	H

**H– Strongly Correlated**  
**M– Moderately Correlated**  
**L–Weakly Correlated**

## SEMESTER I

### PCPHA20 – MATHEMATICAL PHYSICS – I

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PCPHA20	<b>Title of the Course:</b> Mathematical Physics – I	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To inculcate to the students the mathematical concepts for solving physical problems which arise in many branches of Physics
2. To prepare the students for solving the problems of mathematical physics in competitive examinations

#### Course Outcomes (CO)

The learners will be able to

1. Understand and apply the basic concepts of vectors and vector space.
2. Perceive various types of matrices, solve Eigen value problems and carry out matrix operations.
3. Solve ordinary differential equations that are common in the physical-sciences.
4. Understand the characteristics of special functions to solve the physical problems.
5. Understand and use Dirac-delta function for describing physical systems and apply Green's function to solve partial differential equations.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	H
CO2	H	M	H	M	H	H
CO3	H	H	M	H	M	M
CO4	H	H	H	H	H	H
CO5	H	M	H	M	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	H	H
CO5	M	M	M	M	M	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Vector Analysis

(14 hours)

- 1.1 Vector Field - Orthogonal curvilinear co-ordinates - Expression for gradient, divergence, curl and Laplacian (K1,K2,K3)
- 1.2 Spherical and cylindrical coordinate systems - expression for gradient, divergence, curl and Laplacian(K2,K4, K5)
- 1.3 Stoke's theorem - Simple applications (K2,K3,K4,K5)
- 1.4 Gauss theorem - Simple applications (K2,K3,K4,K5)
- 1.5 Linear vector Space - Linear independence of vectors - Basis and Expansion theorem - Inner product and Unitary vector spaces (K2,K3,K4,K5)
- 1.6 Orthonormal sets - Schwarz inequality - Schmidt's orthogonalization method - Completeness (K2,K3, K4)

### Unit II: Matrix Theory

(14 hours)

- 2.1 Introduction - Matrices - Transpose of a matrix - Conjugate - Conjugate transpose - Symmetric and Skew-symmetric matrices -Hermitian and Skew-Hermitian matrices - Unitary matrices (K1,K2)
- 2.2 Determinant- Co-factors - Minors of a matrix - Singular and non-singular matrices - Adjoint of a matrix - Inverse of a matrix- Orthogonal matrices - Unitary matrices (K2,K3,K4)
- 2.3 Characteristic equation of a matrix - Evaluation of Eigen values and Eigen vectors (K4, K5)
- 2.4 Cayley-Hamilton's theorem - Inverse of a matrix using Cayley Hamilton theorem (K3, K4, K5)
- 2.5 Important theorems on Eigen values and Eigen vectors (K2, K3, K5)
- 2.6 Stochastic matrices - Theorem on Stochastic matrix -Diagonalization of matrices(K2, K3, K4)

### Unit III: Differential Equations

(16 hours)

- 3.1 Differential equations - Order and degree of a differential equation - Solution of first order differential equation by the method of separation of variables (K2, K3, K4, K5)
- 3.2 Solution of Linear differential equation of first order by the method of Integrating factor - Problems (K2, K3, K4, K5)
- 3.3 Solution of first order differential equation reducible to linear form (Bernoulli's equation) - Problems (K2, K3, K4, K5)
- 3.4 Solution of Second order differential equations with constant coefficients - Problems (K2, K3, K4, K5)
- 3.5 Power series solution: Frobenius' method
- 3.6 Linear independence of solutions: Wronskian method – Problems

### Unit IV: Special Functions

(16 hours)

- 4.1 Series solution and Generating function of Bessel function(K2, K3, K5)
- 4.2 Orthonormal properties of Bessel - Evaluation of recurrence relations(K2, K3, K4, K5)
- 4.3 Series solution and Generating function of Legendre polynomial(K2, K3, K5)
- 4.4 Rodrigues formula and Orthogonal properties of Legendre Polynomial - Evaluation of recurrence relations(K2, K3, K4, K5)
- 4.5 Series solution and Generating function of Hermite polynomial(K2, K3, K5)

4.6 Rodrigues formula and Orthogonal properties of Hermite Polynomial - Evaluation of recurrence relations(K2, K3, K4, K5)

### **Unit V: Green's Function**

**(12 hours)**

- 5.1 Dirac-delta function - Properties of Delta function - Problems - Fourier transform of Delta function - Laplace transform of Delta function(K1, K2, K4)
- 5.2 Green's function - Green's function for one-dimensional case (K1, K2, K4)
- 5.3 Evaluation of Green's function for boundary value problems (K1, K2, K4)
- 5.4 Eigen function Expansion of Green's function - Problem(K1, K2, K4)
- 5.5 Green's function for Poisson's equation and solution of Poisson's equation - Green's function for three dimensional Helmholtz equation(K1, K2, K4)
- 5.6 Green's function for Quantum mechanical scattering problem (K1, K2, K4)

### **Books for Study:**

1. Sathyaprakash - Mathematical Physics - S.Chand& Sons, Reprint 2006.
2. B.D.Gupta- Mathematical Physics, 3<sup>rd</sup> Edition - Vikas Publishing House Pvt. Ltd., 2004.
3. E. Kreyszig - Advanced Engineering Mathematics, 8<sup>th</sup> Edition - Wiley, New York, 1999.
4. H.K. Dass - Mathematical Physics - S.Chand, Reprint 2007.

### **Books for Reference:**

1. P.R. Halmos - Finite dimensional Vector Spaces, 2<sup>nd</sup> Edition - Affiliated East - West, New Delhi, 1965.
2. C.R. Wylie and LC. Barrett - Advanced Engineering Mathematics, 6<sup>th</sup> International Edition - McGraw Hill, New York, 1995.
3. P.K. Chakrabarti and S.N. Kundu - A Textbook of Mathematical Physics - New Central Book Agency, Kolkata, 1996.
4. A.K. Ghatak, I.C. Goyal and S.H. Chua - Mathematical Physics - Macmillan India, New Delhi, 2002.
5. M.D. Greenberg - Advanced Engineering Mathematics, 2<sup>nd</sup> Edition - International Ed., Prentice Hall International, New Jersey, 1998.
6. P.K. Chattopadhyay - Mathematical Physics - Wiley Esatern, Madras, 1990.
7. S. Lipschutz - Linear Algebra - Schaum's Series, McGraw Hill, New York, 1987.
8. G. Arfken and H.J. Weber - Mathematical Methods for Physics, 5<sup>th</sup> Edition - Harcourt (India), New Delhi, 2001.

**SEMESTER I**  
**PCPHB20 - CLASSICAL MECHANICS**

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PCPHB20	<b>Title of the Course:</b> Classical Mechanics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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**Course Objectives**

1. To make the students understand the different transformations that governs the classical mechanics.

**Course Outcomes (CO)**

The learners will be able to

1. Acquire knowledge about the fundamental concepts of dynamics of system of particles
2. Use D'Alembert's principle and calculus of variations to derive the Lagrange - Hamilton formalism applicable to solve the equation of motion for any mechanical system
3. Understand the essential features of canonical transformations and their applications to various systems.
4. Describe the Hamilton-Jacobi equation and develop the skills to use them to set and solve the appropriate physical problems.
5. Gain knowledge about the fundamental principles of small theory of oscillations and its applications.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	M
CO2	H	H	H	H	M	L
CO3	M	H	H	H	H	M
CO4	H	H	H	H	M	M
CO5	H	M	H	H	H	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	M	H	H	M	M
CO3	M	H	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	H	H	M	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Rigid Body Dynamics

(16 Hours)

- 1.1 Introduction - Generalized coordinates of a rigid body - Body and space reference systems (K1, K2, K3)
- 1.2 Euler's angles - Infinitesimal rotations as vectors (K1, K2, K3)
- 1.3 Components of angular velocity - Angular momentum and Inertia tensor (K1, K2, K3)
- 1.4 Principle axes - Principle moments of inertia - Rotational Kinetic energy of a rigid body - Moment of inertia for different body systems (K1, K2)
- 1.5 Euler's equations of motion of rigid body - Torque free motion of a rigid body (K1, K2, K4)
- 1.6 Motion of a symmetrical top under the action of gravity (K4, K5, K6)

### Unit II: Lagrangian and Hamiltonian Formulations

(14 Hours)

- 2.1 Newton's equation and conservation laws for system of particles - Constraints (K1, K2)
- 2.2 Generalized co-ordinates - Principle of Virtual work (K1, K2)
- 2.3 D'Alembert's Principle - Lagrange's equation from D'Alembert's Principle - Procedure for formation of Lagrange's equation (K1, K2)
- 2.4 Kinetic energy in generalized coordinates - Lagrange's equation from Hamilton's Principle - Hamilton's equations (K1, K2, K3)
- 2.5  $\Delta$  variations - Principle of least action (K1, K2)
- 2.6 Applications (Atwood's Machine, Compound pendulum and LC circuit) (K3, K4, K5, K6)

### Unit III: Canonical Transformations

(13 Hours)

- 3.1 Introduction (K1, K2) - Canonical Transformations and their generators (K2)
- 3.2 Lagrange and Poisson Brackets notation (K2, K3)
- 3.3 Procedure for Applications of Canonical transformations - Condition for canonical transformations (K2, K3, K4)
- 3.4 Problems on canonical transformation (Simple Harmonic Oscillator) (K3, K4, K5, K6)
- 3.5 Proof of invariance of Poisson's Bracket under canonical transformations (K3, K4)
- 3.6 Infinitesimal contact transformation (K1, K3)

### Unit IV: Hamilton–Jacobi Theory

(14 Hours)

- 4.1 Hamilton–Jacobi equations (K1, K2)
- 4.2 Hamilton's Characteristic function - Physical Significance (K1, K2)
- 4.3 Linear Harmonic Oscillator problem by Hamilton Jacobi method (K3, K4, K5)
- 4.4 Action Angle variables - Problem of harmonic oscillator using action angle variables (deduction of frequency of motion) (K3, K4, K5)
- 4.5 Hamilton Jacobi method and Motion of a particle in a plane under a central force (K2, K3)
- 4.6 Application to Kepler's problem based on Hamilton Jacobi method (K3, K4, K5)

### Unit V: Small oscillations

(15 Hours)

- 5.1 Introduction - General theory of small oscillations (K1, K2)
- 5.2 Secular equations and Eigen value equations - solution to Eigen value equations (K1, K2)
- 5.3 one dimensional oscillator - The Lagrangian of one dimensional oscillator and its solution (K3, K4, K5)
- 5.4 Two coupled oscillators - Lagrangian equation of two coupled oscillators and its solution

(K3, K4, K5)

5.5 Example of two coupled oscillator: Two coupled pendulum (K3, K4, K5, K6)

5.6 Vibrations of linear triatomic molecule (K3, K4, K5)

**Books for Study:**

1. J.C. Upadhyaya - Classical Mechanics - Himalaya Publishing House, Reprint 2003.
2. Gupta Kumar and Sharma - Classical Mechanics, 2nd Edition - PragatiPrakasan, Meerut, 2006.
3. B.D. Gupta and Sathya Prakash - Classical Mechanics - Kedar Nath, Ram Nath, 2003.

**Books for Reference:**

1. H. Goldstein - Classical Mechanics, 3rd Edition - C. Poole and J. Safko, Pearson Education, Asia, New Delhi, 2002.
2. S.N. Biswas - Classical Mechanics - Books and Allied Ltd., Kolkata, 1998.
3. K. Huang - Statistical Mechanics - Wiley Eastern Ltd., New Delhi, 1975.
4. B.K. Agarwal and M. Eisner - Statistical Mechanics, 2nd Edition - New Age International, New Delhi, 1998.
5. J.K.Bhattacharjee - Statistical Mechanics: An Introductory Text - Allied Publication, New Delhi, 1996.
6. L.D. Landau and E.M. Lifshitz - Mechanics - Pergomon Press, Oxford, 1969.
7. C.R.Mondal - Classical Mechanics - Prentice Hall of India, New Delhi, 2009.
8. L.P. Kadanoff - Statistical Physics: Statics, Dynamics and Renormalization - World Scientific, Singapore, 2001.
9. M. Glazer and J. Wark - Statistical Mechanics - Oxford University Press, 2001.

**SEMESTER I**  
**PCPHC20- STATISTICAL MECHANICS**

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PCPHC20	<b>Title of the Course:</b> Statistical Mechanics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Course Objectives**

1. To understand the fundamental principles of thermodynamics and statistical mechanics to perform a quantitative calculations on ideal systems.

**Course Outcomes (CO)**

The learners will be able to

1. Define and discuss the concepts in thermodynamics and statistical mechanics.
2. Differentiate classical and quantum statistics, explain the statistical behaviour of ideal system (Maxwell, Bose & Fermi) and calculate the statistical quantities.
3. Apply the Bose-Einstein and Fermi-Dirac distributions appropriately to understand the macroscopic properties. (Black body radiation, electrons in metals, paramagnetism etc.)
4. Formulate theories and microscopic models to explain the properties of complex system. (Ising model, Bose-Einstein condensation, liquid helium II)
5. Describe the role of fluctuations and transport phenomena in a system.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	L	L	M
CO2	H	M	H	H	H	H
CO3	H	M	H	M	H	L
CO4	M	L	M	M	H	H
CO5	H	M	M	M	M	L

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	M
CO2	H	H	H	H	H	M
CO3	H	M	H	H	M	H
CO4	H	M	H	M	H	M
CO5	M	H	M	M	L	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Thermodynamics (14 Hours)

- 1.1 Introduction - Thermodynamic potentials (K1, K2)
- 1.2 Phase equilibrium (K1, K2, K3)
- 1.3 Gibb's phase rule - Entropy of mixing and Gibb's paradox (K1, K2, K3)
- 1.4 Phase transition and Ehrenfest's Classification (K2)
- 1.5 Landau theory of Phase transition (K2, K3)
- 1.6 Critical indices- Scale transformation and dimensional analysis (K2, K3)

### Unit II: Ensembles (14 Hours)

- 2.1 Introduction - Phase space (K2)
- 2.2 Micro canonical, Canonical and grand canonical ensembles (K2, K3, K4)
- 2.3 Trajectories and density of states (K2, K3)
- 2.4 Liouville's theorem (K2, K3, K4)
- 2.5 Partition function - Calculation of statistical quantities (K3, K4, K5)
- 2.6 Energy and density fluctuations (K3, K4, K5)

### Unit III: Maxwell-Boltzmann statistics and Bose-Einstein statistics (15 Hours)

- 3.1 Postulates of classical and quantum statistics (K2, K3)
- 3.2 Density of matrix - Statistics of indistinguishable particles (K2, K3, K4)
- 3.3 Maxwell- Boltzmann distribution function - Broadening of spectral lines (K3, K4)
- 3.4 Bose-Einstein statistics - Bose-Einstein distribution of gas (K2, K3, K4)
- 3.5 Equation of states - black body radiation (K3, K4)
- 3.6 Bose - Einstein condensation - Landau's theory of Liquid Helium II (K3, K4)

### Unit IV: Fermi-Dirac statistics (14 Hours)

- 4.1 Fermi-Dirac distribution - Equation of states (K2, K3, K4)
- 4.2 Free electron gas in metals (K2, K3, K4)
- 4.3 Heat capacity (K2, K3, K4)
- 4.4 Pauli's paramagnetism (K2, K3, K4)
- 4.5 Thermionic emission (K2, K3, K4)
- 4.6 Superconductivity (K2, K3, K4)

### Unit V: Ising model and Fluctuations (15 Hours)

- 5.1 Ising model - Mean field theories of the Ising model in three, two and one dimension (K2, K3, K4)
- 5.2 Exact solutions in one dimension (K2, K3, K4, K5)
- 5.3 Correlation of space-time dependent fluctuations (K2, K4)
- 5.4 Fluctuations and transport phenomena (K2, K3)
- 5.5 Brownian motion - Langevin theory (K2, K3, K4)
- 5.6 Fluctuation-dissipation theorem - The Fokker- Planck equation (K3, K4)

**Books for study:**

1. Gupta, Kumar and Sharma - Statistical Mechanics - PragatiPrakasan, 21st Ed., 2006
2. SathyaPrakash and J.P Agarwal - Statistical mechanics - KedarNath Ram Nath, 2005.
3. SathyaPrakash and J.P. Agarwal - Thermodynamics, statistical physics and kinetics
4. B.B.Laud- Fundamentals of Statistical mechanics - New Age International Pvt Ltd., 2012.

**Books for reference:**

1. Statistical mechanics and properties of matter - E.S.R. Gopal
2. Statistical physics - L.D. Landau and E. M. Lifshitz
3. K. Srivastava and J. Ashok - Statistical mechanics - Prentice-Hall of India Pvt. Ltd., 2005.
4. Brijlal, Dr. N. Subrahmanyam, P.S. Hemne - Heat Thermodynamics and Statistical Physics - S.Chand.
5. Dr. D. Jayaraman, Dr. K. Ilangovan - Thermal Physics and Statistical Mechanics – Viswanathan(Publishers).

## SEMESTER I

### PEPHA20 - ELECTIVE IA: ELECTRONIC DEVICES AND APPLICATIONS

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PEPHA20	<b>Title of the Course:</b> Electronic Devices and applications	<b>Course Type:</b> Theory	<b>Course Category:</b> Major Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To teach the students the methods of the fabrication of digital circuits and the devices used in the design of digital systems.
2. To understand the principles of operational amplifier and its applications and digital communication.

#### Course Outcomes (CO)

##### The learners will be able to

1. Analyze about the fabrication of various Integrated circuits and semiconductor devices (construction, working, principles and V-I characteristics) and their applications.
2. Ability to understand about the basic principles and operations of opto electronic devices and their features and applications.
3. To study the Timer IC and its applications.
4. To know the principles, configuration, linear and non-linear applications of Op-amp used to design various digital circuits.
5. To understand the concepts of combinational circuits and sequential circuits and A/D –D/A converters used to design advanced digital system.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	L	H	M	M
CO3	M	H	M	H	M	M
CO4	M	H	H	H	M	H
CO5	H	M	M	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	H	H
CO5	M	M	M	M	M	H

(Low -L, Medium– M, High-H)

## Course Syllabus

### Unit I: FinFET and SET

(16 Hours)

- 1.1 Multi gate transistors - Need of FinFET- Structure of FinFET - Fabrication - Mechanism of FinFET Technology-Bulk FinFET- SOI FinFET(K1, K2, K3)
- 1.2 FinFET Classifications: Gate shorted (SG), Insulated Gate (IG) and Low Power (LP) - n-FinFET and p-FinFET - Working of FinFET- I-V characteristics of FinFET(K2, K3, K4)
- 1.3 Applications of FinFET - Design of Switches, logic gates, flip-flops and Schmidt trigger using FinFET(K3, K4, K5)
- 1.4 Single Electron Transistor: Principle - Quantum dots - Coulomb blockade and electron tunneling –Construction and operation of SET (K3, K4)
- 1.5 Single island RC equivalent circuit of SET- Operation Temperature - Different ways to increase Coulomb energy  $E_c$  - I-V characteristics of symmetric and asymmetric junction (Coulomb Stair-Case) SET (K3, K4, K5)
- 1.6 Design of logic gates using SET - Realization of AND, OR and NOT gates using SET - Advantages and disadvantages of SET- Difference between SET and FET - Applications of SET (K4, K5, K6)

### Unit II: Opto Electronic Devices

(12 Hours)

- 2.1 Light units - Light emitting diodes - Operation and construction - Characteristics and parameters (K1, K2)
- 2.2 Seven-segment displays - LED seven-segment display - liquid crystal cells - LCD seven-segment displays(K1, K2, K3)
- 2.3 Photoconductive cells - Construction - Characteristics and Parameters - Applications(K2, K3, K4)
- 2.4 Photodiodes and Solar cells - Photodiode operation - characteristics - specification - construction- Applications - Solar cells (K2, K4, K5, K6)
- 2.5 Phototransistors (BJT) - Characteristics and specifications - Applications - Photo-Darlington- Photo-FET-Optocouplers- Operation and constructions - specification - Applications (K2, K3, K4)
- 2.6 Laser diode - Operation - Characteristics and parameters- Drive circuits - Modulation (K3, K4, K5, K6)

### Unit III: 555 Timer and Applications

(13 Hours)

- 3.1 555 Timer - Description (K1, K2)
- 3.2 Monostable operation - Frequency divider(K1, K2, K3)
- 3.3 Astable operation - Schmitt trigger (K2, K3)
- 3.4 Phase Locked Loops - Basic principles (K2, K3, K4, K6)
- 3.5 Analog phase detector(K2, K3)
- 3.6 Voltage Controlled Oscillator - Voltage to Frequency conversion (K2, K3)

#### **Unit IV: Op-Amp Applications**

**(18 Hours)**

- 4.1 Instrumentation amplifier - V to I and I to V converter - Op-amp circuits using diodes - Sample and Hold circuits (K1, K2)
- 4.2 Log and Antilog amplifiers –Multiplier and Divider - Electronic analog Computation (K2, K3, K4)
- 4.3 Phase shift and Wein bridge sine wave oscillators (K1, K2, K3)
- 4.4 Solution to simultaneous equations and differential equations - Schmitt Trigger - Astable, Monostable Multivibrator (K2, K3, K4, K6)
- 4.5 Square, Triangular and Saw tooth wave generators (K2, K3, K4, K6)
- 4.6 RC Active filters - Low pass, High pass and Band pass filter (K2, K3, K4)

#### **Unit V: Digital Electronic Devices**

**(13 Hours)**

- 5.1 4bit Binary adder/subtractor IC 7483 (K1, K2, K3, K4)
- 5.2 Multiplexer IC 74150 and Demultiplexer IC 74154 (K1, K2)
- 5.3 Counters: Binary Counter - BCD Counter - Parallel Counters (K1, K2)
- 5.4 D/A Converters: Binary Weighted Resistor method - R-2R Ladder method (K1, K2, K3)
- 5.5 A/D Converters: Counter type, Successive Approximation (K2, K3, K4)
- 5.6 Dual Slope method - Parallel comparator A/D converter (K2, K3, K4)

#### **Books for Study:**

1. D. Roy Choudhury - Linear Integrated Circuits - Wiley Eastern, New Delhi, 1991.
2. V.Vijayendran - Introduction to Integrated Electronics, S.Viswanathan (Printers & Publishers), Pvt. Ltd., 2007.
4. Amar K.Ganguly - Optoelectronic Devices and Circuits - Narosa Publishing House, 2007.
5. R.A. Gaekwad - Op-Amps and Integrated Circuits EEE, 1994.
6. CMOS VLSI Design: A circuit and systems perspective, by Neil H.E. Weste, David Harris and Ayan Banerjee Third edition , Pearson
7. Physics of Semiconductor Devices by J.P. Colinge, C.A. Colinge
8. FinFETs and Other Multi-Gate Transistors by J.-P. Colinge
9. Hybrid CMOS Single-Electron-Transistor Device And Circuit Design by Santanu Mahapatra, Adrian Mihai Ionescu
10. Nanoscale Transistors: Device Physics, Modeling and Simulation Mark Lundstrom, Jing Guo

#### **Book for Reference:**

1. R.F. Coughlin and F.F, Driscoll - Op-Amp and Linear Integrated Circuits, Prentice Hall of India, New Delhi, 1996.
2. M.S.Tyagi - Introduction to Semiconductor Devices - Wiley, New York, 2014.
3. Deboo/ Burrous - Integrated circuits and Semiconductor Devices - Theory and Application, McGraw Hill, New Delhi, 1985.
4. Ramakant Gaekwad - Operational Amplifiers - Wiley Eastern, New Delhi, 1981.
5. S.M. Sze - Semiconductor Devices - Physics and Technology, Wiley, New York, 1985.
6. Millman and Halkias - Integrated Electronics - McGraw Hill, New Delhi.
7. Quantum Transport: Atom to Transistor by Supriyo Datta Organic field-effect transistors by Bao Z., Locklin J. (eds.)

## SEMESTER I

### PEPHB20 - ELECTIVE IB: ELECTRONIC COMMUNICATION SYSTEMS

<b>Year:</b> I	<b>Course Code:</b> PEPHB20	<b>Title of the Course:</b> Electronic Communication Systems	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To make the students acquire knowledge about electronic communication systems.
2. To understand the error control coding for encoding and decoding digital data.
3. To access the analog and digital technologies used for satellite communication networks.
4. To impart to the students the basic understanding of wireless network system.

#### Course Outcomes (CO)

The learners will be able to

1. Compare the performance of AM, FM and PM schemes with reference to SNR.
2. Design encoder and decoder schemes for error control.
3. Understand the orbital and functional principles of satellite communication systems.
4. Understand the evolution of cellular communication systems up to and beyond 3G.
5. Understand fundamentals of wireless communications.

CO	PSO					
	1	2	3	4	5	6
CO1	L	H	M	M	L	H
CO2	M	L	H	L	M	M
CO3	H	M	L	M	H	H
CO4	H	L	M	L	H	H
CO5	H	M	L	H	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	H	H
CO5	M	M	M	M	M	H

(Low -L, Medium– M, High-H)

## Course Syllabus

### **Unit I: Signal Encoding Techniques (14 Hours)**

- 1.1 Line of sight transmission - Fading in the mobile environment (K2, K3)
- 1.2 Antennas: types - Propagation modes (K1, K2)
- 1.3 Signal encoding techniques: criteria (K1, K2)
- 1.4 ASK - FSK - BFSK - MFSK - PSK - BPSK - QPSK (K1, K2)
- 1.5 Multilevel PSK - AM modulation - Angle modulation (K1, K2)
- 1.6 PCM - delta and adaptive delta modulation (K1, K2)

### **Unit II: Coding and Error Control (14 Hours)**

- 2.1 Error detection - Parity check - cycle redundancy check (K3, K4, K5)
- 2.2 Block error correction codes - hamming code (K1, K4, K5)
- 2.3 Cyclic codes - BCH code - reed - Solomon codes(K3, K4, K5)
- 2.4 Block interleaving –convolution codes - decoding (K4, K5)
- 2.5 Turbo coding - automatic repeat request (K4, K5)
- 2.6 Flow control - error control (K4, K5)

### **Unit III: Satellite Communication (15 Hours)**

- 3.1 Satellite parameters and configurations (K1, K2)
- 3.2 Satellite orbits - GEO - MEO - LEO (K1, K2)
- 3.3 Frequency bands - transmission impairments (K2, K3)
- 3.4 Satellite foot print - atmospheric attenuation (K2)
- 3.5 Satellite network - configuration - capacity allocation (K2, K3, K4)
- 3.6 Multiplexing: FDM and TDM (K1, K2)

### **Unit IV: Cellular Wireless Networks (16 Hours)**

- 4.1 Principles of cellular networks: Organization - frequency reuse (K1, K2)
- 4.2 Operation - mobile radio propagation effects - hand-off (K2, K3, K4)
- 4.3 Power control - traffic engineering - first generation analog(K3, K4, K5)
- 4.4 AMPS - second generation - TDMA - mobile wireless TDMA design consideration (K2, K3)
- 4.5 CDMA - mobile wireless CDMA design considerations (K3, K4, K5)
- 4.6 Soft handoff –IS 95 - Third generation systems - wireless local loop (K1, K2)

### **Unit V: Wireless LANS (13 Hours)**

- 5.1 Overview: Wireless LAN applications - wireless LAN requirements (K1, K2, K3)
- 5.2 Wireless LAN technology - Infrared LANS (K1, K2)
- 5.3 Spread spectrum LANS (K2, K3, K4)
- 5.4 Narrow band microwave LANS (K1, K2)
- 5.5 IEEE 802 architecture (K1, K2)
- 5.6 IEEE 802.11 architecture (K1, K2)

**Books for Study:**

1. George Kennedy, Brendan Davis, SRM Prasanna, Electronic Communication Systems, McGraw Hill (India) Pvt. Ltd., Fifth Edition, 2011.
2. Simon O. Haykin, Michael Moher, Modern Wireless Communications, Pearson Education, 2007.

**Books for Reference:**

1. Theodore S. Rappaport, Wireless Communications: Principles and Practice, Pearson Education India, 2009.
2. Gordon L. Stuber, Principles of Mobile Communications, Springer International Ltd., 2001.
3. William Stallings - Wireless Communications and Networks –Pearson Education, Asia, 2002.
4. Robert J. Schoenbeck - Electronic Communications, Modulation and Transmission - Prentice Hall of India, 1999.
5. P. Gnanasivam - Telecommunication Switching and Networks - Prentice Hall of India, 2004

## SEMESTER I

### PIPHA20 –IEP: PHYSICS FOR SET / NET - PAPER-I

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PIPHA20	<b>Title of the Course:</b> IEP:Physics for SET/NET- Paper-I	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To represent the equations of motion for complicated mechanical systems using the Lagrangian and Hamiltonian formulation of classical mechanics.
2. To analyze logic processes and implement logical operations using combinational and sequential logic circuits.
3. To understand the basic concepts of thermodynamic.
4. To impart knowledge about Classical Mechanics, Electronics and Statistical mechanics for competitive Examinations.

#### Course Outcomes (CO)

The learners will be able to

1. Describe and understand the motion of a mechanical system using Lagrange-Hamilton formalism.
2. Design and analyze of electronic circuits
3. Develop a digital logic and apply it to solve real life problems.
4. Ability to identify the properties of substances on property diagrams and obtain the data from property tables.
5. To acquire knowledge about classical and Quantum statistical mechanics.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	M	L	M
CO2	H	M	H	H	M	L
CO3	H	L	M	M	H	H
CO4	H	L	M	M	H	M
CO5	H	M	L	H	M	L

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	M	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	M	H	M
CO5	H	H	L	H	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Classical Mechanics

Dynamical systems - Phase space dynamics - Euler's angles and Euler's equation of motion - Lagrangian and Hamiltonian formalism and equations of motion - Conservation laws and cyclic coordinates - Principle of least action - Poisson's Bracket - Canonical transformations - Hamilton Jacobi theory - Linear harmonic oscillator problem - Action angle variables - Small oscillations - Normal modes - Linear triatomic molecule. Classical statistics - Ensembles, Liouville's theorem - Quantum statistics - Maxwell-Boltzmann - Bose-Einstein - Fermi-Dirac.

### Unit II: Electronics - I

Semiconductor devices - Diodes - Rectifiers - Filters - Transistors, FET, UJT - Optoelectronic devices - Solar cells, photo detectors - LEDs structure - Characteristics - Frequency dependence and applications. Op-Amp and their applications -

### Unit III: Electronics - II

Amplifiers - Oscillators - Logic circuits & logic families - Flip flops - Registers - Counters and Comparator circuits - A/D and D/A converters - Op-Amp based instrumentation amplifier - Feedback - Filtering and noise reduction - Shielding and grounding - 555 timer - IC 565-Lock-in detector - Modulation techniques. Elementary ideas of Microprocessor and Microcontroller - Transducers - Temperature/ Pressure/Vacuum magnetic fields - Vibration - Optical detectors - Solar cells - Photo detectors - LED's - Digital techniques and applications.

### Unit IV:

#### Thermodynamics:

Equation of state for various thermodynamics systems - laws of thermodynamics - thermodynamic potentials - phase equilibrium - Gibbs phase rule - phase transitions and Dia, para and ferromagnetism - Ehrenfest's classification.

#### Classical Statistical Mechanics:

Phase space, micro and macro states - Micro-canonical - Canonical and Grand canonical ensembles and partition function - Statistical ensemble - Statistical postulates - Probability calculations - Partition function and their properties - Calculation of statistical quantities - Langevin's theory of paramagnetism.

### Unit V: Quantum Statistical Mechanics:

Postulates of Quantum statistical mechanics - Density operator and matrix - Properties of ideal Bose & Fermi gases - Bose-Einstein condensation - Cluster expansion for a classical gas - Virial equation of state - Ising model - One dimensional Ising model - Correlation of space - Time dependent fluctuations - Brownian motion - Black body radiation and Plank's radiation law.

#### Books for study:

1. J.C. Upadhyaya - Classical Mechanics, Himalaya Publishing house, Reprint 2017.
2. J.D. Jackson - Classical Electrodynamics, Willey Eastern Ltd., New Delhi, 1975.
3. R.A. Gaekwad - Op-Amps and Integrated circuits - EEE, 2012.
4. D. Roy Choudary and Shail B. Jain - Integrated Circuits - New Age International Publishers 2011.
5. V. K. Mehta and Rohit Mehta- Principles of Electronics - S. Chand & Co., New Delhi, Reprint 2014.
6. SathyaPrakash - Statistical Mechanics (1994) - Kedar, Meerut, 1994.

7. F. Reif - Fundamentals of Statistical and Thermal Physics - McGraw Hill, Auckland 1965.
8. S.K. Sinha -Introduction to Statistical Mechanics - Alpha Science International,2005

**Books for reference:**

1. H. Goldstein - Classical mechanics, 3<sup>rd</sup> Ed., C. Poole and J. Safko, Pearson Education, Asia, New Delhi, 2015.
2. S.M. Sze - Semiconductor Devices: Physics and Technology - Wiley, New York, 1985.
3. Sathyaprakash - Statistical Mechanics, Kedar Publications, Meerut, 2017.
4. R.K. Pathria, Paul D.Beale,-Statistical Mechanics - Butterworth Heinemann, UK, 1996.

## SEMESTER I

### PIPHB20 – IEP: ASTRO PHYSICS

<b>Year: I</b> <b>Sem: I</b>	<b>Course Code:</b> PIPHB20	<b>Title of the Course:</b> IEP: Astro Physics	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To make the students acquire the knowledge about the universe
2. To provide a clear understanding of Astro Physics.
3. To explain the relationship between mass and gravity in solar system.
4. To formulate astrophysical problems in mathematical terms; solve with analytic and numerical methods
5. To propose, plan, and conduct astronomical observations with professional telescopes

#### Course Outcomes (CO)

The learners will be able to

1. In-depth knowledge within the defined area of astrophysics.
2. Explain stellar evolution, including supernovas, neutron stars, pulsars, white dwarfs and black holes, using evidence and presently accepted theories.
3. Detail the presently accepted formation theories of the solar system based upon observational and physical constraints.
4. Detail the main features and formation theories of the various types of observed galaxies, in particular the Milky Way.
5. Develop observation skills to be able to explain astronomical features and observations obtained via telescopic observations.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	M	L	H
CO2	H	M	H	H	H	H
CO3	H	L	H	M	H	L
CO4	H	L	H	M	M	H
CO5	H	M	H	H	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	M	H	H	H	H
CO3	H	H	H	M	H	M
CO4	H	M	H	H	M	H
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I: Solar system (14 Hours)**

- 1.1 Basic ideas of the Solar system - Geo-centric theory - Helio-centric theory (K1, K2)
- 1.2 Kepler's laws of gravitation - Newton's law of gravitation (K1, K2, K3)
- 1.3 Physical processes in the solar system (K1, K2)
- 1.4 Dynamics of the solar system - physics of planetary atmospheres (K1, K2)
- 1.5 Individual planets; comets, asteroids, and other constituents of the solar system (K1, K2)
- 1.6 Extra-solar planets - formation of the solar system, stars, and planets (K1, K2)

### **Unit II: The Sun (13 Hours)**

- 2.1 The sun - A typical star - Helioseismology (K1, K2)
- 2.2 Temperature distribution near the photosphere - Limb darkening (K1, K2, K3)
- 2.3 Chromospheres - Spicules, plages and filaments - Solar granulation (K1, K2)
- 2.4 Solar corona - Prominences - Solar flares - Radio emission from the sun (K1, K2)
- 2.5 Solar wind - Pyrheliometer (K1, K2, K3)

### **Unit III: The Stars (16 Hours)**

- 3.1 Stars - General Distances to stars - Stellar masses and radii (K1, K2)
- 3.2 Measuring of masses and stellar radii - Colour index of stars (K1, K2)
- 3.3 Stellar Evolution - Birth of a star - Maturity - Ageing of stars (K1, K2)
- 3.4 Death of a star - Types of Stars - Binary, multiple, variable, erupting and exploding stars (K1, K2)
- 3.5 Interstellar medium: Nebulae - Novae - Super Novae - White Dwarfs (K1, K2)
- 3.6 Electrons in white Dwarfs - Neutron stars - Pulsars - Quasars - Black holes (K1, K2)

### **Unit IV: The Galaxy (15 Hours)**

- 4.1 The Galaxy - Hubble's law - Schematic representation of the general structure of galaxy (K1, K2)
- 4.2 The nucleus, the galactic disk and the galactic halo - Dark matter (K1, K2)
- 4.3 Milky way - Hubble classification of galaxies (K1, K2)
- 4.4 Spiral galaxies - Elliptical galaxies - Irregular galaxies (K1, K2)
- 4.5 Dwarf galaxies - Masses of galaxies (K1, K2)
- 4.6 Rotation curves of galaxy - the general rotation law (K1, K2)

### **Unit V: Cosmic Rays and Instrumentation (14 Hours)**

- 5.1 Cosmic rays - Discovery of Cosmic rays - Latitude effect (K1, K2, K4)
- 5.2 Azimuth effect - Altitude effect - longitude effect (K1, K2)
- 5.3 Primary cosmic rays - Secondary rays - Detection methods (K1, K2, K3, K4)
- 5.4 Cosmic ray showers - Vanallen Belts (K1, K2)
- 5.5 Astronomical Instruments: Reflecting and refracting telescopes (K2, K4)
- 5.6 Radio telescopes - Hubble space telescope (HST) (K2, K4)

**Books for study:**

1. BaidyananthBasu- An Introduction to Astro Physics - Prentice Hall of India, 2004.
2. K.S.Krishnaswamy- Astro Physics: A Modern Perspective - Reprint, New Age International Pvt.Ltd., New Delhi, 2002.
3. G.K.Sasidharan- The Great Universe - S.Chand& amp; Company Ltd., New Delhi - 2008.
4. R.Murugesan&KiruthigaSivaprasath - Modern Physics - S.Chand& amp; Co. Publication - 2007.

**Books for Reference:**

1. V.B.Bhatia- Textbook of Astronomy and Astro Physics with Elements of Cosmology - Narosa Publishing House, New Delhi, 1998.
2. R.R.Danial- Concepts of Space Science - University Press, Reprint 2002.
3. K.CosmicKapoor- Space Book - Lotus Press, 2005.

## SEMESTER II

### PCPHD20 - MATHEMATICAL PHYSICS – II

<b>Year:</b> I	<b>Course Code:</b> PCPHD20	<b>Title of the Course:</b> Mathematical Physics - II	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
<b>Sem:</b> II							

#### Course Objectives

1. To inculcate to the students the mathematical concepts for solving physical problems which arise in many branches of Physics.

#### Course Outcomes (CO)

The learners will be able to

1. Apply concepts of complex analysis to evaluate definite integrals.
2. Explain various operations of tensors and apply in many branches of science.
3. Apply Laplace/Fourier transforms to solve mathematical problems and use Fourier transforms as an aid for analysing experimental data.
4. Use various probability distribution methods to analysis any experimental event.
5. Apply the concept of group theory in the domain of physical sciences.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	H
CO2	H	L	L	M	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	M	H	H
CO5	H	M	H	M	H	L

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	H	H	M	H	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	H	H	M
CO5	H	M	M	M	L	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Complex Variables

(15 Hours)

- 1.1 Analytic functions - Cauchy-Riemann conditions (K2, K3, K4)
- 1.2 Single and multi-valued functions (K2, K3, K4)
- 1.3 Cauchy's integral theorem and formula (K2, K3, K4, K5)
- 1.4 Taylor's theorem and Laurent's theorem (K2, K3, K4, K5)
- 1.5 Poles and Residues - Cauchy's residue theorem (K2, K3, K4, K5)
- 1.6 Application to evaluation of definite integrals of round unit circle and an infinite semi-circle (K2, K3, K4, K5)

### Unit II: Tensors

(13 Hours)

- 2.1 Introduction - Transition of coordinates - Einstein's summation convention (K2, K3, K4)
- 2.2 Contravariant, co-variant and mixed tensors - Rank of a tensor - Tensors of higher ranks (K2, K3, K4)
- 2.3 Kronecker delta symbol - Invariant tensors - Levi civita symbol- Reciprocal tensors - Relative and absolute tensors (K2, K3, K4)
- 2.4 Algebraic operations of tensors - Outer product, Contraction, Inner product and Quotient law (K2, K3, K4)
- 2.5 Symmetric and anti-symmetric tensors (K2, K3, K4)
- 2.6 Basic idea of Christoffel's 3-index symbols - Covariant derivative of a tensor (K2, K3, K4)

### Unit III: Integral Transforms

(15 Hours)

- 3.1 Laplace transforms and inverse Laplace transforms (K3, K4, K5)
- 3.2 Solution of linear differential equations with constant co-efficients- evaluation of integrals(K3, K5)
- 3.3 Fourier transforms - Fourier sine and cosine transforms (K3, K4, K5)
- 3.4 Convolution theorem (K4)
- 3.5 Simple applications(K3,K5)

### Unit IV: Probability Theory

(15 Hours)

- 4.1 Probability densities and probability distributions(K2, K3, K5)
- 4.2 Binomial, Poisson's and Normal distributions(K2, K3, K5)
- 4.3 Moments and generating functions (K2, K3, K5)
- 4.4 Discrete distributions (K2, K3, K5)
- 4.5 Casual and uniform distribution (K2, K3, K5)
- 4.6 Cauchy continuous distribution (K2, K3, K5)

### Unit V: Group Theory

(14 Hours)

- 5.1 Definition of groups, subgroups and conjugate classes - Invariant subgroup (K2, K4)
- 5.2 Homomorphism and isomorphism between groups (K2, K4)
- 5.3 Point groups - Representation of a group - Reducible and irreducible representations (K2, K4)

- 5.4 Schur's lemma - Great orthogonality theorem (K4)
- 5.5 Character table - Construction of character table for  $C_{3V}$  and  $C_{4V}$  group (K3, K6)
- 5.6 Continuous and Lie groups - Symmetry group of Schrodinger equation - Two dimensional Rotation group  $R+(2)$  - Three dimensional Rotation group  $R+(3)$  (K4)

**Books for Study:**

- 1. Sathyaprakash - Mathematical Physics - S.Chand & Sons, Reprint 2006.
- 2. B.D.Gupta- Mathematical Physics, 3rd Edition - Vikas Publishing House Pvt. Ltd., 2004.
- 3. E. Kreyszig - Advanced Engineering Mathematics, 8th Edition - Wiley, New York, 1999.
- 4. H.K. Dass - Mathematical Physics - S.Chand, Reprint 2007.

**Books for reference:**

- 1. M. Hamermesh - Group Theory and Its Application to Physics: Problems – Addison Wesley, London, 1962.
- 2. C.R. Wylie and LC. Barrett - Advanced Engineering Mathematics, 6th Edition, International Edition, McGraw Hill, New York, 1995.
- 3. P.K. Chakrabarti and S.N. Kundu - A Textbook of Mathematical Physics - New Central Book Agency, Kolkata, 1996.
- 4. A.K. Ghatak, I.C. Goyal and S.H. Chua - Mathematical Physics - Macmillan India, New Delhi, 2002.
- 5. M.D. Greenberg - Advanced Engineering Mathematics, 2nd International Edition - Prentice Hall International, New Jersey, 1998.
- 6. P.K. Chattopadhyay - Mathematical Physics - Wiley Eastern, Madras, 1990.
- 7. F.A. Cotton - Chemical Applications of Group Theory - Wiley Eastern, New Delhi, 1987.
- 8. A.W. Joshi - Elements of Group Theory for Physicists - (Wiley Eastern, New Delhi, 1971.
- 9. G. Arfken and H.J. Weber - Mathematical Methods for Physics, 5th Edition – Harcourt (India), New Delhi, 2001.

## SEMESTER II

### PCPHE20 - ELECTROMAGNETIC THEORY

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCPHE20	<b>Title of the Course:</b> Electromagnetic Theory	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To make the students understand the principles and theory of electrostatics, magneto statics.
2. To familiarize the students with electromagnetic waves and its applications.

#### Course Outcomes (CO)

The learners will be able to

1. Able to understand and apply the basic principles of electrostatics
2. Analyses the properties of magnetostatic field through current distribution with the application of various laws and conditions.
3. Able to perceive the propagation and interaction of electric and magnetic fields through free space and matter
4. Imbibes the wide-spread knowledge about radio communication with its mathematical applications.
5. Acquires the comprehensive knowledge of the various applications of antennas

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	L
CO2	H	H	H	H	H	L
CO3	H	H	M	M	H	L
CO4	H	H	H	H	L	M
CO5	H	H	M	M	H	L

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	M	M	H	M	M	M
CO3	M	M	M	H	H	H
CO4	H	M	H	M	H	H
CO5	M	H	H	M	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Electrostatics

(14 hours)

- 1.1 Electrostatic potential - Poisson's equation and Laplace's equation from Gauss' law (K1, K2)
- 1.2 Solution of Laplace's equation in spherical co-ordinates - Solution to Laplace equation in cylindrical coordinates - solution to Laplace equations in Cartesian coordinates (K2, K3, K5)
- 1.3 Polar molecules - Langevin equation (K2, K3, K5)
- 1.4 Non-polar molecules - Clausius-Mossotti relation (K2, K3, K4)
- 1.5 Polarization vector - Electric field at external and internal points due to polarization - Displacement vector (K1, K2, K3)
- 1.6 Conducting sphere in a uniform field - Dielectric sphere in a uniform field (K3, K4, K5)

### Unit II: Magnetostatics

(15 hours)

- 2.1 Magnetic field of steady current - current density  $J$  (K1, K2)
- 2.2 Ampere's circuital law - Force on current carrying conductors and charges - Force between parallel wires & force on a point charge moving in a magnetic field (Lorentz force) (K2, K3)
- 2.3 Magnetic scalar potential - Application to a circular coil (K2, K3, K4)
- 2.4 Magnetic vector potential - Application to a long current carrying wire - Line integral of a vector potential over a closed curve (K2, K3, K4)
- 2.5 Lorentz condition - Magnetic shielding (K3, K5)
- 2.6 Energy in a magnetic field (K3, K4)

### Unit III: Maxwell's Equations

(15 hours)

- 3.1 Faraday's laws of electro-magnetic induction - Faraday's law in vector form (K1, K2, K4)
- 3.2 Maxwell's displacement current - Maxwell's equations - Derivation (K2, K3, K4)
- 3.3 Electromagnetic Potentials  $\mathbf{A}$  and  $\phi$  (Vector and Scalar potentials) - Maxwell's equations in terms of Electromagnetic Potentials (K2, K4)
- 3.4 Non-uniqueness of Electromagnetic Potentials - Gauge invariance - Lorentz gauge and Coulomb gauge (K3, K4, K5)
- 3.5 Conservation laws for a systems of charges and electromagnetic fields - Equation of Continuity (charge) - Momentum in EM Fields - Energy in EM fields (Poynting theorem) (K3, K4, K5)
- 3.6 Wave equation in general - Plane wave solution for free space (K2, K3)

### Unit IV: Application of Maxwell's Equations

(14 hours)

- 4.1 Fields and radiation of localized sources (K1, K2)
- 4.2 Oscillating electric dipole - Radiation from an oscillating electric dipole - Poynting vector and radiated power (K2, K3, K4)
- 4.3 Radiation from a small current element - Electric field and Radiation resistance (K3, K4)
- 4.4 Radiation from a linear antenna - Electric field intensity, Magnetic field intensity, radiated power (K4, K5)

4.5 Antenna arrays - Broad side array - end fire array (K4,K5)

4.6 Radiation pressure - Electromagnetic oscillators (K4,K5)

### **Unit V: Wave Propagation**

**(14 hours)**

5.1 Propagation of electromagnetic waves in isotropic and anisotropic dielectrics (K3, K4)

5.2 Propagation in conducting media - Calculation of Phase Velocity - Refractive Index - Skin depth ( K3,K4)

5.3 Linear and circular polarization - Reflection and refraction at a plane interface (K2,K3)

5.4 Propagation of waves in a rectangular wave guide - TE Waves - TM Waves (K4,K5)

5.5 Cavity resonator - TE Mode - TM Mode (K4,K5)

5.6 Faraday and Kerr effects (K4)

### **Books for Study:**

1. Chopra, Agarwal - Electromagnetic Theory, 5<sup>th</sup> Edition - K. Nath & Co, Meerut, 2014.
2. SathyaPraksah - Electromagnetic Theory and Electrodynamics - Kedarnath Ramnath &Co., 2006.
3. Gupta, Kumar, Singh - Electrodynamics - PragatiPrakashan, Meerut, 2003.

### **Books for Reference:**

1. J.D. Jackson - Classical Electrodynamics - Willey Eastern Ltd., New Delhi, 1975.
2. D.J.Griffiths - Introduction to Electrodynamics, 3<sup>rd</sup> Edition - Prentice Hall of India, New Delhi, 2002.
3. J.R.Rertz, F.J. Milford and R.W. Christy - Foundations of Electromagnetic Theory, 3<sup>rd</sup> Edition - Narosha Publication, New Delhi, 1986.
4. W. Panofsky and M. Phillips - Classical Electricity and Magnetism - Addison Wesley, London, 1962.
5. J.D. Kraus and D.A. Fleisch - Electromagnetic with Applications, 2<sup>nd</sup> Edition - WCB McGraw Hill, New York, 1999.
6. B. Chakraborty - Principles of Electrodynamics -Books and All Kolkata, 2002.

## SEMESTER II

### PCPHF20 - QUANTUM MECHANICS - I

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PCPHF20	<b>Title of the Course:</b> Quantum Mechanics – I	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To make the students understand the inadequacy of Classical mechanics, the origin of Quantum mechanics and its operators.
2. To impart knowledge about the postulates of Quantum mechanics, its applications and various approximation methods.

#### Course Outcomes (CO)

The learners will be able to

1. Understand the concepts of Quantum Mechanics.
2. Apply the concept of Quantum mechanics to various problems.
3. Understand various representations in Quantum Mechanics.
4. Attain knowledge about various approximation methods and their applications.
5. Acquire knowledge about Angular momentum and commutation rules.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	M
CO2	M	H	H	H	M	H
CO3	H	M	H	M	M	M
CO4	H	H	H	H	M	M
CO5	H	M	M	M	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	H
CO2	H	H	M	M	M	H
CO3	M	M	L	M	H	H
CO4	H	H	M	M	M	H
CO5	M	M	M	M	M	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Basic Formalism

(14 Hours)

- 1.1 Limitations of Classical Physics - Wave function for a free particle - Physical significance of wave function - Linear operator – Defns. of Eigen functions and Eigen values (K1,K2)
- 1.2 Hermitian operator - Theorem on Hermitian operator - Derivation of operators for momentum and total energy - Postulates of Quantum mechanics (K2,K3)
- 1.3 Time dependent and time independent Schrodinger equations (K3, K4)
- 1.4 Derivation of Expectation Value of a normalized wave function - Ehrenfest's Theorem(K3, K4, K5)
- 1.5 Definition of orthonormality - Schrödinger equation in spherical polar coordinates(K3, K4, K5)
- 1.6 Operator and Eigen values of Orbital angular momentum (K4,K5)

### Unit II: Applications

(16 Hours)

- 2.1 Linear harmonic oscillator (Schrödinger method) - Zero point energy (K2, K3, K4, K5)
- 2.2 Ladder operator - Particle in a Spherically symmetric potential (K2, K3, K4, K5)
- 2.3 System of two interacting particles - Rigid rotator in three dimensions (K2, K3, K4, K5)
- 2.4 Problem of Hydrogen atom (K2, K3, K4, K5)
- 2.5 Particle in a Spherical well(K2, K3, K4, K5)
- 2.6 Three dimensional Square well potential - The Deuteron (K2, K3, K4, K5)

### Unit III: General Formalism

(14 Hours)

- 3.1 Dirac's notation and Hilbert space –Types of equations of motion - Schrödinger representation (K2, K3, K4)
- 3.2 Heisenberg representation - Interaction representation (K3, K4)
- 3.3 Definition of Momentum representation - Probability density in momentum representation Operator for position coordinate (K2, K3, K4)
- 3.4 Operator for momentum - Equation of motion in momentum representation (K3, K4, K5)
- 3.5 Definition of Unitary transformation - Symmetry transformation - Translation in Space - Conservation of linear momentum Translation in time: Conservation of energy (K2, K3, K4)
- 3.6 Rotation in space: Conservation of Angular momentum - Space inversion-:Parity conservation (K2, K3, K4)

### Unit IV: Angular Momentum

(14 Hours)

- 4.1 Orbital angular momentum operators - Derivation of Orbital angular momentum Commutation relations (K2, K5)
- 4.2 Total angular momentum  $J$  - Eigen values of  $J^2$  and  $J_z$  - Matrix representation of  $J^2$  and  $J_z$  (K2, K3, K4)
- 4.3 Matrices for  $J_+$ ,  $J_x$ ,  $J_y$  and  $J_-$  - Construction of total angular momentum matrices for different values of  $j$  (K4, K5)
- 4.4 Spin angular momentum - Pauli's spin matrices - Spin vectors for spin half systems Symmetric and anti-symmetric wave functions (K2, K4,)
- 4.5 Addition of two angular momenta –Clebsch–Gordan coefficients - Selection rules – Procedure for Computation of CG coefficients (K2, K4, K5)
- 4.6 Computation of CG Coefficients for different values of  $j_1$  and  $j_2$ (K6)

## Unit V: Approximation Methods

(14 Hours)

- 5.1 Time-independent perturbation theory - Derivation of first order, second order perturbation equations - Definition of degeneracy (K2, K4)
- 5.2 Non degenerate energy levels - First order correction to energy and wave function - Second order correction to energy and wave function (K3, K4)
- 5.3 Applications - Ground state of anharmonic oscillator - Effect of electric field on the ground state of Hydrogen: Stark effect (K3, K4, K5)
- 5.4 Degenerate energy levels - First order correction - Variational method principle - Application to ground state of Helium atom (K3, K4, K5)
- 5.5 WKB Approximation - General solution - Validity of WKB approximation - Classical turning point - Connection formula (K2, K4)
- 5.6 Bound states in a potential well (WKB quantization rule)- Application to Simple harmonic oscillator (K3, K4, K5)

### Books for Study:

1. G. Aruldas - Quantum Mechanics - Second edition - PHI Learning private Limited, Delhi, 2009.
2. Gupta & Kumar - Quantum Mechanics - 33<sup>rd</sup> edition -Jai Prakash Nath Publications, 2015.
3. Satyaprakash - Quantum Mechanics - Kedar Nath Ram Nath Publications , 2019
4. V. Devanathan - Quantum Mechanics - Narosa Publishing House, New Delhi, 2005.
5. V.Devanathan- Angular momentum techniques in Quantum Mechanics - Springer publications, 2010.
6. V.K. Thankappan - Quantum Mechanics, 2<sup>nd</sup> Edition - Wiley Eastern Ltd., New Delhi, 1985.
7. David Bohm - Quantum theory - Courier Corporation, 1989.

### Books for Reference:

1. P.M. Mathews and K. Venkatesan - A Textbook of Quantum Mechanics - Tata McGraw Hill, New Delhi, 1976.
2. L.I. Schiff - Quantum Mechanics, 3<sup>rd</sup> Edition - International Student Edition, McGraw Hill, Kogakusha, Tokyo, 1968.
3. E. Merzbacher - Quantum Mechanics, 2<sup>nd</sup> Edition - John Wiley and Sons, New York, 1970.
4. P.A.M. Dirac - The Principles of Quantum Mechanics - Oxford University Press, London, 1973.

## SEMESTER II

### PEPHC20 - ELECTIVE II A: CRYSTAL GROWTH, NANO SCIENCE AND RESEARCH METHODOLOGY

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PEPHC20	<b>Title of the Course:</b> Crystal Growth, Nano Science and Research Methodology	<b>Course Type:</b> Theory	<b>Course Category:</b> Major Elective	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To provide the students, knowledge on crystal growth techniques and nanoscience
2. To learn the basic concepts in research methodology for pursuing future research work.

#### Course Outcomes (CO)

The learners will be able to

1. Explain the fundamental concepts behind in the formation of crystal.
2. Demonstrate the various methods in crystal growth techniques and their advantages.
3. Understand the advanced methods of characterization instruments for crystal and nanomaterials.
4. To familiarize about the physical concepts and principles of nanoscience and nanotechnology.
5. Provide a broad view of various approaches for the synthesis and fabrication of nanostructures and their outstanding properties useful to carry out their project and research work.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	L	H	H	M
CO3	H	H	M	H	H	M
CO4	H	M	M	H	L	H
CO5	H	M	M	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	H	H
CO5	M	M	M	M	M	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Nucleation and Growth

(10 Hours)

- 1.1 Nucleation - Different kinds of nucleation - Theories of nucleation (K1, K2)
- 1.2 Classical theory of nucleation - Gibbs Thomson equation for vapour (K1, K2)
- 1.3 Modified Thomson's equation for melt - Gibbs Thomson equation for solution (K1, K2)
- 1.4 Concept of formation of critical nucleus - Spherical and cylindrical nucleus (K1, K2, K3)
- 1.5 Crystal growth techniques - Solution Growth Technique: Low temperature solution growth: Solution - Solubility and super solubility - Expression of super saturation - Miers T-C diagram (K1, K2, K3)
- 1.6 Gel Growth Technique: Principle - Various types - Structure of gel - Importance of gel - Experimental procedure (K1, K2, K3)

### Unit II: Growth and Characterization Techniques

(10 Hours)

- 2.1 Melt technique: Bridgman technique - Basic process - Vertical Bridgman technique - Crystal Pulling technique (K1, K2, K3, K4)
- 2.2 Czochralski technique - Experimental arrangement - Growth process (K4, K5, K6)
- 2.3 X - Ray Diffraction (XRD) - Powder and single crystal (K1, K2)
- 2.4 Fourier transforms Infrared analysis (FT-IR) - FT - Raman Elemental analysis (K1, K2)
- 2.5 Elemental dispersive X-ray analysis (EDAX) - Scanning Electron Microscopy (SEM) - Transmission electron microscopy (TEM) (K2, K4, K5, K6)
- 2.6 UV-Vis-NIR Spectrometer - Etching (Chemical) - Vickers Micro hardness - TGA - DTA - PL studies (K4, K5, K6)

### Unit III: Basics of Nano Technology

(9 Hours)

- 3.1 History of Nano technology - concept of Nano technology and Nano machines (K1, K2)
- 3.2 Atomic structure molecules and phases - Molecular and atomic sizes - Surfaces and dimensional space (K1, K2, K3)
- 3.3 Top down and bottom up approach in synthesis - Nano scale formation (K3, K4, K5)
- 3.4 Strong intermolecular forces - Covalent and coulomb interactions (K2, K4)
- 3.5 Weak inter molecular forces - Vander Waal forces - Repulsive forces (K2, K4, K5)
- 3.6 Hydrogen bonding, Hydrophobic and hydrophilic interactions (K2, K5, K6)

### Unit IV: Fabrication Techniques and Properties of Nano-Structure

(9 Hours)

- 4.1 Vacuum Techniques: Thermal evaporation - Physical Vapour deposition - Ionized Cluster beam deposition - Laser vaporization (ablation) - laser pyrolysis (K1, K2, K3)
- 4.2 Sputter deposition - DC sputtering - RF sputtering - Magnetron sputtering - ECR plasma deposition (K1, K2)
- 4.3 Chemical vapour deposition - Electric arc deposition - Ion beam techniques - molecular beam epitaxy (K2, K3, K4)
- 4.4 Nanolithography techniques: Lithography using Photons (UV-VIS, Lasers and X-rays) (K2, K3, K5)
- 4.5 Lithography using particle beams - Electron and Ion beam Lithography (K1, K2, K3, K4)
- 4.6 Quantum dots and Quantum wires - Size dependent variation in magnetic properties - Thermal and electronic transport properties (K3, K4, K5, K6)

## **Unit V: Research Methodology**

**(10 Hours)**

- 5.1 Meaning of research - Objectives of research - Motivation of research - Types, approaches and significance - Methods versus methodology (K1, K2, K3)
- 5.2 Identification of the problem - Literature survey - Reference collection - Necessity and techniques involved in defining the problem (K2, K3, K4)
- 5.3 Research design - Needs and features of good design - Different research design - Basic principles of experimental designs - Meaning of research report (K2, K3, K4)
- 5.4 Logical format for writing thesis and paper - Essential of scientific report: abstract, introduction, review of literature, materials and methods and discussion (K3, K4, K5)
- 5.5 The use of quotation, footnotes, tables and figures - Referencing - Appendixes - Revising the paper or thesis (K4, K5, K6)
- 5.6 Oral power point presentation - Poster preparation - Editing and evaluating the final product - Proof reading - The final typescopy (K4, K5, K6)

### **Books for Study:**

1. Charles P. Poole, Frank J. Owens - Introduction to Nanotechnology - Wiley-Interscience, 2003.
2. P. Santhana Ragavan and P. Ramasamy - Crystal Growth Processes and Methods - KRU Publications, Kumbakonam, 2001.
3. C.R. Kothari and Gaurav Garg - Research Methodology, Methods and Techniques - New age International Publishers, III Edition, 2014
4. Santosh Gupta - Research Methodology Methods and Statistical Techniques
5. Rajammal et al., -A hand Book of Methodology of Research - Sri Ramakrishna Mission Vidyalaya Press, Coimbatore.

### **Books for Reference:**

1. J.C. Brice - Crystal Growth Processes - John Wiley and Sons, New York, 1986.
2. C. Hawkins & M. Sorigi - Research Ed Norosa Publishing House, New Delhi - 2000
3. Robert Ross - Research: An introduction - - Harper and Row Publications.
4. P. Saravanavel - Research methodology - - Kitlab Mahal, Sixth Edition.
5. R.A. Day - How to write and publish a scientific paper - Cambridge University press
6. Anderson - Thesis and Assignment writing - - Wiley Eastern Ltd.

## SEMESTER II

### PEPHD20 - ELECTIVE II B: ELECTRONIC INSTRUMENTATION

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PEPHD20	<b>Title of the Course:</b> Elective II B: Electronic Instrumentation	<b>Course Type:</b> Theory	<b>Course Category:</b> Major Elective	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To gain knowledge about electronic equipments.
2. To give to the students an application oriented paper.

#### Course Outcomes (CO)

The learners will be able to

1. Describe the Principle and working of Transistor, Thyristor and other electronic equipments used to measure the physical parameters such as Temperature, pressure and force etc., ,
2. Attain the knowledge of working principle of digital instruments ( digital pH meter, digital storage oscilloscope, digital multimeter etc.,)
3. Demonstrate about the description of analytical Instruments (UV-VIS Spectrometer, IR Spectrometer, Flame Emission Spectrometer and ICP-AES Spectrometer) which was used to characterize the materials and analyze the results.
4. Impart the knowledge in working of Bio medical instruments and its applicable to find out any defects in our human body and to save our life.
5. Understand about the essential parts of the computer and their need and develop the skills to handle above all instruments useful for our carrier.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	L	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	H	M
CO4	H	M	L	H	H	M
CO5	H	H	M	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	H	H
CO5	M	M	M	M	M	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Transducers

(10 Hours)

- 1.1 Classification of Transducers- Principle, Construction and working of Thermistor (K1, K2)
- 1.2 LVDT, Electrical strain gauges (K1, K2, K3)
- 1.3 and capacitive transducers (K1, K2, K3)
- 1.4 Measurement of non-electrical quantities ( K1, K2, K3, K4)
- 1.5 Strain, Displacement - Temperature (K1, K2, K3)
- 1.6 Pressure and Force (K2, K3, K4)

### Unit II: Digital Instrumentation

(8Hours)

- 2.1 Principle, block diagram and working of Digital frequency counter (K1, K2, K3)
- 2.2 Digital multimeter(K1, K2, K3)
- 2.3 Digital pH meter (K1, K2, K3)
- 2.4 Digital conductivity meter (K2, K3)
- 2.5 Digital storage oscilloscope (K1, K2, K3)
- 2.6 Digital voltmeter (K2, K3, K4)

### Unit III: Analytical Instrumentation

(10 Hours)

- 3.1 Principle, block diagram, description, working and applications of UV-VIS Spectrometer (K1, K2, K3)
- 3.2 IR Spectrometer (K2, K3)
- 3.3 Flame Emission Spectrometer (K2, K3, K4)
- 3.4 and ICP-AES Spectrometer (K2, K3, K4)
- 3.5 Basic concepts of Gas and Liquid Chromatography (K3, K4)
- 3.6 Elemental analyzers- salt analyzers- CHN analyzers- Thermal analyzers(K3, K4)

### Unit IV: Bio-Medical Instrumentation

(10 Hours)

- 4.1 Physiological transducers to measure blood pressure, body temperature (K1, K2)
- 4.2 Sources of Bio-electric potentials - resting potential (K1, K2, K3)
- 4.3 action potential, Bio-potential electrodes (K1, K2)
- 4.4 Principle, block diagram and operation of ECG and EEG - Recorders (K1, K2, K3)
- 4.5 EMG and - ERG recorders (K3, K4, K4)
- 4.6 Lead system and recording methods - Typical waveforms - Electrical safety in medical environment - Shock hazards (K1, K2, K3)

### Unit V: Computer Peripherals

(10 Hours)

- 5.1 Printers - Printer mechanism - Classification (K1, K2)
- 5.2 Dot matrix, Ink-Jet and Laser Printers (K1, K2)
- 5.3 Basic concepts of key board and mouse - Mass storage - floppy disk - Hard Disk - Optical disk (CD) (K1, K2, K3)
- 5.4 Digital camera - video camera - microphone (K2, K3, K4)
- 5.5 External hard drives - media card readers - digital camcorders (K1, K2, K3)
- 5.6 Monitor - projector - TV screen - plotter - speakers (K2, K3, K4)

**Books for Study:**

1. Dr. Rajendra Prasad - Electronic Measurements and Instrumentation - Khanna Publications,2012.
2. S. Ramambhadran- Elements of Electronic Measurements and Instruments - Khanna Publications,1999.

**Books for Reference:**

1. S.M. Dhir - Applied Electronics and Instrumentation - Khanna Publishers,1999.
2. Khandpur - Handbook of Biomedical Instrumentation - McGraw Hill Publications, 2014.
3. Theodre S. Rappaport, Wireless Communications: Principles and Practice, Pearson Education India, 2009.
4. William Stallings - Wireless Communications and Networks –Pearson Education, Asia, 2002.

## SEMESTER II

### PIPHC20 - IEP: PHYSICS FOR SET/NET - PAPER – II

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PIPHC20	<b>Title of the Course:</b> IEP: Physics for SET/NET - paper –II	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To recall and apply the knowledge about Mathematical Physics and Electromagnetic Theory for competitive Examinations.

#### Course Outcomes (CO)

The learners will be able to

1. Recall and apply the concepts and methods in mathematical physics and solve relevant problems in any competitive exams.
2. Understand the characteristics of special functions to solve the physical problems.
3. Apply concepts of complex analysis to evaluate definite integrals, tensors, probability distribution methods and group theory in the domain of physical sciences.
4. Recall and apply the concepts and methods in Electromagnetic theory and solve problems quantitatively in any competitive exams.
5. Acquires comprehensive knowledge of the various applications of wave guides, Maxwell's equations.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	M	H	M
CO2	H	L	H	M	H	H
CO3	M	H	M	H	H	M
CO4	H	M	H	M	H	M
CO5	M	H	M	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	M	M	H	H	M
CO4	H	H	H	M	M	H
CO5	H	H	H	H	H	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Mathematical Physics-I

- 1.1 Vector field- Gradient - Divergence - Curl and Laplacian in orthogonal curvilinear (K1, K2, K3, K5)
- 1.2 Spherical and cylindrical coordinate systems (K1, K2, K3)
- 1.3 Gauss-divergence and Stoke's theorem (K1, K2, K3, K5)
- 1.4 Matrices - Types of Matrices - Diagonal matrix (K1, K2)
- 1.5 Cayley-Hamilton theorem (K1, K2, K3)
- 1.6 Eigen values and Eigen vectors(K3, K5)

### Unit II: Mathematical Physics-II Special Functions

- 2.1 Bessel, Legendre, Laguerre and Hermite polynomials (K1,K2,K3,K5)
- 2.2 Recurrence relations (K1,K3,K5)
- 2.3 Orthogonality formulae - Rodrigue's formula (K3,K5)
- 2.4 Green's function (K1, K2,K5)
- 2.5 Partial differential equations (K1,K2)
- 2.6 Laplace, wave and heat equations in two and three dimensions (K3,K5)

### Unit III: Mathematical Physics-III

- 3.1 Elements of complex analysis - Analytic functions- Poles - Residues and evaluation of integrals (K3, K5)
- 3.2 Taylor and Laurent's series (K1, K3, K5)
- 3.3 Elementary ideas of Tensors (K1, K2)
- 3.4 Laplace and Fourier Transforms - Fourier series (K3, K5)
- 3.5 Elementary probability theory - Binomial - Poisson and Normal distributions (K3, K5)
- 3.6 Introductory group theory - groups and subgroups - Abelian and cyclic groups - Point groups ( $C_{2v}$  &  $C_{3v}$ ) - reducible and irreducible representations and its theorems (K1, K2)

### Unit IV: Electromagnetic Theory- I

- 4.1 Electro statics - Gauss law and its applications (K1, K3, K5)
- 4.2 Poisson's and Laplace equations - Boundary value problems (K1, K3, K5)
- 4.3 Magnetostatics- Biot-Savart law (K1, K3, K5)
- 4.4 Ampere's theorem - Lorentz force (K1, K3, K5)
- 4.5 Maxwell's equations in free space and linear isotropic media (K1, K3, K5)
- 4.6 Boundary conditions on the fields- Gauge invariance (K1, K3, K5)

### Unit V: Electromagnetic Theory – II

- 5.1 Wave Propagation - Electromagnetic waves in free space (K1, K3, K5)
- 5.2 Dielectrics and conductors - Rectangular wave guides - Cavity resonator (K1, K2)
- 5.3 Dispersion relations in plasma (K3, K5)
- 5.4 Lorentz invariance of Maxwell's equations - Transmission lines and waveguides (K3, K5)
- 5.5 Scalar and vector potentials - Oscillating electric dipole - Pointing vector and radiated power (K3, K5)
- 5.6 Radiation from moving charges and dipoles and retarded potentials (K3, K5)

**Books for study:**

1. Sathyaprakash - Mathematical Physics, S. Chand & Sons, Reprint 2018.
2. H.K. Dass - Mathematical Physics, S.Chand, Reprint 2017.
3. Chopra Agarwal - Electromagnetic theory - K. Nath& Co. 2008
4. Sathyaprakash-Electromagnetic theory and Electrodynamics, K. Nath& Co.2019.

**Books for reference:**

1. E. Kreyszig- Advanced Engineering Mathematics, 8th Ed., Wiley, New York, 1999.
2. D.J.Griffiths - Introduction to Electrodynamics, 3rdEd.Prentice Hall of India, New Delhi, 2012.

## SEMESTER II

### PIPHD20 - IEP: MEDICAL PHYSICS AND INSTRUMENTATION TECHNIQUES

<b>Year: I</b> <b>Sem: II</b>	<b>Course Code:</b> PIPHD20	<b>Title of the Course:</b> IEP: Medical Physics And Instrumentation Techniques	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To give a perspective about the concepts of physics involved in human body.

#### Course Outcomes (CO)

The learners will be able to

1. Explain the effect of pressure on human system.
2. Explain the physics of lungs and respiratory system.
3. Explain the physics of cardiovascular system.
4. Explain the application of electricity and magnetism in medicine.
5. Explain medical imaging techniques.

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	L	H	M	H
CO2	M	H	L	H	M	M
CO3	M	H	L	H	M	H
CO4	H	H	L	H	H	H
CO5	M	H	L	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	H	H
CO5	M	M	M	M	M	H

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I: Effects of Pressure on Human System**

- 1.1 Measurement of pressure in the human body (K2, K3)
- 1.2 Pressure inside the skull (K2, K3)
- 1.3 Transillumination - eye pressure - tonometers- ophthalmoscopy (K2, K3)
- 1.4 Pressure in the digestive system - urinary bladder (K2, K3)
- 1.5 Pressure in the skeletal system - stress and strain - strain gage (K2, K3)
- 1.6 Transducers for biomedical applications (K2, K3)

### **Unit II: Physics of Lungs and Breathing**

- 2.1 The airways - interaction of the blood and the lungs (K2, K3)
- 2.2 Measurement of pulmonary volume - volume relationships of the lungs (K2, K3)
- 2.3 Physics of alveoli - breathing mechanism (K2, K3, K4)
- 2.4 Pulmonary flow - pulmonary diffusion - airway resistance - measurement of airway resistance (K2, K3)
- 2.5 Work done in breathing - measurement of gaseous exchange and diffusion (K2, K3, K4)
- 2.6 Respiratory therapy equipment - physics of some common lung disease (K2, K3)

### **Unit III: Physics of Cardiovascular Systems**

- 3.1 The heart and cardiovascular system (K2, K3)
- 3.2 Oxygen and CO<sub>2</sub> exchange - work done by heart (K2, K3)
- 3.3 Pressure across the blood vessel - characteristics of blood flow - heart sounds (K2, K3)
- 3.4 Blood pressure measurement - indirect measurements - direct measurements (K2, K3, K4)
- 3.5 Percutaneous insertion - catheterization implantation of transducer - measurement of blood flow and cardiac output (K2, K3, K4)
- 3.6 Elements of intensive care monitoring - pacemakers - defibrillators (K2, K3)

### **Unit IV: Application of Electricity and Magnetism in Medicine**

- 4.1 The nervous system and neurons (K2, K3)
- 4.2 Source of bioelectric potentials - testing and action potentials (K2, K3)
- 4.3 Propagation of action potentials - electrodes - theory (K2, K3)
- 4.4 Biopotential electrodes electromyogram-electrocardiogram -electroencephalogram (K2, K3)
- 4.5 Magneto cardiogram - thermography and skin temperature measurements (K2, K3, K4)
- 4.6 Applications of high and frequency electricity in medicine (K2, K3)

### **Unit V: Medical Imaging Techniques**

- 5.1 X-rays and radio isotopes - instrumentation - X-rays in diagnosis (K2, K3, K4)
- 5.2 Medical application of radioisotopes - radiation therapy (K2, K3)
- 5.3 Principles of ultrasonic measurement - ultrasonic diagnosis (K2, K3, K4)
- 5.4 Magnetic Resonance Imaging (MRI) - Computerized Axial Tomography scanner (CAT)(K2, K3, K4)
- 5.5 Positron Emission Tomography (PET) imaging (K2, K3, K4)
- 5.6 Physiological effects of electric current - shock hazards - methods of accident prevention(K2, K3, K4)

**Books for study:**

1. J.R. Cameron and James G. Skofronick - Medical Physics - John Wiley & Sons Inc. 1978.
2. A.C. Damask - Medical Physics Vol I & II - Academic press 1978, 1981.
3. John G. Webster - Bioinstrumentation - John Wiley & Sons, Inc. 2003.
4. M. Arumugam - Biomedical Instrumentation - Anuradha publications, 2007.

**Books for reference:**

1. W. Hoppe et al. - Biophysics - Springer - Verlag 1983.
2. A.J. Vander, J.H. Sherman and D.S. Lucian - Human Physiology, McGraw –Hill (International Ed.), 1986.
3. Leslie Cromwell, Fred. J. Weibell Erich A. Pfeiffer, Biomedical Instrumentation and Measurements, Prentice Hall of India Pvt., Ltd., 2007.

## SEMESTER I & II

### PCPHG20 - PRACTICAL - I: GENERAL EXPERIMENTS

Year: I Sem: I & II	Course Code: PCPHG20	Title of the Course: Practical I: General Experiments	Course Type: Practical	Course Category: Core	H/W 3	Credits 4	Marks 100
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#### Course Objectives

1. To understand the concepts and principles behind in experimental physics.
2. To teach the students to measure the electrical, mechanical, thermal and magnetic properties of materials.
3. Students are trained to handle advanced sophisticated equipments and analyze the data.

#### Course Outcomes (CO)

The learners will be able to

1. Measure electrical, magnetic and thermo-dynamical properties of solids.
2. Measure the thickness of glass plate (mechanical property) by using cornu's method
3. To find the wavelength of different colors through solar, mercury and hydrogen spectrum.
4. Calculate the acceptance angle and light gathering capability and attenuation properties of optical fiber and find out the Viscosity, specific rotary power and polarizability of different liquids through various experiments.
5. Develop the skills to take an accurate reading and analyze the results of experiments and to solve problems while handling with analytical instruments.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	L	H	H	H
CO2	H	H	L	M	L	H
CO3	H	H	M	M	M	H
CO4	H	H	M	H	M	H
CO5	H	H	L	M	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	H
CO2	M	H	H	M	M	M
CO3	M	H	M	H	H	H
CO4	H	M	H	M	H	M
CO5	M	H	H	M	M	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### (Any 15 experiments)

1. Cornu's method - Determination of Young's modulus of the material beam by elliptical fringes.
2. Cornu's method - Determination of Young's modulus of the material beam by hyperbolic fringes.
3. Determination of Stefan's constant.
4. Band gap energy - using point contact diode (Ge and Si)
5. Hartmann's formula - Determination of wavelength of spectral lines in mercury spectrum.
6. Determination of Rydberg's constant - Hydrogen and Neon spectrum.
7. Solar spectrum - Hartmann's interpolation formula.
8. Co-efficient of linear expansion - Air wedge method.
9. Viscosity of liquid - Meyer's disc.
10. F.P.Etalon- using Spectrometer.
11. Specific charge of an electron –Magnetron method.
12. Energy bandgap of a Semiconductor - Four Probe method (as a function of temperature).
13. Edser and Butler fringes - Thickness of air film.
14. Spectrometer - Charge of an electron.
15. Spectrometer - Polarisability of liquids by finding the refractive indices at different wavelengths.
16. Permittivity of a liquid using RFO.
17. B-H loop using Anchor ring.
18. Determination of strain hardening co-efficient.
19. Determination of Audio frequencies - Bridge method.
20. Specific heat of a liquid - Ferguson's method.
21. Measurement of Numerical aperture (NA) of a telecommunication graded index optic fiber (for different length of fibers).
22. Fiber attenuation of the given optical fiber (between different lengths of fibers).
23. Biprism - Wavelength of monochromatic source - using Spectrometer.
24. Determination of specific rotatory power of a liquid using polarimeter.
25. Compressibility of a liquid using ultrasonic interferometer.
26. Lasers: study of laser beam parameters.

## SEMESTER I & II

### PCPHH20 - ELECTRONICS LAB

Year: I Sem: I & II	Course Code: PCPHH20	Title of the Course: Electronics Lab	Course Type: Lab	Course Category: Core	H/W 3	Credits 4	Marks 100
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#### Course Objectives

1. Students will learn and understand the Basics of digital electronics.
2. To analyze logic processes and implement logical operations using combinational logic circuits.
3. To understand concepts of sequential circuits and to analyze sequential systems.
4. To analyze the different RC and LC oscillator circuits to determine the frequency of oscillation

#### Course Outcomes (CO)

The learners will be able to

1. Identify the various digital ICs and understand their operation.
2. Develop a digital logic and apply it to solve real life problems.
3. Analyze, design and implement combinational logic circuits.
4. Analyze, design and implement sequential logic circuits.
5. Design the different oscillator circuits for various frequencies.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	M	M
CO2	H	M	M	H	H	H
CO3	H	L	H	M	L	M
CO4	H	L	H	M	M	H
CO5	H	L	H	M	L	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	H	H
CO5	M	M	M	M	M	H

(Low - L, Medium – M, High - H)

## Course Syllabus

(Any 18 experiments)

### List of experiments (K1 - K6):

1. V-I Characteristics of SCR and TRIAC.
2. Study of Rectifiers using C, L-C and Pi filters.
3. Study of Voltage - Current characteristics of UJT & UJT as a Relaxation Oscillator.
4. FET as amplifier - frequency response, input impedance and output impedance.
5. Study of V-I Characteristics of J-FET as a VVR (Voltage Variable Resistor).
6. Study of V-I Characteristics of MOSFET.
7. Op-amp - Voltage follower (Inverting) summing, difference, average amplifier-differentiator and integrator.
8. Op-amp - Solving simultaneous equations.
9. Op-amp - Design of square wave generator, triangular wave generator and saw tooth wave generator.
10. Op-amp - 4 bit D/A converter - Binary Weighted Resistor method and R-2R ladder method
11. Op-amp - Design of active Low pass, High pass, Band Pass and band rejector filter.
12. Op-amp - Study of attenuation characteristics and design of Phase Shift Oscillator.
13. Op-amp - Study of attenuation characteristics and design of Wien Bridge Oscillator.
14. IC 555 - Construction of Monostable Multivibrator, Frequency Divider
15. IC 555 - Design of Schmitt Trigger and hysteresis.
16. IC 555 - Construction of Astablemultivibrator and Voltage controlled Oscillator
17. Design of Synchronous and Asynchronous Counters using IC-7476/ 7473.
18. Construction of 4 bit Shift Register - Ring Counter and Johnson Counter - IC7476
19. Study of
  - i) Multiplexer and using IC 74150
  - ii) De-Multiplexer using IC 74154
20. Arithmetic operations (Adder/Subtractor) Using IC 7483.
21. Modulus counter using IC7490 and display using IC7447.
22. Phase locked loops using IC 555.
23. Binary adder andSubtractor using EX-OR and NAND gates.

## SEMESTER III

### PCPHI20- SPECTROSCOPY

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PCPHI20	<b>Title of the Course:</b> Spectroscopy	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To impart the knowledge about molecular spectroscopic techniques (rotational, vibrational and magnetic resonance spectroscopy).

#### Course Outcomes (CO)

The learners will be able to

1. Describe theoretical background (classic and quantum) of spectroscopic techniques such as microwave, IR and Raman, NMR, NQR, ESR and Mossbauer spectroscopy.
2. Apply solutions of the Schrodinger equations for simple systems (rigid rotor and harmonic oscillator) to real systems (rotational and vibrational) for use in determining the molecular energy levels.
3. Analyse rotational and vibrational (microwave, IR& Raman) spectra to determine the molecular structure and physical constants.
4. Interpret NMR, NQR, ESR and Mossbauer spectra to obtain the information about the chemical, structural and magnetic properties of the material.
5. Outline the methods, instrumentation and applications (any one application) for the following spectroscopic techniques: microwave, IR, Raman, NMR, NQR, ESR and Mossbauer spectroscopy.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	L	M	H
CO2	H	L	H	L	H	M
CO3	H	M	M	M	H	H
CO4	H	M	M	M	H	H
CO5	M	H	L	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	M
CO2	H	H	H	M	M	L
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	M	L	M	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Microwave Spectroscopy (14 Hours)

- 1.1 Introduction - Pure rotational spectra of diatomic molecule (K2, K3, K5)
- 1.2 Study of linear molecules and symmetric top molecules(K2, K3)
- 1.3 Hyperfine structure and quadruple moment of linear molecules(K2, K4)
- 1.4 Polyatomic molecules(K2)
- 1.5 Experimental techniques(K2, K3, K4)
- 1.6 Molecular structure determination–Stark effect–Applications to chemical analysis(K4, K5)

### Unit II: Infrared Spectroscopy (15 Hours)

- 2.1 Vibrational spectroscopy of diatomic molecules - Harmonic Oscillator - Anharmonic Oscillator(K2, K3, K4, K5)
- 2.2 Rotational vibrators (K2, K3, K4)
- 2.3 Vibrational spectroscopy of simple polyatomic molecules -Normal modes of vibration of polyatomic molecules(K2, K3, K4)
- 2.4 Inversion spectrum of ammonia (K2, K4)
- 2.5 Experimental techniques - Infrared spectro- photometer - Reflectance spectroscopy (K2, K3, K4)
- 2.6 Applications of infrared spectroscopy (K3, K4)

### Unit III: Raman Spectroscopy (13 Hours)

- 3.1 Classical and quantum theory of Raman Scattering (K2, K3, K4)
- 3.2 Raman effect and molecular structure - Raman effect and crystal structure (K2, K3, K4)
- 3.3 Raman effect in relation to inorganic, organic and physical chemistry (K3, K4)
- 3.4 Experimental techniques (K2, K3)
- 3.5 Coherent Anti Stokes Raman Spectroscopy (K2, K3, K4)
- 3.6 Applications of infrared and Raman spectroscopy in molecular structural confirmation of water and CO<sub>2</sub> molecules (K3, K4)

### Unit IV: NMR and NQR Techniques (15 Hours)

- 3.1 Theory of NMR - Bloch equations - Steady state solution of Bloch equations (K3, K4, K5)
- 3.2 Theory of chemical shifts (K2, K3, K4)
- 3.3 Experimental methods - Single coil and double coil methods - Pulse Method - High resolution method(K2, K3)
- 3.4 Applications of NMR to quantitative measurements (K3, K4, K5)
- 3.5 Quadruple Hamiltonian of NQR - Nuclear quadruple energy levels for axial and non-axial symmetry (K2, K3)
- 3.6 Experimental techniques and applications(K3, K4)

### Unit V: ESR and Mossbauer Spectroscopy (15 Hours)

- 5.1 Quantum mechanical treatment of ESR - Nuclear interaction and hyperfine structure - Relaxation effects (K2, K3, K4)
- 5.2 Basic principles of spectrograph - Applications of ESR method (K2, K3)
- 5.3 Mossbauer Effect - Recoilless emission and absorption - Mossbauer spectrum (K2, K3, K4)

- 5.4 Experimental methods - Mossbauer spectrometer(K2, K3)
- 5.5 Hyperfine interactions - Chemical Isomer shift - Magnetic hyperfine interactions - Electric quadruple interactions (K2,K3, K4, K5)
- 5.6 Simple biological applications (K3, K4, K5)

**Books for Study:**

1. Gupta Kumar Sharma - Elements of Spectroscopy –PragatiPrakashan, Meerut 2006.
2. G. Aruldas - Molecular Structure and Spectroscopy - Prentice Hall of India Pvt. Ltd., New Delhi, 2001.
3. B.K. Sharma - Spectroscopy - GOEL Publishing House, Meerut, 2005.
4. C.N. Banwell and E.M. Mc Cash - Fundamentals of Molecular Spectroscopy, 4th Edition - Tata McGraw Hill Publications, New Delhi, 1994.

**Books for Reference:**

1. D.N. Satyanarayana - Vibrational Spectroscopy and Applications, New Age International Publications, New Delhi, 2004.
2. Atta Ur Rahman - Nuclear Magnetic Resonance –SpingerVerlag, New York, 1986.
3. Towne and Schawlow - Microwave Spectroscopy - McGraw-Hill, 1995.
4. Raymond Chang - Basic Principles of Spectroscopy -McGraw Hill, Kogakusha, Tokyo, 1980.
5. D.A. Lang - Raman Spectroscopy - McGraw Hill International, N.Y., 1977.
6. D.D. Jyaji and M.D. Yadav- Spectroscopy - Amol Publications, 1991.

## SEMESTER III

### PCPHJ20 - QUANTUM MECHANICS - II

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PCPHJ20	<b>Title of the Course:</b> Quantum Mechanics - II	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To impart knowledge about various theories related to Quantum Mechanics.
2. To understand the importance of relativistic equations.
3. To impart knowledge about Quantization of fields.

#### Course Outcomes (CO)

The learners will be able to

1. Understand the concept of scattering theory.
2. Achieve knowledge about Perturbation theory.
3. Attain Knowledge about relativistic Quantum Mechanics.
4. Assimilate the concepts of Dirac equation and its applications.
5. Gain knowledge about Quantization of fields.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	H
CO2	M	H	H	M	M	H
CO3	H	M	H	M	M	M
CO4	H	M	M	M	M	M
CO5	M	H	M	M	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	M	M	H	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	M	M	H
CO5	H	M	M	M	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Time dependent Perturbation Theory

(14 Hours)

- 1.1 Time dependent perturbation theory - Constant perturbation (First order perturbation) (K2, K4)
- 1.2 Harmonic perturbation: Transition to a discrete state - Transition to a continuum states (Fermi's Golden rule) (K3, K4, K5)
- 1.3 Absorption and emission of radiation: The electromagnetic field - The Hamiltonian operator - Electric dipole approximation (K2, K3, K4)
- 1.4 Transition probability - Einstein's A and B coefficients (K4, K5)
- 1.5 Selection rules for dipole transition - Identification of allowed transitions (K2, K4)
- 1.6 Raman scattering - Rayleigh scattering (K2, K4, K5)

### Unit II: Scattering Theory

(16 Hours)

- 2.1 Introduction - Scattering cross section - Scattering amplitude - Relationship between scattering amplitude and differential scattering cross section (K1, K2, K3)
- 2.2 Partial waves - Partial wave analysis: Scattering by a Central potential - Ramsaur-Townsend effect (K2, K4)
- 2.3 Optical theorem - Scattering by an attractive square well potential (K2, K3, K4)
- 2.4 Low energy scattering by an attractive square well potential (Breit Wigner formula)- Scattering length (K2, K4, K5)
- 2.5 Expression for Phase shifts - Born approximation - validity of Born approximation (K3, K4, K5)
- 2.6 Scattering by Screened coulomb potential - Scattering in Laboratory and centre of mass co-ordinate systems - Relationship between the cross sections and kinetic energy in centre of mass and laboratory systems (K2, K4, K5)

### Unit III: Relativistic Quantum Mechanics (14 Hours)

- 3.1 Klein-Gordon equation - Interpretation of Klein-Gordon equation (K2, K3, K4)
- 3.2 Particle in a coulomb field (K3, K4)
- 3.3 Dirac's equation for a free particle - Dirac matrices - Traces (K2, K4)
- 3.4 Covariant form of Dirac equation - Probability density (K4, K5)
- 3.5 Spin of the Dirac particle (electron) (K3, K4, K5)
- 3.6 Magnetic moment of an electron due to spin (K3, K4, K5)

### Unit IV: Dirac Equation

(14 Hours)

- 4.1 Spin orbit interaction (K4, K5)
- 4.2 Radial equation for an electron in a central potential (K3, K4)
- 4.3 Hydrogen atom problem - Lamb shift (K2, K3, K4, K5)
- 4.4 Invariance of Dirac equation under Lorentz transformation - Density matrix - Spin density matrix (K2, K4)
- 4.5 T-Transformation for the Dirac equation in the presence of electromagnetic field (K3, K4)
- 4.6 Magnetic resonance - Projection operators for energy and spin (K2, K3, K4)

## Unit V: Quantization of Fields

(14 Hours)

- 5.1 Second quantization - Concepts of Classical mechanics - Coordinates of a field (K1, K2, K3)
- 5.2 Classical field equation in Lagrangian form - Classical field equation in Hamiltonian form (K2, K3)
- 5.3 Quantization of Schrödinger equation - Creation and annihilation operators (K2, K4, K5)
- 5.4 Relativistic fields - Natural units - Quantization of Klein-Gordon field (K2, K4, K5)
- 5.5 Quantization of Dirac field (K4, K5)
- 5.6 Quantization of electromagnetic field (K4, K5)

### Books for Study:

1. G. Aruldas - Quantum Mechanics - Second edition - PHI learning private Limited, Delhi, 2009.
2. Gupta & Kumar - Quantum Mechanics - 33<sup>rd</sup> edition -Jai Prakash Nath Publications-2015.
3. Satyaprakash - Quantum Mechanics - Kedar Nath Ram Nath Publications - 2019
4. V. Devanathan - Quantum Mechanics - Narosa Publishing House, New Delhi, 2005.
5. V.K. Thankappan - Quantum Mechanics, 2<sup>nd</sup> Edition - Wiley Eastern Ltd., New Delhi, 1985.
6. B.K.Agarwal- Quantum Mechanics and Field theory - LokbharatiPrakashan publications, 2003.

### Books for Reference:

1. P.M. Mathews and K. Venkatesan - A Textbook of Quantum Mechanics - Tata McGraw Hill, New Delhi, 1976.
2. L.I. Schiff - Quantum Mechanics, 3<sup>rd</sup> Edition - International Student Edition, McGraw Hill, Kogakusha, Tokyo, 1968.
3. E. Merzbacher - Quantum Mechanics, 2<sup>nd</sup> Edition - John Wiley and Sons, New York, 1970.
4. P.A.M. Dirac - The Principles of Quantum Mechanics - Oxford University Press, London, 1973.

### SEMESTER III

#### PCPHK20 – MICROPROCESSOR AND MICRO-CONTROLLER

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PCPHK20	<b>Title of the Course:</b> Microprocessor and Microcontroller	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To make the students understand the concepts that are involved in the Microprocessor 8085 and Microcontroller 8051.
2. To make the students understand instruction sets, addressing modes, timings, memory and I/O interfaces.

#### Course Outcomes (CO)

The learners will be able to

1. Describe Hardware, different bus cycles and memory interface to 8085 Microprocessor.
2. Develop programs using 8085 Microprocessor Instruction set and addressing modes.
3. Describe and perform different types of peripheral interfaces to 8085 Microprocessor.
4. Explain hardware, instruction set and addressing modes of Microcontroller 8051 and develop programming for basic operations.
5. Describe and perform different types of external interfaces to 8051 Microcontroller.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	L	M	M	M
CO2	H	H	L	M	M	M
CO3	H	M	L	M	M	M
CO4	H	M	L	M	M	M
CO5	H	M	L	M	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	L	M	M	M
CO4	H	H	H	M	M	M
CO5	H	M	L	M	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: 8085 Microprocessor- Architecture, Instruction set and Programming (12 Hours)

- 1.1 Architecture- Functional pin diagram (K2)
- 1.2 Buses - Address bus, data bus, multiplexing address/data bus (K2)
- 1.3 Instruction format–instruction fetch and execution–Machine and instruction cycle- T state- (K2)
- 1.4 Addressing modes- Instruction set - data transfer group- arithmetic/logic group (K2)
- 1.5 Branch group - stack and I/O control instruction (K2)
- 1.6 Programming: Picking up Largest / smallest number - Arranging an array in ascending / descending order - Code conversion: Binary to BCD and BCD to Binary, Binary to ASCII, ASCII to Binary and ASCII to BCD and BCD to ASCII (K3, K6)

### Unit II: 8085 Microprocessor- Memory and I/O interfacing (12 Hours)

- 2.1 ROM and RAM memory - Memory interface: 2K X 8, 4K x 8 ROM and RAM interface(K2)
- 2.2 8255 Programmable interface I/O –functional Pin configuration- Internal Architecture (K2)
- 2.3 Interfacing of 8255 (K2)
- 2.4 ADC interface - DAC interface - wave form generator (K2, K3, K6)
- 2.5 Hex keyboard interface - 4 step Stepper motor interface (K2, K3, K6)
- 2.6 Traffic regulation interface (K2, K3, K6)

### Unit III: 8051 Microcontroller-Architecture, Instruction set and Programming (12 Hours)

- 3.1 Introduction to Microcontroller –8051 Functional pin diagram (K2)
- 3.2 Architecture - Internal registers (K2)
- 3.3 Special function registers -Memory organizations (K2)
- 3.4 Instruction set - Addressing modes (K2)
- 3.5 Programming - Addition and Subtraction -Multiplication and Division (K3, K6)
- 3.6 Arranging an array in ascending/ descending order -Sorting out the maxima and minima (K3, K6)

### Unit IV: 8051 Microcontroller - Memory and I/O interfacing (12 Hours)

- 4.1 8051 Input/output Ports (K2, K3)
- 4.2 8051 Interrupts (K2, K3)
- 4.3 Interface 8051 to external memory and I/O devices using its I/O ports (K2, K3)
- 4.4 Counters and Timers –Serial communication using MAX232 (K2, K3)
- 4.5 Interfacing 8051 with ADC –DAC (K2, K3, K6)
- 4.6 LED Display - Hex Keyboard (K2, K3, K6)

### Unit V: Sensor Based Embedded Controller &IoT Applications (12 Hours)

- 5.1 Working principle of Sensors/Transducers: Light sensor LDR, Heat sensor LM35, IR Transmitter/ Receiver module (K2)
- 5.2 Embedded system concept–Architecture & salient features of ATmega328 (K2)
- 5.3 Programming & compiling with IDE software - Motor driver IC LM339 (K2, K3)
- 5.4 Blue tooth controller HC05 for wireless communication (K2, K3)

- 5.5 IoT applications for automation : Light activated Morning alarm - Darkness activated Garden Lights - Heat activated Fire alarm (K3, K6)
- 5.6 Intruder alarm using IR - Android mobile touch key pad controlled Robot car (K3, K6)

**Books for Study:**

1. R.S. Gaonkar - Microprocessor Architecture, Programming and Application with the 8085, 3rd Edition - Penram International Publishing, Mumbai, 1997.
2. V.Vijayendran - Fundamentals of Microprocessor 8085 - Architecture, Programming and interfacing - Viswanathan Publication, Chennai, 2002.
3. N. NagoorKanni- Microprocessor and Microcontroller –2<sup>nd</sup> Edition - Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2017.
4. Muhammed Ali Mazidi and Janice Gillespie Mazidi- The 8051 Microcontroller and Embedded Systems, Fourth Indian Reprint - Pearson Education, 2004.
5. Kenneth J. Ayala - The 8051 Micro Controller Architecture, Programming and Applications, 3rd Edition - West Publishing Company, 1991.

**Books for Reference:**

1. B. Ram - Fundamentals of Microprocessors and Microcomputers – Dhanpat Rai Publications, New Delhi, 2005.
2. R. Thiagarajan, S. Dhanasekaran and S.Dhanapal - Microprocessor and its Applications, New Age International, New Delhi, 2010.
3. John B. Peatman - Design with PIC Microcontrollers, 7th Indian Reprint – Pearson Education, 2004.
4. Raj Kamal - Introduction to Embedded Systems - TMS, 2002.

## SEMESTER III

### PEPHE20 - NUMERICAL METHODS AND C-PROGRAMMING

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PEPHE20	<b>Title of the Course:</b> Numerical Methods and C-Programming	<b>Course Type:</b> Theory	<b>Course Category:</b> Core Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To impart the knowledge of numerical methods for solving problems arise in physics
2. To equip the students with the skill of C language.

#### Course Outcomes (CO)

The learners will be able to

1. Understand and apply numerical concepts to solve equations and find missing values for any physical problems
2. Solve ordinary differential equations using numerical techniques
3. Understand the basic concepts of C Language
4. Understand and use various operators and arrays in C Language
5. Develop simple programs using C language along with computational tools

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	L	L
CO2	H	H	H	M	L	L
CO3	H	L	L	M	M	M
CO4	H	L	L	H	M	M
CO5	H	M	M	H	M	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	L	L
CO2	H	H	H	M	M	M
CO3	H	H	L	M	M	M
CO4	H	H	M	L	L	L
CO5	H	H	M	M	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Solution of Equations and Interpolation

(14 Hours)

- 1.1 Methods of false position (K2, K3, K4, K5)
- 1.2 Newton's method (K2, K3, K4, K5)
- 1.3 Fixed point - Iteration method (K2, K3, K4, K5)
- 1.4 Interpolation - Lagrangian polynomials (K2, K3, K4, K5)
- 1.5 divided differences (K2, K3, K4, K5)
- 1.6 Newton's forward and backward difference formulae (K2, K3, K4, K5)

### Unit II: Numerical Differentiation, Integration and Differentiation Equations(16 Hours)

- 2.1 Derivatives - Newton's forward / backward interpolation and Stirling formula (K2, K3, K4, K5)
- 2.2 Numerical integration by Trapezoidal Solutions of equations (K2, K3, K4, K5)
- 2.3 Simple iterative methods - Newton method (K2, K3, K4, K5)
- 2.4 Numerical Integration - Simpsons 1/3 and 3/8 rules (K2, K3, K4, K5)
- 2.5 Solution to first order differential equations: Taylor series method (K2, K3, K4, K5)
- 2.6 Euler and modified Euler methods - Runge-kutta method (K2, K3, K4, K5)

### Unit III: Programming in C

(13 Hours)

- 3.1 Introduction - Basic structure of C Programming (K1, K2)
- 3.2 Character set - Key words (K1, K2)
- 3.3 Identifiers (K1, K2)
- 3.4 Variables (K1, K2)
- 3.5 Assigning values to variables (K1, K2)
- 3.6 Symbolic constant (K1, K2)

### Unit IV: Operators, Arrays and Strings

(14 Hours)

- 4.1 Operators - Arithmetic, relational, logical, assignment, increment (K1, K2)
- 4.2 Decrement conditional and special type conversion in Expressions (K1, K2)
- 4.3 Arrays - Multi dimensional arrays(K1, K2)
- 4.4 Initializing two dimensional arrays (K1, K2)
- 4.5 Initializing string variables (K1, K2)
- 4.6 Reading and writing Strings on the Arithmetic operations on strings (K1, K2)

### Unit V: Simple Programmes

(15 Hours)

- 5.1 User defined functions - their needs - Multi function programme (K3, K6)
- 5.2 Return values and their types - Calling functions (K3, K5, K6)
- 5.3 Categories of functions - Multiplication (K3, K5, K6)
- 5.4 Diagonalization and inversion - Solution and C programming (K3, K5, K6)
- 5.5 Lagrangian interpolation - Simpson's rule (K3, K5, K6)
- 5.6 Euler method- Runge- Kutta method (K3, K5, K6)

**Books for Study:**

1. T. Veerarajan and T. Ramachandran, Numerical Methods with Programming in C, Second Edition, Tata McGraw Hill, 2007
2. E. Balagurusamy - Computing Fundamentals and Programming, ANSI C, 3<sup>rd</sup> Edition - Tata McGraw Hill Education, Ltd., 2014.
3. G. Balaji - Numerical Methods, 9<sup>th</sup> Edition - G. Balaji Publishers, Chennai, 2008.

**Books for Reference:**

1. S. Kalavathy, M. JoicePunitha - Numerical Methods, 2nd Edition - Vijay Nicole imprints Pvt. Ltd.,2010.
2. Kandasamy P., K. Thilagavathy and K. Gunavathy, Numerical Methods, S. Chand Co. Ltd., New Delhi, 2003.
3. A. Singaravelu, Numerical Methods, Meenakshi Agency, 2016.

### SEMESTER III

#### PEPHF20 - ELECTIVE - III B: ADVANCED OPTICS

<b>Year:</b> II <b>Sem:</b> III	<b>Course Code:</b> PEPHF20	<b>Title of the Course:</b> Advanced Optics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core Elective	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To provide the knowledge on optics for higher studies.

#### Course Outcomes (CO)

The learners will be able to

1. Understand the basic concepts of Laser theory
2. Understand and describe the different types of Laser
3. Explain the propagation of Laser beam
4. Describe the principle, types and loss of optical fiber
5. Understand the importance of nonlinear optics and apply the concepts of NLO to optical materials.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	M
CO2	H	H	L	H	M	M
CO3	H	H	M	H	H	M
CO4	H	H	L	H	M	M
CO5	H	H	M	H	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	L	M	L	L	L
CO2	H	L	L	L	M	M
CO3	H	H	M	H	M	M
CO4	H	M	L	M	M	M
CO5	H	H	M	H	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Basic Laser theory

(9 Hours)

- 1.1 Historical background of laser (K1, K2)
- 1.2 Einstein coefficients and (K1, K2, K3)
- 1.3 Stimulated light amplification (K1, K2)
- 1.4 Population inversion (K1, K2)
- 1.5 Creation of population inversion in three level and four level lasers (K3, K4)
- 1.6 Applications (K4, K5)

### Unit II: Basic laser systems

(10 Hours)

- 2.1 Gas Lasers - CO<sub>2</sub> laser - N<sub>2</sub> Laser (K1, K2, K3)
- 2.2 Helium Neon - Argon, Krypton, and Xenon ion lasers (K1, K2, K3)
- 2.3 Solid state laser - Nd:YAG Laser (K2, K3, K4)
- 2.4 Semiconductor laser - Ruby Laser (K2, K3, K4)
- 2.5 Liquid laser - Europium Chelate (K2, K3, K5)
- 2.6 Dye Laser - Coumarin dye laser (K2, K3, K4)

### Unit III: Laser Beam Propagation

(9 Hours)

- 3.1 Laser beam propagation - properties of Gaussian beam (K1, K2, K3)
- 3.2 Resonator - stability - various types of stability (K2, K3, K4)
- 3.3 Resonator for high gain and high energy lasers (K2, K3, K4)
- 3.4 Gaussian beam focusing - Properties of Laser Radiation (K1, K2, K3)
- 3.5 Mode Locking Lasers - Basic principle - Techniques (K1, K2, K3)
- 3.6 Q Switching - Pulse Shaping (K2, K3, K4)

### Unit IV: Fiber optics

(10 Hours)

- 4.1 Optical fiber waveguides principles - acceptance angle - Total internal Reflection - Numerical aperture (K1, K2, K3)
- 4.2 types of fibers- step index - graded index - single mode - multi mode - step index multi-mode fiber - graded index multi-mode fiber (K1, K2, K3)
- 4.3 attenuation in fiber- Losses in fiber- fiber bandwidth - Fiber alignment and joint loss (K2, K3, K4)
- 4.4 Fabrication of optical fiber- Liquid Phase- Vapour phase deposition - Chemical vapour deposition (K2, K3, K4)
- 4.5 Fiber splices - Mechanical splices - Fiber connectors: cylindrical ferrule expanded beam connectors (K3, K4, K5)
- 4.6 Fiber couplers: Three and four port couplers - star couplers (K3, K4, K5)

### Unit V: Non-linear optics

(10 Hours)

- 5.1 Introduction - origin of non-linearity (K1, K2, K3)
- 5.2 Susceptibility tensor - phase matching - second harmonic generation (K1, K2, K3)
- 5.3 Kurtz powder method of finding SHG - Z-scan technique (K1, K2, K3)
- 5.4 Intensity dependent refractive index - self-focusing - Phase matching - four wave mixing (K1, K3) - frequency mixing processes (K2, K3, K4)
- 5.5 Nonlinear Schrödinger equation for solitons - soliton switching - soliton laser- advantages of soliton based communication (K3, K4, K5)

## 5.6 Applications of Non-linear optical materials (K3, K4, K5)

### **Book for study:**

1. Murugesan and KiruthigaSivarprasath- Modern Physics , 17<sup>th</sup> Revised Edition- S.Chand&Co.Pvt Ltd., New Delhi,2017
2. K. Thyagarajan, and A.K. Ghatak - Laser Theory and Applications –MacmillanIndia Ltd,1997.
3. B.B. Laud - Lasers and Non Linear Optics - Wiley Eastern Ltd.,1991.
4. R.L. Sautherland- Handbook of Non LinearOptics

### **Books for Reference:**

1. AjoyGhatakandK.Thyagaran- IntroductiontoFiberOptics- CambridgeUniversity Press, 6<sup>th</sup>Ed.,2006.
2. K.R. Nambiar - Laser Principles, Types and Applications - New Age International, 2004.
- 3.Robert W Boyd - Non linearFiber Optics, 2<sup>nd</sup> Ed., Elsevier,2006.

### SEMESTER III

#### PIPHE20 - IEP: PHYSICS FOR SET/NET-PAPER III

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PIPHE20	<b>Title of the Course:</b> IEP: Physics for SET/NET - Paper III	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To impart knowledge about Quantum Mechanics, Atomic & Molecular Physics and Spectroscopy for competitive Examination.

#### Course Learning Outcomes (CO)

The learners will be able to

1. Understand about Schrödinger equation, ladder operators and the concepts of time independent theory to solve Eigen value problems
2. Describe the properties of relativistic quantum mechanics and solve the problems using Fermi's Gold rule.
3. Understand the energy levels and structure of hydrogen atom and to solve the problems using ESR, NMR and Frank-Condon Principle.
4. Attain the basic concepts and theories in basic elements of atomic and molecular spectroscopy, classical/Quantum description of electronic, vibrational and rotational spectra and solve the problem related to that.
5. Gain the knowledge to solve the problems by using the theory of Raman, NMR and Spin resonance spectroscopy in order to face competitive exams and for perusing higher research work.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	M
CO2	H	H	H	M	M	M
CO3	H	H	H	M	H	L
CO4	H	H	H	M	H	M
CO5	H	H	H	M	M	L

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	H	M	H
CO2	H	H	H	M	M	M
CO3	M	H	M	H	H	H
CO4	H	M	M	M	H	H
CO5	M	M	H	M	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Quantum Mechanics I

- 1.1 Wave- particle duality - Schrodinger Equation - Time dependent and Time independent (K1, K2, K3)
- 1.2 Expectation value - Uncertainty principle - Ladder operators (K1, K2, K3)
- 1.3 Eigen value problems particle in a box - Harmonic oscillator (K2, K3, K4)
- 1.4 Spherical well - Tunneling through a barrier - Hydrogen atom, Coordinate and Momentum representations (K2, K3, K4)
- 1.5 1.5 Approximation methods - Time independent perturbation theory - Hydrogen variation method (K3, K4, K5, K6)
- 1.6 WKB method. Angular momentum operators - CG coefficients - Pauli's spin matrices (K3, K4, K5, K6)

### Unit II: Quantum Mechanics II

- 2.1 Scattering theory - Scattering amplitude - Cross sections (K1, K2)
- 2.2 Partial wave analysis - Effective range theory - Optical theorem (K1, K2, K3)
- 2.3 Time dependent perturbation theory - Transition probabilities - Fermi's Golden rule and selection rules for dipole radiations (K1, K2, K3, K4)
- 2.4 Klein-Gordan equation - Dirac equation ( K3, K4, K5)
- 2.5 Plane wave solution - Negative energy states - Antiparticles - Properties of Gamma matrices (K3, K4, K5, K6)
- 2.6 Quantization of fields - Semi classical theory of radiation - Creation - Destruction and Number operators (K3, K4, K5)

### Unit III: Atomic and Molecular Physics –I

- 3.1 Quantum states of an electron in an atom - Electron spin (K1, K2)
- 3.2 Spectrum of helium and alkali atom. –Relativistic corrections for energy levels of hydrogen atom (K1, K2, K3)
- 3.3 Hyperfine structure and isotopic shift - Width of spectrum lines - (K1, K2, K3, K4)
- 3.4 LS & JJ couplings - Zeeman, Paschen - Bach & Stark effects (K2, K3, K4)
- 3.5 Electron spin resonance - Nuclear magnetic resonance - (K3, K4, K5)
- 3.6 Chemical shift - Frank-Condon principle (K4, K5)

### Unit IV: Atomic and Molecular Physics –II

- 4.1 Born-Oppenheimer approximation (K1, K2)
- 4.2 Electronic, rotational, vibrational and Raman spectra of diatomic molecules, selection rules (K1, K2, K3)
- 4.3 Lasers: spontaneous and stimulated emission (K2, K3, K4)
- 4.4 Einstein A & B coefficients. Optical pumping (K3, K4)
- 4.5 Population Inversion - Rate equation (K2, K3, K4)
- 4.6 Modes of resonators and Coherence length (K2, K3, K4, K5)

### Unit V: Spectroscopy

- 5.1 Rotational spectra of diatomic - Polyatomic and symmetric top molecules (K1, K2, K3)
- 5.2 IR of diatomic and simple polyatomic molecules - Harmonic/anharmonic oscillator (K2, K3)

- 5.3 Normal modes of vibrations - Raman scattering - Raman Effect in inorganic - Organic and physical chemistry (K1, K2)
- 5.4 NMR - chemical shift - Single coil and double coil methods (K2, K3, K4)
- 5.5 NQR - Nuclear quadrupole energy levels for axial/non-axial symmetry (K2, K3, K4)
- 5.6 ESR - Nuclear interaction and hyperfine structure. Mossbauer Effect - Hyperfine/electric quadrupole interactions (K3, K4, K5)

**Book for study:**

1. G. Aruldas - Quantum mechanics, PHI Learning, 2008.
2. Gupta Kumar Sharma - Quantum Mechanics Jai Prakash Nath Publications, 2012.
3. Devanathan - Quantum Mechanics
4. B.K. Sharma - Spectroscopy - Goel publishing House Krishna Prakashan Media Pvt., Ltd., 2017.

**Book for Reference:**

1. Mathews Venkatesan - Quantum Mechanics
2. C.N. Banwell and E.M. Mc Cash - Fundamentals of Molecular Spectroscopy, Tata McGraw Hill Publications, Reprint 2017.
3. G. Aruldas - Molecular structure and Spectroscopy, Prentice Hall of India Pvt., Ltd., New Delhi, 2016.

### SEMESTER III

#### PIPHF20 - IEP: NUMERICAL METHODS & RESEARCH METHODOLOGY

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code:</b> PIPHF20	<b>Title of the Course:</b> IEP: Numerical Methods and Research Methodology	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To impart knowledge of various concepts involved in numerical analysis
2. To prepare the students for higher studies

#### Course Outcomes (CO)

The learners will be able to

1. Understand and apply numerical concepts to solve equations and evaluate any integrals
2. Solve ordinary differential equations using numerical differentiation techniques
3. Understand the basics of research and research methodology
4. Define research problem in their own domain and describe various research design
5. Draw a good research report and impart research communication techniques

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	L
CO2	H	M	H	M	M	L
CO3	H	L	L	L	M	H
CO4	H	H	M	M	L	H
CO5	H	H	L	M	H	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	H	M	H	M	M
CO3	M	H	M	H	H	H
CO4	H	M	H	M	M	M
CO5	M	M	H	M	M	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### **Unit I: Solution of Equations and Numerical Integrations (14 Hours)**

- 1.1 Fixed point iteration method (K2, K3, K4, K5)
- 1.2 Newton's Raphson method (K2, K3, K4, K5)
- 1.3 Solutions of simultaneous equation (K2, K3, K4, K5)
- 1.4 Numerical integration using Trapezoidal(K2, K3, K4, K5)
- 1.5 Simpson's 1/3 rule (K2, K3, K4, K5)
- 1.6 Simpson's 3/8 rule (K2, K3, K4, K5)

### **Unit II: Numerical Differentiations (14 Hours)**

- 2.1 Solutions of equations (K2, K3, K4, K5)
- 2.2 Numerical Differentiation (K2, K3, K4, K5)
- 2.3 Numerical solution of first order differential equations (K2, K3, K4, K5)
- 2.4 RungeKutta method (K2, K3, K4, K5)
- 2.5 Taylor series method (K2, K3, K4, K5)
- 2.6 Euler's and modified Euler's method (K2, K3, K4, K5)

### **Unit III: Research Methodology - An Introduction (13 Hours)**

- 3.1 Meaning of research - Objectives of research (K1, K2)
- 3.2 motivation of research (K1, K2)
- 3.3 Types, approaches and significance - Methods versus methodology (K1, K2)
- 3.4 Research in scientific methods - Research process (K1, K2, K3, K5)
- 3.5 Criteria for good research - Problem encountered by research in India-(K1, K2, K4)
- 3.6 Funding agencies (K1, K2)

### **Unit IV: Research Design (15 Hours)**

- 4.1 Identification of the problem - Literature Survey (K1, K2, K6)
- 4.2 Reference Collection (K1, K6)
- 4.3 Necessity and techniques involved in defining the problem (K1, K2, K4)
- 4.4 Research design - Needs and features of good design (K3, K4, K5)
- 4.5 Different research design (K3, K4, K5, K6)
- 4.6 Basic principles of experimental designs (K1, K2)

### **Unit V: Research Communication (16 Hours)**

- 5.1 Meaning of research report - Logical format for writing thesis and paper (K1, K2)
- 5.2 Essential of scientific report: abstract, introduction (K1, K2)
- 5.3 Review of literature, materials and methods and discussion - The use of quotation (K1, K2)
- 5.4 Footnotes - tables and figures - referencing - appendixes - revising the paper or thesis (K2, K6)
- 5.5 Oral power point presentation - Poster preparation (K1, K2, K6)
- 5.6 Editing and evaluating and the final product - proof reading - the final types copy (K1, K2, K6)

**Books for Study:**

1. Dr. G. Balaji - Numerical Methods 15<sup>th</sup> edition - G.Balaji Publishers-2017
2. E. Balagurusamy - Numeric Methods - Tata Mc Graw Hill.
3. C.R. Kothari and Gaurav Garg - Research Methodology, Methods and Techniques - New age International Publishers, III Edition. 2014
4. Santosh Gupta - Research Methodology Methods and Statistical Techniques
5. Rajammal et al., -A hand Book of Methodology of Research - Sri Ramakrishna Mission Vidyalaya Press, Coimbatore.

**Books for Reference:**

1. C.Hawkins& M Sorgi - Research Ed Norosa Publishing House, New Delhi - 2000
2. Robert Ross - Research: An introduction - - Harper and Row Publications.
3. P. Saravanel - Research methodology - - KitlabMahal, Sixth Edition.
4. R.A. Day - How to write and publish a scientific paper - Cambridge University Press.
5. Anderson - Thesis and Assignment writing - - Wiley Eastern Ltd.

## SEMESTER IV

### PCPHL20 - MATERIALS SCIENCE AND LASER PHYSICS

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCPHL20	<b>Title of the Course:</b> Materials Science and Laser Physics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 5	<b>Marks</b> 100
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#### Course Objectives

1. To impart knowledge about phase diagram and defects in crystals
2. To acquire knowledge about polymer and ceramics
3. To understand the principle and working of lasers

#### Course Outcomes (CO)

The learners will be able to

1. To acquire knowledge about phase diagrams
2. To Impart knowledge about defects in crystals
3. Learn the basic principles of optical, Dielectric and Ferro Electric properties of materials
4. To acquire knowledge about polymer and ceramics
5. To understand the principle and working of Lasers

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	L	M	L	L
CO2	H	M	M	H	H	M
CO3	M	L	M	M	H	M
CO4	H	L	M	M	M	M
CO5	H	M	L	H	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	H	H
CO5	M	M	M	M	M	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Phase Diagram & Defects (15 Hours)

- 1.1 Phase diagram - Basic principles - Simple binary systems - Solid solutions (K1, K2, K3)
- 1.2 Eutectic systems- Application - Interstitial and substitution solid solutions (K1, K2)
- 1.3 Elementary Ideas of corrosion - Oxidation - Creep and fracture (K4, K5)
- 1.4 Dislocations- Edge and screw dislocations - Stress fields around dislocations - Density - Work hardening (K1, K2, K4)
- 1.5 Plastic deformation - Slip - Motion of dislocations under uniform Shear Stress (K3, K4, K5)
- 1.6 Effect of grain size on dislocation motion –Effect of solute atoms on dislocation motion (K3, K4)

### Unit II: Optical Properties (13 Hours)

- 2.1 Atomic and Electromagnetic Radiation - Light Interactions with Solids (K1, K2, K3)
- 2.2 Electronic Interactions (K1, K2)
- 2.3 Refraction - Reflection - Absorption - Transmission (K1, K2, K3)
- 2.4 Colourcenters- Photo conductivity - Electronic transitions in Photo conductors (K1, K2)
- 2.5 Trap, capture, recombination centers- Luminescence (K1, K2, K3)
- 2.6 Excitation and emission Decay mechanisms -(K1, K2, K4)

### Unit III: Magnetic Properties (14 Hours)

- 3.1 Diamagnetism and Paramagnetism(K1, K2)
- 3.2 Ferromagnetism - Antiferromagnetism and Ferrimagnetism (K1, K2)
- 3.3 Thallium activated alkali halides - Sulfide phosphorous - Ferroelectrics (K2, K3, K4)
- 3.4 Ferro electricity - General properties - Dipole theory (K1, K2)
- 3.5 Ionic displacements and the behaviour of BaTiO<sub>3</sub> - Spontaneous polarization of BaTiO<sub>3</sub>(K3, K4, K5)
- 3.6 Thermodynamics of Ferro electric transitions (K1, K2)

### Unit IV: Elastic Behaviour, Polymer and Ceramics (14 Hours)

- 4.1 An elastic and visco elastic behaviour - Atomic model of elastic behaviour (K1, K2)
- 4.2 Rubber like elasticity - An elastic deformation - Relaxation process (K2, K3, K4)
- 4.3 Model for visco elastic behaviour - Polymers - Polymerization mechanism (K1, K2)
- 4.4 Polymer structures - Deformation of polymers - Behaviour of polymers (K1, K2, K4)
- 4.5 Ceramics - Ceramic phases - Structure - classes (K1, K2)
- 4.6 Effect of structure on the behaviour of ceramic phases - composites and its basic properties (K3, K4, K5)

### Unit V: Laser Physics (16 Hours)

- 5.1 Introduction - Interaction of radiation with matter - Spontaneous and stimulated emission (K1, K2)
- 5.2 Conditions for oscillation to occur - Frequency of oscillation of the system (K1, K2, K4)
- 5.3 Einstein co-efficient - Population inversion - Laser pumping Rate equations (K1, K2)
- 5.4 Three level laser - Four level Laser - Nd:YAG Laser - He-Ne Laser - Optical resonator (K3, K4, K5)

- 5.5 Types and modes of resonator - Oscillation - Threshold condition - The confocal resonant cavity (K1, K2)
- 5.6 Theory - Spot size and beam divergence - quality factor (Q) of an optical cavity (K2, K3, K4)

**Books for Study:**

1. G.K. Narula, K.S. Narula and V.K. Gupta - Material Science, TMH, New Delhi, 1995.
2. A.J. Dekker - Solid State Physics - McMillan Co., 1981.
3. V.Ragavan - Material Science and Engineering, 4th Edition - Prentice Hall of India, New Delhi, 2003.
4. M. Arumugam - Materials Science, 3rd Edition - Anuradha Agencies, 2002.

**Books for Reference:**

1. Lawrence H. Vlack - Elements of Materials Science and Engineering, 6th Edition -Reprint, Addison-Wesley, 1998.
2. H. Iabch and H. Luth - Solid State Physics: An introduction to Principles of Material Science, 2nd Edition, Springer, 2001.
3. B.B. Laud - Lasers and Non linear optics, Wiley Eastern Ltd, 1991.
4. Verdayan J.J. - Laser Electronics - Prentice-Hall India, New Delhi, 1993.
5. Allen and Jones - Principles of Gas Lasers - Butterworths, London, 1967.
6. K.R. Nambiar - Laser Principles, Types and Application - New Age International, 2004.
7. K. Thyagarajan and A.K. Ghatak - Laser Theory and Applications - Macmillan India Ltd., 1997.

## SEMESTER IV

### PCPHM20- NUCLEAR AND PARTICLE PHYSICS

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCPHM20	<b>Title of the Course:</b> Nuclear And Particle Physics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To impart knowledge about nuclear- interactions, reactions, models and basic concepts in elementary particles.

#### Course Outcomes (CO)

The learners will be able to

1. Apply core concepts in physics to understand nuclear interactions, features of nuclear reactions and characteristics of radioactive decays (beta & gamma).
2. Describe basic nuclear structure and nuclear properties by applying the mathematical theory and models (liquid drop model, Shell model, collective model, optical model etc.)
3. Evaluate some basic nuclear parameters such as radius, BE, Q-value, nuclear spin, parity etc.
4. Classify elementary particles (based on interactions and spin) and explain the fundamental concepts in particle physics (conservation laws, parity violation, interactions etc.)
5. Study the substructure and symmetries in elementary particles (SU (2) &SU (3)); apply Quark model to find the missing particle.

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	L	M	M
CO2	H	L	H	H	M	M
CO3	H	L	H	M	M	M
CO4	H	L	L	L	M	H
CO5	M	L	H	M	M	H

CO	PO					
	1	2	3	4	5	6
CO1	H	L	H	M	M	M
CO2	H	M	H	H	M	M
CO3	H	M	H	M	M	M
CO4	H	M	L	L	M	L
CO5	H	L	H	M	M	L

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Nuclear Interactions

(14 Hours)

- 1.1 Introduction - Nuclear forces - Two body problem (K1, K2)
- 1.2 Ground state of deuteron - Magnetic moment - Quadrupole moment - Tensor forces (K2, K3, K4)
- 1.3 Meson theory of nuclear forces - Yukawa potential (K3, K4)
- 1.4 Nucleon - Nucleon scattering - Low energy n-p scattering (K2, K3, K4)
- 1.5 Effective range theory - Spin dependence (K3, K4)
- 1.6 Charge independence and charge symmetry of nuclear forces-Isospin formalism (K3, K4)

### Unit II: Nuclear Reactions

(15 Hours)

- 2.1 Types of reactions and conservation laws (K1, K2)
- 2.2 Energetic of nuclear reactions –Dynamics of nuclear reactions - Q-value equation (K2, K3, K4, K5)
- 2.3 Scattering and reaction cross sections (K3, K4, K5)
- 2.4 Compound nucleus reactions -Scattering matrix - Reciprocity theorem (K2, K3, K4)
- 2.5 Breit - Wigner one level formula - Resonance scattering (K2, K3, K4)
- 2.6 Continuum theory - Optical model (K3, K4)

### Unit III: Nuclear Models

(13 Hours)

- 3.1 Introduction - Liquid drop model (K2, K3, K4)
- 3.2 Semi empirical mass formula of Weizsacker- Nuclear stability- Mass parabolas (K3, K4, K5)
- 3.3 Bohr-Wheeler theory of fission (K3, K4, K5)
- 3.4 Shell model - Spin-orbit coupling - Magic numbers (K3, K4)
- 3.5 Angular momenta and parities of nuclear ground states (K4, K5)
- 3.6 Collective model of Bohr and Mottelson-Nilsson Model - Oblate and prolate deformations of Nucleus (K3, K4)

### Unit IV: Nuclear Decay

(15 Hours)

- 4.1 Beta decay - Fermi theory of beta decay - Fermi - Curie Plot (K3, K4, K5)
- 4.2 Fermi and Gamow- Tellar selection rules - Allowed and forbidden decays - Decay rates (K4, K5)
- 4.3 Theory of neutrino - Helicity of neutrino (K2, K4)
- 4.4 Theory of electron capture - Non conservation of parity (K3, K4)
- 4.5 Gamma decay - Multipole transitions in nuclei (K3, K4)
- 4.6 Internal conversion - Nuclear isomerism (K3, K4)

### Unit V: Elementary Particle Physics

(15 Hours)

- 5.1 Types of interaction between elementary particles - Hadrons and leptons (K2, K4)
- 5.2 Quantum numbers and conservation laws (K2)
- 5.3 Symmetries - Elementary ideas of CP and CPT invariance (K2, K4)
- 5.4 Classification of hadrons - SU(2) and SU(3) multiplets (K3, K4, K5)
- 5.5 Quark model - Gell-Mann-Okubo mass formula for octet and decupled hadrons (K3, K4, K5)
- 5.6 Charm, bottom and top quarks (K2)

**Books for Study:**

1. M.L. Pandya and R.P.S. Yadav - Elements of Nuclear Physics, 7th Edition, KedarNath Ram Nath, Delhi, 1995.
2. D.C.Tayal- Nuclear Physics - Himalaya Publishing House, 2006.
3. S.N. Ghoshal - Atomic and Nuclear Physics, Vol. 2 - S Chand & Co. Ltd., 2000.
4. V.Devanathan- Nuclear Physics, 2nd Edition - Narosa Publication, 2011.

**Books for Reference:**

1. K. S. Krane - Introductory Nuclear Physics - Wiley, New York, 1987.
2. D. Griffiths - Introduction to Elementary Particle Physics - Harper & Row, New York, 1987.
3. R. R. Roy and B.P. Nigam - Nuclear Physics - New age Intl. New Delhi, 1983.
4. H. A. Enge - Introduction to Nuclear Physics - Addison-Wesley, Tokyo, 1983.
5. Y. R. Waghmare - Introductory Nuclear Physics - Oxford-IBH, New Delhi, 1981.
6. J. M. Longo - Elementary particles, McGraw Hill, New York, 1971.
7. R. D. Evans - Atomic Nucleus - McGraw Hill, New York, 1955.
8. Kaplan - Nuclear Physics - Narosa, New Delhi, 1989.
9. B. L. Cohen - Concepts of Nuclear Physics - TMH, New Delhi, 1971.
10. M. K. Pal - Theory of Nuclear Structure - Affl. East-West, Chennai, 1982.
11. W. E. Burcham and M. Jobses - Nuclear and Particle Physics - Addison-Wesley, Tokyo, 1995.

## SEMESTER IV

### PCPHN20 - CONDENSED MATTER PHYSICS

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCPHN20	<b>Title of the Course:</b> Condensed Matter Physics	<b>Course Type:</b> Theory	<b>Course Category:</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To relate crystal structure to symmetry, recognize the correspondence between real and reciprocal space.
2. To know about the theories of metals and semiconductors
3. To develop an understanding of the dielectric properties and ordering of dipoles in ferroelectrics.
4. To get familiarized with the different parameters associated with superconductivity and the theory of superconductivity.

#### Course Learning Outcomes (CO)

The learners will be able to

1. Able to correlate the X-ray diffraction pattern for a given crystal structure.
2. Formulate the theory of lattice vibrations and use that to determine thermal properties of solids.
3. Ability to understand theory of metals and semiconductors.
4. Able to differentiate between ferroelectric, anti-ferroelectric materials.
5. Able to differentiate between type-I and type-II superconductors and their theories.

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	M	L	M
CO2	M	H	L	M	H	H
CO3	H	M	L	H	L	L
CO4	M	H	L	M	L	L
CO5	H	M	L	M	H	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	M
CO2	M	H	H	H	H	H
CO3	H	H	L	M	M	H
CO4	H	H	LH	M	M	M
CO5	H	L	M	M	H	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Crystal Physics

(13 Hours)

- 1.1 Types of lattices - Miller indices - Simple crystal structures (K1, K2)
- 1.2 Crystal diffraction - Bragg's law (K1, K2)
- 1.3 Reciprocal lattice [Sc, bcc, fcc] - Laue equation (K1, K2, K5)
- 1.4 Structural factor - Atomic form factor (K1, K2)
- 1.5 Types of crystal binding - Cohesive energy of ionic crystals (K1, K2)
- 1.6 Madelung constant - types of crystal bonding (general ideas) (K1, K2)

### Unit II: Lattice Dynamics

(14 Hours)

- 2.1 Monoatomic lattices - lattices with two atoms per primitive cell (K1, K2)
- 2.2 First Brillouin zone - group and phase velocities (K1, K2)
- 2.3 Quantization of lattice vibrations - Phonon momentum (K1, K2, K3)
- 2.4 Inelastic scattering by phonons - Debye's theory of lattice heat capacity (K1, K2)
- 2.5 Einstein's model and Debye's model of specific heat (K1, K2, K5)
- 2.6 Thermal expansion - Thermal conductivity - Umklapp processes (K1, K2)

### Unit III: Theory of Metals and Semiconductors

(15 Hours)

- 3.1 Free electrons gas in three dimensions - Electronics heat capacity - Wiedmann Franz law (K1, K2, K3)
- 3.2 Hall effect - Bloch theorem - Kronig-Penny model (K1, K2, K5)
- 3.3 Band theory of metals and semiconductors (K1, K2)
- 3.4 Semiconductors - Density of States - Intrinsic and Extrinsic carrier concentration (K1, K2, K3)
- 3.5 Mobility - Impurity conductivity (K1, K2)
- 3.6 Fermi surfaces and construction - De Haas Van Alphen effect (K2, K4, K5)

### Unit IV: Magnetism

(16 Hours)

- 4.1 Elementary ideas of dia, Para and Ferro magnetism - quantum theory of paramagnetism (K1, K2, K3)
- 4.2 Rare earth ion - Hund's rule - Quenching of orbital angular momentum - Adiabatic demagnetization Quantum theory of ferromagnetism (K1, K2)
- 4.3 Curie point Exchange integral - Heisenberg's interpretation of Weiss field (K1, K2, K3)
- 4.4 Ferromagnetism domains - Bloch Wall - Spin waves quantization - Magnons (K1, K2)
- 4.5 Thermal excitation of magnons - Curie temperature and susceptibility of ferrimagnetisms (K1, K2, K3)
- 4.6 Theory anti ferromagnetism - Neel temperature (K1, K2)

### Unit V: Super Conductivity

(14 Hours)

- 5.1 Experimental facts - occurrence - Effect of magnetic fields - Meissner effect (K1, K2)
- 5.2 Entropy and heat capacity - Energy gap - Microwave and infrared properties (K1, K2, K5)
- 5.3 Type I and type II Super conductors - Theoretical explanation (K1, K2, K3)
- 5.4 Thermodynamics of Super conducting transition - London equation - Coherence length (K1, K2)
- 5.5 Theory - Single particle tunneling - Josephson tunneling (K1, K2)

5.6 DC and AC Josephson's effect - High temperature super conductors - SQUIDS (K1, K2, K4)

**Books for Study:**

1. S.O Pillai - Solid State Physics, 7th Edition - New Age International, Delhi, 2015.
2. Guptha Kumar - Solid State Physics, 9th Edition - K.Nath& Co. Education, 2006.
3. K.Ilangovan - Solid State Physics - MJP Publications, Chennai, 2013.

**Books for Reference:**

1. A.J. Dekkar - Solid State Physics - Macmillan India, New Delhi, 2007.
2. H.M. Rosenberg - The Solid State Physics, 3rd Edition - Oxford University, Oxford. 1993.
3. S.L. Altman - Band Theory of Metals: The Elements - Pergamon Press Ltd., Oxford, 1970.
4. J.M. Ziman - Principles of the Theory of Solid - Cambridge University Press, London, 1971.
5. C. Kittel - Introduction to Solid State Physics, 7th Edition - New York, 1996.
6. M.Ali Omar - Elementary Solid State Physics: Principles, Applications - Addison- Wesley, London, 1974.
7. H.P. Myers - Introductory Solid State Physics, 2nd Edition - V K Taylor Francis Ltd., 1998.

## SEMESTER IV

### PEPHG20 - ELECTIVE IV A: FIBER OPTICS AND NON-LINEAR OPTICS

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PEPHG20	<b>Title of the Course:</b> Fibre Optics and Non-Linear Optics	<b>Course Type:</b> Theory	<b>Course Category:</b> Major Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To make the students understand the concepts of fiber optics, Non linear optics and their applications.

#### Course Outcomes (CO)

The learners will be able to

1. Understand the basic principles and concepts in optical fiber and describe the properties of optical sources.
2. Distinguish between the various types and the characteristics of optical fiber.
3. Analyze and comparing the different fabrication process of fiber.
4. Describe various losses and connectors in optical fiber.
5. Understand non-linear effects in optical fiber and their applications.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	M
CO2	H	H	M	H	M	M
CO3	H	H	H	M	H	H
CO4	H	H	L	H	M	M
CO5	H	H	L	M	H	H

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	H	M	H
CO2	H	H	H	M	M	M
CO3	H	M	M	H	H	H
CO4	H	H	H	M	H	M
CO5	M	H	M	H	M	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Optical fiber waveguides and sources

(13 hours)

- 1.1 Ray theory transmission: Total internal reflection, acceptance angle, numerical aperture and skew rays (K1, K2, K3, K6)
- 1.2 Phase shift with total internal reflection and the evanescent field -Goos- Haechen shift (K1, K2, K3)
- 1.3 Sources: LED-structure - Light source materials - Quantum efficiency and LED power - Modulation of LED - Transient response (K1, K2, K5)
- 1.4 Laser diode modes and threshold conditions for laser oscillations (K1, K2, K3)
- 1.5 Laser diode structures and radiation patterns(K1, K2, K6)
- 1.6 Modulation of laser diode –Temperature effects - Mode locking laser - Light source linearity and reliability (K1, K2, K3)

### Unit II: Types of Optical Fibers

(11 Hours)

- 2.1 Glass and plastic fibers - Step index - single mode - Multimode - Graded index fibers-wave propagation (K1, K2)
- 2.2 Fiber modes - Step index single mode fiber- step index multimode fiber - Graded index multi-mode fiber (K1, K2, K3)
- 2.3 Single mode fibers- cutoff wavelength - mode field diameter and spot size - effective refractive index (K1, K2, K3)
- 2.4 Fiber loss - Attenuation coefficient - Material absorption losses in silica glass fibers- Intrinsic and extrinsic absorption (K1, K2, K4)
- 2.5 Linear Scattering losses - Rayleigh scattering - Mie scattering - Non linear Scattering losses - Stimulated Brillouin scattering - Stimulated Raman scattering (K1, K2, K3)
- 2.6 Fiber bend loss - Intermodal dispersion - Multimode step index - Multimode graded index - Modal noise - Overall fiber dispersion - Multimode - single mode fibers (K3, K4, K5)

### Unit III: Fabrication and Connection of Optical Fibers

(11 Hours)

- 3.1 Glass fibers - Preparation of optical fibers(K1, K2)
- 3.2 Liquid-phase (melting) technique - fiber drawing (K1, K2)
- 3.3 Vapour-phase deposition techniques - outside vapour phase deposition (K1, K2, K3)
- 3.4 Modified chemical vapour deposition (K1, K2, K3, K4)
- 3.5 Plasma activated chemical vapour deposition (K2, K3, K5)
- 3.6 characteristics of single-mode, multimode, plastic-clad and all-plastic fibers(K4, K5, K6)

### Unit IV:Transmission Characteristics

(12 Hours)

- 4.1 Stability of Fiber Transmission Characteristics: Micro bending and hydrogen absorption (K1, K2)
- 4.2 fiber alignment and joint loss - Single mode fiber- Multimode fiber(K1, K2, K3)
- 4.3 fiber splices - Tube splices, Fusion splices (K2, K3, K4)
- 4.4 Mechanical Splices (K4, K5, K6)
- 4.5 Fiber connectors: cylindrical ferrule expanded beam connectors - GRIN rod lenses ( K3, K5, K6)
- 4.6 Fiber couplers: Three and four port couplers - star couplers (K4, K5, K6)

## **Unit V: Nonlinear Optics and Solitons**

**(13 Hours)**

- 5.1 Wave propagation in an anisotropic crystal - Polarization response of materials to light (K1, K2)
- 5.2 Second order non-linear optical processes - Sum and difference frequency generation (K1, K2)
- 5.3 Third order nonlinear optical processes - third harmonic generation (K1, K2)
- 5.4 Intensity dependent refractive index - self-focusing - self defocusing - Phase matching – four wave mixing (K1, K3)
- 5.5 Concept of solitons - formation of solitons- kdV equation (K1, K2, K4, K5)
- 5.6 Nonlinear Schrödinger equation for solitons - soliton switching - soliton laser- advantages of soliton based communication (K1, K2, K5, K6)

### **Books for Study:**

1. John M. Senior - Optical Fiber Communications: Principles and Practice, 2nd Edition - PHI, 2011.
2. Ajoy Ghatak and K. Thyagarajan - Introduction to Fiber Optics, 6th Edition - Cambridge University Press, 2006.
3. Gerd Keiser - Optical Fiber Communications, 4th Edition - McGraw Hill, 2012.
4. B.B. Laud - Lasers and Non-Linear Optics - New Age International, New Delhi, 2011.
5. William T. Silfvast, Laser fundamentals, Cambridge university press, Cambridge 2003.

### **Books for Reference:**

1. Akira Hasegawa and Yuji Odama - Solitons in Optical Communications - Oxford Press, 1995.
2. Robert W Boyd - Nonlinear Fiber Optics, 2nd Edition - Elsevier, 2006.
3. Govind P. Agrawal - Fiber Optic Communication Systems - John Wiley, 2003.
4. M Remoissenet - Waves Called Solitons: Concepts and Experiments, Springer Verlag, 1992.
5. B.B. Laud - Lasers and Nonlinear Optics, 2nd Edition - New Age International (P) Ltd., New Delhi, 1991.

## SEMESTER IV

### PEPHH20 - ELECTIVE IV B: ADVANCED MATERIAL SCIENCE

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PEPHH20	<b>Title of the Course:</b> Advanced Material Science	<b>Course Type:</b> Theory	<b>Course Category:</b> Major Elective	<b>H/W</b> 5	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To impart knowledge about crystallography and wide knowledge about properties of materials.

#### Course Outcomes (CO)

The learners will be able to

1. Understand the building unit of structure of crystal and their symmetry.
2. Interpret about the magnetic properties and effects on materials
3. Attain the knowledge of superconducting materials and problem solving.
4. Pick up the ideas in lasing action, optical resonators and its applications.
5. Get introduced all about smart, nano and magnetic materials and its application useful to carry out the research work and fabricating the devices for public utility.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	L	M	H	H
CO2	H	H	L	H	M	H
CO3	H	H	H	H	L	H
CO4	H	H	L	H	M	M
CO5	H	H	L	H	H	H

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	M	H	M	H	H	M
CO3	H	H	M	H	H	M
CO4	H	M	M	M	H	M
CO5	M	H	H	M	M	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Applied Crystallography in Material Science (10 Hours)

- 1.1 Crystal systems, unit cells (K1, K2)
- 1.2 Indices of lattice directions and planes (K1, K2)
- 1.3 co-ordinates of position in the unit cell - Crystal geometry (K1, K2, K3)
- 1.4 Symmetry classes and point groups, space groups (K2, K3)
- 1.5 Glide planes and screw axes, space group notations, equivalent points (K2, K3, K4)
- 1.6 Systematic absences - Determination of crystal symmetry from systematic absences (K3, K4, K5)

### Unit II: Magnetism (9 Hours)

- 2.1 Principles of magnetic measurements (K1, K2, K3)
- 2.2 Basic ideas of measuring M,  $\chi$ , and  $T_c$  (K1, K2)
- 2.3 Magneto thermal effect - magneto resistance (K1, K2)
- 2.4 Magneto optical phenomena - magnetic acoustic effect (K2, K3, K4)
- 2.5 Magneto optic recording (K2, K3, K4)
- 2.6 Importance of magnetic anisotropy (K3, K4, K5, K6)

### Unit III: Superconductivity (10 Hours)

- 3.1 Introduction - critical parameters (K1, K2)
- 3.2 Anomalous characteristics - isotope effect, Meissner effect (K1, K2, K3)
- 3.3 Type I and II superconductors - BCS theory (K2, K3)
- 3.4 Josephson junctions and tunneling- SQUID (K3, K4, K5)
- 3.5 High temperature superconductors, crystallographic and structural properties of high temperature superconductors (K1, K2, K3)
- 3.6 Dependence of  $T_c$  on crystal structures - applications (K1, K2, K3, K4)

### Unit IV: Laser Theory and Applications (9 Hours)

- 4.1 Introduction - Einstein's coefficient (K1, K2)
- 4.2 Threshold condition for laser action - optical pumping (K1, K2, K3)
- 4.3 Resonant cavities, spot size - types of resonator, quality factor of an optical resonator (K1, K2, K3)
- 4.4 Welding, drilling and hardening (K3, K4)
- 4.5 Advantages and uses of laser in material processing (K1, K2, K3)
- 4.6 Applications (K1, K2)

### Unit V: Technological materials (10 Hours)

- 5.1 Metallic glasses - preparation properties and applications (K1, K2)
- 5.2 SMART materials - Piezoelectric, magnetostrictive, electrostrictive materials (K1, K2, K3)
- 5.3 CCD device materials - applications (K1, K2, K3)
- 5.4 Solar cell materials (single crystalline, amorphous and thin films) (K2, K3, K4)
- 5.5 Introduction to nanophase materials (K2, K3, K4)
- 5.6 Properties of nanophase materials (K1, K2, K3)

**Books for study:**

1. V. Raghavan - Material science and Engineering, Prentice Hall ,2003
2. C. Kittel - Introduction to Solid State Physics - Wiley and Sons Ltd., New York. 2015.
3. M.Tinkham- Introduction to superconductivity- Rhinehard and Winton New York, 1996
4. Charles P. Poole- Introduction to Nanotechnology - Wiley inter science, 2003
5. M.N. Avadhanulu- An introduction to lasers, theory & applications - S. Chand & Co. New Delhi. 2001.
6. B.D. Cullity - Introduction to magnetic materials - Addison - Wesley, 1972.

**Books for reference:**

1. M. Ali Omar- Elementary Solid State Physics- Revised Printing Pearson Edn., 2000.
2. J. Dekker - Solid state Physics - Prentice Hall, 1957.
3. Oshea and Co. - An Introduction to lasers and their applications - Addison Wesley, 1969.
4. C.N.R. Rao- Chemistry of High temperature superconductors - World Scientific, 1991.
5. C.R.M. Grovenor and Co. Microelectronic materials - Adam hilger, Philadelphia, 1989.

## SEMESTER IV

### PIPHG20 - IEP: PHYSICS FOR SET/NET - PAPER IV

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PIPHG20	<b>Title of the Course:</b> IEP: Physics for SET/NET – Paper IV	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To impart knowledge about Nuclear & Particle Physics, Numerical Methods and Condensed matter Physics for competitive Examinations.

#### Course Outcomes (CO)

The learners will be able to

1. Understand the basic properties of nucleus and nuclear models.
2. Gain the knowledge about the elementary particles and quantum numbers.
3. Impart knowledge of finding solutions to any differential equations and Interpolation by using Newton's method, Simpson's and Trapezoidal rules.
4. Attain the basic concepts and theories in crystals and magnetism and develop the skills to solve the problems in the respective field for performing higher studies and research.
5. Understand the basic concepts in superconductors.

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	L
CO2	H	H	H	M	M	M
CO3	H	H	H	H	L	L
CO4	H	H	M	M	M	H
CO5	H	H	M	H	L	H

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	L
CO2	H	M	M	M	M	L
CO3	H	H	H	H	L	L
CO4	H	H	H	H	M	M
CO5	H	M	M	H	L	M

(Low - L, Medium – M, High - H)

## Course Syllabus

### Unit I: Nuclear and Particle Physics – I

- 1.1 Basic nuclear properties - size, shape and charge distribution (K1, K2,)
- 1.2 Spin and parity - Binding energy - Ground state of deuteron (K1, K2, K3)
- 1.3 Nuclear reactions - Types of reactions - Conservation laws (K1, K2, K3, K4)
- 1.4 Q-value equation - Nuclear models - Liquid drop (K2, K3, K4)
- 1.5 Semi empirical mass formula - Shell model (K3, K4,)
- 1.6 Magic numbers - Angular momentum and parity - Collective model (K3, K4, K6)

### Unit II: Nuclear and Particle Physics –II

- 2.1 Nuclear decay - alpha - beta decays (K1, K2)
- 2.2 Gamma decays - Selection rules (K1, K2)
- 2.3 Elementary particles - Symmetries (K2, K3)
- 2.4 Conservation laws - CPT invariance - Quark model (K2, K3, K4)
- 2.5 Baryons and mesons - Fission and Fusion (K2, K3, K4)
- 2.6 Nuclear reactions - Elementary particles and their quantum numbers (K4, K5, K6)

### Unit III: Numerical Methods

- 3.1 Derivatives - Newton's forward / backward interpolation and (K1, K2, K3)
- 3.2 Stirling formula, Numerical integration by Trapezoidal Solutions of equations (K2, K3, K4)
- 3.3 Numerical methods - Regular falsi(K3, K4, K5)
- 3.4 Newton's method - Lagrangian Interpolation (K3, K4, K5)
- 3.5 Newton's divided difference method - Trapezoidal - Simpson's rule (K3, K4, K5)
- 3.6 Solution of differential equations by Runge-Kutta method (K4, K5, K6)

### Unit IV: Condensed Matter Physics

- 4.1 Bravais lattices - Reciprocal lattices and Brillouin zones ((K1, K3, K4, K5)
- 4.2 Crystal diffraction - Bragg's law - Crystal diffraction techniques (K3, K4, K5)
- 4.3 Bonding of solids - Lattice specific heat - Phonons (K4, K5)
- 4.4 Einstein's and Debye's theory of specific heat - Free electron gas - Hall effect (K1, K2, K3)
- 4.5 Bloch theorem - Kronig Penny Model - Semiconductors (K1, K2, K3)
- 4.6 Elementary ideas of dia, para and ferro magnetism (K1, K2, K3)

### Unit V: Superconductors

- 5.1 Superconductors - Properties of superconductor - Experimental facts - occurrence - Effect of magnetic fields - Meissner effect - Entropy and heat capacity (K1, K2)
- 5.2 Energy gap - Type I and II Superconductors - Josephson Effect (K1, K2, K3)
- 5.3 London equation - Theoretical explanation (K1, K2, K4)
- 5.4 Thermodynamics of Super conducting transition - London equation - BCS theory (K2, K3, K4)
- 5.5 Coherence length - Theory - Single particle tunneling(K3, K4, K5)
- 5.6 High temperature superconductors and applications (K4, K5)

**Books for Study:**

1. M.L. Pandya and R.P.S. Yadav - Elements of Nuclear Physics, KedarNathRamNath, Delhi,2005.
2. D. C. Dayal - Nuclear Physics University of Chicago Press Chicago.; Revised Edition, 6th Printing edition(1956)
3. D. Griffiths - Introduction to Elementary Particle Physics, Harper & Row, New York, 1987
4. S.O. Pillai - Solid State Physics, New Age International Publishers, New Delhi,2017.
5. Gupta Kumar Sharma - Solid statePhysics
6. C. Kittel - Introduction to Solid State Physics, Wiley & Sons Ltd., New York.2012.
7. Dr.SurekhaTomar - Competitive Exams for CSIR - UGC NET/JRF/SET - Upkar's publications.
8. M.K. Venkataraman. - Introduction to NumericalMethods

**Book for reference:**

1. K.S. Krane - Introductory Nuclear Physics , Wiley, New York,1987.
2. J.K. Bhattacharjee - Statistical Mechanics an Introductory text - AlliedPublishers Ltd., New Delhi, 1996.
3. Charles Kittel, Elementary Statistical Physics - Dover Publications, Inc, NewYork, 2004.
4. M. Glazer and J. Wark - Statistical Mechanics - Oxford UniversityPress.
5. C. Kalidas, M.V.Sangaranarayanan - Non - Equilibrium Thermodynamics - Macmillan India, New Delhi.

## SEMESTER IV

### PIPHH20- IEP: ADVANCED NUCLEAR PHYSICS AND SPECTROSCOPY

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PIPHH20	<b>Title of the Course:</b> IEP:Advanced Nuclear	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective	<b>H/W</b> -	<b>Credits</b> 2	<b>Marks</b> 100
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#### Course Objectives

1. To impart knowledge about nuclear detectors and particle accelerators, basic aspects of astrophysics and applications of nuclear physics.
2. Beside this, students will be familiarized to UV spectroscopy, atomic absorption and emission spectroscopic techniques.

#### Course Outcomes (CO)

The learners will be able to

1. Explain the basic concepts of nuclear detectors and particle accelerators.
2. Explain the basic aspects of astrophysics.
3. Explain the principles, working and application of nuclear spectroscopic techniques (RBS, NAA, PIXE) and other applications of nuclear physics.
4. Explain the basic principles, instrumentation and applications of UV spectroscopy.
5. Explain the basic principles, instrumentation and applications of atomic absorption and emission spectroscopy.

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	L	H	M	L
CO2	M	L	L	L	M	M
CO3	M	H	L	H	H	M
CO4	M	M	L	H	H	H
CO5	M	M	L	H	H	M

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	H	M	L
CO2	M	L	L	L	M	M
CO3	H	H	M	H	M	M
CO4	H	H	M	H	H	M
CO5	H	M	L	M	M	L

(Low - L, Medium – M, High - H)

## **Course Syllabus**

### **Unit I: Nuclear Detectors and Particle Accelerators**

- 1.1 Introduction - Interaction of radiation with matter (K1, K2)
- 1.2 Ge and Si solid state detectors - Calorimeters and their use for measuring jet energies (K2, K3)
- 1.3 Scintillation and Cerenkov counters (K2, K3)
- 1.4 Qualitative ideas, Hybrid detectors (K2, K3)
- 1.5 Particle accelerators - Pelletron-Synchrotron - Synchrocyclotron (K2, K3)
- 1.6 Colliding beam accelerators - Large Hadron Collider (K2, K3)

### **Unit II: Nuclear Astrophysics**

- 2.1 Cosmic rays: Origin of cosmic rays (K2, K3)
- 2.2 Nature of primary cosmic rays and its energy distribution (K2, K3)
- 2.3 Geomagnetic and Latitude effect - East-west asymmetry - Origin of secondary rays (K2, K3)
- 2.4 Collision with electrons - Thermonuclear fusion (K2, K3)
- 2.5 Stellar nucleo- synthesis - Energy production in stars (K2, K3)
- 2.6 PP chain - CNO cycle. (K2, K3)

### **Unit III: Applications of Nuclear Physics**

- 3.1 Rutherford Backscattering Spectroscopy as a tool for depth profiling (K2, K3, K4)
- 3.2 Nuclear Fission Reactors (K2, K3)
- 3.3 Neutron Activation Analysis (K2, K3, K4)
- 3.4 Proton Induced X-ray Emission for trace element analysis (K2, K3, K4)
- 3.5 Radioactive dating - Mossbauer Effect (K2, K3)
- 3.6 Applications in medicine (K3, K4)

### **Unit IV: UV Spectroscopy**

- 4.1 Energy levels - Molecular orbital's theory and UV spectra (K2, K3)
- 4.2 Franck Condon Principle - Transition Probability - Measurement of spectrum (K2, K3, K4)
- 4.3 Types of transition in Organic molecules - Types of absorption bands (K2, K3)
- 4.4 Transition in metal complexes - Selection rules (K2, K3, K4)
- 4.5 Electronic spectra in poly atomic molecules - Chromospheres concept (K2, K3)
- 4.6 Application of UV Spectroscopy (K3, K4)

### **Unit V: Atomic Absorption and Emission Spectroscopy**

- 5.1 Principle of AAS - Measurement of atomic absorption (K2, K3)
- 5.2 Instrumentation - Single beam Spectrophotometer (K2, K3)
- 5.3 Applications of AAS (K2, K3, K4)
- 5.4 Atomic Emission Spectroscopy - Principle of AES - Advantages (K2, K3)
- 5.5 Instrumentation - Laser beam - Applications of AES (K2, K3, K4)
- 5.6 Difference between AAS and AES (K3, K4)

**Books for Study:**

1. G. Aruldas - Molecular Structure and Spectroscopy - Prentice Hall of India Pvt. Ltd., New Delhi, 2001.
2. H.Kaur - Spectroscopy, 5th Edition - A PragatiPrakashan, 2009
3. P. S. Sindhu - Molecular Spectroscopy - Tata McGraw Hill, New Delhi, 1990.
4. Krane K.S. Nuclear Physics, Wiley India Pvt. Ltd., (2008).
5. Lilley J.S., Nuclear physics principles and applications John Wiley & sons Ltd., (2007).

**Books for Reference:**

1. Raymond Chang - Basic Principles of Spectroscopy - McGraw Hill Kogakusha, 1980.
2. G. W. King - Spectroscopy and Molecular Structure - HoitRinchart and WinstenInc, London, 1964
3. Concepts of Modern Physics: A.Beiser.
4. Subatomic Physics, Frauenfelder and Henley. (Prentice-Hall)
5. De Soete, D. R. Gijbelsa n d J. Hoste, Neutron Activation Analysis. John Wiley and Sons: New York, NY. (1972).
6. L. C. Feldmen and j. W. Mayer, fundamentals of surface and thin film s analysis, North Holland, Elsevier, 1986.
7. W. R. Leo, Techniques for Nuclear and Particle Physics Experiments, Narosa Publishing House, Indi, 1995.
8. G. F.Knoll, Radiation Detection and Measurement, John, Wiley & Sons, Inc, 2000.

## SEMESTER IV

### PCPHO20- PRACTICAL III: ADVANCED GENERAL EXPERIMENTS

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCPHO20	<b>Title of the Course:</b> Practical III: Advanced General Experiments	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To provide the student hands-on experiences to conduct advanced general experiments in laboratory in lieu with the theory taught in the class.

#### Course Outcomes (CO)

The learners will be able to

1. Interpret and appreciate the advanced concepts in physics.
2. Use scientific equipment for analysis and data acquisition.
3. Analyse the properties (electric, magnetic, nuclear and dielectric) of solids/liquids.
4. Apply acquired knowledge to the analysis of experimental data.
5. Get exposure to work environment at research level and motivation for a lifelong learning.

CLO	PSO					
	1	2	3	4	5	6
CLO1	H	L	H	L	H	H
CLO2	M	H	L	M	H	H
CLO3	H	H	H	M	H	H
CLO4	H	M	H	L	H	H
CLO5	L	M	L	L	H	H

CLO	PO					
	1	2	3	4	5	6
CLO1	H	H	H	H	H	H
CLO2	H	H	M	M	H	H
CLO3	H	H	H	M	H	H
CLO4	H	M	H	M	H	H
CLO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

## Course Syllabus

### (Any 15 experiments) (K1 - K6)

1. G.M. Counter - characteristics, Inverse square law.
2. G.M. Counter - Absorption co-efficient.
3. Determination of Carrier Concentration - Hall Effect.
4. Determination of Volume Susceptibility of a liquid by Quincke's method.
5. Determination of Mass Susceptibility of a liquid by Guoy's method.
6. Michelson Interferometer - Wavelength and separation of wavelengths.
7. Michelson Interferometer - Thickness of mica sheet.
8. F.P. Etalon using Michelson set up.
9. Determination of Wave length of Laser Beam.
10. Ultrasonic Interferometer - Velocity and Compressibility of a liquid.
11. Ultrasonic Diffraction - Velocity and Compressibility of a liquid.
12. Determination of Planck's constant.
13. B-H curve using CRO.
14. Salt Analysis using Spectrograph - CDS
15. Dielectric constant of liquids and solids by capacitance method.
16. Determination of coefficient of coupling by AC bridge method.
17. Impedance measurement using LCR bridge.
18. Four probe method - Determination of conductivity of thin films.
19. Determination of dielectric loss using CRO.
20. Laser diode characteristics.

## SEMESTER IV

### PCPHP20 - PRACTICAL- IV MICROPROCESSOR, MICROCONTROLLER AND C PROGRAMMING

<b>Year: II</b> <b>Sem: IV</b>	<b>Course Code:</b> PCPHP20	<b>Title of the Course:</b> Microprocessor, Microcontroller & C-Programming	<b>Course Type:</b> Practical	<b>Course Category:</b> Core	<b>H/W</b> 4	<b>Credits</b> 4	<b>Marks</b> 100
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#### Course Objectives

1. To provide the students hands on training of programming knowledge on Microprocessor, Microcontroller and C language.
2. To make the students develop the assembly language programs for arithmetic and peripheral interface operations.

#### CourseOutcomes (CO)

The learners will be able to

1. Develop assembly language programs on arithmetic and sorting operations using 8085 and 8051
2. Develop and perform peripheral interface programs with 8085 Microprocessor
3. Perform all code conversions and analog signals into digital and vice versa. Also can generate wave forms.
4. Write C program for any basic operations
5. Solve any physical problems using C language along with numerical techniques

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	L	H	H	M
CO3	H	M	L	L	M	M
CO4	H	L	M	M	M	M
CO5	H	M	M	H	H	M

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	M	H	M	M
CO3	H	M	L	L	M	M
CO4	H	H	M	M	M	M
CO5	H	H	M	H	M	M

(Low - L, Medium – M, High - H)

## **Course Syllabus**

**(Any 20 experiments)**

### **Microprocessor 8085 Programmes (K1 - K6)**

1. Addition & subtraction and Multiplication & Division of 8-bit hexadecimal numbers.
2. Square and Square Root of 8-bit hexadecimal numbers.
3. Picking up Largest and Smallest number in an array of 8-bit hexadecimal numbers.
4. Arranging an array of 8-bit hexadecimal numbers in Ascending and Descending orders.
5. Code Conversion of Binary to BCD and BCD to Binary, Binary to ASCII and ASCII to Binary and BCD to ASCII and ASCII to BCD.
6. 8-Bit and 16-Bit BCD Addition.
7. Addition of Array of 8-Bit Numbers.
8. Digital Clock Program for 12 / 24 Hours.
9. Analog to Digital Conversion and ADC Interface.
10. Digital to Analog Conversion - Wave form Generator - DAC Interface.
11. Keyboard Display Interface.
12. Stepper Motor Interface.
13. Traffic regulation interface
14. Dynamic message display
15. 8255 I/O Display interface

### **Microprocessor 8086 Programmes**

1. 16-Bit Addition & subtraction and Multiplication & division.
2. 16-Bit Ascending and descending order.
3. Computation of LCM.
4. Factorial of a number.

### **Microcontroller 8051 Experiments**

1. 8-Bit Addition and Subtraction
2. 8-Bit Multiplication and Division.
3. Sorting in ascending and descending order.
4. Sorting out the maxima and minima.

### **Computation Methods - C Programming**

1. Lagrange interpolation with algorithm, flow chart with program and its output
2. Numerical integration by Simpson's rule with algorithm and flowchart with program and its output.

3. Numerical solution of ordinary first order differential equation -Euler's method with algorithm, flowchart and its output.
4. Numerical solution of ordinary first order differential equations by the Runge- kutta method, with algorithm, flow chart with program and its output
5. Curve fitting - Least square fitting with algorithm, flowchart and its output.

# **Department of Zoology (PG)**

## **SYLLABUS AND REGULATIONS**

Under

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**AUXILIUM COLLEGE (Autonomous), Gandhi Nagar, Vellore-632006.**  
(Accredited by NAAC with A<sup>+</sup> Grade with a CGPA of 3.55 out of 4 in the 3<sup>rd</sup> cycle)

**OUTCOME BASED EDUCATION**  
**M.Sc. ZOOLOGY**

(Effective for those admitted from the Academic Year 2020 – 2021)

**Structure of the Course and Scheme of Examinations:**

Sem	Paper Code	Title	Hours/ Week	Exam Hours		Credits	Marks
				Th	Pr		
I	PCZOA20	Phylogeny of Invertebrates and Chordates.	7	3	-	4	40+60
	PCZOB20	Molecular Biology and Genetics.	6	3	-	5	40+60
	PCZOC20	Applied Biotechnology and Microbiology.	6	3	-	4	40+60
	PCZOG20	Core Practical I	3	-	-	-	-
	PCZOH20	Core Practical II	3	-	-	-	-
	PEZOA20	Elective 1A: Biostatistics and Computational Biology.	5	3	-	5	40+60
	PEZOB20	Elective 1B: Computational Methods for Sequence Analysis.					
	PIZOA20	Independent Elective IA: Pet Keeping.	-	-	-	2	100
	PIZOB20	Independent Elective IB: Biophysics.					
		<b>Total</b>		<b>30</b>	<b>-</b>	<b>-</b>	<b>18</b>
II	PCZOD20	Research Methodology	6	3	-	4	40+60
	PCZOE20	Applied Entomology	5	3	-	4	40+60
	PCZOF20	Biodiversity and Wildlife Conservation	6	3	-	4	40+60
	PCZOG20	Core Practical I	3	-	4	4	40+60
	PCZOH20	Core Practical II	3	-	4	4	40+60
	PEZOC20	Elective II A: Biochemistry	5	3	-	5	40+60
	PEZOD20	Elective II B: Endocrinology					
	PNHRA20	Human Rights	2	3	-	2	40+60
	PIZOC20	Independent Elective IIA: Animal Husbandry	-	-	-	2	100
	PIZOD20	Independent Elective IIB: Eco Energetics and Ecological Methods					
		<b>Total</b>		<b>30</b>			<b>27</b>

III	PCZOI20	Environmental Biology	7	3	-	4	40+60
	PCZOJ20	Limnology and Toxicology	6	3	-	4	40+60
	PCZOK20	Animal Behaviour	6	3	-	4	40+60
	PCZOL20	Summer Project	-	-	-	-	100
	PCZOP20	Core Practical III	3	-	-	-	-
	PCZOQ20	Core Practical IV	3	-	-	-	-
	PEZOE20	Elective III A: Clinical Laboratory Techniques	5	3	-	5	40+60
	PEZOD20	Elective III B: Fisheries Science					
	PGTRA15	Teaching and Research Aptitude	5	3	-	3	40+60
	PIZOE20	Independent Elective III A: Radiation Biology					
	PIZOF20	Independent Elective IIIB: Dairying	-	-	-	2	100
		<b>Total</b>	<b>30</b>			<b>20</b>	<b>600</b>
IV	PCZOM20	Physiology and Endocrinology	7	3	-	4	40+60
	PCZON20	Developmental Biology and Immunology	6	3	-	4	40+60
	PCZOO20	Evolution	6	3	-	4	40+60
	PCZOP20	Core Practical III	3	-	4	4	40+60
	PCZOQ20	Core Practical IV	3	-	4	4	40+60
	PEZOE20	Elective IV A: Fishery Biology					
	PEZOF20	Elective IV B: Aquaculture and Farm Management	5	3	-	5	40+60
	PIZOG20	Independent Elective IV A: Biosystematics					
	PIZOH20	Independent Elective IVB: General Psychology	-	-	-	2	100
	PIZOI20	Independent Elective IVC: Animal Care					
		<b>Total</b>	<b>30</b>	-	-	<b>25</b>	<b>600</b>
	<b>Grand Total</b>				<b>90</b>	<b>2300</b>	
	<b>Teaching and Research Aptitude</b>	<b>5</b>	<b>3</b>	-	<b>3</b>	<b>100</b>	
	<b>Summer Project</b>	-	-	-	<b>3</b>	<b>100</b>	
	<b>Independent Elective</b>	-	-	-	<b>8</b>	-	

**PROGRAMME OBJECTIVES:**

**On completion of the PG Programme, students will be able to:**

**PO1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.

**PO2:** Assimilate and apply principles and concepts towards skill development and employability.

**PO3:** Apply critical and scientific approaches to address problems and find solutions.

**PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO5:** Integrate issues of social relevance in the field of study.

**PO6:** Persist in life-long learning for personal and societal progress.

**PROGRAMME SPECIFIC OBJECTIVES:**

**As Masters in Zoology, graduates will:**

**PSO1:** Have in-depth knowledge on animal diversity from acellular to multicellular level of organization and apply the learnt concepts in all the fields of Zoology.

**PSO2:** Demonstrate expertise in practical procedures and handling laboratory equipments/instruments. Effective communicator, novel thinker to address the emerging needs.

**PSO3:** Be abled leaders with team spirit, analytical thinking and completion of work in academic, on-field and research areas.

**PSO4:** Gain ability to develop research aptitude/creative thinking in contemporary and current fields of interest.

**PSO5:** Conduct their duty with at most honesty and adhere to ethical protocols. On the whole, be agents of social transformation to up bring their society at large.

**PSO6:** Be technically sound in applying the Information technology and will be lifelong learners in updating to the current advancements in their respective fields.

PSO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	H	H	H	H	H	H
PSO2	H	H	H	H	H	H
PSO3	H	H	H	H	H	H
PSO4	H	H	H	H	H	M
PSO5	H	H	H	H	H	H
PSO6	H	H	H	H	H	H

## SEMESTER I

### PCZOA20 - PHYLOGENY OF INVERTEBRATA AND CHORDATA

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PCZOA20	Phylogeny of Invertebrata and Chordata	Theory	Core	7	4	100

#### Objectives:

- To enlighten the students with adequate scientific details on origin, evolution, adaptive radiations and Phylogenetic relationships of Invertebrates and Chordates.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Analyze the taxonomic status of Invertebrates, its origin and Evolution

**CO2:** Categorize Respiratory, Circulatory and Urinogenital system of various classes of vertebrates.

**CO3:** Justify adaptive radiations of annelids, molluscs, pisces, amphibians and mammals.

**CO4:** Explain salient features of invertebrate and chordates.

**CO5:** Distinguish structural, functional and phylogenetic significance of minor phyla.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	H
CO4	H	H	M	H	M	H
CO5	H	H	M	H	M	H

#### Unit 1:

(21 Hours)

- 1.1: Phylogenetic tree of Invertebrates. (K1, K2, K3, K4, K5)
- 1.2: Origin and evolution of Metazoan theories - Haeckal, syncytial, colonial, Hadzi's theory. (K1, K2, K3, K4, K5)
- 1.3: Coelom- classification, theories - Enterocoel, Gonocoel, Nephrocoel and Schizocoel. (K1, K2, K3, K4, K5)
- 1.4: Grades of Symmetry; Metamerism - classification, theories- Pseudometamerism, Cyclomerism, corm theory, Embryological theory. (K1, K2, K3, K4, K5)

- 1.5: Origin of Cephalization; Jawed vertebrates- origin, class- Acanthodians. (K1, K2, K3, K4, K5)  
1.6: Placoderms – order - Arthrodire, Ptyctodonts, Phyllolepid, Antiarchs, Petalichthys, Rhenanids, Palaeospondylus. (K1, K2, K3, K4, K5)

**Unit 2:**

**(21 Hours)**

- 2.1: Comparative anatomy of Respiratory System- Respiratory organs - Gills, Lungs. (K1, K2, K3, K4, K5)  
2.2: Circulatory system - Evolution of Heart. (K1, K2, K3, K4, K5)  
2.3: Modification of aortic arches. (K1, K2, K3, K4, K5)  
2.4: Modifications of veins. (K1, K2, K3, K4, K5)  
2.5: Urino-genital system - Origin and structure of Kidney across vertebrates. (K1, K2, K3, K4, K5)  
2.6: Gonads and their ducts. (K1, K2, K3, K4, K5)

**Unit 3:**

**(21 Hours)**

- 3.1: Adaptive radiations in: Annelids - Polychaete, Hirudinae. (K1, K2, K3, K4, K5, K6)  
3.2: Molluscs – Gastropods, Polyplacophora, Bivalves, Scaphopods, Cephalopods. (K1, K2, K3, K4, K5, K6)  
3.3: Fishes- Earliest Elasmobranchs, Teleost - Body forms, Feeding habit. (K1, K2, K3, K4, K5, K6)  
3.4: Protective mechanism, Bioluminescence. (K1, K2, K3, K4, K5)  
3.5: Adaptive radiation in Amphibians - Limbless Amphibians, Salamanders and Newts, Frogs and Toads. (K1, K2, K3, K4, K5)  
3.6: Adaptive radiation in Mammals - Terrestrial; Arboreal; Flying; Aquatic. (K1, K2, K3, K4, K5)

**Unit 4:**

**(21 Hours)**

- 4.1: Torsion in Mollusca. (K1, K2, K3, K4, K5)  
4.2: Larval forms in Echinoderms and their significance. (K1, K2, K3, K4, K5)  
4.3: Origin of Tetrapod limbs. (K1, K2, K3, K4, K5, K6)  
4.4: Extinct Reptiles. (K1, K2, K3, K4, K5)  
4.5: Archaeopteryx and affinities. (K1, K2, K3, K4, K5)  
4.6: Egg laying Mammals. (K1, K2, K3, K4, K5)

**Unit 5:**

**(21 Hours)**

- 5.1: Structural, functional and Phylogenetic significance of Lophophora. (K1, K2, K3, K4, K5)  
5.2: Structural, functional and Phylogenetic significance of Phoronida. (K1, K2, K3, K4, K5)  
5.3: Structural, functional and Phylogenetic significance of Rotifera. (K1, K2, K3, K4, K5)  
5.4: Structural, functional and Phylogenetic significance of Sipunculida. (K1, K2, K3, K4, K5)  
5.5: Structural, functional and Phylogenetic significance of Chaetognatha. (K1, K2, K3, K4, K5)  
5.6: Structural, functional and Phylogenetic significance of Phoronophora. (K1, K2, K3, K4, K5)

**Books Study for Reference:**

**Textbooks:**

1. Jordan E.L, Verma P.S 1997- Invertebrate Zoology 14ed- S. Chand and company limited.
2. Kotpal R.L 1997- Modern textbook of Zoology- Invertebrates 7ed- Rastogi Publications.

**Reference Books:**

1. Meglitsch P 1967- Invertebrate Zoology - Oxford University Press.
2. Barrington E.J.W 1979- Invertebrate structure and function 2ed – The English Language Book Society and Nelson (ELBS)
3. Robert D. Barnes 1981- Invertebrate Zoology 4ed- Holt- Saunders International Editions.
4. Marshall A.J and Williams W.D 1976– Textbook of Zoology Vol I: Invertebrates 7ed- ELBS.
5. Edwin H. Colbert 1969- Evolution of Vertebrates 2ed- Wiley Eastern Private Limited.
6. Harvey Pough F, John B. Heiser and William N. McFarland 1990- Vertebrate life 3ed – Maxwell Macmillan International editions.
7. Kenneth V. Kardong 2011- Vertebrates- Comparative anatomy, functions, evolution 4ed- Tata McGraw Hill Editions.
8. Young J.Z 1981- The life of vertebrates 3ed- ELBS.
9. George C. Kent 1987- Comparative anatomy of Vertebrates 6ed-Times Mirror/Mosby College Publishing.
10. Vasanthika Kashyap 1997- Life of Invertebrates 2ed- Vikas Publishing house pvt. Limited.

**E-Resources:**

<http://www.earthlife.net/begin>.

<http://faunaofindia.nic.in>

<https://www.civilserviceindia.com>

## SEMESTER I

### PCZOB20 - MOLECULAR BIOLOGY AND GENETICS

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PCZOB20	Molecular Biology and Genetics	Theory	Core	6	5	100

#### Objectives:

To understand the fine structure of genetic material, functional modifications and their regulation.  
To know the chromosomal basis of genetic disorders, development and differentiation.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Expand knowledge of DNA, RNA structure and understand their synthesis process.

**CO2:** Summarize transcription and translation concepts.

**CO3:** Describe transcriptional modification mechanism.

**CO4:** Interpret various genetic disorders and genetic variation in metabolism.

**CO5:** Discuss genetic recombination and analyze genetic concepts.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

#### Unit 1:

(18 Hours)

1.1: Molecular structure of DNA – Chemical structure; double helix. (K1, K2, K3, K4, K5)

1.2: Identification of DNA and RNA as genetic material. (K1, K2, K3, K4, K5, K6)

1.3: Characterization of genetic code-non ambiguous- non overlapping; Degenerative code. (K1, K2, K3, K4, K5, K6)

1.4: DNA Replication - Chargaff's rule, geometry, Enzymology of DNA replication.

Discontinuous Replication, Events in the Replication Fork, Initiation of Synthesis of the Leading Strand. (K1, K2, K3, K4, K5, K6)

- 1.5: Bidirectional Replication, Termination of Replication, Methylation of DNA. (K1, K2, K3, K4, K5, K6)
- 1.6: DNA damage and repair - Excision repair (Base and nucleotide), mismatch repair, recombination repair. (K1, K2, K3, K4, K5, K6)

**Unit 2: (18 Hours)**

- 2.1: RNA - Chemical Structure, Types. (K1, K2, K3, K4, K5, K6)
- 2.2: Transcription: Enzymatic Synthesis of RNA; RNA polymerase structure. (K1, K2, K3, K4, K5, K6)
- 2.3: Basic features of RNA synthesis – Template recognition - Core promoters (-10 and -35 box), UP element; Initiation; Elongation. (K1, K2, K3, K4, K5, K6)
- 2.4: Termination- Rho independent and Rho dependent. (K1, K2, K3, K4, K5, K6)
- 2.5: Operons - Prokaryotic transcriptional control: Negative control by repressor and Positive control by CAP (Catabolic Activator Protein). (K1, K2, K3, K4, K5, K6)
- 2.6: Lac operon; Gal operon. Role of Genome Imprinting in Epigenetic regulation of gene expression. (K1, K2, K3, K4, K5, K6)

**Unit 3: (18 Hours)**

- 3.1: Post transcriptional modifications: Splicing - splicing signals. (K1, K2, K3, K4, K5, K6)
- 3.2: Mechanism of splicing of nuclear mRNA precursor - branched lariat shaped intermediate; snRNPs. (K1, K2, K3, K4, K5, K6)
- 3.3: Spliceosome - spliceosome assembly and function; alternative splicing. (K1, K2, K3, K4, K5, K6)
- 3.4: Self-Splicing RNAs- Group I and II Introns - tRNA splicing. (K1, K2, K3, K4, K5, K6)
- 3.5: Capping: structure; synthesis, function. (K1, K2, K3, K4, K5, K6)
- 3.6: Polyadenylation: Poly A tailing, mechanism, functions. (K1, K2, K3, K4, K5, K6)

**Unit 4: GENETICS (18 Hours)**

- 4.1: Chromosomal mapping in Eukaryotes. (K1, K2, K3, K4, K5, K6)
- 4.2: Man – Heterokaryon and translocation studies. (K1, K2, K3, K4, K5, K6)
- 4.3: Inborn errors of metabolism- Protein; Carbohydrate; Lipid; Nucleic acid. (K1, K2, K3, K4, K5, K6)
- 4.4: Recombination: Types of Recombination, Breakage and Rejoining and Heteroduplexes. (K1, K2, K3, K4, K5, K6)
- 4.5: Branch migration, The Holliday Model- The recBCD Protein. (K1, K2, K3, K4, K5, K6)
- 4.6: Evolution of Sex Chromosomes; Dosage compensation and X Inactivation role in Sex Determination. (K1, K2, K3, K4, K5, K6)

**Unit 5: (18 Hours)**

- 5.1: Genes in development and differentiation in Drosophila. (K1, K2, K3, K4, K5, K6)
- 5.2: Binary fate decision, positional pattern formation – A- P axis, D-V axis. (K1, K2, K3, K4, K5, K6)
- 5.3: Cell fates; refining pattern; comparison of vertebrate/pattern with insects. (K1, K2, K3, K4, K5, K6)
- 5.4: Neoplasia - Difference between normal and cancer cells- Biochemical, Cytoskeleton, Cell surface. (K1, K2, K3, K4, K5, K6)
- 5.5: Genetic basis of human cancer; Transforming agents – Oncoviruses (RNA and DNA). (K1, K2, K3, K4, K5, K6)
- 5.6: Chemical carcinogenesis. (K1, K2, K3, K4, K5)

**Books for Study and Reference:**

**Textbooks:**

1. Robert P. Wagner - Introduction to modern genetics- John Wiley and sons, Inc, 1980.
2. Anthony J.F Griffiths - An introduction to genetic analysis 7ed- W.H Freeman, 2000.

**Reference Books:**

3. Robert F. Weaver - Molecular Biology 5<sup>th</sup> Edition - McGraw Hill, 2013.
4. Benjamin Lewin - Genes VII- Oxford University Press, 2000.
5. Harvey H. Lodish, Darnell J - Molecular Cell biology- W. H Freeman and Co, 2004.
6. Gardner - Principles of genetics 7ed- John Wiley and Sons Publications, 1984.
7. Nelson D. L, Cox M.M - Lehninger Principles of Biochemistry 4ed- W. H Freeman and Co, 2005.
8. Ursula Goodenough - Genetics 2 Edition- Holt- Saunders International Editions, 1984.
9. Tamarin R.H - Principles of Genetics- WCB Publications,1996
10. Verma P.S, Aggarwal V.K – Genetics- S Chand, 1975.

**E-Resources:**

<https://www.britannica.com>

<https://www.microscopemaster.com>

<https://ghr.nlm.nih.gov>

<https://www.genetics.or>

## SEMESTER I

### PCZOC20- APPLIED BIOTECHNOLOGY AND MICROBIOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PCZOC20	Applied Biotechnology And Microbiology	Theory	Core	6	4	100

#### Objectives:

- To familiarize the use of the data and techniques of engineering and technology in biology for the study of living organisms.
- To make or modify products of processes for specific use.
- To find solution of problems concerning human activities including agriculture, medical treatment, industry and environment
- To acquire a basic knowledge of the microbes in general and of the environmental, medical and industrial important microbes in particular in order to have an integrated approach in biology.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Explain the benefits of microbes in production and value addition of food products.

**CO2:** Apply the tools and techniques used in molecular biology.

**CO3:** Solve the problems related to biotechnology keeping in mind the safety factor for environment and society.

**CO4:** Discuss the basic techniques used in genetic manipulation. Biosafety and ethical issues.

**CO5:** Explain transgenic animals and their use in research field.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	M	H
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	M	M	H	H	M
CO5	H	H	H	H	M	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	M	H
CO2	H	H	H	L	M	H
CO3	H	H	H	M	M	L
CO4	H	H	H	L	M	H
CO5	H	M	H	H	L	H

**Unit 1:****(18 Hours)**

- 1.1: Microbes in food production- Bread, Yoghurt. (K1, K2, K3, K4, K5)
- 1.2: Microbes in food production Cheese, Butter. (K1, K2, K3, K4, K5)
- 1.3: Microbes in food production Vinegar. (K1, K2, K3, K4, K5)
- 1.4: Microbes in food production Beer and Wine. (K1, K2, K3, K4, K5)
- 1.5: Food Spoilage. (K1, K2, K3, K4, K5)
- 1.6: Food Preservation. (K1, K2, K3, K4, K5)

**Unit 2:****(18 Hours)**

- 2.1: Gene therapy. (K1, K2, K3, K4, K5, K6)
- 2.2: Forensic Medicine-DNA fingerprinting using minisatellite. (K1, K2, K3, K4, K5, K6)
- 2.3: Autoantibody fingerprinting. (K1, K2, K3, K4, K5, K6)
- 2.4: Hybridoma technology. (K1, K2, K3, K4, K5, K6)
- 2.5: Monoclonal antibodies. (K1, K2, K3, K4, K5)
- 2.6: Polyclonal antibodies. (K1, K2, K3, K4, K5)

**Unit 3:****(18 Hours)**

- 3.1: Use of genetically engineered organisms for removal of specific pollutants. (K1, K2, K3, K4, K5)
- 3.2: GEM for treating oil spills. (K1, K2, K3, K4, K5)
- 3.3: GEM for detecting pesticides in the soil and their degradation. (K1, K2, K3, K4, K5)
- 3.4: Bioleaching, Biomining, Biosurfactants. (K1, K2, K3, K4, K5)
- 3.5: Biosensors-Conventional, Microbial, Urea. (K1, K2, K3, K4, K5)
- 3.6: Alcohol and Integrated Multibiosensor. (K1, K2, K3, K4, K5)

**Unit 4:****(18 Hours)**

- 4.1: GM Papaya, GM Tomato. (K1, K2, K3, K4, K5)
- 4.2: Bt Cotton, Bt Brinjal and Golden Rice. (K1, K2, K3, K4, K5)
- 4.3: Transgenic plants Application-Industrial enzymes. (K1, K2, K3, K4, K5)
- 4.4: Organic chemical, plastics. (K1, K2, K3, K4, K5)
- 4.5: Vaccine- producing plants. (K1, K2, K3, K4, K5)
- 4.6: Biofertilizers. (K1, K2, K3, K4, K5)

**Unit 5:****(18 Hours)**

- 5.1: Transgenic Fish, Chickens, Mouse. (K1, K2, K3, K4, K5)
- 5.2: Transgenic Cow, Goat, Sheep. (K1, K2, K3, K4, K5)
- 5.3: Transgenic Pig, Dog. (K1, K2, K3, K4, K5)
- 5.4: Applications of Transgenic animals. (K1, K2, K3, K4, K5)
- 5.5: Molecular Pharming. (K1, K2, K3, K4, K5)
- 5.6: Gene Pharming in Transgenic animals. (K1, K2, K3, K4, K5)

## **Books for Study and Reference:**

### **Textbooks:**

1. Purohit S.S.2001 - Biotechnology Fundamentals and Applications -Agrobios New Delhi.
2. Dubey R.C. 2014 – Advanced Biotechnology, S.Chand and Company Pvt. Ltd. New Delhi.

### **Reference Books:**

3. Sharma P.D. 2010- Microbiology, Rastogi Publications,Meerut.
4. Gupta P.K.2004 - Biotechnology and Genomics - Rastogi Publications, Meerut.
5. Pelczar M.J., Reid R.D., Chan, E.C.S.1996 – Microbiology - Tata McGraw Hill Co., Ltd., New Delhi.
6. Casida L.E. 1996 –Industrial Microbiology, New Age International (P) Limited, New Delhi.
7. Rema L.P. 2006- Applied Biotechnology, MJP Publishers, Chennai.
8. Moshrafuddin Ahmed and Basumatary S.K. 2008- Applied Microbiology, MJP Publishers, Chennai.
9. Patel A.H. 2007- Industrial Microbiology, Published by Rajiv Beri for Macmillan India Ltd. New Delhi.
10. Kumar H.D. 1998- Modern concepts of Biotechnology, Vikas Publishing House Pvt. Ltd. New Delhi.
11. Vijaya Ramesh K. 2009- Food Microbiology, MJP Publishers, Chennai.
12. Willey, Sherwood and Woolverton 2011 -Joann Prescott’s Microbiology, Eighth Edition, McGraw- Hill International Ed. Singapore.
13. Powar C.B. and Daginawala H.F. 2015. General Microbiology- Vol.II Himalaya Publishing House.

### **E-Resources:**

<https://www.biointeractive.org>

<https://www.bio.org>

<https://www.ncbi.nlm.nih.gov>

## SEMESTER I

### PEZOA20 - ELECTIVE IA: BIostatISTICS AND COMPUTATIONAL BIOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PEZOA20	Biostatistics and Bioinformatics	Theory	Core	5	5	100

#### Objective:

- To understand the basic concepts of biostatistics and its application in research.
- To synthesis an area of modern biology in order to analyze and solve biological problems in a more systematic way through computational management.

#### Course Outcomes:

**CO1:** Describe statistical population, sampling and probability.

**CO2:** Explain and perform standard deviation, Student t test and Chi square Test.

**CO3:** Compute Correlation, Regression and ANOVA.

**CO4:** Discuss the databases and application of search tools.

**CO5:** Explain genomics, proteomics, drug designing and phylogenetic tree analysis.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	L	M	H	H	L	M
CO2	L	M	H	H	L	M
CO3	L	M	H	H	L	M
CO4	L	M	H	H	L	M
CO5	L	M	H	H	L	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	L	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	L	H	L	M
CO5	H	H	L	H	M	M

#### Unit 1:

(15 Hours)

1.1: Introduction and scope of statistics. (K1, K2, K3, K4, K5)

1.2: Statistical Population – Finite, Infinite; Sample and Sampling Methods, Variables –Types. (K1, K2, K3, K4, K5)

1.3: Probability – Definition, Events and its types. (K1, K2, K3, K4, K5)

1.4: Types of probability – Apriori, Aposteriori. (K1, K2, K3, K4, K5)

1.5: Rules of probability - Addition rule, Product rule. (K1, K2, K3, K4, K5)

1.6: Simple Choice, Combination, Permutation. (K1, K2, K3, K4, K5)

**Unit 2:** (15 Hours)

- 2.1: Dispersion – Standard Deviation: Standard Error. (K1, K2, K3, K4, K5)
- 2.2: Hypothesis testing – Null and Alternate hypothesis. (K1, K2, K3, K4, K5)
- 2.3: Levels of significance. Degree of freedom. (K1, K2)
- 2.4: Test of significance for large and small samples. (K1, K2, K3, K4, K5)
- 2.5: Students ‘t’ Test. (K1, K2, K3, K4, K5)
- 2.6: Chi square Test. (K1, K2, K3, K4, K5)

**Unit 3:** (15 Hours)

- 3.1: Correlation – Types. (K1, K2, K3, K4, K5)
- 3.2: Methods of Correlation-Scatter diagram. (K1, K2, K3, K4, K5)
- 3.3: Methods of Correlation - Karl Pearson’s. (K1, K2, K3, K4, K5)
- 3.4: Regression – Regression Equation. (K1, K2, K3, K4, K5)
- 3.5: Regression line. (K1, K2, K3, K4, K5)
- 3.6: ANOVA – One way analysis (Analysis of Variance). (K1, K2, K3, K4, K5)

**Unit 4: BIOINFORMATICS** (15 Hours)

- 4.1: Definition – History - Scope of Bioinformatics. (K1, K2, K3, K4, K5)
- 4.2: Databases - Primary, secondary and Tertiary. (K1, K2, K3, K4, K5)
- 4.3: Database search - Sequence database search. (K1, K2, K3, K4, K5, K6)
- 4.4: FASTA. (K1, K2, K3, K4, K5, K6)
- 4.5: BLAST. (K1, K2, K3, K4, K5, K6)
- 4.6: Amino acid substitution matrices (PAM) and Blossum. (K1, K2, K3, K4, K5, K6)

**Unit 5:** (15 Hours)

- 5.1: Genomics. (K1, K2, K3, K4, K5)
- 5.2: Human Genome Project. (K1, K2, K3, K4, K5)
- 5.3: Proteomics. (K1, K2, K3, K4, K5)
- 5.4: Phylogenetic analysis. (K1, K2, K3, K4, K5)
- 5.5: Drug designing. (K1, K2, K3, K4, K5, K6)
- 5.6: Drug targeting. (K1, K2, K3, K4, K5, K6)

**Books for Study and Reference:**

**Textbooks:**

1. Negi K. S.2012 Methods in Biostatistics AITBS Publication.
2. Gurumani N. 2005 An Introduction to Biostatistics and Revised Edition. MJP Publishers.
3. Sharma V, Munjal A, Shankar A. 2013- A textbook of Bioinformatics- Rastogi Publications.

**Reference Books:**

4. Visweswara Rao K 1996 –Biostatistics- Jaypee Publication New Delhi.
5. Ronald N, Forthofer, Eun Sul Lee Michael Hernandez 2007 –Biostatistics-An Imprint of Elsevier.
6. Das N G 2009 Statistical Methods-Tata McGraw-Hill Publishing Company-New Delhi.
7. Bernard Rosner – Fundamentals of Biostatistics 5th edition – Duxbury Thomson Learning, USA 2000.
8. Clifford Blair R., Richard A. Taylor – Biostatistics for the Health Sciences – (Indian edition) Dorling Kindersley India Pvt. Ltd., New Delhi 2009.
9. Arthur M.L. 2003 - Introduction to Bioinformatics - Oxford University Press - New Delhi.
10. Attwood T.K, Harry Smith D.J, Phukan S. 2013 – Introduction to Bioinformatics-Published by Dorling Kindersley (India) Pvt. Ltd.
11. Ignacimuthu S.J 2013- Basic Bioinformatics- Narosa Publishing House Pvt. Ltd.
12. Sundaralingam R, Kumaresan V 2013- Bioinformatics- Saras Publications
13. Dan E. Krane, Michael L Raymer 2006- Fundamental concepts of Bioinformatics- Pearson Education Inc.

**E-Resources:**

<https://www.statistics.com>

<https://bms.ucsf.edu>

<https://www.iscb.org>

<http://sbbsindia.in>

## SEMESTER I

### PEZOB20 - ELECTIVE - I B: COMPUTATIONAL METHODS FOR SEQUENCE ANALYSIS

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PEZOB20	Computational Methods For Sequence Analysis	Theory	Core	5	5	100

#### Objective:

- Understand Genomic data acquisition and analysis, comparative and predictive analysis of DNA and protein sequence, Phylogenetic inference etc.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Explain and classify the biological databases and its application.

**CO2:** Describe the sequence alignment, substitution matrices, and score matrices and search tools.

**CO3:** Analyze the evolutionary distance and boot strapping strategies.

**CO4:** Asses the genomic sequences, gene finding and analyses the regulatory regions.

**CO5:** Explain the secondary structure and gene identification.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

#### Unit 1:

(15 Hours)

1.1: Introduction to bioinformatics. (K1, K2, K3, K4, K5)

1.2: Classification of biological databases. (K1, K2, K3, K4, K5)

1.3: Biological data formats. (K1, K2, K3, K4, K5)

1.4: Application of bioinformatics in various fields. (K1, K2, K3, K4, K5)

1.5: Introduction to single letter code of amino acids, symbols used in nucleotides.

(K1, K2, K3, K4, K5)

1.6: Data retrieval – Entrez and SRS. (K1, K2, K3, K4, K5, K6)

**Unit 2:** (15 Hours)

2.1: Introduction to Sequence alignment. (K1, K2, K3, K4, K5)

2.2: Substitution matrices, scoring matrices – PAM and BLOSUM. (K1, K2, K3, K4, K5, K6)

2.3: Local and Global alignment concepts, dot plot, dynamic programming methodology.  
(K1, K2, K3, K4, K5)

2.4: Multiple sequence alignment – Progressive alignment. (K1, K2, K3, K4, K5)

2.5: Database searches for homologous sequences – FASTA. (K1, K2, K3, K4, K5, K6)

2.6: BLAST versions. (K1, K2, K3, K4, K5, K6)

**Unit 3:** (15 Hours)

3.1: Evolutionary analysis. (K1, K2, K3, K4, K5)

3.2: Distances - clustering methods. (K1, K2, K3, K4, K5)

3.3: Rooted tree representation. (K1, K2, K3, K4, K5)

3.4: Unrooted tree representation. (K1, K2, K3, K4, K5)

3.5: Bootstrapping strategies. (K1, K2, K3, K4, K5)

3.6: Phylogenetic analysis. (K1, K2, K3, K4, K5)

**Unit 4:** (15 Hours)

4.1: Fragment assembly. (K1, K2, K3, K4, K5)

4.2: Genome sequence assembly. (K1, K2, K3, K4, K5, K6)

4.3: Gene finding method. (K1, K2, K3, K4, K5)

4.4: Gene prediction – Analysis. (K1, K2, K3, K4, K5)

4.5: Genome annotation. (K1, K2, K3, K4, K5)

4.6: Prediction of regulatory regions. (K1, K2, K3, K4, K5)

**Unit 5:** (15 Hours)

5.1: Concepts and secondary structure prediction. (K1, K2, K3, K4, K5)

5.2: Probabilistic models. (K1, K2, K3, K4, K5)

5.3: Markov chain. (K1, K2, K3, K4, K5)

5.4: Hidden Markov Models. (K1, K2, K3, K4, K5, K6)

5.5: Gene identification and other applications. (K1, K2, K3, K4, K5, K6)

5.6: Internet resources for gene identification, detection of functional sites, gene expression.  
(K1, K2, K3, K4, K5)

**Books for Study and Reference:**

**Textbooks:**

1. Andreqas D. Baxevanis, B. F. Francis Ouellette. Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins John Wiley and Sons, New York (1998).
2. Shanmughavel, P. 2005. Principles of Bioinformatics, Pointer Publishers, Jaipur, India.

**Reference Books:**

3. Richard Durbin, Sean Eddy, Anders Krogh, and Graeme Mitchison - Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids Cambridge University Press, 1998.
4. Bishop M.J., Rawlings C.J. (Eds.) 1997. DNA and protein sequence analysis. A Practical approach IRL Press, Oxford.
5. Doolittle R.F. (Ed.) Computer methods for macromolecular sequence analysis (Methods in Enzymology, Vol. 266). Academic Press, San Diego (1996).

**E-Resources:**

<https://bms.ucsf.edu>

<https://www.iscb.org>

<http://sbbsindia.in>

## SEMESTER II

### PCZOD20 - RESEARCH METHODOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PCZOD20	Research Methodology	Theory	Core	6	4	100

#### Objectives:

- To enable the students to understand the principles and methods of various instruments used in biology and to prepare them to use these techniques in their own research.
- To understand the Research methods and the preparation of research manuscripts and the role of Journals and e-journals in research.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Describe the principle and working mechanisms of various instruments.

**CO2:** Interpret theoretical knowledge of various biological instruments useful for research.

**CO3:** Demonstrate critical thinking in designing research problem and find the solution to scientific research problem.

**CO4:** Discuss research based acquaintance in designing the experiments and interpretation of data with research tools.

**CO5:** Explain scientific ideas in both written and oral formats.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

#### Unit 1:

**(18 Hours)**

1.1: Principles and biological uses of phase contrast, fluorescence. (K1, K2, K3, K4, K5)

1.2: Scanning and transmission electron microscopes. (K1, K2, K3, K4, K5)

1.3: Spectroscopic techniques- Absorption and Emission principles - UV, visible spectroscopy. (K1, K2, K3, K4, K5)

1.4: Fluorescence and Raman spectroscopy. (K1, K2, K3, K4, K5)

1.5: X-ray crystallography. (K1, K2, K3, K4, K5)

1.6: NMR. (K1, K2, K3, K4, K5, K6)

**Unit 2:** **(18 Hours)**

2.1: Principle and application of - Chromatography - Gel, Ion, column, Affinity, HPLC & GLC. (K1, K2, K3, K4, K5)

2.2: Electrophoresis – Agarose, SDS - PAGE, Immunoelectrophoresis. (K1, K2, K3, K4, K5)

2.3: Centrifugation - Principle, Ultra centrifugation. (K1, K2, K3, K4, K5)

2.4: Applications of Radioactive Isotopes in biology. (K1, K2, K3, K4, K5, K6)

2.5: Counting methods - GM counters, Scintillation counters. (K1, K2, K3, K4, K5)

2.6: PEG. Autoradiography. (K1, K2, K3, K4, K5)

**Unit 3:** **(18 Hours)**

3.1: Scientific Method and its goals. (K1, K2, K3, K4, K5)

3.2: Research process. (K1, K2, K3, K4, K5)

3.3: Criteria of good research – research problem. (K1, K2, K3, K4, K5)

3.4: Criteria for selecting the problem. (K1, K2, K3, K4, K5)

3.5: Necessity of defining the problem – hypothesis. (K1, K2, K3, K4, K5)

3.6: Types of hypothesis - testing of hypothesis and their limitations. (K1, K2, K3, K4, K5)

**Unit 4:** **(18 Hours)**

4.1: Research Design - Meaning and needs of research design. (K1, K2, K3, K4, K5)

4.2: Important concepts relating to research design - different research design. (K1, K2, K3, K4, K5)

4.3: Sampling design - Steps in sampling design - Characteristics of good sampling design. (K1, K2, K3, K4, K5)

4.4: Different types of sample design. (K1, K2, K3, K4, K5)

4.5: Research methods – Survey - experimental, exploratory - case study. (K1, K2, K3, K4, K5)

4.6: Selection of tools - criteria for selection of tools – different types of tools - criteria of good research tool. (K1, K2, K3, K4, K5)

**Unit 5:** **(18 Hours)**

5.1: Reference work and preparation of dissertation. (K1, K2, K3, K4, K5, K6)

5.2: Pubmed, Google Scholar, and Infilibnet. (K1, K2, K3, K4, K5)

5.3: Computer aided techniques for data analysis, SPSS software. (K1, K2, K3, K4, K5, K6)

5.4: Data presentation and power point presentation. (K1, K2, K3, K4, K5)

5.5: Reference collection – preparation of thesis. (K1, K2, K3, K4, K5)

5.6: Preparation of scientific paper for publication in a Journal. (K1, K2, K3, K4, K5)

## **Books for Study and Reference:**

### **Textbooks:**

1. Anderson Durston, Polle 1970 - Thesis and Assignment Writing - Wiley Eastern Ltd., New Delhi.
2. Comir and Peter Wood Ford 1979 - Writing Scientific Papers in English - Pitman Medical Publishing Co., London.

### **Reference Books:**

3. Day R.A. 1994 - How to Write and Publish a Scientific Paper - Cambridge University Press, London.
4. Palanichamy S. and Shanmugavelu M. 1997 - Research Methods in Biological Sciences – Palani Paramount Publications, Tamil Nadu, India.
5. Milton J.S., 1992-Statistical Methods in Biological and Health Sciences-McGrawHill Inc., York.
6. Gurumani N. 2006 - Research Methodology for Biological Sciences - MJP Publishers, Chennai.
7. Kothari C.R. 2010- Research Methodology- New Age International Publishers.
8. Sybesma C., 1989, Biophysics-An Introduction, Kluwer Academic Publisher.
9. Thomas F. Weiss, 1995, Cellular Biophysics I and II, MIT press.
10. Yeagers E.K, 1992, Basic Biophysics for Biology, CRC press.
11. Narayanan P. 2000- Essentials of Biophysics- New Age International Publishers.

### **E-Resources:**

<https://research-methodology.net>

<https://study.com/academy>

<https://ncu.libguides.com>

## SEMESTER II

### PCZOE20 - APPLIED ENTOMOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PCZOE20	Applied Entomology	Theory	Core	5	4	100

#### Objective:

- This core paper has been designed to understand the biology of Insects, Insect pest management, Integrated Pest Management and biological control.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Identify the pest in different cash crops and the mode of infection.

**CO2:** Analyze the pest species of vegetables, fruits, stored grains and household pests.

**CO3:** Categorize the different insect pests and vectors of livestock.

**CO4:** Explain the classification of insecticides and the mode of action.

**CO5:** Apply appropriate method of insect pest management and integrated pest management.

CO/PO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	H
CO4	H	M	M	H	M	H
CO5	H	H	M	H	M	H

#### Unit 1:

**(15 Hours)**

1.1: Causes for insects assuming pest status. (K1, K2, K3, K4, K5)

1.2: Forecasting Pest outbreak. (K1, K2, K3, K4, K5)

1.3: Biology, nature, extent of damage and control measures of insect pests of Sugarcane - *Chilo infuscatellus*, *Tryporyza nivella*, *Chilo sacchariphagus*. (K1, K2, K3, K4, K5)

1.4: Biology, nature, extent of damage and control measures of insect pests of Cotton – *Aphis gossypii*, *Dysdercus koenigii*, *Thrips tabaci*. (K1, K2, K3, K4, K5)

1.5: Biology, nature, extent of damage and control measures of insect pests of Groundnut – *Aphis craccivora*, *Aproraema modicella*, *Helicoverpa armigera*. (K1, K2, K3, K4, K5)

1.6: Coconut - *Rhynchophorus ferrugineus*, *Oryctes rhinoceros*, *Nephantis seiropa*. (K1, K2, K3, K4, K5)

**Unit 2: (15 Hours)**

- 2.1: Biology, nature, extent of damage and control measures of insect pests of Vegetable - *Epilachna dodecastigma*, *Pieris brassicae*, *Leucinodes orbonalis*. (K1, K2, K3, K4, K5)
- 2.2: Biology, nature, extent of damage and control measures of insect pests of Fruits - *Sternochetus mangifera*, *Cosmopolites sordidus*, *Papilio demoleus*. (K1, K2, K3, K4, K5)
- 2.3: Biology, nature, extent of damage and control measures of insect pests of Stored product - Paddy - *Leptocorisa varicornis*, *Tryporyza incertulus*, *Sitophilus oryzae*. (K1, K2, K3, K4, K5)
- 2.4: Biology, nature, extent of damage and control measures of insect pests of stored product Wheat - *Triticum vulgare*, *Mythimna separata*, *Spodoptera mauritia*. (K1, K2, K3, K4, K5)
- 2.5: Biology, nature, extent of damage and control measures of insect pests of Household pest- *Ctenolepisma saccharina*, *Anthrena pimpinella*, *Trichophaga abruptella*. (K1, K2, K3, K4, K5)
- 2.6: Insect resistant crops. (K1, K2, K3, K4, K5, K6)

**Unit 3: (15 Hours)**

- 3.1: Insect pest of domestic animals - Cattle- Cattle fly. (K1, K2, K3, K4, K5)
- 3.2: Insect pest of domestic animals Ox - Warble fly. (K1, K2, K3, K4, K5)
- 3.3: Insect pest of domestic animals Fowl - Chicken flea, Shaft louse. (K1, K2, K3, K4, K5)
- 3.4: Insect pest of domestic animals Sheep and Goat - Head Maggot, Sheep Ked, Biting Louse. (K1, K2, K3, K4, K5)
- 3.5: Insect vectors of Animals – Mites, Ticks. (K1, K2, K3, K4, K5)
- 3.6: Organic methods of domestic pest management. (K1, K2, K3, K4, K5)

**Unit 4: (15 Hours)**

- 4.1: Classification of Insecticides - Chemical nature – Inorganic - Arsenic and Fluorine compounds. (K1, K2, K3, K4, K5)
- 4.2: Organic compounds- Animal origin – Nereistoxin. (K1, K2, K3, K4, K5)
- 4.3: Plant origin - Nicotinoids, Pyrethroides, Rotenoids. Hydrocarbons. (K1, K2, K3, K4, K5)
- 4.4: Synthetic organic compounds - DDT, BHC, Parathion. (K1, K2, K3, K4, K5)
- 4.5: Mode of action - Physical Poison, Protoplasmic Poison, Respiratory Poison. (K1, K2, K3, K4, K5)
- 4.6: Nerve Poison. Mode of Entry - Stomach Poisons, Contact Poison, Fumigants. (K1, K2, K3, K4, K5)

**Unit 5: (15 Hours)**

- 5.1: Biological control of plant pest. (K1, K2, K3, K4, K5)
- 5.2: Viral insecticides, Bacterial insecticides, Fungal insecticides. (K1, K2, K3, K4, K5)
- 5.3: Integrated Pest Management. (K1, K2, K3, K4, K5, K6)
- 5.4: Use of insect pathogens in control of pest. (K1, K2, K3, K4, K5)
- 5.5: Non-conventional pest control- Insect Attractants, Repellents, Antifeedants, Genetic radiations. (K1, K2, K3, K4, K5)
- 5.6: Plant protection appliances- Duster, Sprayers and Fumigators. (K1, K2, K3, K4, K5)

## **Books for study and Reference:**

### **Textbooks:**

1. Vasantharaj V.B, Kumaraswami. T- 1998-Elements of Economic Entomology- Popular Book Depot.
2. Nalina Sundari, Santhi R- 1962- Entomology- MJP Publishers.

### **Reference Books:**

3. Jawaid Ahsan, Subhas Prasad Sinha 1981- A handbook on Economic Zoology- S. Chand and Company limited.
4. B.S Tomar 2004-Introduction to Economic Zoology-EMKAY Publications.
5. Chinmoy Goswami, B.D Panaik 2011- Handbook of Entomology- Wisdom press.
6. M. R Ghosh 1995-Concepts of Insect control- New Age International Publishers.
7. C.L Metcalf, W.P Flint 1962- Destructive and useful insects their habits and control 4ed- Tata McGraw Hill Publications.
8. United Stated Department of Agriculture Washington DC 1952- The Yearbook of Agriculture – Oxford and IBH Publishing Co.
9. David B.V, Muralirangan, M.C, Meera Muralirangan 1992- Harmful and Beneficial Insects- Popular Book Depot.
10. Saxena A.B 1996 - Harmful Insects- Anmol Publications.

### **E-Resources:**

<http://www.entosocindia.org>

<https://www.entsoc.org>

<https://entomology.cals.cornell.edu>

## SEMESTER II

### PCZOF20 - BIODIVERSITY AND WILDLIFE CONSERVATION

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PCZOF20	Biodiversity and wild life conservation	Theory	Core	6	4	100

#### Objective:

- To understand the habitat and distribution of wild animals, causes for their endangerment and methods adopted for their conservation.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Discuss the Biodiversity India and ecosystems.

**CO2:** Explain the values of Biodiversity.

**CO3:** Discuss the Wildlife of India and threats to the wildlife.

**CO4:** Explain Wildlife protection and conservation.

**CO5:** Explain conservation methods.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	M	H
CO5	H	H	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	H
CO4	H	M	M	H	M	H
CO5	H	H	M	H	M	H

#### Unit 1:

(18 Hours)

1.1: Biodiversity in India: Genetic, species and ecosystem diversity. (K1, K2, K3, K4, K5)

1.2: Biogeographic classification of India. National and local level. (K1, K2, K3, K4, K5)

1.3: India as a mega diversity nation. (K1, K2, K3, K4, K5, K6)

1.4: Ecology and Ecosystems - Structure and function of ecosystem. (K1, K2, K3, K4, K5)

1.5: Energy flow in the ecosystem. (K1, K2, K3, K4, K5, K6)

1.6: Types of Ecosystem: Forest, Aquatic (Lake and Ocean) and Urban. (K1, K2, K3, K4, K5)

**Unit 2:** (18 Hours)

- 2.1: Value of biodiversity: Consumptive use, Productive use, Social, Ethical and Aesthetic. (K1, K2, K3, K4, K5)
- 2.2: Hotspots of biodiversity. (K1, K2, K3, K4, K5, K6)
- 2.3: Endemic and Invasive species. (K1, K2, K3, K4, K5)
- 2.4: Threats to biodiversity: Habitat loss. (K1, K2, K3, K4, K5, K6)
- 2.5: Climate change; Poaching. (K1, K2, K3, K4, K5)
- 2.6: Man and wildlife conflicts. (K1, K2, K3, K4, K5)

**Unit 3:** (18 Hours)

- 3.1: Wildlife of India. (K1, K2, K3, K4, K5)
- 3.2: Values of wildlife - Positive and Negative. (K1, K2, K3, K4, K5)
- 3.3: Morphological and Physiological adaptations of Endangered and threatened species. (K1, K2, K3, K4, K5)
- 3.4: Population dynamics: Exponential and Logistic. (K1, K2, K3, K4, K5)
- 3.5: Local and Regional Extinction. (K1, K2, K3, K4, K5)
- 3.6: Red Data Book. (K1, K2, K3, K4, K5)

**Unit 4:** (18 Hours)

- 4.1: Wildlife protection Act. (K1, K2, K3, K4, K5)
- 4.2: In-situ and ex-situ conservation. (K1, K2, K3, K4, K5, K6)
- 4.3: IUCN Red List – CITES. (K1, K2, K3, K4, K5)
- 4.4: National Parks and Sanctuaries. (K1, K2, K3, K4, K5)
- 4.5: Biospheres reserves. (K1, K2, K3, K4, K5)
- 4.6: Project Tiger - Project Gir Lion and Crocodile breeding project. (K1, K2, K3, K4, K5)

**Unit 5:** (18 Hours)

- 5.1: Germplasm conservation and Cryogenic preservation. (K1, K2, K3, K4, K5)
- 5.2: Assisted reproduction. (K1, K2, K3, K4, K5)
- 5.3: Captive breeding - Non-invasive and Minimal invasive method. (K1, K2, K3, K4, K5)
- 5.4: Scat analysis and Radio telemetry. (K1, K2, K3, K4, K5, K6)
- 5.5: Habitat suitability. (K1, K2, K3, K4, K5)
- 5.6: Remote sensing and GIS. (K1, K2, K3, K4, K5, K6)

**Books for Study and Reference:**

**Textbooks:**

1. H.R Singh, Neeraj Kumar - Ecology and Environmental science- Vishal Publishing Co., 2006
2. Rayappa A. Kasi - Earth- Designed for Biodiversity- LTD Media Publications, 2010

**Reference Books:**

3. K.C Agarwal - Biodiversity- Agarobios India, 2000
4. Desh Deepak Verma, Sujata Arora, R K Rai - Perspectives of Biodiversity-Ministry of Environment and Forest, 2006
5. Lee Hannah - Climate change Biology- Elsevier, 2011
6. P.C Das - Environmental Biology- AITBS Publishers India, 2011
7. V.K Agarwal, Usha Gupta - Ecology and Ethology- S. Chand and Company Ltd, 2002

**E-Resources:**

<http://www.enviroindia.net>

<http://aelsindia.com>

<http://environment-ecology.com>

**SEMESTER II**  
**PCZOG20 - PRACTICAL I**  
**INVERTEBRATA, CHORDATA, MOLECULAR BIOLOGY, GENETICS,**  
**BIOTECHNOLOGY AND MICROBIOLOGY**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I & II	PCZOG20	Practical -I	Practical	Core	3	4	100

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Demonstrate and dissect different systems of specimen.

**CO2:** Identify structural modification of chordates, adaptive feature based on mode of life and chromosomes.

**CO3:** Identify and explain various inborn errors of metabolism, describe karyotyping and identify functional gene in given sequence.

**CO4:** Gain practical insights on various instruments used in molecular biology.

**CO5:** Identify /explain various microorganisms, transgenic animals and GM plants.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	H	M	H
CO5	H	H	H	H	M	H

CO/PSO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	H
CO4	H	M	M	H	M	H
CO5	H	H	M	H	M	H

**Major: Dissections:**

**1. Invertebrata:** Digestive system- Prawn, Cockroach and Sepia  
 Nervous system – Prawn, Cockroach and sepia

**2. Chordata:** 9<sup>th</sup> and 10<sup>th</sup> Cranial nerves of Shark  
 Arterial system of Shark

**3. Minor: Mounting:**

Appendages of Prawn  
 Mouth parts – Cockroach, Mosquito, House fly, Honey bee  
 Sting of Honey Bee  
 Brain of frog and calotes (Museum Specimen)

#### **4. Study of museum specimen and slides relevant to**

- Structural modifications of chordates - Hippocampus, Acipenser and Ambystoma.
- Adaptive features for their mode of life - Echeneis, Hyla, and Draco.

#### **5. Molecular Biology and Genetics:**

- Giant chromosome - polytene chromosomes 1. Chironomous Larva (Slide),  
2. Lampbrush chromosomes - chart
- Identification of a functional gene in the given nucleotide sequence.

#### **6. Karyotyping using human metaphase chromosome plates: Identification of syndromes:**

- (i) Down (ii) Klinefelter (iii) Turner

#### **7. Study on Inborn errors of metabolism using Chromosomal Charts.**

Lipid metabolism	-	Tay-Sachs and Niemann-Pick
Protein metabolism	-	PKU and Alkaptonuria
Carbohydrate metabolism	-	Galactosemia and Pompe's disease

#### **8. Visit to a Molecular Biology laboratory.**

#### **9. Biotechnology and Microbiology:**

- Aspergillus, Rhizopus, Pseudomonas, Bacillus
- Salmonella*, *Lactobacillus*, *Saccharomyces cerevisiae*
- GM Papaya, GM Tomato, Bt Cotton, Bt Brinjal
- Hybridoma Technology
- Transgenic Animals- Fish, Goat.

#### **10. Determination of Bacterial Growth by Turbidity Measurement – Demonstration.**

**SEMESTER II**  
**PCZOH20 - PRACTICAL II - RESEARCH METHODOLOGY, APPLIED**  
**ENTOMOLOGY, BIODIVERSITY AND WILDLIFE CONSERVATION**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I & II	PCZOH20	Practical II	Practical	Core	3	4	100

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CLO1:** Apply basic concepts of instrumentation.

**CLO2:** Gain skills in techniques of chromatography, electrophoresis and spectroscopy.

**CLO3:** Demonstrate Histochemical staining techniques.

**CLO4:** Summarize the insect pest and their control measures.

**CLO5:** Explain biodiversity and explore the fauna existing around for documentation and motivates for further studies and research in the field.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	L	H	M	H
CO4	H	M	M	H	M	H
CO5	H	H	H	H	M	H

**LOW-L, MEDIUM-M, HIGH- H**

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	L	M
CO2	H	H	H	L	M	H
CO3	H	H	H	M	M	L
CO4	H	H	H	H	M	H
CO5	H	M	H	H	L	H

**Research Methodology:**

1. Electrophoresis – Agarose gel - SDS PAGE
2. Paper Chromatography
3. Gel/ Affinity Chromatography- Demonstration
4. Histochemical staining technique of Carbohydrates, Protein and Lipids
5. Estimation of Urea - DAM Method
6. Estimation of Cholesterol - ZAC'S Method
7. Estimation of Glucose – Ortho Toluidine Method
8. Estimation of Protein – Biuret Method

**Spotters:** Microscope- Compound, Fluorescent, TEM, SEM

**Applied Entomology:**

**Study on Insect Pests:- Spotters**

1. Pest of sugarcane – *Euethola humilis*, *Chilio infuscatellus*

2. Pest of cotton – *Dysdercus koenigii*, *Aphis gossypii*
3. Pest of paddy – *Sogatella furcifera*, *Leptocorisa varicornis*
4. Pest of coconut- *Oryctes rhinoceros*, *Rhyncophorus ferrugineus*
5. Pest of Wheat- *Meromyza Americana*, *Triticum vulgare*
6. Pest of Fruits- *Batocera rufamaculata*, *Papilio demoleus*
7. Pest of vegetables- *Epilachna vigintioctopunctata*, *Leucinodes orbonalis*
8. House hold pest- *Ctenolepisma saccharina*, *Anthrena pimpinella*
9. Stored products pest- *Sitophilus oryzae*, *Leptocorisa varicornis*
10. Collection of Insects and preservation Techniques- Insect box

### **Biodiversity and Wild Life Conservation:**

1. Observation and documentation of fauna inside the College campus – Soil microarthropods- Annelids, Amphibians, Reptiles and Birds
2. Spotters of endemic species- Laughing thrush, Grey headed bulbul.
3. Endangered species of India- Red crowned roofed turtle, Javan rhinoceros.
4. Zoo geographical realms:
  - Holartic realm-Hoary bat, Elk
  - Paleotropical realm- Hyena, Gibbon
  - Notogaeen realm- Flying fox, Bandicoot
  - Antartic realm – Leopard seal, Orca
5. Hotspots of Tamil Nadu- Western Ghats- Lion tailed macaque, Dwarf Malabar Pufferfish, Nilgiri Langur.
6. Endemism- Komodo dragon, Kangaroo, Kiwi

**SEMESTER II**  
**PEZOC20 - ELECTIVE II A: BIOCHEMISTRY**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PEZOC20	Biochemistry	Theory	Elective	5	5	100

**Objective:**

- To comprehend the molecular design of life introduces the most important classes of biological macromolecules like proteins, carbohydrates, lipids and presents the basic concepts of catalysis and enzyme action.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Explain the atom and types of bonds and buffers.

**CO2:** Explain the properties of water body fluids its biological function and Classification of Amino acids.

**CO3:** Appraise the classification, properties and mode of action of Protein and Enzyme.

**CO4:** Summarize the complexity of the carbohydrate metabolism.

**CO5:** Categorize the Vitamins and its importance.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	H
CO2	H	H	L	H	L	M
CO3	H	H	L	H	L	H
CO4	H	M	L	H	M	H
CO5	H	H	L	M	L	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	L	M
CO2	H	M	H	L	M	M
CO3	H	L	H	M	M	L
CO4	H	H	H	H	M	H
CO5	H	M	H	H	L	H

**Unit 1:**

**(15 Hours)**

1.1: Structure of an atom. Types of bonds-covalent-ionic- hydrogen. (K1, K2, K3, K4, K5)

1.2: Zwitter ions- isoelectrical point. (K1, K2, K3, K4, K5)

1.3: Water - Biological importance, Physical properties, Structure, Interactions in aqueous solution. (K1, K2, K3, K4, K5)

1.4: pH and buffers. (K1, K2, K3, K4, K5)

- 1.5: Acid- Base balance, Henderson Hasselbach equation, Biological importance of Buffers. (K1,K2, K3, K4, K5)
- 1.6: Acidosis and Alkalosis. (K1, K2, K3, K4, K5)

**Unit 2:** (15 Hours)

- 2.1: Electrolyte and water balance. (K1, K2, K3, K4, K5)
- 2.2: Body fluids- Milk, Colostrum. (K1, K2, K3, K4, K5)
- 2.3: Amniotic fluid and CSF. (K1, K2, K3, K4, K5)
- 2.4: Urine. (K1, K2, K3, K4, K5)
- 2.5: Amino Acids: Structure. (K1, K2, K3, K4, K5)
- 2.6: Classification of amino acids and properties. (K1, K2, K3, K4, K5)

**Unit 3:** (15 Hours)

- 3.1: Proteins: Classification of Proteins based on the structure, properties. (K1, K2, K3, K4, K5)
- 3.2: Metabolism- Deamination, Transamination, Transmethylation. (K1, K2, K3, K4, K5)
- 3.3: Krebs's Henslict cycle(Urea cycle). (K1, K2, K3, K4, K5)
- 3.4: Enzymes: Nomenclature, Classification. (K1, K2, K3, K4, K5)
- 3.5: Properties of enzymes. (K1, K2, K3, K4, K5)
- 3.6: Mode of enzyme action, enzyme substrate compounds. (K1, K2, K3, K4, K5)

**Unit 4:** (15 Hours)

- 4.1: Carbohydrates: Structure. Classification. (K1, K2, K3, K4, K5)
- 4.2: Metabolism- Glycogenesis, Glycogenolysis, Gluconeogenesis. Glycolysis- Embden Meyerhoff Pathway. Hexose Monophosphate shunt. (K1, K2, K3, K4, K5, K6)
- 4.3: Lipids: Structure and Classification. (K1, K2, K3, K4, K5)
- 4.4: Biosynthesis and oxidation of fatty acids-Biological significance of carbohydrates, protein and lipids. (K1, K2, K3, K4, K5)
- 4.5: Convergence of Central Metabolic Pathway - TCA/Krebs's Cycle. (K1, K2, K3, K4, K5, K6)
- 4.6: Electron transport system. (K1, K2, K3, K4, K5)

**Unit 5:** (15 Hrs)

- 5.1: Water soluble Vitamins - Structure, Classification, Sources, Functions. (K1, K2, K3, K4, K5)
- 5.2: Hyper and Hypo vitaminosis and deficiencies in man. (K1, K2, K3, K4, K5)
- 5.3: Fat soluble Vitamins - Structure, Classification, Sources, Functions. (K1, K2, K3, K4, K5)
- 5.4: Hyper and Hypo vitaminosis and deficiencies in man. (K1, K2, K3, K4, K5)
- 5.5: Metabolism of Xenobiotics. (K1, K2, K3, K4, K5)
- 5.6: Detoxification and Biotransformation. (K1, K2, K3, K4, K5, K6)

**Books for Study and Reference:**

**Textbooks;**

1. Rastogi S. C 2013 – Biochemistry 2ed- Tata McGraw Hill Publishing Company Ltd., N. Delhi.
2. Jain J.L. 2001- Fundamentals of Biochemistry - S. Chand and Company.

**Reference Books:**

1. Lehninger A.L. 1984- Principles of Biochemistry - CBS Publishers and Distributors, New Delhi.
2. Friefelder D. 1993- Physical Biochemistry -W.H. Freeman & Company.
3. Peter R. Bergethon, 1998- The Physical Basis of Biochemistry - Springer-Verlag
4. Lubert stryer 1989 - Biochemistry - Freeman International Edition
5. Keshav Trehan 1997 - Biochemistry- Wiley Eastern Publications.
6. Roger L.P. Adams, John T. Knowler and David P. Leader 1998 - The Biochemistry of Nucleic acid 10ed - Chapman and Hall Publications.

**E-Resources:**

<https://www.oercommons.org>

<https://www.oercommons.org>

<https://www.mcgill.ca>

## SEMESTER II

### PEZOD20 - ELECTIVE II B: ENDOCRINOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PEZOD20	Endocrinology	Theory	Elective	5	5	100

#### Objective:

- To make the students learn the objectives and scope of comparative endocrinology, anatomy, morphology and histology of endocrine tissues of vertebrates, crustacean and insect endocrine organs and their functions

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Discuss hormones its classification and function, the anatomy of endocrine glands,

**CO2:** Explain Pituitary and Parathyroid Structure and Function.

**CO3:** Comprehensive knowledge about structure and function of Pancreas and Adrenal glands.

**CO4:** Describe the complexity of the endocrine system of invertebrates.

**CLO5:** Elucidate hormones in development.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

#### Unit 1:

(15 Hours)

1.1: Introduction, objectives and scope of endocrinology. (K1, K2, K3, K4, K5)

1.2: Modern concepts in Endocrinology. (K1, K2, K3, K4, K5)

1.3: Problems in Endocrinology. (K1, K2, K3, K4, K5)

1.4: Endocrine glands in crustaceans, insects and vertebrates. (K1, K2, K3, K4, K5, K6)

1.5: Experimental methods of hormone research. (K1, K2, K3, K4, K5, K6)

1.6: General classes of chemical messengers. (K1, K2, K3, K4, K5)

**Unit 2:** (15 Hours)

- 2.1: Pituitary gland - characteristics, structural organization. (K1, K2, K3, K4, K5)
- 2.2: Hormone secretion and its functions. (K1, K2, K3, K4, K5)
- 2.3: Hypothalamic control. (K1, K2, K3, K4, K5)
- 2.4: Thyroid gland - structural organizations. (K1, K2, K3, K4, K5)
- 2.5: Metabolic effects of thyroid - effects on reproduction. (K1, K2, K3, K4, K5)
- 2.6: Parathyroid its structures and functions. (K1, K2, K3, K4, K5)

**Unit 3:** (15 Hours)

- 3.1: Structure of pancreas. (K1, K2, K3, K4, K5)
- 3.2: Pancreatic hormones and their functions. (K1, K2, K3, K4, K5)
- 3.3: Structural organizations of adrenals. (K1, K2, K3, K4, K5)
- 3.4: Hormones secreted by adrenal gland. (K1, K2, K3, K4, K5)
- 3.5: Functions of cortical hormones. (K1, K2, K3, K4, K5)
- 3.6: Functions of Medullary hormones. (K1, K2, K3, K4, K5)

**Unit 4:** (15 Hours)

- 4.1: Concepts of neurosecretions. (K1, K2, K3, K4, K5, K6)
- 4.2: Endocrine systems in crustaceans. (K1, K2, K3, K4, K5)
- 4.3: Endocrine control of moulting and metamorphosis. (K1, K2, K3, K4, K5)
- 4.4: Neuroendocrine system in insects. (K1, K2, K3, K4, K5)
- 4.5: Endocrine control of moulting in insects. (K1, K2, K3, K4, K5)
- 4.6: Metamorphosis and reproduction in insects. (K1, K2, K3, K4, K5)

**Unit 5:** (15 Hours)

- 5.1: Hormonal control of metamorphosis in an anuran amphibian. (K1, K2, K3, K4, K5)
- 5.2: Structure and hormones of mammalian testis. (K1, K2, K3, K4, K5)
- 5.3: Structure and hormones of mammalian ovary. (K1, K2, K3, K4, K5)
- 5.4: Estrous and menstrual cycle. (K1, K2, K3, K4, K5)
- 5.5: Hormones of pregnancy and parturition. (K1, K2, K3, K4, K5)
- 5.6: Hormonal control of lactation. (K1, K2, K3, K4, K5)

**Books for Study and Reference:**

**Textbooks:**

1. Harris G.W and B.T. Donovan 1968- The Pituitary Gland-S. Chand and Co.
2. Bentley P.J 1985 – Comparative Vertebrate Endocrinology 2ed- Cambridge University Press, Cambridge.

**Reference Books:**

3. Mac Hadley 1992 - Endocrinology 3ed- Prentice Hall Inc. A Simon & Schuster Company, Englewood Cliffs, New Jersey, USA.
4. Turner, C.D. and J.T. Bangara 1986 - General Endocrinology- Saunders International Student Edition, Toppan Company Limited, Tokyo.
5. Ingleton P.M. and J.T. Bangara 1986 - Fundamentals Comparative Vertebrate Endocrinology, Kluwer Academic Publishers.
6. Barrington E.J.W. 1985 - An introduction to General and Comparative Endocrinology Claredon Press Oxford.

**E-Resources:**

<https://www.endocrinology.org>

<https://www.hormone.org>

<https://www.endotext.org>

### SEMESTER III

#### PCZOI20 - ENVIRONMENTAL BIOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PCZOI20	Environmental Biology	Theory	Core	7	4	100

**Objectives:**

- Understand the Changes in environment and its impact.
- Understand the contaminants, their effects and disposal.
- Importance of recycling technologies in Environmental Conservation.
- Understand the issues related to pollution and laws enforced.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Describe ecological succession and Environmental stresses and their management.

**CO2:** Explain the major classes of contaminants and their impact on environment.

**CO3:** Explain green energy and the types of recycling technologies for solid and liquid wastes and their role in environmental conservation.

**CO4:** Discuss environmental indicators and their role in environmental balances and bioremediation.

**CO5:** Explain the importance of global ecology towards sustainable civilization.

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	H	H	H	H	M	H
CLO2	H	H	H	H	M	H
CLO3	H	H	H	H	M	H
CLO4	H	H	H	H	M	H
CLO5	H	H	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	H	H	M	H	M	H
CLO2	H	H	M	H	M	H
CLO3	H	H	M	H	M	H
CLO4	H	H	M	H	M	H
CLO5	H	H	M	H	M	H

**Unit 1:**

**(21 Hours)**

1.1: Ecological succession – Process and Patterns of Succession. (K1, K2, K3, K4, K5)

1.2: Human influence on Succession. (K1, K2, K3, K4, K5, K6)

1.3: Homeostasis. (K1, K2, K3, K4, K5, K6)

1.4: Radioactive compounds and their impact on the environment. (K1, K2, K3, K4, K5)

1.5: Environmental Stresses and their management - global climatic pattern. (K1, K2, K3, K4, K5, K6)

1.6: Atmospheric ozone, Ozone depletion, coping with climatic variations. (K1, K2, K3, K4, K5, K6)

**Unit 2:** (21 Hours)

2.1: Major classes of contaminants. (K1, K2, K3, K4, K5)

2.2: Uptake, biotransformation, detoxification, elimination and accumulation of toxicants. (K1, K2, K3, K4, K5)

2.3: Factors influencing bioaccumulation from food and tropic transfer. (K1, K2, K3, K4, K5)

2.4: Important heavy metals and their role in environment. (K1, K2, K3, K4, K5)

2.5: Agrochemical use and misuse, alternatives. Pesticides and other chemicals in agriculture, industry and hygiene and their disposal. (K1, K2, K3, K4, K5)

2.6: Impact of chemicals on biodiversity of microbes, animals and plants. Biodegradation of chemicals. (K1, K2, K3, K4, K5)

**Unit 3:** (21 Hours)

3.1: Green energy – Bio fuels. (K1, K2, K3, K4, K5)

3.2: Recycling and reuse technologies for solid wastes and their role in environmental conservation. (K1, K2, K3, K4, K5)

3.3: Recycling and reuse technologies for liquid wastes and their role in environmental conservation. (K1, K2, K3, K4, K5)

3.4: Remote sensing – basic concepts. (K1, K2, K3, K4, K5)

3.5: Applications of remote sensing techniques in environmental conservation.  
(K1, K2, K3, K4, K5, K6)

**Unit 4:** (21 Hours)

4.1: Environmental indicators and their role in environmental balance. (K1, K2, K3, K4, K5)

4.2: Bioremediation - Definition - Need and Scope of Bioremediation. (K1, K2, K3, K4, K5, K6)

4.3: Environmental application of Bioremediation. (K1, K2, K3, K4, K5)

4.4: Phytoremediation. (K1, K2, K3, K4, K5)

4.5: Biomagnifications. (K1, K2, K3, K4, K5)

4.6: Bioavailability. (K1, K2, K3, K4, K5)

**Unit 5:** (21 Hours)

5.1: Global ecology towards sustainable civilization: Ecological. (K1, K2, K3, K4, K5)

5.2: Societal gaps. (K1, K2, K3, K4, K5)

5.3: Global sustainability, Long term transitions. (K1, K2, K3, K4, K5)

5.4: Human designed and Management systems. (K1, K2, K3, K4, K5)

5.5: Environmental laws and Acts pertaining to environmental protection and management. (K1, K2, K3, K4, K5)

5.6: Environmental monitoring and environmental assessment. (K1, K2, K3, K4, K5)

## **Books for Study and Reference:**

### **Text books:**

1. Odum E.P., 1983, Basic Ecology, Saunders, New York.
2. Shardha Sinha, Manisha Shukla and Ranjana Shukla. 2013, A Text book of Environmental Studies, A.I.T.B.S. Publishers, India.

### **Reference Books:**

3. Rao C.S., 1992, Environmental Pollution Control Engineering, Wiley Eastern Ltd.
4. Peter Gomes Dayal, 2010-11, Environmental Toxicology, Dominant Publishers.
5. Trivedi P.R., Gurdeep Raj, 1992, Environmental Biology, Akashdeep Publishing House.
6. Sharma B.K., 2001, An Introduction to Environmental Pollution, Goel Publishing House, Meerut.
7. Sharma P.D., 1995, Ecology and Environment, Rastogi Publications.
8. Chapman J.L. and Resiss M.J., 1992, Ecology Principles and applications, Cambridge University Press.
9. Biswarup Mukherjee, 1997, Environmental Biology, Tata McGraw-Hill Publishing Company Ltd. New Delhi.
10. Lee Hannah 2011, Climate Change Biology, Elsevier.
11. Conklin, A.R. Jr., 2004, Principles and Practices in Environmental Analysis, CRC Press.
12. Grant, W.E. and Swannack, T.M., 2013, Ecological Modeling, Blackwell.
13. Meenambal T., Uma R.N., and Murali K., 2005, Principles of Environmental Science and Engineering, S. Chand and Company Ltd.

### **E-resources:**

<https://www.sebiology.org>  
<http://www.enviroindia.net>  
<http://aelsindia.com>  
<http://environment-ecology.com>

## SEMESTER III

### PCZOJ20 - LIMNOLOGY AND TOXICOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PCZOJ20	Limnology and Toxicology	Theory	Core	6	4	100

#### Objectives:

- To understand the different fresh water habitat, their fauna and Physio-chemical properties.
- An introduction to basic toxicology to understand dosage, route of exposure and its effects on fauna

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Attains basic concept about fresh water habitats and its types.

**CO2:** Describe the Physio-Chemical Characteristics and its importance in freshwater ecosystems.

**CO3:** Summarize about the organisms and adaptation in the freshwater ecosystem.

**CO4:** Explain the basic knowledge about toxicology its principle, agents and estimation methods.

**CO5:** Describe the impact of toxicant in the aquatic ecosystem.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	L
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	L	H
CO2	H	H	M	H	M	H
CO3	H	H	H	M	M	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

#### Unit 1: LIMNOLOGY

(18 Hours)

1.1: Limnology – Definition, historical development. (K1, K2, K3, K4, K5)

1.2: Scope of Limnology. (K1, K2, K3, K4, K5)

1.3: Types of freshwater habitats and their ecosystem. (K1, K2, K3, K4, K5, K6)

1.4: Lentic- Ponds. (K1, K2, K3, K4, K5)

1.5: Lakes. (K1, K2, K3, K4, K5)

1.6: Lotic- Streams, Rivers. (K1, K2, K3, K4, K5)

**Unit 2:****(18 Hours)**

- 2.1: Physio – Chemical Characteristics- Light. (K1, K2, K3, K4, K5)
- 2.2: Temperature and Radiation.(K1, K2, K3, K4, K5)
- 2.3: Stratification and Heat Budget. (K1, K2, K3, K4, K5)
- 2.4: Dissolved Solids – Carbonate, Bicarbonates, Phosphate and Nitrate. (K1, K2, K3, K4, K5)
- 2.5: Turbidity. (K1, K2, K3, K4, K5)
- 2.6: Dissolved gases - Oxygen, Carbon dioxide, pH. (K1, K2, K3, K4, K5)

**Unit 3:****(18 Hours)**

- 3.1: General study of freshwater organisms. Plankton – Phytoplankton - Diatoms, Dinoflagellates, Blue- green algae. (K1, K2, K3, K4, K5, K6)
- 3.2: Zooplankton – Larval forms of Arthropods. (K1, K2, K3, K4, K5, K6)
- 3.3: Benthos- general adaptations. (K1, K2, K3, K4, K5)
- 3.4: Littoral zone- general adaptations. (K1, K2, K3, K4, K5)
- 3.5: Limnetic zone- general adaptations. (K1, K2, K3, K4, K5)
- 3.6: Profundal zone - general adaptations. (K1, K2, K3, K4, K5)

**Unit 4: TOXICOLOGY****(18 Hours)**

- 4.1: Toxicology - Basic concepts. (K1, K2, K3, K4, K5)
- 4.2: Toxicokinetics –Principles- ADME (Absorption, Distribution, Metabolism and Excretion). (K1, K2, K3, K4, K5, K6)
- 4.3: Various types of toxicological agents. (K1, K2, K3, K4, K5)
- 4.4: Toxicity testing principles, hazards, risks and their control methods. (K1, K2, K3, K4, K5)
- 4.5: Heavy metal toxicity – Estimation of mercury by Dithizone Colorimetric method, Estimation of fluoride by Diphenyl Carbozide Colorimetric method. (K1, K2, K3, K4, K5)
- 4.6: Estimation of Chromium by Diphenyl Carbozide Colorimetric method. (K1, K2, K3, K4, K5)

**Unit 5:****(18 Hours)**

- 5.1: Aquatic environment – Toxicants and toxicity. (K1, K2, K3, K4, K5)
- 5.2: Factors that affect the environmental concentrations of the toxicants. (K1, K2, K3, K4, K5, K6)
- 5.3: Factors that influence toxicity. (K1, K2, K3, K4, K5)
- 5.4: Effect on aquatic Fauna. (K1, K2, K3, K4, K5)
- 5.5: Toxicity test: Acute toxicity test - chronic toxicity test - LC 50 – LD 50. (K1, K2, K3, K4, K5)
- 5.6: Factors that modify toxicity. (K1, K2, K3, K4, K5)

**Books for Study and Reference:****Textbooks:**

1. V.K.Agarwal, Usha Gupta 2002 - Ecology and Ethology- S. Chand and Company Ltd.
2. S.N Prasad 1991- An Introduction to Toxicology- S. Chand and Company Ltd.

**Reference Books:**

3. H.R Singh, Neeraj Kumar 2006 - Ecology and Environmental Science - Vishal Publishing Co.
4. G T Tonapi 1950 - Fresh Water animal of India an ecological approach - Oxford and IBH Publishing Co.
5. Alexander J Horne, Charles R. Goldman 1994- Limnology- McGraw- Hill International editions.
6. Modern concepts of ecology H.D. Kumar 1995 - Vikas Publishing House Pvt. Ltd., New Delhi.
7. Ecology of Freshwater, Alison Leadlay Brown 1971, Heinemann Educational Books Ltd., London.
8. Introduction to Ecology, Papul A. Colinvaux, 1978 John Wiley and Sons, Inc., New York.
9. Fish and Fisheries of India V.G. Jhingram, 1980 Hindustan Publishing Co., New Delhi.
10. Peter Gomes Dayal 2011- Environmental Toxicology- Dominant Publishers and Distributors.
11. Krishna Pillai N. 1986- Introduction to Planktonology 1 ed - Himalaya Publishing House.
12. Manivasakam. N. Physico chemical examination of water, sewage and industrial effluents. Pragati Prakashan, Meerut.

**E-Resources:**

<https://limnology.org>

<https://www.aslo.org>

<http://www.geocities.ws/limsocindia/limlinks.htm>

<https://www.toxicology.org>

<https://www.setac.org>

<http://www.indiansocietyoftoxicology.org>

**SEMESTER III**  
**PCZOK20 - ANIMAL BEHAVIOUR**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PCZOK20	Animal Behaviour	Theory	Core	6	4	100

**Objective:**

- This paper has been designated to highlight the Behavioural strategies and adaptations of animals for their survival.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Discuss the innate, acquired and group behaviours.

**CO2:** Explain the habitat selection and foraging methods of animals.

**CO3:** Compute the interspecific behaviours.

**CO4:** Explain about communication in animals.

**CO5:** Analyze Social behaviours in animals.

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	H	H	M
CO2	H	M	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PLO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

**Unit 1:**

**(18 Hours)**

1.1: Ethology – Definition. (K1, K2, K3, K4, K5)

1.2: Biorhythms and biological clocks. (K1, K2, K3, K4, K5)

1.3: Instinct and learning. (K1, K2, K3, K4, K5)

1.4: Cognition. Group Behaviour - Stereotyped and acquired Behaviour. (K1, K2, K3, K4, K5)

1.5: Learning. (K1, K2, K3, K4, K5)

1.6: Memory. (K1, K2, K3, K4, K5)

**Unit 2:** (18 Hours)

- 2.1: Habitat selection - Dispersal, environmental signals for dispersal. (K1, K2, K3, K4, K5)
- 2.2: Habitat imprinting, tradition, theory of habitat selection. Homing. (K1, K2, K3, K4, K5, K6)
- 2.3: Foraging methods - Prey model, patch model. (K1, K2, K3, K4, K5)
- 2.4: Techniques for acquiring food. (K1, K2, K3, K4, K5)
- 2.5: Modifying food supply. Construction of traps, electromagnetic fields. (K1, K2, K3, K4, K5)
- 2.6: Territorialism. (K1, K2, K3, K4, K5)

**Unit 3:** (18 Hours)

- 3.1: Anti-predator Behaviour - Individual strategies- escaping and freezing. (K1, K2, K3, K4, K5)
- 3.2: Anti-predator Behaviour - Individual strategies- Deception, toxicity. (K1, K2, K3, K4, K5)
- 3.3: Anti-predator Behaviour - Individual strategies- Mimicry, distraction, displays.  
(K1, K2, K3, K4, K5)
- 3.4: Social strategies – Host - parasite relation. (K1, K2, K3, K4, K5)
- 3.5: Individual Behaviour – Conflict. (K1, K2, K3, K4, K5)
- 3.6: Aggression. (K1, K2, K3, K4, K5)

**Unit 4:** (18 Hours)

- 4.1: Communication in animals – Types. (K1, K2, K3, K4, K5)
- 4.2: Sound - Alarm calls, sonar in bats. (K1, K2, K3, K4, K5)
- 4.3: Neurobiology of Bird song. (K1, K2, K3, K4, K5)
- 4.4: Language acquisition by Humans and Apes. (K1, K2, K3, K4, K5, K6)
- 4.5: Chemical communication – Pheromones - Insect pheromones and vertebrate pheromones.  
(K1, K2, K3, K4, K5)
- 4.6: Visual communication. (K1, K2, K3, K4, K5)

**Unit 5:** (18 Hours)

- 5.1: Social Behaviour. (K1, K2, K3, K4, K5)
- 5.2: Social organization in Insects. (K1, K2, K3, K4, K5)
- 5.3: Social organization in Mammals. (K1, K2, K3, K4, K5)
- 5.4: Advantages of social Behaviour. (K1, K2, K3, K4, K5)
- 5.5: Reproductive Behaviour. (K1, K2, K3, K4, K5)
- 5.6: Courtship in birds. (K1, K2, K3, K4, K5)

**Books for Study and Reference:**

**Textbooks:**

1. Reena Mathur 1996 - Animal Behaviour-Rastogi and Co.
2. Amita Sarkar 2004 - Social behaviour in animal- Discovery Publishing house.

**Reference Books:**

3. Niko Tinbergen 1968- Animal Behaviour-LIFE young readers' library.
4. Aubrey Manning, Marian Stamp Dawkins 2013 - An Introduction to Animal Behaviour 5ed- Cambridge University press.
5. Michael J. Ryan, Walter Wilczynski 2011- An introduction to Animal Behaviour- An integrative approach- Cold Spring Harbour Laboratory Press.
6. M.M Ranga 2013 - Animal Behaviour- Saraswati Purohit for student's edition.
7. E.G Boulenger 2003 - An introduction to Animal Behaviour – Discovery Publishing House.
8. Hoshang S. Gundevia, Hare Govind Singh 1996 – A textbook of Animal Behaviour-S. Chand and Company Ltd.
9. V.K Agarwal 2013- Animal Behaviour (Ethology) - S. Chand and Company Ltd.
10. V.K Agarwal, Usha Gupta 2002- Ecology and Ethology- S. Chand and Company Ltd.

**E-Resources:**

<https://www.animalbehaviorsociety.org>

<https://www.asab.org>

<http://www.behavecol.com>

**SEMESTER III**  
**PEZOE20 - ELECTIVE III A: CLINICAL LABORATORY TECHNIQUES**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PEZOE20	Clinical Laboratory Techniques	Theory	Elective	5	5	100

**Objective:**

To imbibe the knowledge in the laboratory techniques which are applied to humans in day to day life.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Develop technical knowledge in laboratory practices and apparatus maintenance.

**CO2:** Examine blood composition and basic hematological techniques.

**CO3:** Justify the pathology of diseases caused by parasites, virus, bacteria & fungus.

**CO4:** Discuss experimental techniques and methods of urine analysis.

**CO5:** Analyze the results of physical, microscopic and biochemical analysis of body fluids.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit 1:**

**(15 Hours)**

1.1: Scope of Clinical laboratory technique (CLT). (K1, K2, K3, K4, K5)

1.2: Management and administration. (K1, K2, K3, K4, K5)

1.3: First aid in Laboratories. (K1, K2, K3, K4, K5)

1.4: General lab apparatus and general procedures, glass wares used in CLT studies.  
(K1, K2, K3, K4, K5)

1.5: Sterilization. (K1, K2, K3, K4, K5)

1.6: Disposal of infected materials. (K1, K2, K3, K4, K5)

**Unit 2:** (15 Hours)

- 2.1: Hematology – Blood. Haemopoiesis. (K1, K2, K3, K4, K5)
- 2.2: Collection – Capillary and venipuncture. Anticoagulants. (K1, K2, K3, K4, K5)
- 2.3: Basic hematology techniques - TC, DC, PCV, ESR, RBC fragility test. (K1, K2, K3, K4, K5, K6)
- 2.4: Clotting time, bleeding time, prothrombin time, GOD/POD. (K1, K2, K3, K4, K5, K6)
- 2.5: Blood grouping. (K1, K2, K3, K4, K5)
- 2.6: Platelets and its importance - blood coagulation. (K1, K2, K3, K4, K5)

**Unit 3:** (15 Hours)

- 3.1: Common Parasites of Man, life cycle and their Clinical diagnosis in body fluids- Blood- *Plasmodium vivax*. (K1, K2, K3, K4, K5)
- 3.2: Lymph - *Wuchereria bancrofti*. (K1, K2, K3, K4, K5)
- 3.3: CSF- toxoplasma, Perinicious malaria. (K1, K2, K3, K4, K5)
- 3.4: Clinical diagnosis of bacterial diseases – Typhoid. (K1, K2, K3, K4, K5)
- 3.5: Clinical diagnosis of viral disease - Hepatitis B. (K1, K2, K3, K4, K5)
- 3.6: Clinical diagnosis of Fungal Infections – Candidiasis. (K1, K2, K3, K4, K5)

**Unit 4:** (15 Hours)

- 4.1: Urine analysis – Physical - volume, appearance, colour, order. (K1, K2, K3, K4, K5)
- 4.2: Microscopic examinations for deposits, RBC, casts, pus cells. (K1, K2, K3, K4, K5)
- 4.3: Biochemical analysis - Estimation of sugar, albumin, bile pigments, bile salt and ketone bodies. (K1, K2, K3, K4, K5)
- 4.4: Semen analysis - Physical examinations. (K1, K2, K3, K4, K5)
- 4.5: Microscopic examinations - motility of sperms – sperm counting(K1, K2, K3, K4, K5)
- 4.6: Vaginal analysis - Microscopic examinations – Pap smear. (K1, K2, K3, K4, K5)

**Unit 5:** (15 Hours)

- 5.1: CSF - Collection, Physical examinations; Microscopic examinations; Biochemical analysis. (K1, K2, K3, K4, K5)
- 5.2: Gastric juice – Collection - Test for resting gastric content, Detection and estimation of gastric juice secretions. (K1, K2, K3, K4, K5)
- 5.3: Liver function test - Liver functions, estimation of serum bilirubin, serum enzymes, serum proteins. (K1, K2, K3, K4, K5, K6)
- 5.4: Estimation of cavity fluids - Pericardial, Pleural, peritoneal, Amniotic and for physical, chemical, cytological examination. (K1, K2, K3, K4, K5)
- 5.5: Stool analysis - Appearance, Composition, Collection, Physical, Chemical, microscopical examinations. (K1, K2, K3, K4, K5)
- 5.6: Examination for intestinal parasites. (K1, K2, K3, K4, K5)

**Books for Study and Reference:**

**Textbooks;**

1. Kanai, L. Mukerjee, Medical laboratory technology, Vol I, II, III Tata McGraw Hill, Publishing Co., New Delhi, 1988.

**Reference Books:**

2. Arumugam N. Microbiology (General and Applied) Saras Publication, Nagercoil. 2013
3. John Bernard Henry Clinical Diagnosis & Management - W.B. Saunders Company. 1986
4. A Text Book of Microbiology, P. Chakraborty, New Central Book Agency (P) Ltd. Kolkata, India. 1995.

**E-Resources:**

<https://www.indiaeducation.net>

<https://www.encyclopedia.com>

<https://medicallabtechnicianschool.org>

## SEMESTER III

### PEZOF20 - ELECTIVE III B: FISHERIES SCIENCE

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PEZOF20	Fisheries Science	Theory	Elective	5	5	100

#### Objective:

- The aim of the paper is to understand the morphology, classification and identification of fishes and the fisheries and fishery resources of India.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Explain the morphology and physiology of Indian fishes.

**CO2:** Analyze the environmental and nutritional requirements of fishes.

**CO3:** Understand the types, distribution and scope of inland fisheries.

**CO4:** Impart theoretical knowledge on surveying methods of fishery resources.

**CO5:** Acquire knowledge on various threats and conservation strategies of Indian fishes.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

#### Unit 1:

(15 Hours)

1.1: General morphology and outline classification of fish. (K1, K2, K3, K4, K5)

1.2: Major groups of fish and their characteristics – morphometric and meristic characters of elasmobranchs and teleost fishes. (K1, K2, K3, K4, K5)

1.3: Basic anatomy of fish – digestive, circulatory, respiratory, nervous and reproductive system. (K1, K2, K3, K4, K5)

1.4: Food and feeding habits. (K1, K2, K3, K4, K5)

1.5: Maturity, fecundity, spawning. (K1, K2, K3, K4, K5)

1.6: Survival of Indian fish. (K1, K2, K3, K4, K5, K6)

**Unit 2:** (15 Hours)

- 2.1: Length-weight relationship. (K1, K2, K3, K4, K5)
- 2.2: Factors influencing growth condition factor, age determination. (K1, K2, K3, K4, K5)
- 2.3: Theory of fishing. (K1, K2, K3, K4, K5)
- 2.4: Unit stock, recruitment. (K1, K2, K3, K4, K5)
- 2.5: Growth, mortality, migration. (K1, K2, K3, K4, K5)
- 2.6: Fish tagging and marking. (K1, K2, K3, K4, K5)

**Unit 3:** (15 Hours)

- 3.1: Fishery zones in India. (K1, K2, K3, K4, K5)
- 3.2: Types of fisheries in India – Riverine, Estuarine, Coldwater, Reservoir and Pond fisheries. (K1, K2, K3, K4, K5)
- 3.3: Present status and scope of inland capture fisheries – their fishery characterizes, distribution and importance. (K1, K2, K3, K4, K5)
- 3.4: Present status and scope of marine capture fisheries – crustaceans (Prawn/shrimp, lobster and crabs). (K1, K2, K3, K4, K5)
- 3.5: Present status and scope of marine capture fisheries Molluscs (clam, cockle, mussel, oyster, cephalopods). (K1, K2, K3, K4, K5)
- 3.6: Present status and scope of marine capture fisheries Fishes – their fishery characteristics, distribution and importance. (K1, K2, K3, K4, K5)

**Unit 4:** (15 Hours)

- 4.1: Methods of surveying the fishery resources- Acoustic method. (K1, K2, K3, K4, K5, K6)
- 4.2: Methods of surveying the fishery resources - Aerial method. (K1, K2, K3, K4, K5)
- 4.3: Survey of fish eggs and larvae. (K1, K2, K3, K4, K5)
- 4.4: Analyzing population features. (K1, K2, K3, K4, K5)
- 4.5: Growth mortality selection. (K1, K2, K3, K4, K5)
- 4.6: Collection of eggs. (K1, K2, K3, K4, K5)

**Unit 5:** (15 Hours)

- 5.1: Principle methods of exploitation of fish. (K1, K2, K3, K4, K5)
- 5.2: Indigenous and modern gears and crafts. (K1, K2, K3, K4, K5)
- 5.3: Principle methods of fish preservation and processing in India. (K1, K2, K3, K4, K5)
- 5.4: Types of spoilage, causative factors. (K1, K2, K3, K4, K5)
- 5.5: Marketing. (K1, K2, K3, K4, K5)
- 5.6: Economics. (K1, K2, K3, K4, K5)

**Books for Study and Reference:**

**Textbooks:**

- 1. Day F. 1981 – Fishes of India, Vol. I and Vol. II – William Sawson & Sons Ltd., London.
- 2. Jhingran C.G. 1981 – Fish and Fisheries of India – Hindustan Publishing Co., India.

**Reference Books:**

3. Maheswari K. 1993 – Common Fish Diseases and Their Control – Institute of Fisheries Education, Powakads, M.P.
4. Santhanam R. 1980 – Fisheries Science – Daya Publishing House, New Delhi.
5. Yadav B.N. 1997 – Fish and Fisheries - Daya Publishing House, New Delhi
6. Bal. D.V, Rao K.V. 1990 – Marine Fisheries of India – Tata McGraw Hill Publishing Co. Ltd., New York.
7. Biswas K.P.1996 – A Textbook of Fish, Fisheries and Technology – Narendra Publishing House, Delhi.
8. Srivastava C.B.L. 1999 – Fish Biology – Narendra Publishing House, Delhi.

**E-Resources:**

<https://aimlta.org>

<https://www.mccc.edu>

<https://researchguides.austincc.edu>

## SEMESTER IV

### PCZOM20 - PHYSIOLOGY AND ENDOCRINOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PCZOM20	Physiology and Endocrinology	Theory	Core	7	4	100

**Objective:**

- To enable students to understand the Structural and functional aspects of systems, the basic concept of Enzymes and Gastrointestinal hormones and the functions of hormones in the body.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Expand knowledge about the enzymes, digestive system and interaction of complex metabolic pathway, respiration and the adaptation at extreme conditions.

**CO2:** Summarize the circulatory and excretory system with its structure, function and regulatory mechanism.

**CO3:** Discuss the muscular and nervous system structure, function and regulation.

**CO4:** Describe hormones its classification and function, the anatomy of endocrine glands.

**CO5:** Interpret endocrine system with its function and regulation in reproduction.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	M

**Unit 1: PHYSIOLOGY**

**(21 Hours)**

- 1.1: Digestion and absorption. Role of gastrointestinal hormones. (K1, K2, K3, K4, K5)
- 1.2: Carbohydrates Proteins and Lipids Metabolism. (K1, K2, K3, K4, K5, K6)
- 1.3: Respiration- Mechanism of respiration. Nervous and chemical control of respiration. (K1, K2, K3, K4, K5)
- 1.4: Acid – base balance. (K1, K2, K3, K4, K5)
- 1.5: Body Mass Index (BMI). (K1, K2, K3, K4, K5)
- 1.6: Basal Metabolic Rate (BMR). (K1, K2, K3, K4, K5)

**Unit 2:** (21 Hours)

- 2.1: Circulation: Structure of heart, Properties of Cardiac muscle. (K1, K2, K3, K4, K5)
- 2.2: Cardiac Cycle, Origin and conduction of Heart beat. (K1, K2, K3, K4, K5)
- 2.3: Hormonal and neural regulation of Circulation. (K1, K2, K3, K4, K5)
- 2.4: Excretion – Structure of Kidney, Blood supply. (K1, K2, K3, K4, K5)
- 2.5: Urine Formation – Micturition. (K1, K2, K3, K4, K5)
- 2.6: Neural, hormonal regulation of urine formation in man. (K1, K2, K3, K4, K5)

**Unit 3:** (21 Hours)

- 3.1: Muscles – Skeletal muscle - Anatomy of muscle fiber – muscle proteins. (K1, K2, K3, K4, K5)
- 3.2: Physiology of muscle contraction- Mechanism of Muscle contraction theories.  
(K1, K2, K3, K4, K5, K6)
- 3.3: Smooth Muscle – Types - Multi unit, Visceral; Calcium - Calmodulin role in Smooth muscle contraction. (K1, K2, K3, K4, K5)
- 3.4: Nervous System – Brain and spinal cord and reflex action. (K1, K2, K3, K4, K5)
- 3.5: Sympathetic and parasympathetic system. (K1, K2, K3, K4, K5)
- 3.6: Neurons, transmissions of nerve impulse, neurotransmitters. (K1, K2, K3, K4, K5)

**Unit 4: ENDOCRINOLOGY** (21 Hours)

- 4.1: Endocrine glands in Mammals. (K1, K2, K3, K4, K5)
- 4.2: Hormones – Classification, function and chemical nature. (K1, K2, K3, K4, K5)
- 4.3: Physiology of endocrine glands – Pituitary gland. (K1, K2, K3, K4, K5)
- 4.4: Physiology of endocrine glands -Pancreas gland. (K1, K2, K3, K4, K5)
- 4.5: Physiology of endocrine glands - Thyroid gland. (K1, K2, K3, K4, K5)
- 4.6: Physiology of endocrine glands- Adrenal gland. (K1, K2, K3, K4, K5)

**Unit 5:** (21 Hours)

- 5.1: Endocrinology and Reproduction. (K1, K2, K3, K4, K5)
- 5.2: Physiology of Mammalian reproductive hormones - Testis (K1, K2, K3, K4, K5)
- 5.3: Physiology of Mammalian reproductive hormones - Ovary. (K1, K2, K3, K4, K5)
- 5.4: Estrous and menstrual cycle. (K1, K2, K3, K4, K5)
- 5.5: Neuroendocrine regulation of Pregnancy. (K1, K2, K3, K4, K5)
- 5.6: Parturition and Lactation. (K1, K2, K3, K4, K5)

**Books for Study and Reference:**

**Textbook:**

1. Hoar, W.S. 1999. General and comparative physiology, prentice Hall, New Delhi.
2. Guyton, A. 2001. Textbook of Medical physiology, Tenth Edition, W.B. Saunders, London.

**Reference Book:**

3. Lohar, P.S. 2005. Endocrinology: Hormones Human Health, MJP Publishers Chennai.
4. Elaine N. Marieb, 2006. Human Anatomy and Physiology, Sixth Ed. Dorling Kindersley. (India) Pvt. Ltd.
5. Herkat P.C. and Mathur P.N. 1976. – Textbook of Animal Physiology – S. Chand Co. Pvt. Ltd., New Delhi.
6. Haris G.W. and Donovan B.T., 1968. The Pituitary Gland- S. Chand and Co.
7. Turner, C.D. and Bangara J.T. 1986 General Endocrinology- Saunders International Student Edition, Toppan Company Limited Tokyo,
8. Barrington E.J.W. 1985, An introduction to General and Comparative Endocrinology- Clarendon press Oxford.

**E-Resources:**

<https://www.physoc.org/explore-physiology>

<https://www.physiology.org>

<https://www.innerbody.com/htm>

## SEMESTER IV

### PCZON20 - DEVELOPMENTAL BIOLOGY AND IMMUNOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PCZON20	Developmental Biology and Immunology	Theory	Core	6	4	100

#### Objectives:

- To imbibe the current knowledge pertaining to the formation and development of embryos.
- To understand the fundamental aspects and basic patterns of animal development.
- To understand the importance of cells in immune system.
- To understand the application of immunology in the treatment of diseases.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Explain the chemo differentiation in the egg during development.

**CO2:** Describe the organizer and cellular differentiation, genetic defects, aging regeneration and teratogenesis.

**CO3:** Discuss the various forms of asexual reproduction, artificial fertilization and stem cells.

**CO4:** Summarize the cells of Immune system and immune response.

**CO5:** Explain the importance of immune therapy in treatment of diseases.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	H	L	M
CO2	H	H	L	H	L	M
CO3	H	H	M	H	L	M
CO4	H	H	L	H	L	M
CO5	H	H	L	H	L	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	M	L	L
CO2	H	H	H	M	M	L
CO3	H	H	H	M	L	M
CO4	H	H	H	H	L	L
CO5	H	H	M	H	L	M

#### Unit 1: DEVELOPMENTAL BIOLOGY

(18 Hours)

1.1: Chemo differentiation: Nucleus of Cleavage cells. (K1, K2, K3, K4, K5)

1.2: Distribution of cytoplasmic substances in the egg during cleavage. (K1, K2, K3, K4, K5)

1.3: Role of egg cortex. (K1, K2, K3, K4, K5)

1.4: Nucleocytoplasmic interactions. (K1, K2, K3, K4, K5)

1.5: Role of maternal genes during early development. (K1, K2, K3, K4, K5)

1.6: Involvement of paternal genes in the control of development. (K1, K2, K3, K4, K5, K6)

**Unit 2: (18 Hours)**

2.1: Organizer: Spemann's primary organizer – analysis of nature and mechanism of induction. (K1, K2, K3, K4, K5)

2.2: Nuclear transplantation – Cellular differentiation and protein synthesis. (K1, K2, K3, K4, K5, K6)

2.3: Differential activation – Developmental genetic defects. (K1, K2, K3, K4, K5)

2.4: Role of cell death in development. Aging. (K1, K2, K3, K4, K5, K6)

2.5: Regeneration. (K1, K2, K3, K4, K5)

2.6: Teratogenesis. (K1, K2, K3, K4, K5)

**Unit 3: (18 Hours)**

3.1: Asexual reproduction – Occurrence and forms of asexual reproduction. (K1, K2, K3, K4, K5)

3.2: Cloning – Artificial fertilization - embryo transfer. (K1, K2, K3, K4, K5)

3.3: Stem cell research and its significance. (K1, K2, K3, K4, K5, K6)

3.4: Asymmetric division of stem cells vs embryonic stem cell. (K1, K2, K3, K4, K5)

3.5: Therapeutic cloning – stem cell therapy. (K1, K2, K3, K4, K5)

3.6: Ethical issues of Stem cell. (K1, K2, K3, K4, K5)

**Unit 4: IMMUNOLOGY (18 Hours)**

4.1: Cells of Immune system – Stem Cells, Lymphoid cells, mononuclear cells, Granulocytes, Mast cells, Dendrite cells. (K1, K2, K3, K4, K5)

4.2: Immunoglobulin - structure, isotypes and biological function. (K1, K2, K3, K4, K5)

4.3: Antigenic determinants on immunoglobulin - isotype, allotype and idiotype. (K1, K2, K3, K4, K5)

4.4: B cell Receptors, T cell Receptors. (K1, K2, K3, K4, K5, K6)

4.5: Antigen – Antibody interaction. (K1, K2, K3, K4, K5)

4.6: MHC – Structure, Antigen processing and Presentation. (K1, K2, K3, K4, K5)

**Unit 5: (18 Hours)**

5.1: Transplantation Immunology – Types of grafts (Auto, Iso, Allo and Xeno). (K1, K2, K3, K4, K5)

5.2: Process of Graft Acceptance and Graft Rejection. (K1, K2, K3, K4, K5)

5.3: Immunosuppressive Therapy. (K1, K2, K3, K4, K5, K6)

5.4: Vaccines-Principles and types of vaccines-DNA Recombinant Vaccines. (K1, K2, K3, K4, K5, K6)

5.5: Autoimmunity. (K1, K2, K3, K4, K5)

5.6: HIV/AIDS. (K1, K2, K3, K4, K5)

**Books for Study and Reference:**

**Textbooks:**

1. Balinsky B.I. 1981 - An Introduction to Embryology- W.B. Saunders, Co., Philadelphia.
2. Karp G. and Berrill N.J. 1981- Development – McGraw Hill, New York.

## Reference Books:

3. Ebert J.D. 1970 - Interacting Systems - Holt Reinhart and Winston, Inc., New York and Chicago.
4. Grant P. 1978 - Biology of Developing Systems - Holt Reinhart and Winston, Inc., New York and Chicago.
5. Saunders J.W. 1982 - Developmental Biology - McMillan Co., London.
6. Nagabhushanam R., Sarojini R., 2002 - Invertebrate Embryology - Oxford IBA Publishing Co.
7. Tyagi Rajiv and Shukla A.N., 2002 - Development of Fishes - Jaya Publishing House, New Delhi.
8. Gibert Scott F. 2003 - Developmental Biology - Sinamer Associates Inc Saunderland Massachusetts, U.S.A.
9. Oppenheimer S.B. 1980 - Introduction to Embryonic Development - Allyn and Bacon, Inc., U.S.A.
10. Richard A. Goldsby Thomas Kindt T., Barbara A Osborne, 2000 - Kuby Immunology – Freeman and Co., New York.
11. Roitt I.M.1994 - Essential Immunology - Blackwell Scientific Oxford.
12. Paul W.E.M. 1989 - Fundamentals of Immunobiology - Raven Press, New York.
13. Srivastava R., Ram B.P., Tyle P., 1991 - Molecular Mechanism of Immune Regulation - VCH Publishers, New York.
14. Kannan I. 2013 – Immunology - MJP Publishers, Chennai.

## E-Resources:

<https://embryology.med.unsw.edu.au>

<http://www.embryology.ch>

<https://www.immunology.org>

<https://www.ncbi.nlm.nih.gov>

**SEMESTER IV**  
**PCZOO20 – EVOLUTION**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PCZOO20	Evolution	Theory	Core	6	4	100

**Objectives:**

- To comprehend the scientific concepts of animal evolution through an understanding of its evidences, its mechanics, process and products.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Analyse the evidences of evolution, and importance of paleontology.

**CO2:** Compare the evolutionary theories, trends and mechanism of evolution.

**CO3:** Justify the adaptations for successful continuation of life and extinction.

**CO4:** Appraise the distribution of animals and geological time scale.

**CO5:** Explain the Human origin and evolution.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit 1:**

**(18 Hours)**

1.1: Evidences For Evolution from Taxonomy. (K1, K2, K3, K4, K5)

1.2: Comparative anatomy and Paleontology. (K1, K2, K3, K4, K5)

1.3: Fossils – Formation, Fossilization - Types of Fossils. (K1, K2, K3, K4, K5)

1.4: Evaluation using fossils. (K1, K2, K3, K4, K5, K6)

1.5: Significance of fossils, Living fossils. (K1, K2, K3, K4, K5)

1.6: Dating of fossils - Lead method, Radio-Carbon method. (K1, K2, K3, K4, K5, K6)

**Unit 2:****(18 Hours)**

- 2.1: Neo-Lamarckism; Neo-Darwinism. (K1, K2, K3, K4, K5)
- 2.2: Micro, macro and mega evolution. (K1, K2, K3, K4, K5)
- 2.3: Isolation and isolating mechanisms. (K1, K2, K3, K4, K5)
- 2.4: Race formation; Selection natural, artificial and sexual. (K1, K2, K3, K4, K5)
- 2.5: Trends in Evolution - Neotony - Types, Factors and evolutionary significance; Atavism. (K1, K2, K3, K4, K5, K6)
- 2.6: Orthogenesis - Mechanism, Orthoselection, Evidences. (K1, K2, K3, K4, K5)

**Unit 3:****(18 Hours)**

- 3.1: Adaptation - Structural adaptation - Cursorial, Fossorial. (K1, K2, K3, K4, K5)
- 3.2: Adaptation - Structural adaptation - Arboreal, Desert, Aquatic. (K1, K2, K3, K4, K5)
- 3.3: Adaptation - Structural adaptation - Volant, Cave, Deep Sea. (K1, K2, K3, K4, K5)
- 3.4: Protective adaptation - Cryptic, Warning, Mimicry. (K1, K2, K3, K4, K5)
- 3.5: Extinction- Types of extinction, Causes, Significance of extinction. (K1, K2, K3, K4, K5)
- 3.6: Extinct animals. (K1, K2, K3, K4, K5)

**Unit 4:****(18 Hours)**

- 4.1: Animal distribution – Kinds of Distribution – In space. (K1, K2, K3, K4, K5)
- 4.2: Geographic – Zoogeographic realms. (K1, K2, K3, K4, K5)
- 4.3: Barriers and Dispersal, Means of dispersal; Bathymetric – Geobiotic, Limnobiologic, Halobiologic. (K1, K2, K3, K4, K5)
- 4.4: In Time – Geological Time scale and Geologic Distribution. (K1, K2, K3, K4, K5)
- 4.5: Patterns of Distribution. (K1, K2, K3, K4, K5)
- 4.6: Insular fauna - Oceanic islands, Continental islands. (K1, K2, K3, K4, K5)

**Unit 5:****(18 Hours)**

- 5.1: History of Primates. (K1, K2, K3, K4, K5)
- 5.2: Classification of Primates. (K1, K2, K3, K4, K5)
- 5.3: Evolution of Man- Structural and Chemical similarities and differences. (K1, K2, K3, K4, K5)
- 5.4: Man in fossil record - Java man, Peking man, Heidelberg man. (K1, K2, K3, K4, K5)
- 5.5: Swanscombe man, Neanderthal man, Cromagnon man. (K1, K2, K3, K4, K5)
- 5.6: Cultural Evolution of Man. (K1, K2, K3, K4, K5)

**Books for Study and Reference:****Textbooks:**

Organic Evolution 2010 – Richard Swann Lull, Maxford Books, New Delhi.

- 1. Evolution of the vertebrates, 1969 – Edwin H. Colbert, Wiley Eastern, New Delhi.

**Reference Books:**

2. T.S Gopalakrishnan, Itta Sambasivaiah, A P Kamalakara Rao 1983- Principles of Organic evolution - Pearl Publications.
3. Kavitha 2013 - Organic Evolution - A.I.T.B.S Publishers India.
4. Edward O. Dodson 1960 - Evolutionary Process and Distribution- Reinhold Publishing Corporation.
5. P.C Jain, M.S. Anantharamam 2000 – Paleontology- Evolution and animal distribution Vishal Publications.
6. A.P Tyagi 1989 - An introduction to Paleontology- S. Chand and company limited.

**E-Resources:**

<http://www.evolutionoftheweb.com>

<https://evolution.berkeley.edu/evolibrary/home.php>

<https://www.oercommons.org>

## SEMESTER IV

### PCZOP20 - PRACTICAL III - ENVIRONMENTAL BIOLOGY, LIMNOLOGY, TOXICOLOGY AND ANIMAL BEHAVIOUR

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III & IV	PCZOP20	Practical III	Practical	Core	3	4	100

#### Course Learning Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Perform practical procedures in ecology.

**CO2:** Describe the adaptive features of animals with reference to their habitat and ethology.

**CO3:** Prepare slides of planktons.

**CO4:** Perform Toxicology studies.

**CO5:** Discuss water treatment through water treatment plant visits.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	L	M
CO4	H	H	H	H	H	M
CO5	H	M	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	M
CO3	H	H	H	H	L	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	M	M

#### I. ENVIRONMENTAL BIOLOGY

##### 1. Estimation:

- Estimation of dissolved Oxygen
- Estimation of CO<sub>2</sub>
- Estimation of Salinity
- Estimation of Carbonates and Bicarbonates

##### 2. Analysis of Industrial effluent – BOD

##### 3. Study of different fauna with special reference to the adaptations:

- Study of Sandy shore fauna
- Study of Muddy shore fauna

c) Study of Rocky shore fauna

## II. LIMNOLOGY AND TOXICOLOGY

4. Estimation:

- a) Estimation of Chromium
- b) Estimation of Nitrites
- c) Estimation of Phosphates

5. Mounting:

- a) Observation of fresh water planktons
- b) Observation of marine planktons

6. Lentic Adaptations: Daphnia, Crab, Prawn, Clams, Snail, Water Strider, Salamander, Alligator

7. Lotic Adaptations: Limpet, Crayfish, Salmon, Eel, Crocodile, Hippopotamus, Brook trout, Lung fish.

8. Toxicity induced diseases: a) Minamata disease b) Itai-itai c) Painter's colic

9. Visit to water treatment plant.

## III. ANIMAL BEHAVIOUR:

10. Animal Association

- a.) Parasitism
  - i) Ectoparasites – Ticks, Mites
  - ii) Endoparasites – *Taenia solium*, *Ascaris lumbricoides*
- b.) Mutualism – Termites and Trichonympha, Sea Anemone and Hermit Crab
- c) Commensalisms – Shark and Echeneis, Whale and Barnacles
- d) Parental Care in Fish – Hippocampus, Male ring- tailed Cardinals, Gouramis
- e) Parental Care in Amphibians – Midwife toad, Ichthyophis, Marsupial frog.

**SEMESTER IV**  
**PCZOQ20 - PRACTICAL IV**  
**PHYSIOLOGY, ENDOCRINOLOGY, DEVELOPMENTAL BIOLOGY, IMMUNOLOGY**  
**AND EVOLUTION**

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III & IV	PCZOQ20	Practical- IV	Practical	Core	3	4	100

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Analyze physiological parameters.

**CO2:** Interpret Endocrine glands and Endocrine disorders.

**CO3:** Explain immunological importance of WBC and principle on antigen antibody reaction in ABO grouping.

**CO4:** Identify the developmental stages, placenta, and histology in development biology.

**CO5:** Compare the evolutionary significance, mimicry and adaptation in animals.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	M	H

**Physiology**

- a) Estimation of RQ in Fish with reference to temperature.
- b) Salt loss and Salt gain in fish.
- c) Study of Human salivary amylase activity in relation to temperature
- d) Study of Human salivary amylase activity in relation to pH
- e) Oxygen consumption by fish in relation to body weight
- f) Estimation of digestive enzyme activity in Cockroach

**Endocrinology:**

- a) Slides: Pituitary gland, Thyroid gland, Parathyroid gland, Adrenal gland, Pancreas.
- b) Abnormalities of hormones: Hypersecretion – Gigantism, Grave's disease, Cushing's syndrome.
- c) Hyposecretion- Dwarfism, Cretinism, Myxoedema, Addison's disease.

**Developmental Biology and Immunology**

- a) Immunoelectrophoresis – chart
- b) Immunodiffusion - chart
- c) Antigen and Antibody reaction – ABO Blood grouping
- d) Differential count of WBC
- e) Pregnancy test

**Spotters/Charts/ Slides**

- a) Blastula and Gastrula of Frog
- b) T.S of Testis – T.S. of Ovary – Graffian Follicles (mammals)
- c) Placentation – Placenta of Shark and Sheep
- d) Embryo of Mammals – Sheep and Pig
- e) Developmental stages in Chick – 18 hours, 24hrs, 48hrs, and 72hrs
- f) Histology of Lymphoid organs – Thymus, Spleen, Bone marrow, Lymph node

**Evolution:****Spotters/Charts/ Slides**

- a) Evolutionary importance of Peripatus, Limulus, Tornaria
- b) Adaptations – Arboreal - Squirrel, Fossorial- Rat, Cursorial- Ostrich and Aerial- Bat
- c) Cryptic coloration -Leaf and stick insects
- d) Batesian mimicry - Monarch and Viceroy butterflies.
- e) Study of Paleontological Fossils - Trilobites, Ammonites, Seymouria, Nautilus.

## SEMESTER IV

### PEZOG20 - ELECTIVE IV A: FISHERY BIOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PEZOG20	Fishery Biology	Theory	Elective	5	5	100

#### Objective:

- The objective of the paper is to understand shell fisheries in India and to have knowledge about their byproducts, marketing, transportation and Insurance.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Apply the parameters for the growth of fish, biology of fish and gears in fishery.

**CO2:** Acquire knowledge of biology and techniques of shell fisheries.

**CO3:** Apply knowledge in establishing and managing sea weed and pearl culture and byproducts of fishery.

**CO4:** Differentiate the types of fish cultures pathogens and their control measures.

**CO5:** Explain the processing, transportation and marketing of Fishes.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

#### Unit 1:

(15 Hours)

- 1.1: Water quality-temperature, pH, CLO<sub>2</sub>, salinity, nutrients and trace elements for the growth of fishes. (K1, K2, K3, K4, K5)
- 1.2: Biology of Marine edible fish - Oil sardines. (K1, K2, K3, K4, K5)
- 1.3: Biology of freshwater edible fish- Catla. (K1, K2, K3, K4, K5)
- 1.4: Indian capture methods – shafts. (K1, K2, K3, K4, K5)
- 1.5: Indaian capture gears. (K1, K2, K3, K4, K5)
- 1.6: Economic importance of commercial fisheries. (K1, K2, K3, K4, K5)

**Unit 2:** (15 Hours)

- 2.1: Biology and culture techniques of Shell fisheries. (K1, K2, K3, K4, K5)
- 2.2: Marine and freshwater Crustaceans- Prawns, Lobsters, Crabs. (K1, K2, K3, K4, K5)
- 2.3: Molluscs – Oysters. (K1, K2, K3, K4, K5)
- 2.4: Clams, Cuttle fish. (K1, K2, K3, K4, K5)
- 2.5: State wise Commercial and export potential of Shell fisheries. (K1, K2, K3, K4, K5)
- 2.6: Economic importance of Shell fisheries. (K1, K2, K3, K4, K5)

**Unit 3:** (15 Hours)

- 3.1: Sea weeds – Types. (K1, K2, K3, K4, K5)
- 3.2: Different culture methods of sea weeds. (K1, K2, K3, K4, K5)
- 3.3: Pearl culture - stages of pearl formations. (K1, K2, K3, K4, K5)
- 3.4: Pearl culture techniques. (K1, K2, K3, K4, K5, K6)
- 3.5: Byproducts of fishes - Fish meal – Fish oil. (K1, K2, K3, K4, K5)
- 3.6: Fish manure – Chunks. (K1, K2, K3, K4, K5)

**Unit 4:** (15 Hours)

- 4.1: Composite fish culture– Paddy cum fish culture. (K1, K2, K3, K4, K5)
- 4.2: Integrated fish culture. (K1, K2, K3, K4, K5)
- 4.3: Sewage water fish culture. (K1, K2, K3, K4, K5)
- 4.4: Raceway culture, cage, pen and rack culture system. (K1, K2, K3, K4, K5)
- 4.5: Control of Parasites, predators. (K1, K2, K3, K4, K5)
- 4.6: Weeds in culture ponds. (K1, K2, K3, K4, K5)

**Unit 5:** (15 Hours)

- 5.1: Methods of processing. (K1, K2, K3, K4, K5)
- 5.2: Packaging. (K1, K2, K3, K4, K5)
- 5.3: Storage of fishes. (K1, K2, K3, K4, K5)
- 5.4: Transport facilities. (K1, K2, K3, K4, K5)
- 5.5: Marketing channels. (K1, K2, K3, K4, K5)
- 5.6: E-marketing. (K1, K2, K3, K4, K5)

**Books for Study and Reference:**

**Textbooks:**

1. Jingran, V.G., 1982. Fish and fisheries of India. Hindustan publishing Corporation - New Delhi
2. Hopher, B and Y. Pruginin, 1981 - Commercial fish farming, John Wiley & Sons, N.Y. Marine Products Export Review, 1982 MPEDA, Cochin.

**Reference Books:**

1. Pandey, K and J.P Shukla 2000. Fish and Fisheries, Rastogi Publication, Meerut.
2. Shanmugam, K. 2005. Fishery Biology and Aquaculture
3. Pradeep Kashyap. 2005. The Rural Marketing Book.

**E-Resources:**

<http://www.cifa.nic.in>

<http://agritech.tnau.ac.in>

<http://aquaculturetraining.com.au>

<http://www.oftri.org>

## SEMESTER IV

### PEZOH20 - ELECTIVE IV B: AQUACULTURE AND FARM MANAGEMENT

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PEZOH20	Aquaculture and Farm Management	Theory	Elective	5	5	100

#### Objective:

- To understand the culture practices of both fin fish and shell fishes.
- Gaining knowledge in the food and feeding habits, investigating the seed production and farm management and method of farming.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Describe parameters of aquatic environment for aquaculture and farm management.

**CO2:** Elucidate biological criteria and economic significance of cultivable species.

**CO3:** Discuss seed production and hatchery management of commercially important cultivable fishes.

**CO4:** Explain different types of fish cultures techniques.

**CO5:** Analyse water quality parameters and biotechnological tools in disease diagnosis of culture fishes.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

#### Unit 1:

**(15 Hours)**

1.1: Overview - Importance of aquaculture. (K1, K2, K3, K4, K5)

1.2: Global scenario. (K1, K2, K3, K4, K5)

1.3: Present status in India-prospects and scope. (K1, K2, K3, K4, K5)

1.4: Aquaculture Farms - Site selection, topography. (K1, K2, K3, K4, K5)

1.5: Water availability and supply, soil conditions and quality. (K1, K2, K3, K4, K5)

1.6: Design and layout, farm design, structure and construction. (K1, K2, K3, K4, K5)

**Unit 2: (15 Hours)**

2.1: Standard guidance for choosing cultivable species- seaweed, Crustacean (Prawns and Lobsters). (K1, K2, K3, K4, K5)

2.2: Molluscs (Clams, Cockles, Mussels and Oysters) and fishes-biological criteria. (K1, K2, K3, K4, K5)

2.3: Environmental adaptability and compatibility. (K1, K2, K3, K4, K5)

2.4: Adaptability to intensive culture. (K1, K2, K3, K4, K5)

2.5: Economic importance-economics, market values. (K1, K2, K3, K4, K5)

2.6: By products and availability in adjacent region. (K1, K2, K3, K4, K5)

**Unit 3: (15 Hours)**

3.1: Distribution and abundance of natural seed resources, collection methods and segregation. (K1, K2, K3, K4, K5)

3.2: Artificial seed production-breeding under controlled condition. (K1, K2, K3, K4, K5)

3.3: Induced breeding technique, larval rearing, packing and transportation. (K1, K2, K3, K4, K5)

3.4: Live feed - Microalgae, Rotifer and Artemia - their culture. (K1, K2, K3, K4, K5)

3.5: Feed formulation - conventional and non-conventional ingredients. (K1, K2, K3, K4, K5)

3.6: Feed additives, feed attractants and feed formulations. (K1, K2, K3, K4, K5)

**Unit 4: (15 Hours)**

4.1: Traditional, Extensive, Semi-intensive and intensive systems, composite fish culture. (K1, K2, K3, K4, K5)

4.2: Paddy-cum-fish culture. (K1, K2, K3, K4, K5)

4.3: Integrated fish culture, sewage water fish culture, raceway culture. (K1, K2, K3, K4, K5)

4.4: Cage, pen and rack culture system management. (K1, K2, K3, K4, K5)

4.5: Pond preparation. (K1, K2, K3, K4, K5)

4.6: Production and economics. (K1, K2, K3, K4, K5)

**Unit 5: (15 Hours)**

5.1: Water quality - temperature, Salinity, pH, O<sub>2</sub>, ClO<sub>2</sub>, levels, nutrients and trace elements (K1, K2, K3, K4, K5)

5.2: Control of parasites, predators. (K1, K2, K3, K4, K5)

5.3: Weeds and diseases in culture ponds. (K1, K2, K3, K4, K5)

5.4: Disease diagnosis-ELISA, Western blotting. (K1, K2, K3, K4, K5)

5.5: DNA based diagnosis of diseases. (K1, K2, K3, K4, K5)

5.6: Fish vaccines. (K1, K2, K3, K4, K5)

## **Books for Study and Reference:**

### **Textbooks:**

1. Baluyut E.A., Aquaculture system and practices-A Selected Review Publishing House, New Delhi, 1989.
2. Dash M.C and Patnik. P.N.-Brackish water Culture-Palani Paramount Publications, Palani, 1994.

### **Reference Books:**

3. Michael. B.N and Singholka B., Freshwater Prawn Farming: A Manual of Culture of Macrobrachium Rosenbergeee - Daya Publishing House, New Delhi, 1985.
4. Paul Raj S. Shrimp Farming Techniques: Problems and Solutions- Palani Paramount Publication, Palani, 1995.
5. Post G.M.- Textbook of fish Health - TFH Publication, 1983
6. Sinha, V.R.P and Srinivastava H.C. - Aquaculture Productivity-Oxford and IBH Publications Co. Ltd., New Delhi, 1991.

### **E-Resources:**

<http://www.cifa.nic.in>

<http://agritech.tnau.ac.in>

<http://aquaculturetraining.com.au>

<http://www.oftri.org>

## SEMESTER I

### PIZOA20 - INDEPENDENT ELECTIVE I A- PET KEEPING

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PIZOA20	Pet Keeping	Theory	Independent Elective	-	2	100

#### Objective:

- To gain an extensive foundation for a career in the pet industry.
- To develop a career or business working with animals in breeding and supplying pets, or supplying services or products to pet owners.

#### Course Outcomes:

##### On completion of the course the student will be able to...

CO1: Analyze the present status of maintaining pets and its needs.

CO2: Interpret on varied dog breeds and train them.

CO3: Identify cat breeds and trace the diseased cat and treat them.

CO4: Expand knowledge on best choices of bird breed for business.

CO5: Elucidate commercially important fishes and understand the construction and requirement for setting aquarium to become an entrepreneur.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

#### Unit 1:

1.1: Animal care: laws and licenses. (K1, K2, K3, K4, K5)

1.2: Animal charities and societies (RSPCA, WSPA, Blue cross). (K1, K2, K3, K4, K5)

1.3: Pet trading. (K1, K2, K3, K4, K5)

1.4: Pet care needs -feeding, watering, shelter. (K1, K2, K3, K4, K5)

1.5: Containment, fencing, caging, and protection. (K1, K2, K3, K4, K5)

1.6: Maintaining health and hygiene. (K1, K2, K3, K4, K5)

**Unit 2:**

- 2.1: Dogs: Selection – breeds. (K1, K2, K3, K4, K5)
- 2.2: Training – positive reinforcement for puppies. (K1, K2, K3, K4, K5)
- 2.3: Adult training; Reappraise basic training; teaching old dogs new tricks.  
(K1, K2, K3, K4, K5)
- 2.4: Illness- first aid on spot diagnosis- vomiting and diarrhea, poisoning.  
(K1, K2, K3, K4, K5)
- 2.5: Cuts, grazes, wounds and burns. (K1, K2, K3, K4, K5)
- 2.6: Breaks and fractures; shock. (K1, K2, K3, K4, K5)

**Unit 3:**

- 3.1: Cat: Breeds (Lang Haired, semi long haired, short haired, oriental). (K1, K2, K3, K4, K5)
- 3.2: Allergies-containment. (K1, K2, K3, K4, K5)
- 3.3: Breeding. (K1, K2, K3, K4, K5)
- 3.4: New born Kittens. (K1, K2, K3, K4, K5)
- 3.5: Care for sick cat signs of illness, temperature. (K1, K2, K3, K4, K5)
- 3.6: Common ailments, skin disorders -ticks. (K1, K2, K3, K4, K5)

**Unit 4:**

- 4.1: Birds: Selection. (K1, K2, K3, K4, K5)
- 4.2: Breeds (canaries, finches, budgerigars, small parrots). (K1, K2, K3, K4, K5)
- 4.3: Containment -Aviaries, selection, design and size. (K1, K2, K3, K4, K5)
- 4.4: Management-feeding -watering- Grooming (Wing trim, beak trim, nail trim).  
(K1, K2, K3, K4, K5)
- 4.5: Caring for sick bird. (K1, K2, K3, K4, K5)
- 4.6: Signs of illness and common ailments. (K1, K2, K3, K4, K5)

**Unit 5:**

- 5.1: Selection - Types of fish -Tropical, Marine, Cold water. (K1, K2, K3, K4, K5)
- 5.2: Costs, size, Equipments. (K1, K2, K3, K4, K5)
- 5.3: Tanks, Ponds, pumps, aquarium, night lights. (K1, K2, K3, K4, K5)
- 5.4: Water quality - changing water. (K1, K2, K3, K4, K5)
- 5.5: Feed -pelleted, live feed. (K1, K2, K3, K4, K5)
- 5.6: Illness -fungal, bacterial parasites. (K1, K2, K3, K4, K5)

**Books for Study and Reference:****Textbooks:**

1. Shane Bateman, The First aid companion for dogs & cats published by Rodale books, 2001.
2. Alan Edwards, The ultimate Encyclopedia of cats, cat breeds & cat care; published by south water, 2012.

**Reference Books:**

3. Sheldon L. Gerstenfeld, V.M.D, The Bird Care Book, published by Da Capo Lifelong books, 1989.
4. David E. Boruchowitz, The simple Guide to freshwater Aquariums, published By TFH publications, inc. 2001.
5. Gary A Gallerstein, D.V.M . The complete Pet Bird owner's Handbook published by Avian Publications, 2003.

**E-Resources:**

[www.bluecrossofindia.org](http://www.bluecrossofindia.org)

[www.peta.org](http://www.peta.org)

<https://www.britannica.com/animal/pet>

## SEMESTER I

### PIZOB20 - INDEPENDENT ELECTIVE I B- BIOPHYSICS

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PIZOB20	Biophysics	Theory	Independent Elective	-	2	100

**Objectives:**

- To impart knowledge on the basic principles of biophysics.
- To employ different advanced Methodologies in Research.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Recall the basic concepts of Biophysics.

**CO2:** Describe and apply the law of thermodynamics of the biological system and concepts of energy

**CO3:** Explain the membrane conductivity and transport.

**CO4:** Explain the principle techniques and application of lasers in biomedical field.

**CO5:** Discuss the working principle, instrumentation and applications of bio-analytical instruments.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	L	H	M	H
CO2	H	H	M	H	L	H
CO3	H	H	H	H	L	H
CO4	H	H	M	H	M	H
CO5	H	H	M	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	L	M
CO2	H	H	H	L	M	H
CO3	H	H	H	M	L	M
CO4	H	H	M	H	M	H
CO5	H	H	H	M	L	H

**Unit 1:**

1.1: Basic concepts of biophysics- Atoms, Atoms and elements. (K1, K2, K3, K4, K5)

1.2: Molecules and components. (K1, K2, K3, K4, K5)

1.3: Structure of atoms, isotopes, hydrogen ion concentration. (K1, K2, K3, K4, K5)

1.4: Mole and mole concept. (K1, K2, K3, K4, K5)

1.5: Normality, buffers, stability. (K1, K2, K3, K4, K5)

1.6: Redox potential and examples of redox potential in biological systems.  
(K1, K2, K3, K4, K5)

**Unit 2:**

- 2.1: Thermodynamics of biological system- first and second law of thermodynamics. (K1, K2, K3, K4, K5)
- 2.2: Activation energy biological system as open non equilibrium system. (K1, K2, K3, K4, K5)
- 2.3: Concepts of energy unavailable energy. (K1, K2, K3, K4, K5)
- 2.4: Entropy. (K1, K2, K3, K4, K5)
- 2.5: Enthalpy, Negative entropy. (K1, K2, K3, K4, K5)
- 2.6: Application of biological system thermodynamics of active and passive transport. (K1, K2, K3, K4, K5)

**Unit 3:**

- 3.1: Membrane conductivity- active transport mechanism. (K1, K2, K3, K4, K5)
- 3.2: Factors-biological significance- characterization. (K1, K2, K3, K4, K5)
- 3.3: Biological importance. (K1, K2, K3, K4, K5)
- 3.4: Techniques used in diffusion, Osmosis, emulsions. (K1, K2, K3, K4, K5)
- 3.5: Colloids, dialysis. (K1, K2, K3, K4, K5)
- 3.6: Velocity and surface tension. (K1, K2, K3, K4, K5)

**Unit 4:**

- 4.1: Principle and application of sensors. (K1, K2, K3, K4, K5)
- 4.2: Laser beam in Biomedical field –applications of Lasers in therapies and diagnosis. (K1, K2, K3, K4, K5)
- 4.3: Magnetic Resonance Imaging ( MRI), Computer Topography (CT)scan. (K1, K2, K3, K4, K5)
- 4.4: Ultrasound in interaction with tissues and application in therapeutics. Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyograph (EMG). (K1, K2, K3, K4, K5)
- 4.5: Flow Cytometry and cell sorting. (K1, K2, K3, K4, K5)
- 4.6: Autoradiography –types and techniques used and Evaluation of radiogram. (K1, K2, K3, K4, K5)

**Unit 5:**

- 5.1: Chromatography-Adsorption, Partition, Principle, Experimental set up, Methodology and Applications of Gel-Permeation Chromatography. (K1, K2, K3, K4, K5)
- 5.2: Gas Liquid Chromatography. (K1, K2, K3, K4, K5)
- 5.3: Electrophoresis principle, factors affecting the migration of substances and supporting media immune electrophoresis. (K1, K2, K3, K4, K5)
- 5.4: Slab Gel electrophoresis. (K1, K2, K3, K4, K5)
- 5.5: Spectroscopy –Atomic Emission Spectroscopy, Atomic Absorption Spectroscopy. (K1, K2, K3, K4, K5)
- 5.6: Electron Spin Spectroscopy. (K1, K2, K3, K4, K5)

## **Books for Study and Reference**

### **Textbooks:**

1. D.A Skoog et.,al Principles of Instrumental Analysis., 5<sup>th</sup> edition Saunders College Publication,1998.
2. Daniel .M Basic Biophysics for Biologist Agro Botanical Publishers India 1989.

### **Reference Books:**

3. De Robertis E.D.P and De Robertis E.M.F Cell and Molecular biology VIII Edition Lippincott Williams and Wilkins Philadelphia 2006.
4. Khandpur,R S Handbook of Biomedical Instrumentation, McGraw Hill Publishing Co.Ltd.2003.
5. Kudesia V.P., Sawhey S.S Instrumental Method of Chemical Analysis Pragathi Prakashan Meerut.
6. Palanichamy S and Shunmugavelu M Principles of Biophysics Palani Paramount Publication 1996.
7. Subramanian M A Biophysics Principles and Techniques MJP Publishers Chennai.
8. Thiravia Raj Biophysics Biophysics Saras Publication 1995.
9. Vatsala Piramal Biophysics Dominant Publishers and Distributors 2006.

### **E-Resources:**

<https://bioeng.berkeley.edu>  
<https://www.vanderbilt.edu>  
<https://worldwidescience.org>

## SEMESTER II

### PIZOC20 - INDEPENDENT ELECTIVE II A-ANIMAL HUSBANDARY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PIZOC20	Animal Husbandry	Theory	Independent Elective	-	2	100

#### Objectives of the paper

- To know about the care and management of livestock.
- To learn the correct method of feeding, breeding, housing and health care of livestock.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Explain the management of livestock.

**CO2:** Expand the knowledge to differentiate special breeds of cattle.

**CO3:** Elucidate different methods of breeding.

**CO4:** Summarize on the nutritive feeding practice of cattle.

**CO5:** Provide intensive ideas on management of cattle.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

#### Unit 1: Cattle Industry In South India

1.1: Cattle – importance, classification. (K1, K2, K3, K4, K5)

1.2: Population and food supply, suitable environment, rainfall and soil. (K1, K2, K3, K4, K5)

1.3: Suitability for tracts and farming types. (K1, K2, K3, K4, K5)

1.4: Grazing conditions, communal, fore stand private grazing. (K1, K2, K3, K4, K5)

1.5: Fodder cultivation. (K1, K2, K3, K4, K5)

1.6: Cattle rearing. (K1, K2, K3, K4, K5)

## **Unit 2: Important Breeds of Cattle In South India**

- 2.1: Breed characters: Kangayam, Ogole. (K1, K2, K3, K4, K5)
- 2.2: Mysore and Alambadi breeds. (K1, K2, K3, K4, K5)
- 2.3: Barghur cattle, jellicut animals. (K1, K2, K3, K4, K5)
- 2.4: Tanjore polled cattle. (K1, K2, K3, K4, K5)
- 2.5: Buffaloes. (K1, K2, K3, K4, K5)
- 2.6: South Indian Breeds. (K1, K2, K3, K4, K5)

## **Unit 3: Methods of Breeding**

- 3.1: In – breeding, line – breeding. (K1, K2, K3, K4, K5)
- 3.2: Out – crossing with other species and breeds. (K1, K2, K3, K4, K5)
- 3.3: Grading – up, selection – individuality. (K1, K2, K3, K4, K5)
- 3.4: Parentage, offspring influence. (K1, K2, K3, K4, K5)
- 3.5: Improvement of cattle in South India. (K1, K2, K3, K4, K5)
- 3.6: Hurdles in grading – up. (K1, K2, K3, K4, K5)

## **Unit 4: Principles of Feeding**

- 4.1: Use of food, nutrients, nutritive ratio. (K1, K2, K3, K4, K5)
- 4.2: Starch equivalent, energy value, feeding standard. (K1, K2, K3, K4, K5)
- 4.3: Rations, roughages and concentrates. (K1, K2, K3, K4, K5)
- 4.4: Schedule of rations, some feeding hints. (K1, K2, K3, K4, K5)
- 4.5: Composition of feeding stuffs. (K1, K2, K3, K4, K5)
- 4.6: Digestibility coefficient of important feeds. (K1, K2, K3, K4, K5)

## **Unit 5: Management of Cattle**

- 5.1: Housing, providing drinking water. (K1, K2, K3, K4, K5)
- 5.2: Grooming and washing. (K1, K2, K3, K4, K5)
- 5.3: Providing exercise. (K1, K2, K3, K4, K5)
- 5.4: Care of sick animals. (K1, K2, K3, K4, K5)
- 5.5: Vaccination. (K1, K2, K3, K4, K5)
- 5.6: Training young stock. (K1, K2, K3, K4, K5)

## **Books for Study and Reference:**

### **Textbooks:**

1. Animal Husbandry Department, Madras, Administration report for the year 1949 – 50.
2. Ind. Council of Agric., Res., New Delhi, Survey of cattle breeds in India, Bull., 24 (1934), 27 (1939) and 54 (1942).

### **Reference Books:**

3. Kellner, C., The Scientific Feeding of Animals.
4. Maaynard, L.A., Animal Nutrition. Newyork, McGraw- Hill Book Company, 1947.
5. Pincher. C., The Breeding of farm Animals. Penguin Books, Ltd., Great Britain, 1946.
6. Sen. K.C., Cattle “Nutritive Value of Indian Feeds”, ICAR Miscellaneous Bull., No.23 (1952).

**E-Resources:**

<https://www.oercommons.org>

<https://www.dairyglobal.net>

<https://www.farmingindia.in/dairy-farming>

## SEMESTER II

### PIZOD20 - INDEPENDENT ELECTIVE II B- ECO ENERGETICS AND ECOLOGICAL METHODS

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PIZOD20	Eco Energetics And Ecological Methods	Theory	Independent Elective	-	2	100

#### Objectives:

- To promote environment, friendly, socially and sustainable model of energy
- To promote the concept of energy efficiency
- To understand the soil population estimation by using techniques
- To understand the methods of wildlife population estimation
- To gain the knowledge about zooplankton and phytoplankton.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Explain the structure and functions of ecosystem.

**CO2:** Discuss the productivity and methods of measuring productivity.

**CO3:** Summarize about sampling and extraction techniques.

**CO4:** Describe the methods of wild life population studies.

**CO5:** Categorize the planktons, method of collection, preservation and morphological identification.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	M
CO2	H	H	M	H	M	M
CO3	H	H	M	H	L	M
CO4	H	H	H	H	M	M
CO5	H	H	M	H	L	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	H	M	M
CO2	H	M	H	H	M	M
CO3	H	M	H	H	M	L
CO4	H	H	M	H	H	L
CO5	H	H	M	H	H	L

#### Unit 1:

- 1.1: Concept of ecosystem- Define terms -ecosystem, habitat, ecological niche. (K1, K2, K3, K4, K5)
- 1.2: Energy flow in an ecosystem – model of energy flow. (K1, K2, K3, K4, K5)
- 1.3: Food Chain-Types of food chains. (K1, K2, K3, K4, K5)
- 1.4: Food webs. (K1, K2, K3, K4, K5)
- 1.5: Efficiency of energy transfer between trophic levels, ecological pyramids. (K1, K2, K3, K4, K5)
- 1.6: Law of thermodynamics. (K1, K2, K3, K4, K5)

**Unit 2:**

- 2.1: Productivity. (K1, K2, K3, K4, K5)
- 2.2: Primary productivity and Secondary productivity. (K1, K2, K3, K4, K5)
- 2.3: Fundamentals of productivity, aspects of productivity. (K1, K2, K3, K4, K5)
- 2.4: Productivity rate, ecological efficiency. (K1, K2, K3, K4, K5)
- 2.5: Methods of measurement - harvest method, oxygen method. (K1, K2, K3, K4, K5)
- 2.6: pH method, disappearance of raw materials. (K1, K2, K3, K4, K5)

**Unit 3:**

- 3.1: Population Estimates by Sampling. (K1, K2, K3, K4, K5)
- 3.2: Unit of Soil or Litter Habitat. (K1, K2, K3, K4, K5)
- 3.3: Extraction Techniques; Bulk staining. (K1, K2, K3, K4, K5)
- 3.4: Mechanical methods of extraction, Dry sieving, Wet sieving. (K1, K2, K3, K4, K5)
- 3.5: Soil arthropod collection- Tullgren funnel series. (K1, K2, K3, K4, K5)
- 3.6: Soil washing and flotation. (K1, K2, K3, K4, K5)

**Unit 4:**

- 4.1: Wildlife Population Estimates by Census and Distance Measuring Techniques. (K1, K2, K3, K4, K5)
- 4.2: Census methods. (K1, K2, K3, K4, K5)
- 4.3: Point and line survey methods. (K1, K2, K3, K4, K5)
- 4.4: Indices of abundance using transects. (K1, K2, K3, K4, K5)
- 4.5: Methods based on flushing. (K1, K2, K3, K4, K5)
- 4.6: Line transect methods: the Fourier series estimator, Point transects. (K1, K2, K3, K4, K5)

**Unit 5:**

- 5.1: Planktons- types, characters and ecology. (K1, K2, K3, K4, K5)
- 5.2: Phytoplankton-Marine. (K1, K2, K3, K4, K5)
- 5.3: Phytoplankton – Freshwater. (K1, K2, K3, K4, K5)
- 5.4: Method of Collection. (K1, K2, K3, K4, K5)
- 5.5: Preservation and morphological Identification of Marine Zooplankton. (K1, K2, K3, K4, K5)
- 5.6: Preservation and morphological Identification of fresh water zooplankton. (K1, K2, K3, K4, K5)

**Books for Study and References:****Textbooks:**

- 1. Dr. Verma and Dr. Agarwal Environmental Biology(principle of ecology).
- 2. Eugene P.Odum Fundamentals of ecology.

**Reference Books:**

3. P.B. Nagaraj- Basic Thermodynamics Paperback – 1 Jan 2005.
4. O.L. Lange P.S Nobel C.B Osmond and H. Ziegler Physiological plant ecology IV .
5. ODarryl I. MacKenzie, James D. Nichols, J. Andrew Royle , Kenneth H. Pollock, Larissa Bailey, James E. Hines- Occupancy Estimation and Modeling: Inferring Patterns and Dynamics of Species Occurrence 1st Edition 2015.
6. Arvind Kumar-Ecology of Plankton.
7. Giri Kattel - Zooplankton and phytoplankton – types characteristic and ecology 2011.

**E-Resources:**

<http://www.enviroindia.net>

<http://aelsindia.com>

<http://environment-ecology.com>

## SEMESTER III

### PIZOE20 - INDEPENDENT ELECTIVE III A- RADIATION BIOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PIZOE20	Radiation Biology	Theory	Independent Elective	-	2	100

**Objective:**

- To understand the radiation protection.
- To learn about the application of radiation in treatments.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Apply the fundamentals of radiation biology.

**CO2:** Explain the effects of Radiation on DNA and its effects.

**CO3:** Analyze the radiation exposure and response.

**CO4:** Asses the role of radiation in carcinogenesis.

**CO5:** Explain radio therapy, protection and precaution in using radioisotopes.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	L	M
CO2	H	H	M	H	L	H
CO3	H	H	H	H	M	M
CO4	H	H	M	H	M	H
CO5	H	H	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	L	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	H
CO5	H	H	M	H	M	M

**Unit 1:**

1.1: Definition, scope and significance of radiation biology. (K1, K2, K3, K4, K5)

1.2: General classification of radiation. (K1, K2, K3, K4, K5)

1.3: Ionizing radiation, linear energy transfer. (K1, K2, K3, K4, K5)

1.4: Radiation dose and units. (K1, K2, K3, K4, K5)

1.5: Principles of radiation dosimetry. (K1, K2, K3, K4, K5)

1.6: Direct and indirect effects. (K1, K2, K3, K4, K5)

**Unit 2:**

2.1: Radiations lesions in DNA, radiobiological effect on cell. (K1, K2, K3, K4, K5)

2.2: Radiation sensitizers and protectors. (K1, K2, K3, K4, K5)

- 2.3: Effect of Radiation on Human Health. (K1, K2, K3, K4, K5)
- 2.4: Long term radiation risks from low radiations doses. (K1, K2, K3, K4, K5)
- 2.5: Radiation induced cancer. (K1, K2, K3, K4, K5)
- 2.6: Radiation effects in the developing embryo and fetus, radiation induced heritable diseases. (K1, K2, K3, K4, K5)

**Unit 3:**

- 3.1: Radiation Quantities Exposure, Absorbed Dose. (K1, K2, K3, K4, K5)
- 3.2: Equivalent Dose, Effective Dose. (K1, K2, K3, K4, K5)
- 3.3: Cellular Response To Radiation Indirect and direct action. (K1, K2, K3, K4, K5)
- 3.4: Time scale of radiation effects. (K1, K2, K3, K4, K5)
- 3.5: DNA damage and chromosomal aberrations. (K1, K2, K3, K4, K5)
- 3.6: Radioprotectors and Radiosensitizers. (K1, K2, K3, K4, K5)

**Unit 4:**

- 4.1: Time-scale of effects in Radiation Biology. (K1, K2, K3, K4, K5)
- 4.2: Response of normal and malignant tissues to radiation exposure. (K1, K2, K3, K4, K5)
- 4.3: Radiation Carcinogenesis. (K1, K2, K3, K4, K5)
- 4.4: Risk estimates for radiation-induced cancer. (K1, K2, K3, K4, K5)
- 4.5: Radiation-induced sterility. (K1, K2, K3, K4, K5)
- 4.6: Hereditary effects of radiation. (K1, K2, K3, K4, K5)

**Unit 5:**

- 5.1: Whole-Body Radiation Effects Acute radiation syndrome. (K1, K2, K3, K4, K5)
- 5.2: Treatment of radiation accident victims. (K1, K2, K3, K4, K5)
- 5.3: Radiation Protection. (K1, K2, K3, K4, K5)
- 5.4: Radio therapy. (K1, K2, K3, K4, K5)
- 5.5: Risk estimates in Humans. (K1, K2, K3, K4, K5)
- 5.6: Precautions and safety measures in handling radioisotopes. (K1, K2, K3, K4, K5)

**Books for Study and reference:**

**Textbooks:**

- 1. Physics and Radiobiology of Nuclear Medicine - Gopal B. Saha. – Springer IIIrd edition 2006.
- 2. Radiation and Man - H. C. Jain - National Book trust, India. – 1994.

**Reference Books:**

- 3. Essentials of Radiation Biology and Protection – Steve Forshier II nd edition 2. Life Sciences and Radiation – J. Kiefer - Springer 2004.
- 4. An Introduction to Radiobiology, 2nd edition (1998), A. H. W. Nias, Wiley Blackwell, ISBN13: 978-0471975908.
- 5. Radiation Biology 3.1. Fliedner, T. M., Friesecke, I. & Beyrer, K., 2001.

6. Medical management of radiation accidents— manual on the acute radiation syndrome. British Institute of Radiology Supplement.
7. Hall, E. J, Giaccia A. J. 2006. Radiobiology for the radiologist, Philadelphia, Pa: Lippincott Williams & Wilkins.
8. INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION, 2006: Low dose extrapolation of radiation-related cancer risk, ICRP publication.

**E-Resources:**

<https://www.utoledo.edu>

<https://www.ncbi.nlm.nih.gov>

<https://www.astro.org>

### SEMESTER III

#### PIZOF20 - INDEPENDENT ELECTIVE III B- DAIRYING.

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PIZOF20	Dairying	Theory	Independent Elective	-	2	100

**Objective:**

- To learn the techniques in improved milk production.
- To know the preservation and processing of milk.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Discuss the development and management of dairying.

**CO2:** Explain properties of milk and its composition.

**CO3:** Describe various periods of milking, variations in compositions and equipments used in milking.

**CO4:** Discuss entry of bacteria into milk and types of bacteria.

**CO5:** Explain various methods of pasteurization.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	H	M	H	H	M
CO3	H	H	M	H	H	M
CO4	H	H	M	H	H	M
CO5	H	H	M	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	M	H	M	H
CO4	H	H	M	H	M	H
CO5	H	H	M	H	M	H

**Unit 1:**

1.1: Development of dairying. (K1, K2, K3, K4, K5)

1.2: Cattle population and production of milk. (K1, K2, K3, K4, K5)

1.3: Dietary requirements of milk, milk intake and income levels. (K1, K2, K3, K4, K5)

1.4: Milk production-cost relationship. (K1, K2, K3, K4, K5)

1.5: Utilisation of milk. (K1, K2, K3, K4, K5)

1.6: Nutritive value of milk. (K1, K2, K3, K4, K5)

**Unit 2:**

- 2.1: Lactation, milk as food. (K1, K2, K3, K4, K5)
- 2.2: Udder, secretion of milk, let-down of milk. (K1, K2, K3, K4, K5)
- 2.3: Factors affecting secretion-individuality, feeding, environment and maintenance.  
(K1, K2, K3, K4, K5)
- 2.4: Properties of milk. (K1, K2, K3, K4, K5)
- 2.5: Composition of milk-proteins, fat, lactose, ash and water, vitamins. (K1, K2, K3, K4, K5)
- 2.6: Thermal stability of milk. (K1, K2, K3, K4, K5)

### **Unit3:**

- 3.1: Variations in composition-period preceding milking. (K1, K2, K3, K4, K5)
- 3.2: Time of milking, portion of milk tested. (K1, K2, K3, K4, K5)
- 3.3: Stage of lactation, age of cow, and feed. (K1, K2, K3, K4, K5)
- 3.4: Food value of milk. (K1, K2, K3, K4, K5)
- 3.5: Enzymes in milk. (K1, K2, K3, K4, K5)
- 3.6: Colostrum pre-milking, slimy or ropy milk. (K1, K2, K3, K4, K5)

### **Unit 4:**

- 4.1: Entry of bacteria into milk, water-supply, attendants. (K1, K2, K3, K4, K5)
- 4.2: Unhealthy animals; types of bacteria in milk. (K1, K2, K3, K4, K5)
- 4.3: Effects of bacteria on milk; reducing number of bacteria in milk. (K1, K2, K3, K4, K5)
- 4.4: Milk borne diseases. (K1, K2, K3, K4, K5)
- 4.5: Dairy utensils, cleaning. (K1, K2, K3, K4, K5)
- 4.6: Sterilising utensils and equipment. (K1, K2, K3, K4, K5)

### **Unit 5:**

- 5.1: Pasteurisation of milk in India. (K1, K2, K3, K4, K5)
- 5.2: Holder method of pasteurisation. (K1, K2, K3, K4, K5)
- 5.3: H.T.S.T. method, pasteurising bottled milk. (K1, K2, K3, K4, K5)
- 5.4: Cooling after pasteurisation. (K1, K2, K3, K4, K5)
- 5.5: Homogenisation, grading milk. (K1, K2, K3, K4, K5)
- 5.6: Packing of milk(K1, K2, K3, K4, K5)

### **Books for Study and Reference:**

#### **Textbooks:**

1. The technology of milk Processing – Ananthakrishnan, C.P., Khan, A.Q. and Padmanabhan, P.N. – Shri Lakshmi Publications.
2. Dastur, N. N. and Banerji, B. N Manufacture and Storage of Ghee. Ind. FarminR, IX (7), pp. 78. 1948.

**Reference Books:**

3. International Inst. of Agric., Rome, Dairy Cow Testing throughout the World, 1938.
4. Owe, L. T. and Goldie, J. M., The Student's Handbook of Milk and Milk Products. Worcestershire, Little bury and Company, 1947.
5. HL Rangappa, K. S. and Achayya, K. T., Chemistry and Manufacture of Indian Dairy Products. The Bangalore Printjng and Publishing Co., Ltd., Bangalore, 1948.
6. Report on the Marketing of Milk in the Indian Union, India Government Publication, New Delhi, 1950.

**E-Resources:**

<http://www.asci-india.com>

<https://dgt.gov.in>

<http://www.dahd.nic.in>

## SEMESTER IV

### PIZOG20 - INDEPENDENT ELECTIVE IVA- BIOSYSTEMATICS

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PIZOG20	Biosystematics	Theory	Independent Elective	-	2	100

**Objectives:**

- To understand biological characteristics.
- To learn diversity and evolutionary relationship among the organisms.
- To apply phylogeny classification at species level and infra species level.

**Course Outcomes:**

**On completion of the course the student will be able to...**

**CO1:** Explain the concept, importance and attributes of biosystematics.

**CO2:** Discuss the biological characteristics.

**CO3:** Compute the evolutionary relationship among the organisms.

**CO4:** Familiarize different taxonomic procedures, taxonomic keys and zoological nomenclature.

**CO5:** Apply phylogeny classification at species level and infra species level.

PSO/CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	M	H	H	H	H

CO/PLO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

**Unit 1:**

- 1.1: Introduction & basic concept of biosystematics & taxonomy. (K1, K2, K3, K4, K5)
- 1.2: Rise of Taxonomy - Problems, aims and tasks in taxonomy. (K1, K2, K3, K4, K5)
- 1.3: Taxonomy as a profession. (K1, K2, K3, K4, K5)
- 1.4: Importance & application of biosystematics in biology. (K1, K2, K3, K4, K5)
- 1.5: Chemotaxonomy – Cytotaxonomy. (K1, K2, K3, K4, K5)
- 1.6: Attributes of Taxonomy. (K1, K2, K3, K4, K5)

**Unit 2:**

- 2.1: Types of biological classification (Essentialism, Nominalism, Empirism, Cladism and evolutionary classification). (K1, K2, K3, K4, K5)
- 2.2: Newer Trends in Taxonomy: Morphological approach, Immature stages and embryological approach. (K1, K2, K3, K4, K5)
- 2.3: Ecological Approach, Behavioural Approach. (K1, K2, K3, K4, K5)
- 2.4: Cytological and Biochemical Approaches. (K1, K2, K3, K4, K5)
- 2.5: Numerical taxonomy. (K1, K2, K3, K4, K5)
- 2.6: Differential Systematics. (K1, K2, K3, K4, K5)

**Unit 3:**

- 3.1: Zoological Classification Kinds of classification, phyletic lineages. (K1, K2, K3, K4, K5)
- 3.2: Components of classification - Hierarchy of categories. (K1, K2, K3, K4, K5)
- 3.3: Species concepts, Typological species concept, Nominalistic species concept. (K1, K2, K3, K4, K5)
- 3.4: Biological species concept, Evolutionary species concept, Recognition species concept. (K1, K2, K3, K4, K5)
- 3.5: Kinds of species : Polytypic & monotypic species, subspecies, infraspecific groups. (K1, K2, K3, K4, K5)
- 3.6: Super species, other kind of species. (K1, K2, K3, K4, K5)

**Unit 4:**

- 4.1: Taxonomic procedures, Taxonomic collection. (K1, K2, K3, K4, K5)
- 4.2: Curing of animals & Process of Identification. (K1, K2, K3, K4, K5)
- 4.3: Preservation of specimens. (K1, K2, K3, K4, K5)
- 4.4: Taxonomic Keys - Types, merits & demerits. (K1, K2, K3, K4, K5)
- 4.5: International code of Zoological Nomenclature (ICZN). (K1, K2, K3, K4, K5)
- 4.6: Interpretation of rules of nomenclature. (K1, K2, K3, K4, K5)

**Unit 5:**

- 5.1: Taxonomic Records. (K1, K2, K3, K4, K5)
- 5.2: Publications Taxonomic keys. (K1, K2, K3, K4, K5)
- 5.3: Taxonomic characters description. (K1, K2, K3, K4, K5)
- 5.4: Taxonomic paper. (K1, K2, K3, K4, K5)
- 5.5: Zoological Records. (K1, K2, K3, K4, K5)
- 5.6: Directories, Abstracts, Review. (K1, K2, K3, K4, K5)

**Books for Study and Reference:****Textbooks:**

1. Kapoor V.C. 2010. Theory and practice of animal taxonomy, Oxford and IBH, New Delhi.
2. Ashok Verma, 2015. Principles of Animal Taxonomy, Narosa Publishing house, New Delhi.

**Reference Books:**

3. George Gaylord Simpson, 1990. Principles of animal taxonomy, Columbia University Press, New York.
4. Quicke, D. L. J, 2008. Principles and Techniques of contemporary Taxonomy, Blackie Academic Professional, 310pp.
5. Quentin. T. Wheeler, 2008m The New Taxonomy, The Systematics Association Special Volume Series, 76. (ed.) CPR Press.
6. Theodore Horace Savory, 1970. Animal Taxonomy, University of Michigan.
7. Dr.R.C.Tripathi, Biosystematics & Taxonomymm, University Book House, Jaipur.
8. G.G. Simpson, Principle of Animal Taxonomy: Oxford & IBH Publishing Co.

**E-Resources:**

<http://epgp.inflibnet.ac.in>

<https://onlinelibrary.wiley.com>

<http://www.brainkart.com>

## SEMESTER IV

### PIZOH20 - INDEPENDENT ELECTIVE IV B - GENERAL PSYCHOLOGY

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PIZOH20	General Psychology	Theory	Independent Elective	-	2	100

#### Objectives:

- To understand, predict and control behavior.
- To learn the causes of abnormal behavior.
- To minimize the intensity of real-life problems

#### Course Outcomes:

##### On completion of the course the student will be able to...

CO1: Explain Psychology and its branches.

CO2: Define concept of self and describe the theories of Personality.

CO3: Discuss the need of social psychology.

CO4: Explain Psychopathology.

CO5: Apply the knowledge of psychology in different areas like forensic, family, court etc.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	L	M	M	H	M	M
CO2	L	M	H	H	H	M
CO3	L	M	H	M	H	H
CO4	L	M	M	H	M	M
CO5	L	M	M	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	M	H	H
CO2	H	M	M	H	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	M	H
CO5	H	H	M	M	H	H

#### Unit 1:

1.1: Psychology -Meaning- Scope. (K1, K2, K3, K4, K5)

1.2: Branches. (K1, K2, K3, K4, K5)

1.3: Application of Psychology in Family. (K1, K2, K3, K4, K5)

1.4: Education, Health, Self-Development. (K1, K2, K3, K4, K5)

1.5: Research in Psychology, Research challenges. (K1, K2, K3, K4, K5)

1.6: States of Consciousness.

**Unit 2:**

- 2.1: The Concept of Self. (K1, K2, K3, K4, K5)
- 2.2: Personality – Definition- Structure of personality. (K1, K2, K3, K4, K5)
- 2.3: Dynamic Nature of Personality. (K1, K2, K3, K4, K5)
- 2.4: Personality development- Theories of Personality. (K1, K2, K3, K4, K5)
- 2.5: Psychoanalytic method. (K1, K2, K3, K4, K5)
- 2.6: Personality Evaluation. (K1, K2, K3, K4, K5)

**Unit 3:**

- 3.1: Social Psychology – Aim – Scope- Methods. (K1, K2, K3, K4, K5)
- 3.2: Nature and Need of Social Behavior. (K1, K2, K3, K4, K5)
- 3.3: Sequence of social development- Infancy, Childhood. (K1, K2, K3, K4, K5)
- 3.4: Social maturity, Social Norm. (K1, K2, K3, K4, K5)
- 3.5: Role and Status- Social Interaction. (K1, K2, K3, K4, K5)
- 3.6: Socialization. (K1, K2, K3, K4, K5)

**Unit 4:**

- 4.1: Psychopathology- Abnormal behavior. (K1, K2, K3, K4, K5)
- 4.2: Models- Diagnosing and Classifying disorders. (K1, K2, K3, K4, K5)
- 4.3: Neuroses- Psychoses- Schizophrenia. (K1, K2, K3, K4, K5)
- 4.4: Personality disorders. (K1, K2, K3, K4, K5)
- 4.5: Prevalence of Mental disorders. (K1, K2, K3, K4, K5)
- 4.6: Anxiety Disorder. (K1, K2, K3, K4, K5)

**Unit 5:**

- 5.1: Forensic Psychology- Family Court- Civil Court- Criminal Court. (K1, K2, K3, K4, K5)
- 5.2: Child Abuse Evaluations, Termination of parental rights. (K1, K2, K3, K4, K5)
- 5.3: Adoption Readiness Evaluation. (K1, K2, K3, K4, K5)
- 5.4: Personal Injury Evaluations. (K1, K2, K3, K4, K5)
- 5.5: Psychological factors in physical trauma, Sexual Harassment. (K1, K2, K3, K4, K5)
- 5.6: Alcohol Abuse and Drug Abuse. (K1, K2, K3, K4, K5)

**Books for Study and References:****Textbooks:**

1. Ernest R Hilgard, Richard C Atkinson and Rita L Atkinson – Introduction to Psychology 6<sup>th</sup> Edition- Oxford & IBH Publishing Co. Pvt. Ltd. 1975
2. Chaube S.P. Social Psychology- Second Revised Edition- Lakshmi Narain Agarwal Educational Publishers, Agra- 3. 1995.

**Reference Books:**

3. Robert S. Feldman – Psychology and Your Life - Tata McGraw Hill Education Pvt. Ltd. New Delhi- 2012
4. Lester D Crow and Alice Crow- Child Development and Adjustment- Surjeet Publication- 2008
5. Saundra K Ciccarelli, Noland White J. – Psychology- Pearson 5<sup>th</sup> Ed. 2017
6. Kaila H. L. – Introduction to Psychology – AITBS Publishers- India 2008.

**E-Resources:**

<https://ocw.mit.edu>

<https://libguides.humboldt.edu>

<https://www.oercommons.org>

## SEMESTER IV

### PIZOI20 - INDEPENDENT ELECTIVE IVC- ANIMAL CARE

Year	SEM	Course code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PIZOI20	Animal Care	Theory	Independent Elective	-	2	100

#### Objective

- To impart special knowledge on animals and their relationship.
- To learn to examine sick animals, and understand how diagnostic procedures are applied for determining diseases.
- To learn about animal psychology; innate behaviour and survival.

#### Course Outcomes:

**On completion of the course the student will be able to...**

**CO1:** Exapand knowledge on animal feeding.

**CO2:** Acquire knowledge on requirements for animal accommodation.

**CO3:** Recognize sick animals and diagnostic procedures to determine the disease.

**CO4:** Apply their knowledge in handling, restraining and transporting animals.

**CO5:** Explain animal psychology, innate behavior and survival.

CO/PO	PO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PLO6
CO1	H	H	H	H	M	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	M	H

#### Unit 1:

1.1: Animal Care- Scope. (K1, K2, K3, K4, K5)

1.2: Animal feeding: Types of feeder. (K1, K2, K3, K4, K5)

1.3: Nutritional requirements; vitamins, minerals. (K1, K2, K3, K4, K5)

1.4: Choosing and preparing food. (K1, K2, K3, K4, K5)

1.5: Quantity and timing of feeding. (K1, K2, K3, K4, K5)

1.6: Supplements. (K1, K2, K3, K4, K5)

**Unit 2:**

- 2.1: Animal accommodation. (K1, K2, K3, K4, K5)
- 2.2: Housing requirements. (K1, K2, K3, K4, K5)
- 2.3: Bedding materials. (K1, K2, K3, K4, K5)
- 2.4: Fixtures and fittings. (K1, K2, K3, K4, K5)
- 2.5: Cleaning and maintaining. (K1, K2, K3, K4, K5)
- 2.6: Waste disposal. (K1, K2, K3, K4, K5)

**Unit 3:**

- 3.1: Animal health: Disease prevention. (K1, K2, K3, K4, K5)
- 3.2: Common diseases of dogs, cats and rabbits. (K1, K2, K3, K4, K5)
- 3.3: Endoparasites and ectoparasites. (K1, K2, K3, K4, K5)
- 3.4: Signs of ill health. (K1, K2, K3, K4, K5)
- 3.5: First aid procedures. (K1, K2, K3, K4, K5)
- 3.6: Remedies. (K1, K2, K3, K4, K5)

**Unit 4:**

- 4.1: Handling, restraining and moving animals. (K1, K2, K3, K4, K5)
- 4.2: Need for handle, restrain and move animals. (K1, K2, K3, K4, K5)
- 4.3: Personal protective equipment. (K1, K2, K3, K4, K5)
- 4.4: Handling equipment. (K1, K2, K3, K4, K5)
- 4.5: Restraint equipment. (K1, K2, K3, K4, K5)
- 4.6: Reducing stress. (K1, K2, K3, K4, K5)

**Unit 5:**

- 5.1: Animal behaviour; Normal behaviour; Emotions. (K1, K2, K3, K4, K5)
- 5.2: Abnormal behaviour. (K1, K2, K3, K4, K5)
- 5.3: Stereotypic behaviour. (K1, K2, K3, K4, K5)
- 5.4: Observing behaviour; methods and recording. (K1, K2, K3, K4, K5)
- 5.5: Avoiding/ reducing abnormal behaviour. (K1, K2, K3, K4, K5)
- 5.6: Environmental enrichment. (K1, K2, K3, K4, K5)

**Books for Study and Reference:****Textbooks:**

1. Staff of ACS distance education. Animal feed and nutrition- ISBN NO: 979-0-9942948.
2. Dr. Pitcarins complete guide to natural health for dogs and cat. Published by Rodale books 2005.

**Reference Books:**

1. Carol Ekarius -Animal housing
2. Julie Massoni, Health pets naturally published in 2014
3. Martin Goldstein, The Nature of Animal Healing. Published by Ballantine books, 1999.
4. D. Broom, Domestic animal behavior and welfare published by CABI, 2007.

**E-Resources:**

<https://olaw.nih.gov>

<https://www.academia.edu>

<http://www.sanjaygandhianimalcarecentre.org>

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# **Department of Business Administration (PG)**

## **SYLLABUS AND REGULATIONS**

**Under**

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

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**Gandhi Nagar, Vellore-632 006**

**Department of Business Administration (PG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighboring districts.

**B) NAME OF THE PROGRAMME: MBA**

**Vision:**

To empower and mould young women students in professional, ethical, social and environmental dimensions with high degree of entrepreneurial and managerial competence so that they can integrate their skills to serve the industry and society globally.

**C) ELIGIBILITY CRITERIA OF THE PROGRAMME**

The prospective applicant must satisfy one of the following eligibility criteria for admissions to the MBA programme. A graduate degree under 10+2+3 or 10+2+4 pattern under any discipline, securing at least 50% marks in aggregate, from a recognized university.

**D) COURSE CURRICULUM GUIDELINES**

***Choice Based Credit System (CBCS):*** The MBA Degree programme is offered through a unique Choice Based Credit System'. Under Choice Based Credit System, subjects are classified into Core, Non Core, Employability Skill and Independent Elective papers.

**Core(C)** subjects are compulsory. The prescribed syllabi of the Core Subjects will help the students to acquire mastery over the fundamental concepts, in-depth knowledge of the respective discipline and get updated with the latest developments in the subject.

**Non Core (N)** subjects are compulsory. The prescribed syllabi of the Non Core Subjects are supportive to substantiate the core papers.

**Employability Skill (E)** subjects are job-oriented skill and need-based, designed to develop skills in the student to enhance her Opportunities for acquiring a suitable job.

**Independent Elective (I)** subjects are based on the choice of the students from among the list offered by the Department. At least one paper per semester is compulsory. The students can opt for a maximum of three self-study papers that will add an advantage of gaining extra credits.

### **Testing, Assessing and Valuation**

**Weightage of Marks:** The weightage of marks between Continuous Internal Assessment and End Semester Examination shall be 40 and 60 respectively.

**Passing Minimum:** A student is declared to have passed a given subject only when she secures a minimum of 30 (out of 60) marks in the end-semester examination and an aggregate of 50% marks (both Internal and End-Semester Examination put together). There is no minimum passing marks for the internal assessment component.

**Continuous Internal Assessment Components:** The weightage of 40 marks for Internal Assessment Components shall consist of the following components.

- Two written tests each of two hours duration for 50 marks will be conducted. The tests will be conducted centrally. The average of two such CA is calculated for 35 marks. Syllabus of not less than two units shall be included for each CA. There is no passing minimum for CA.
- 5 marks includes the innovative method of testing during class hours by the staff in charge of the subject in the form of assignments/ quiz/ seminars/ presentations/ online/open book/ Viva voce/ group work/ mini project/ exhibition, etc. The topic and time for submission/presentation will be announced by the staff member in charge of the subject in advance. Each student should explain and defend her presentation.

### **Evaluation of End Semester Written Examination**

- The End Semester Examination shall be evaluated for a weightage of 100 marks and this will be evaluated by the panel of examiners that consists of both internal and external examiners.
- The valuation will be centralized.
- A student has a maximum period of five years from the Date of Admission to clear all the subjects prescribed for the programme at the time of her admission. After the fifth year, to complete the programme, the student has to appear for an examination in the same/equivalent paper offered under the revised syllabus structure.

### ***Question Paper Pattern***

The question paper pattern for the end semester written examination shall be as given below

<b><i>Section A-</i></b> 8 questions carrying 5 marks each out of 10 (Open Choice)	<b>8x5 = 40marks</b>
<b><i>Section B-</i></b> 3 questions out of 5 (Open Choice)	<b>3x15= 45 marks</b>
<b><i>Section C-</i></b> A compulsory question/Case Study in the relevant subject	<b>1x15=15 marks</b>
Total	<b>100 marks</b>

***Attendance:*** Each student should obtain 75 per cent attendance to be eligible for appearing for the End Semester Examination.

### ***Revaluation***

- A student can apply for the photocopy of answer scripts, if needed, on payment of the prescribed fee.
- A student can apply for revaluation of any paper on payment of the prescribed fee within the specified date.
- Receipt of the photocopy of the answer script is a pre- requisite for revaluation.

### ***Re-Examination***

After the declaration of the results of the final semester, a student can apply by the specified date, for re-examination in not more than three papers. This facility is available only for those students who have not obtained a pass in maximum of three papers. The examination will be conducted and results published within a month of the first publication of the result.

### ***Note***

A student can report any grievance regarding CA or SE, to the Controller of Examinations, who in turn, will present the same to the Examination Committee, Chaired by the Principal.

### **Classification of Successful Candidates**

Conversion of Marks to Grade Points and Letter Grade

<b>Range(Percentage)</b>	<b>Letter Grade</b>	<b>Grade Point</b>	<b>Description</b>
90 – 100	S	10	Outstanding
80 – 89	A	8	Distinction
70 – 79	B	7	Good
60 – 69	C	6	Average
50 – 59	D	5	Pass
00 – 49	F	2	Fail
Absent for Final Exam	E	1	Exposure
Lack of Attendance	I	0	Incomplete

### **Calculation of Grade Point Average**

Based on the average grades obtained by a candidate, the Grade Point Average (CGPA) is calculated.

E) List of Courses

**SEMESTER I**

Code	Subject	Core/ Non core	Hours/Week			Credit	Max Marks		
			L	T	P		CA	SE	Total
<b>PCBAA20</b>	Management Process	<b>C</b>	5	1		3	40	60	100
<b>PCBAB20</b>	Organizational Behavior	<b>C</b>	5	1		3	40	60	100
<b>PCBAC20</b>	Economics for Management	<b>C</b>	5	1		3	40	60	100
<b>PCBAD20</b>	Accounting for Management	<b>C</b>	5	1		3	40	60	100
<b>PCBAE20</b>	Business Research Methods	<b>N</b>	5	1		2	40	60	100
<b>PCBAF20</b>	Management Information System and Technology	<b>N</b>	5	1		2	40	60	100
<b>PIBAB20</b>	Independent Elective *(Disaster Management)	<b>I</b>	-	-		2	40	60	100
<b>PJBAA20</b>	1. English for Professional Communication	<b>E</b>			4	2			
<b>PJBAB20</b>	2. MS Office and Advanced Excel	<b>E</b>			2	2	100	-	100
	<b>Total</b>		<b>30</b>	<b>6</b>	<b>6</b>	<b>22</b>	<b>900</b>		

**SEMESTER II**

Code	Subject	Core/ Non core	Hours/Week			Credit	Max Marks		
			L	T	P		CA	SE	Total
<b>PCBAG20</b>	Supply Chain Management	<b>C</b>	5	1		3	40	60	100
<b>PCBAH20</b>	Marketing Management	<b>C</b>	5	1		3	40	60	100
<b>PCBAI20</b>	Human Resource Management	<b>C</b>	5	1		3	40	60	100
<b>PCBAJ20</b>	Financial Management	<b>C</b>	5	1		3	40	60	100
<b>PCBAK20</b>	Applied Operations Research for Management	<b>N</b>	5	1		2	40	60	100
<b>PCBAL20</b>	Enterprise Resource Planning	<b>N</b>	5	1		2	40	60	100
<b>PIBAM20</b>	Independent Elective *(Human Rights)	<b>I</b>	-	-		2	40	60	100
<b>PJBAC20</b>	Innovation and Start up Management	<b>E</b>			4	2	100	-	100
<b>PJBAD20</b>	Accounting Software	<b>E</b>			2	2	100	-	100
	<b>Total</b>		<b>30</b>	<b>6</b>	<b>6</b>	<b>22</b>	<b>900</b>		

### SEMESTER – III

Code	Subject	Core/ Non core	Hours/Week			Credit	Max Marks		
			L	T	P		CA	SE	Total
<b>PCBAM20</b>	Business Law	<b>C</b>	5	1		3	40	60	100
<b>PCBAN20</b>	Strategic Management	<b>C</b>	5	1		3	40	60	100
-	Elective I	<b>C</b>	5	1		3	40	60	100
-	Elective II	<b>C</b>	5	1		3	40	60	100
-	Elective III	<b>C</b>	5	1		3	40	60	100
-	Elective IV	<b>C</b>	5	1		3	40	60	100
-	Independent Elective	<b>I</b>	-	-		2	40	60	100
<b>PJBAE20</b>	Stock Trading	<b>E</b>	0	0	2	2	100	-	100
<b>PJBAF20</b>	*Institutional Training	<b>E</b>	0	0	4	2	100	-	100
	<b>TOTAL</b>		<b>30</b>	<b>6</b>	<b>6</b>	<b>24</b>	<b>900</b>		

### SEMESTER - IV

Code	Subject	Core/ Non core	Hours/Week			Credit	Max Marks		
			L	T	P		CA	SE	Total
<b>PCBAO20</b>	Production and Operations Management	<b>C</b>	5	1	0	3	40	60	100
<b>PCBAP20</b>	International Business and Ethics	<b>C</b>	5	1	0	3	40	60	100
-	Elective V	<b>C</b>	5	1		3	40	60	100
-	Elective VI	<b>C</b>	5	1		3	40	60	100
-	Independent Elective	<b>I</b>	-	-	-	2	40	60	100
<b>PCBAQ20</b>	Project Work	<b>C</b>	0	0	6	6	100	-	100
<b>PCBAR20</b>	Comprehensive Viva- Voce	<b>C</b>	0	0	0	4	100	-	100
	<b>TOTAL</b>		<b>20</b>	<b>4</b>	<b>6</b>	<b>24</b>	<b>700</b>		

## LIST OF ELECTIVES

<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>MARKETING ELECTIVES</b>					
PEMKA20	Retail Marketing	4	1	0	3
PEMKB20	Services Marketing	4	1	0	3
PEMKC20	Advertising & Sales Promotion	4	1	0	3
<b>FINANCE ELECTIVES</b>					
PEFNA20	Security Analysis and Portfolio Management	4	1	0	3
PEFNB20	Merchant Banking and Financial Services	4	1	0	3
PEFNC20	Risk and Derivative Management	4	1	0	3
<b>HUMAN RESOURCE ELECTIVES</b>					
PEHRA20	Compensation and Reward Management	4	1	0	3
PEHRB20	Training and Development	4	1	0	3
PEHRC20	Industrial Relations	4	1	0	3
<b>SYSTEMS ELECTIVES</b>					
PESSA20	Cloud Computing	4	1	0	3
PESSB20	Digital Business and E Commerce	4	1	0	3
PESSC20	Decision Support and Business Intelligence	4	1	0	3
<b>HEALTH CARE MANAGEMENT ELECTIVES</b>					
PEHCA20	Hospital Design and Operations Management	4	1	0	3
PEHCB20	Hospital Materials and Equipment Management	4	1	0	3
PEHCC20	Hospital Quality Management and Legal Aspects	4	1	0	3
<b>LOGISTICS ELECTIVES</b>					
PELMA20	Logistics Management	4	1	0	3
PELMB20	Export and Import Management	4	1	0	3
PELMC20	Green Supply Chain Management	4	1	0	3

## LIST OF INDEPENDENT ELECTIVE PAPERS

S. No.	Paper Code	Title of the Paper
<b>SEMESTER I</b>		
1	PIBAA20	Management Concepts in Thirukural
2	PIBAB20	*Disaster Management
3	PIBAC20	Industrial Safety and Pollution Management
<b>SEMESTER II</b>		
4	PIBAD20	Event Management
5	PIBAE20	Family Business Management
6	PIBAF20	Mall Management
7	PIBAM20	*Human Rights
<b>SEMESTER III</b>		
8	PIBAG20	Innovation and Creativity Management
9	PIBAH20	Rural Marketing
10	PIBAI20	Travel and Tourism Management
<b>SEMESTER IV</b>		
11	PIBAJ20	Cyber Security and Laws
12	PIBAK20	Management of Multinational Corporation
13	PIBAL20	Work-Life Balance and Emotional Intelligence Management

\*Compulsory paper Disaster Management to be studied in Semester I

\*Compulsory paper Human Rights to be studied in Semester II offered by College

## F) PROGRAMME OBJECTIVES (PO)

**PO 1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.

**PO 2:** Assimilate and apply principles and concepts towards skill development and employability.

**PO 3:** Apply critical and scientific approaches to address problems and find solutions.

**PO 4:** Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO 5:** Integrate issues of social relevance in the field of study.

**PO 6:** Persist in life-long learning for personal and societal progress.

## G) PROGRAMME SPECIFIC OUTCOMES (PSO)

**PSO 1:** At the end of the course the students shall be able to conceptualize, critically analyse, provide solutions to problems challenging real-life situations, gain practical exposure in Business and Management.

**PSO 2:** Students gain the ability to synthesize knowledge with skills in the areas of Business and Management and can provide innovative and entrepreneurial solutions to job-related problems.

**PSO 3:** Students can objectively research on business and management problems by collecting, analysing, and interpreting the data and professionally recommend feasible solution/s.

**PSO 4:** Students will understand the professional, legal, ethical, and environmental responsibilities and will be committed towards them.

**PSO 5:** Students develop self-learning skills, and remain updated on contemporary management practices and can leverage their learning to provide solutions to business problems.

**PSO 6:** The students can function effectively as an individual and in a group with the capacity to be a team leader, as an entrepreneur, and administrator.

PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	2	2	3	3	3	3
PSO2	3	3	3	3	2	3
PSO3	2	3	3	3	2	2
PSO4	3	1	2	1	3	2
PSO5	3	2	3	3	1	3
PSO6	2	3	2	2	2	2

(STRONGLY CORRELATED - 3, MODERATELY CORRELATED - 2, WEAKLY CORRELATED -1)

## SEMESTER – I

### PCBAA20 - MANAGEMENT PROCESS

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / I	PCBAA20	Management Process	Theory	Core	6	3	100

#### OBJECTIVES

1. To understand the functions of management and to strengthen the knowledge about the basic approaches to management.
2. To learn the fundamentals and the process of planning and decision making.
3. To attain in depth knowledge about the types of organization.
4. To know the process of recruitment, selection and appraisal.
5. To understand the various leadership styles adopted in the organization and the controlling techniques of management.

#### COURSE OUTCOMES

The learners will be able to

CO1: Attain the knowledge of the functions and importance of management.

CO2: Be confident on the planning and decision making process involved in organization as well as in personal life.

CO3: Come to know about the types of organization and equip themselves accordingly in their career ahead.

CO4: Understand the process of recruitment, selection and appraisal, the students prepare themselves to meet the needs of the industry.

CO5: Adopt a style of leadership and practice controlling techniques when they start their career in the field.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	L	L	M
CO2	H	H	H	H	L	H
CO3	L	H	M	H	M	M
CO4	M	H	M	H	M	M
CO5	M	M	M	L	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	L	L	L
CO2	M	H	H	L	H	M
CO3	M	H	H	M	M	H
CO4	M	M	H	M	M	L
CO5	M	H	H	L	H	M

HIGH(3), M-MODERATE(2), L-LOW(1)

## **Unit I – Introduction to Management**

**(15 hours)**

- 1.1 Definition of Management-Evolution of Management -Science or Art (K1,K2,K3)
- 1.2 Functions of management-History of management-Management and Administration. (K1,K2,K3)
- 1.3 Levels of Management - Management skills (K1,K2,K3,K4)
- 1.4 Types of manager and the role of a Manager- Manager Versus Entrepreneur(K1,K2,K3)
- 1.5 Contribution of Fayol, Taylor, Elton and Drucker– Approaches to Management(K1,K2,K3)
- 1.6 Types of Business organization – Sole proprietorship, partnership, company-public and private sector enterprises – Current trends in Management. (K1,K2,K3,K4)

## **Unit II - Planning and Decision making**

**(15 hours)**

- 2.1 Planning meaning- Importance-Types of plan- Steps in Planning (K1,K2,K3)
- 2.2 Strategies-Policies (K1,K2,K3)
- 2.3 SWOT analysis- Objectives – Setting objectives(K1,K2,K3, K4)
- 2.4 Decision Making – Importance and limitations – Steps in decision making (K1,K2,K3)
- 2.5 Types – Tools and Techniques (K1,K2,K3,K4)
- 2.6 Strategic Management - Span of Management (K1,K2,K3,K4)

## **Unit III – Organization**

**(15 hours)**

- 3.1 Meaning – Formal and Informal – The nature of organizing Organization Chart and Manual (K1,K2,K3, K4)
- 3.2 Organization Structure - Line / Staff authority (K1,K2,K3)
- 3.3 Power and Authority (K1,K2,K3)
- 3.4 Delegation (K1,K2,K3)
- 3.5 Departmentation- Centralization and Decentralization (K1,K2,K3)
- 3.6 Effective organizing and organization culture and diversity(K1,K2,K3, K4)

## **Unit IV – Staffing**

**(15 hours)**

- 4.1 Human resource management – Recruitment – Process - Types - Sources (K1,K2,K3, K4)
- 4.2 Selection – Process- Types of tests (K1,K2,K3,K4)
- 4.3 Interview Types and Techniques - Barriers (K1,K2,K3)
- 4.4 Group Discussion - Performance appraisal –Need- Importance - Methods (K1,K2,K3)
- 4.5 Training and Development– Process- Methods (K1,K2,K3)
- 4.6 Career Planning (K1,K2,K3, K4)

## **Unit V – Directing and Controlling**

**(15 hours)**

- 5.1 Motivation - Motivation Theories – Types - Techniques (K1,K2,K3, K4)
- 5.2 Leadership - Theories- Qualities of leader- Leader vs. Manager- Committees(K1,K2,K3,K4)
- 5.3 Communication -Types-Importance - Barriers(K1,K2,K3, K4)
- 5.4 Controlling -Need -The system and process of controlling – Control techniques (K1,K2,K3, K4)
- 5.5 MBO -MBE- Direction- Supervision (K1,K2,K3,K4)
- 5.6 Coordination Concept, Importance, Principles and Techniques of Coordination, (K1,K2,K3,K4)

**Note:** Case studies for all Units. (K5,K6)

### **Text Books**

1. Harold Koontz, Heinz Weihrich – Essentials of Management, An International, Innovation, and Leadership Perspective, 10<sup>th</sup> Edition, Mc Graw Hill Education,2015
2. C.B. Gupta – Business Management , 9<sup>th</sup> Edition – Sultan ChandPublication,2013

## **Reference Books**

1. Chuck Williams, Management: Principles of Management , Cengage Learning, 8<sup>th</sup> Student Edition, 2015
2. Stephen P. Robins, Principles of Business Management, Pearson Education, 6<sup>th</sup> Edition, 2012.

## **Websites**

1. <http://www.managementstudyguide.com/>
2. [www.edx.org .learn .management](http://www.edx.org/learn/management)

## SEMESTER I

### PCBAB20 - ORGANIZATIONAL BEHAVIOR

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / I	PCBAB20	Organizational Behavior	Theory	Core	6	3	100

#### OBJECTIVES

1. To give a comprehensive view on the behavior of individuals and groups within diverse organizations and on organizational structure and processes.
2. To introduce students to theories and concepts of organizational behavior, increase knowledge and understanding of organizational behavior terminology and main concepts.
3. To develop students' skills in organizational behavior analysis, by providing practice in assessing organizational behavior problems.
4. To acquaint the students with the determinants of intra -individual, inter-personnel and inter group behaviour in organisational setting and to equip them with behavioural skills in managing people at work.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Asses an organization and classify the contributing disciplines, approaches to OB

**CO2:** Acquire knowledge in applying personality traits and motivational theories.

**CO3:** Analyze the behavior of individuals and groups in organizations in terms of key factors.

**CO4:** Ability to comprehend the leadership skills and effective communication systems.

**CO5:** Assess the potential effects of organizational factors develop skills in handling stress and manage Quality of work life.

CO	PO					
	1	2	3	4	5	6
CO1	H	L	H	H	H	L
CO2	M	M	M	M	L	H
CO3	H	M	M	M	H	H
CO4	H	H	M	M	H	H
CO5	M	H	H	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	L	M	L
CO2	M	M	H	L	M	L
CO3	H	L	M	L	H	M
CO4	H	M	M	M	M	L
CO5	H	L	L	L	L	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit - I Focus and Purpose****(15 hours)**

- 1.1 Definition , Need (K1,K2,K3)
- 1.2 Importance of Organizational Behavior , Nature (K1,K2,K3)
- 1.3 Scope , Framework , Organizational behavior models (K1,K2,K3)
- 1.4 Challenges of OB ,Role of OB (K1,K2,K3)
- 1.5 Diversity in Organizations-Discrimination-Biographical Characteristics (K1,K2,K3)
- 1.6 Disabilities, Implementing Diversity Management Strategies (K1,K2,K3)

**Unit – II Individual Behavior****(15 hours)**

- 2.1 Personality, Types, Factors influencing personality (K1, K2, K3)
- 2.2 Theories, Learning, Types of Learners (K1, K2, K3)
- 2.3 Learning process, Learning theories, Organizational behavior modification (K1, K2, K3)
- 2.4 Emotional Intelligence, Attitudes, Characteristics, Components, Formation (K1, K2, K3)  
Measurement, Values, Perception, Importance
- 2.5 Factors influencing perception, Impression Management (K1, K2, K3)
- 2.6 Motivation, Theories, Maslow, Herzberg, Mc Clelland, Vrooms , X and Y Theory (K1, K2, K3)

**Unit – III Group Behavior****(15 hours)**

- 3.1 Groups in organizations, Influence (K1, K2, K3, K4)
- 3.2 Group dynamics (K1, K2, K3, K4)
- 3.3 Formal and informal (K1, K2, K3, K4)
- 3.4 Group cohesiveness, Group decision making techniques (K1, K2, K3, K4)
- 3.5 Interpersonal behaviour (K1, K2, K3, K4)
- 3.6 Work teams, Concept,Types, Effective teams (K1, K2, K3, K4)

**Unit – IV Leadership and Power****(15 hours)**

- 4.1 Meaning, Importance (K1, K2, K3, K4)
- 4.2 Leadership styles, Theories, Leaders Vs Managers (K1, K2, K3, K4)
- 4.3 Sources of power, Power centers (K1, K2, K3, K4)
- 4.4 Power and politics, Communication (K1, K2, K3, K4)
- 4.5 Functions, Model, Choice of Communication (K1, K2, K3, K4)
- 4.6 Barriers to Effective Communication (K1, K2, K3, K4)

**Unit – V Dynamics of Organizational Behavior****(15 hours)**

- 5.1 Organizational Change, Importance (K1, K2, K3, K4)
- 5.2 Stability Vs change, Proactive Vs Reactive change (K1, K2, K3, K4)
- 5.3 Change process, Resistance to change, Managing change , Stress (K1, K2, K3, K4)
- 5.4 Work stressors, Prevention and management of stress (K1, K2, K3, K4)
- 5.5 Balancing work and life, Organizational Development (K1, K2, K3, K4)
- 5.6 Characteristics, Objectives, Organizational interventions(K1, K2, K3, K4)

**Note:** Case studies for all units. (K5,K6)

## **Text Books**

1. Stephen P. Robins, Organizational Behavior, PHI Learning Pearson Education, 11<sup>th</sup> Edition, 2008.
2. Stephen P. Robbins, Timothy A. Judge, Neharika Vohra, Organizational Behavior, PHI Learning Pearson Education, 18<sup>th</sup> Edition, 2019.

## **References**

1. Schermerhorn, John Wiley, Hunt and Osborn, Organizational Behavior, 9<sup>th</sup> Edition, 2008.
2. Udai Pareek, Understanding Organizational Behavior, Oxford Higher Education, 2<sup>nd</sup> Edition, 2004.

## **Websites**

1. [www.obweb.org](http://www.obweb.org)
2. [www.coursera.org](http://www.coursera.org)

## SEMESTER - I

### PCBAC20 - ECONOMICS FOR MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / I	PCBAC20	Economics for Management	Theory	Core	6	3	100

#### OBJECTIVES

1. To gain knowledge about the basic concepts of economics
2. To attain in depth understanding of day today basic elements that drive the economics
3. To acquire the familiarity with the elements of production required in the current corporate scenario
4. To imbibe awareness about the pricing in the current market which serves as the basic elements of personal and professional life
5. To empower the wards about the economic issues that is ethically important as sincere citizens of India.

#### COURSE OUTCOMES (CO)

The learners will be able to

**CO1:** Understand the concept of Economics

**CO2:** Acquire the acquaintance of Demand and Supply

**CO3:** Apply the Conception of Cost Production Function

**CO4:** Understand the assumption of pricing and Market competition

**CO5:** Acquire the knowledge on Macroeconomics, Inflation

CO	PO					
	1	2	3	4	5	6
CO1	L	H	M	L	H	L
CO2	L	M	L	M	H	M
CO3	L	M	L	M	M	M
CO4	M	M	M	M	M	H
CO5	M	L	M	M	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	L	L	M	H
CO2	H	H	H	L	H	H
CO3	H	H	H	L	H	H
CO4	H	H	H	M	M	H
CO5	H	H	H	M	M	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I: Introduction to Concepts of Economics****(15 hours)**

- 1.1 Definition, Scope, Types, Kinds (K1, K2,)
- 1.2 Themes, Macro and Micro Econometrics, Problems (K1, K2,)
- 1.3 Production Possibility Frontier, Efficiency, Market Mechanisms (K1, K2, K3)
- 1.4 Role of Government, Rise of Welfare State (K1, K2, K3, )
- 1.5 Consumption Function, Investment Function, (K1, K2, K3)
- 1.6 Marginal Efficiency, Multiplier, Accelerator (K1, K2, K3, K4)

**Unit II: Elements of Supply & Demand****(15 hours)**

- 2.1 Demand and Supply Analysis, (K1, K2,)
- 2.2 Laws of Supply and Demand (K1, K2)
- 2.3 Elasticity of Demand and Supply, Types (K1, K2)
- 2.4 Equilibrium and Changes in Market Equilibrium- (K1, K2, K3)
- 2.5 Demand Forecasting, Techniques (K1, K2, K3)
- 2.6 Demand Forecasting for New Products.(K1, K2, K3, K4)

**Unit III: Cost Production Function****(15 hours)**

- 3.1 Law of Diminishing Utility (K1, K2,)
- 3.2 Indifference Curve (K1, K2,)
- 3.3 Cost of Production (K1, K2, K3, K4)
- 3.4 Short and Long Run Cost Function- (K1, K2, K3)
- 3.5 Economies of Scale (K1, K2, K3)
- 3.6 Dis-Economies of Scale (K1, K2, K3)

**Unit IV: Theory of pricing and Market competition****(15 hours)**

- 4.1 Pricing (K1, K2,)
- 4.2 Equilibrium of Firm (K1, K2,)
- 4.3 Perfect Competition, Monopoly and Price Discrimination (K1, K2, K3)
- 4.4 Revenue, Types and Relationship- (K1, K2, K3)
- 4.5 Monopolistic and Oligopoly Competition (K1, K2, K3)
- 4.6 Stabilization Policies (K1, K2, K3, K4,)

**Unit V - Macro Economics, Inflation****(15 hours)**

- 5.1 Business Cycle (K1, K2,)
  - 5.2 Challenges of Economic Development, Unemployment, (K1, K2, K3)
  - 5.3 Macroeconomics (K1, K2, K3)
  - 5.4 National Income and Expenditures (K1, K2, K3)
  - 5.5 Macro Economic Aggregates (K1, K2, K3, K4)
  - 5.6 Inflation and Deflation (K1, K2, K3)
- Note:** Case studies for all Units.(K5.K6)

### **Text Books**

1. P. L. Mehta – Managerial Economics, 13<sup>th</sup> Edition – Sultan Chand and Sons, New Delhi, Reprint2007.
2. Dr. H.L.Ahuja Managerial Economics – Chand publication 8th edition 2014

### **Reference Books**

1. Geetika, Piyali Ghosh, Purba Roy Choudhury – Managerial Economics – Third Edition, Tata Mc Graw Hill,2018.
2. N. Gregory Mankin – Principles of Economics, 3<sup>rd</sup> Edition – Thomson Learning, New Delhi,2007.

### **Websites**

1. [www.tutor2u.net](http://www.tutor2u.net) .economics
2. [www.edx.org](http://www.edx.org)

## SEMESTER – I

### PCBAD20 - ACCOUNTING FOR MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/ W	Credits	Marks
I / I	PCBAD20	Accounting for Management	Problem	Core	6	3	100

#### OBJECTIVES

To enable the students to understand the principles , concepts , conventions and preparation of financial statements.

1. To enable the students understand and prepare Financial Statement Analysis.
2. To give practical knowledge over the most important tools of analysis and interpretation of Financial Statements
3. To enable the students understand the concept of Cost Accounting, the elements of Cost and methods of Costing
4. To make understand the learners and to give practical knowledge over the most important techniques of Management Accounting.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Be able to acquire depth knowledge in Accounting and will be capable of preparing financial income statement and financial balance sheet.

**CO2:** Be capable of preparing analysis and interpreting financial statements using various tools.

**CO3:** Gain knowledge how to prepare fund flow statement and cash flow statement and using the same for decision making in business.

**CO4:** Gains knowledge on the concepts of management and cost accounting techniques, preparation of cost sheet, valuation of stock, pricing of material issues and prepare accounting for stage wise production under different process.

**CO5:** Acquire Knowledge to help the management in decision making in the form of preparing budgets and price fixation.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	L	L	L	M
CO2	M	M	L	M	L	M
CO3	H	M	M	M	M	M
CO4	M	H	M	L	L	L
CO5	L	H	L	L	L	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit 1 – Financial Accounting**

**(15 Hours)**

- 1.1 Introduction to Financial Accounting (K1, K2, K3)
- 1.2 Cost Accounting (K1, K2, K3)
- 1.3 Management Accounting (K1, K2, K3)
- 1.4 Generally accepted accounting principles, conventions and concepts (K1, K2, K3)
- 1.5 Balance Sheet and related concepts (K1, K2, K3)
- 1.6 Profit and Loss account and related concepts (K1, K2, K3)

**Unit II – Analysis of Financial Statement – I**

**(15 Hours)**

- 2.1 Analysis of financial statements – Objectives – Comparative Income statement – Comparative position statement (K1, K2, K3, K4)
- 2.2 Common size Income statement – Common size position statement (K1, K2, K3, K4)
- 2.3 Trend analysis (K1, K2, K3, K4)
- 2.4 Financial ratio analysis (K1, K2, K3, K4)
- 2.5 Profitability analysis – Solvency analysis (K1, K2, K3, K4)
- 2.6 Liquidity analysis – Turnover ratios (K1, K2, K3, K4)

**Unit III – Analysis of Financial Statement – II**

**(15 Hours)**

- 3.1 Cash concept – Sources and applications of cash flow (K1, K2, K3, K4)
- 3.2 Cash from operation (K1, K2, K3, K4)
- 3.3 Cash flow (as per Accounting Standard 3) (K2, K3, K4)
- 3.4 Concepts of funds – Meaning of funds flow (K2, K3, K4)
- 3.5 Working Capital concepts of funds – Schedule of changes in working capital (K2, K3, K4)
- 3.6 Funds from operations – Funds flow statement analysis – Difference between Cash flow and Funds Flow (K2, K3, K4)

**Unit IV – Cost Accounting**

**(15 Hours)**

- 4.1 Cost accounts – Need for cost accounts – Classification of costs (K1, K2, K3, K5)
- 4.2 Cost sheet (K3, K5)
- 4.3 Material FIFO, LIFO (K1, K3, K5)
- 4.4 Labour – Taylor, Merrick, Gantt, (K3, K4, K5)
- 4.5 Overheads – Allocation and Apportionment (K3, K4, K5)

4.6 Process costing. (K1,K3, K5)

## **Unit V – Management Accounting**

**(15 Hours)**

5.1 Marginal Costing (K1,K2,K3, K5)

5.2 Break even Analysis – Break Even Point (K1, K2, K3, K5)

5.3 CVP Analysis- Margin of safety – PV ratio (K1, K2, K3, K5)

5.4 Budgetary Control – Production Budget (K1, K2, K3, K5)

5.5 Sales Budget – Cash Budget (K1, K2, K3, K5)

5.6 Fixed and Flexible Budget. (K1,K2, K3, K5)

**Note:** 80% problems and 20% theory

### **Text Books**

1. S.P.Jain & K.L. Narang – Advanced Accountancy, Kalyani Pulishers , Delhi, 7<sup>th</sup> Revised Edition, 2008
2. T.S. Reddy and Y. Hari prasad Reddy – Cost and Management Accounting – Margham Publications 2017.

### **Reference Books**

1. S.P. Iyengar – Cost and Management Accounting, 4<sup>th</sup> Edition – Sultan Chand & Sons, 2008.
2. Khan and Jain – Management Accounting, 6<sup>th</sup> Edition – Tata McGraw Hill, 2012

### **Websites**

1. [www.accountingprinciples.com](http://www.accountingprinciples.com)
2. [www.edx.org](http://www.edx.org)

## SEMESTER- I

### PCBAF20 - MANAGEMENT INFORMATION SYSTEM AND TECHNOLOGY

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / I	PCBAF20	Management Information System and Technology	Theory	Core	6	2	100

#### OBJECTIVES

1. To gain domain knowledge in all aspects of management information system and technology
2. To enhance the managerial skills using information system
3. To implement the conceptual and practical management concepts using information system and technology in the workplace.
4. To adhere the values and ethics relevant to the business environment.
5. To master in developing the information system and technology to work in an organization as a team or to start an enterprise.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand about management information system concepts and resources.

**CO2:** Be able to analyze various concepts of information technology.

**CO3:** Be able to classify the different functional business systems using information system and technology and can implement in their organization.

**CO4:** Enhance the planning and developing skills and master in business IT environment.

**CO5:** Adhere ethical responsibility of business concepts.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	L	L	L	M
CO2	H	M	M	L	L	M
CO3	M	M	M	M	M	M
CO4	M	M	M	M	M	H
CO5	L	M	L	M	H	H

	PSO					
	1	2	3	4	5	6
CO1	H	L	M	M	M	H
CO2	H	M	M	H	M	L
CO3	H	M	H	H	H	L
CO4	H	H	H	H	H	L
CO5	L	L	M	L	M	H

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

## **Unit I - Information Systems**

**(15 hours)**

- 1.1 Introduction -Fundamental roles of IS – Trends in IS (K1, K2, K3)
- 1.2 Applications in Business – E-business in business (K1, K2, K3)
- 1.3 Types of IS (K1, K2, K3, K4)
- 1.4 System concepts- – Components of Information System (K1, K2, K3, K4)
- 1.5 Information System Resources –Information System Activities (K1, K2, K3, K4)
- 1.6 Recognizing Information System– Information system Advantages and Disadvantages (K1, K2, K3, K4)

## **Unit II - Information Technology concepts**

**(15 hours)**

- 2.1 Managerial challenges of Information technology (K1, K2, K3)
- 2.2 Fundamentals of Strategic Advantage – Strategic Uses of IT –Value chain and strategic IT (K1, K2, K3)
- 2.3 Using Information Technology for strategic advantage - Reengineering process - Role of IT (K1, K2, K3)
- 2.4 Data Resource Management Approach- Foundation Concepts-Types of Databases (K1, K2, K3, K4)
- 2.5 Data Mining - Data Warehousing and their business applications (K1, K2, K3, K4)
- 2.6 Database Management Approach (K1, K2, K3, K4)

## **Unit III -IT in Business**

**(15 hours)**

- 3.1 Functional business systems (K1, K2, K3)
- 3.2 Customer Relationship Management (CRM) (K1, K2, K3)
- 3.3 Enterprise Resource Planning (ERP) (K1, K2, K3)
- 3.4 Supply chain Management (SCM) (K1, K2, K3)
- 3.5 E-commerce systems – Essential E-commerce Processes –Electronic Payment Processes (K1, K2, K3, K4)
- 3.6 E-business models – Clicks and Bricks in E-commerce – M- commerce (K1, K2, K3)

## **Unit IV -IS and IT Development**

**(15 hours)**

- 4.1 Planning Fundamentals (K1, K2, K3)
- 4.2 Business Models and Planning – Business/IT Planning – Business application planning (K1, K2, K3, K4)
- 4.3 Implementing IT – End-user resistance and Involvement- Change Management (K1, K2, K3,K4)
- 4.4 Developing Business /IT Solutions : IS Development – The Systems Approach (K1, K2, K3,K4)
- 4.5 The Systems Development Cycle – Prototyping – Systems Development Process (K1, K2, K3,K4)
- 4.6 Implementing new systems – Evaluating Hardware, Software and Services(K1, K2, K3)

## Unit V - Ethical Responsibilities of a Business

(15 hours)

5.1 Ethical Challenges of IT (K1, K2, K3)

5.2 Computer Crime – Privacy Issues – Health Issues (K1, K2, K3, K4)

5.3 Security Management of IT – Tools of Security Management – Internet worked security defenses (K1, K2, K3)

5.4 Security Measures – IT ACT 2000 in India (K1, K2, K3)

5.5 Enterprise and Global Management of IT Managing the IS function – Failures in IT Management (K1, K2, K3)

5.6 Global Business/IT Strategies- Global IT Platforms. (K1, K2, K3)

**Note:** Case studies for all Units (K5, K6)

### Text Books

1. O'Brien, J Management Information Systems : Managing information technology in the business enterprise, New Delhi, 11<sup>th</sup> Edition, Tata McGraw Hill, 2017
2. Gordon B. Davis, Margrethe H. Olson- *Management Information Systems: Conceptual Foundations Structure and Development*- Tata McGraw Hill, 2017

### Reference Books

1. Kenneth C. Laudon and Jane Price Laudon, Management Information Systems – Managing the digital firm, PHI Learning / Pearson Education, PHI, Asia, 2012.
2. Robert Schultheis and Mary Summer, Management Information Systems – The Managers View, Tata McGraw Hill, 2008.

### Websites

1. [www.coursera.org](http://www.coursera.org)
2. [www.edx.org](http://www.edx.org)

## SEMESTER – I

### PJBAA20 - BUSINESS LAB – I: ENGLISH FOR PROFESSIONAL COMMUNICATION

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / I	PJBAA20	Business Lab- I English for Professional Communication	Theory & Practical	Elective	6	2	100

#### OBJECTIVES

1. To enriching business English vocabulary with self-confidence to communicate effectively in professional contexts and business environment.
2. To assist students to improve fluency and accuracy needed for various domains.
3. To improve professional etiquette in business negotiations, telephone conversations, written reports and emails, and professional presentations .

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Apply the basics of speaking English in everyday conversation and professional need.

**CO2:** Ability to draft letters based on the requirement

**CO3:** Acquire the ability to write reports, agenda and minutes of a meeting

**CO4:** Prepare and make appropriate business presentations

**CO5:** Increase employability quotient with professional and ethical responsibilities.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	L	L	M	L
CO2	H	H	M	L	M	L
CO3	H	H	M	M	M	L
CO4	H	M	M	L	M	L
CO5	H	L	M	L	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	M	L	L	H	H	H
CO2	M	M	H	H	L	H
CO3	M	L	L	H	L	H
CO4	M	L	M	H	H	H
CO5	M	H	H	H	H	H

H-HIGH(3), M-MODERATE(2), L-LOW(1)

## **Unit – I Communication Skills**

Introduction of oneself and others - Business vocabulary - Nouns - Verbs - Adjectives

## **Unit – II Writing skill**

Comprehension – Review Writing - Letter Writing - Complaint Letters - Sales – Trade enquiry – Offers and quotations – Collection letters – Circular letters.

## **Unit - III Reporting Skills**

Report : Types - Agenda – Minutes

## **Unit - IV Presentation Skills**

Email Etiquette - Organizing Presentation - Negotiation skills

## **Unit - V Employability Skills**

Applying for a job - Interview Techniques - Preparation of Resume - Group Discussion: Techniques  
- Dos' and Don'ts

## **Text Books**

1. Michael Swan, Practical English Usage, Oxford University Press, Revised Edition 2017
2. Stephen Robbins & [Phillip L Hunsaker](#), Training in interpersonal skills, Pearson Education Limited, Revised Edition 2014.

## **Reference Books**

1. R.S.N.Pillai & Bhagavathi, Modern commercial correspondence, Revised Edition 2010, Reprint 2013.
2. Aysha Viswamohan, English for Technical communication, Tata McGraw Hill Publications, New Delhi, Reprint 2009.

## **Websites**

1. [www.talkenglish.com](http://www.talkenglish.com)
2. [www.englisheverywhere.com](http://www.englisheverywhere.com)

## SEMESTER I

### PJBAB20 - PRACTICAL – I: MS OFFICE AND ADVANCED EXCEL

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / I	PJBAB20	MS Office and Advanced Excel	Practical	Elective	2	2	100

#### OBJECTIVES

1. To heighten their awareness of correct usage of Office Software.
2. Assist students to improve fluency and accuracy in mailing, creating presentations
3. To use advanced excel for data analysis purposes in business environment
4. To equip students with the knowledge and skills required to accomplish Word, Excel and PowerPoint tasks efficiently

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Master in the use of strategies, such as mail merging, creating articles.

**CO2:** Draft and to animate the presentations using power point

**CO3:** Analyse formulas and feeding the data in the excel

**CO4:** Develop and create charts and pivot table

**CO5:** Enhance and develop their ability to solve using conditionals and lookup functions in advanced excel.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	L
CO2	H	H	M	M	M	L
CO3	H	H	L	L	M	L
CO4	H	H	L	L	M	M
CO5	M	H	L	M	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	H	H	H	L
CO2	H	H	M	H	H	L
CO3	M	H	H	H	H	L
CO4	M	H	H	H	H	L
CO5	M	H	M	L	M	M

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit – I Introduction to Microsoft Office 2007**

Introduction to Microsoft Office 2007- Creating a Document in Word – Saving – Formatting – Alignment –Fonts-Borders and Shading – Charts – Hyperlinks –Inserting Clip Art – Mail Merge.

## **Unit – II Introduction to Microsoft PowerPoint 2007**

Introduction to Microsoft PowerPoint 2007 – Working with all Menus – Creating Presentation from Template – Changing Color – Working with Charts – Reordering Slides – Duplicating Slides – Making Slide Shows – Adding Audio – Adding Video Effect – Adding Animation – Adding Action Buttons.

## **Unit – III Introduction to Microsoft Excel 2007**

Introduction to Microsoft Excel 2007 – Understanding Spreadsheets – Working with Format menu, Tools menu, Data menu – Editing Data – Formatting Text – Worksheet Creation – Formulas – Functions in Excel.

## **Unit – IV Charts and Pivot Tables**

Understand Charts - Chart Design - Options and Tools - Chart Format Tools - Combo Charts- Understanding Pivot table-Creating Pivot table - Slicers -Report Filters for basic analytics.

## **Unit – V Conditionals and Lookup Tables**

Scenario Analysis, Data Tables in Scenario Analysis, What-if Analysis, Math and Trig Functions, Text Functions in Excel, Using Lookup Functions, Vlookups, HLookups

### **Text Books**

1. John Walkenbach Michael Alexander Microsoft Office 2013 John Wiley & Sons Ltd 4<sup>th</sup> Edition,2013
2. John Walkenbach -Excel 2016 Bible, , John Wiley & Sons Ltd 10<sup>th</sup> Edition,2016

### **Reference books**

1. Ramesh Bangia - Learning HTML – Khanna Book Publishing Ltd, 2<sup>nd</sup> Edition,2013
2. A. Rajathi, P. Chandran -SPSS for you- MJP publishers, 1<sup>st</sup> Edition,2011

### **Websites**

1. [www.coursera.org](http://www.coursera.org)
2. [www.open.edu](http://www.open.edu)

## Practical List

1. Create your Resume in MS-word with necessary formatting.
2. Write a promotion letter to inform 5 employees that he/she has been chosen to a post or for a task, Based on qualification and experience, using mail-merge, make use of If, Then, Else statement.
3. Create a simple Quiz in PowerPoint (minimum 5 slides) and add animations to it.
4. Create an invitation using Power point presentation with borders, backgrounds and inserting image.
5. Input 5 employee details (Emp. No, name, basic pay, DA, HRA) and calculate GROSS ( $GROSS = \text{Basic} + DA + HRA$ ) and NET pay ( $NET \text{ Pay} = GROSS - DA$ ), Create Bar chart and Column chart for input values.
6. Get the order entry for 5-types of books, and calculate the total cost and cumulative cost sort it from maximum to minimum cost. Create chart for input values
7. Create a Pivot table and extract the significance from a data set using report filter for the goods exported in a year by a company and insert pivot chart .
8. Input data of a product price and quantity in a data table and perform what-if analysis.
9. Create a voters list for 5 members and find weather the candidate is eligible to vote using simple conditionals function.
10. Create a simple Lookup table using Lookup function in excel for employees ID and their salary.

## SEMESTER – II

### PCBAG20 – SUPPLY CHAIN MANAGEMENT

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / II	PCBAG20	Supply Chain Management	Theory	Core	6	3	100

#### OBJECTIVES

1. The course provides an analytical framework for understanding the supply chain techniques of the current business environment.
2. To learn flow in Supply Chain.
3. To understand the inventory techniques.
4. To learn about the entire network in Supply Chain.
5. To learn about the latest trends in technology.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Acquire knowledge on Supply Chain activities in the market and implement Supply Chain Management.

**CO2:** Evaluate the various networks and its flaws.

**CO3:** Distinguish the various inventory models in supply chain.

**CO4:** Implement the supply chain network for logistics.

**CO5:** Elaborate the current trends and technological implementation in the supply chain environment.

CO	PO					
	1	2	3	4	5	6
CO1	HL	M	H	M	M	H
CO2	H	M	M	M	H	H
CO3	H	M	M	M	M	H
CO4	M	H	H	H	H	M
CO5	L	H	M	M	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	L
CO2	M	L	L	L	L	H
CO3	H	M	M	L	M	L
CO4	H	M	H	L	M	L
CO5	H	L	M	L	H	M

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I: Introduction and Planning****(15 hours)**

- 1.1 Introduction, Evolution, Definition (K1, K2, K3)
- 1.2 Supply Chain, Activity Mix, Importance, Conceptual Model (K1, K2, K3)
- 1.3 Supply Chain Management Approach (K1, K2, K3)
- 1.4 Supply chain drivers, metrics (K1, K2, K3)
- 1.5 Supply Chain performance in India (K1, K2, K3)
- 1.6 Enhancing Supply Chain Performance. (K1, K2, K3)

**Unit II : Managing Flows****(15 hours)**

- 2.1 Planning Networks (K1, K2, K3, K4)
- 2.2 Decision making under risk (K1, K2, K3, K4)
- 2.3 Decision trees (K1, K2, K3, K4)
- 2.4 Decision making under uncertainty (K1, K2, K3, K4)
- 2.5 Distribution Network Design, Role (K1, K2, K3, K4)
- 2.6 Factors Influencing Options, Value Addition in Supply Chain (K1, K2, K3, K4)

**Unit III: Inventory Strategy****(15 hours)**

- 3.1 Inventory, objectives, bullwhip effect, control (K1, K2, K3, K4)
- 3.2 Probabilistic inventory models, Risk pooling (K1, K2, K3, K4)
- 3.3 Vendor managed inventory, Multi-echelon inventory (K1, K2, K3, K4)
- 3.4 Warehousing Functions, Types, Site Selection (K1, K2, K3, K4)
- 3.5 Decision Model, Layout Design (K1, K2, K3, K4)
- 3.6 Costing, Virtual Warehouse (K1, K2, K3, K4)

**Unit IV: Supply Chain Network & Transportation****(15 hours)**

- 4.1 Transportation, Drivers, Modes (K1, K2, K3, K4)
- 4.2 Measures, Strategies for Transportation, 3PL and 4PL (K1, K2, K3, K4)
- 4.3 Vehicle Routing and Scheduling, Packaging (K1, K2, K3, K4)
- 4.4 Design considerations, Material and Cost (K1, K2, K3, K4)
- 4.5 Packaging as Unitisation (K1, K2, K3, K4)
- 4.6 Consumer and Industrial Packaging (K1, K2, K3, K4)

**Unit V : Current Trends****(15 hours)**

- 5.1 Supply Chain Integration (K1, K2, K3, K4)
- 5.2 Building partnership and trust in SC Value of Information (K1, K2, K3, K4)
- 5.3 Bullwhip Effect, Effective, forecasting, Coordinating the supply chain (K1, K2, K3, K4)
- 5.4 SC Restructuring, SC Mapping, SC process restructuring (K1, K2, K3, K4)
- 5.5 Postpone the point of differentiation, IT in Supply Chain (K1, K2, K3, K4)
- 5.6 Agile Supply Chains - Reverse Supply chain. Agro Supply Chains (K1, K2, K3, K4)

**Note:** Case studies for all units.(K5,K6)

**Text Books**

1. Chopra S and P Mendil, Supply Chain Management: Strategy, Planning and Operations, Pearson Education, 2<sup>nd</sup> Edition ,2006.
2. N Chandrasekar, Supply Chain Management- Process, System and Process, Oxford University Press, January 2012

**Reference Books**

1. Donald J. Bowersox and David J. Closs, Logistical Management, Tata McGraw- Hill, 2<sup>nd</sup> Edition, 2013.
2. David Simchi , Levi, Designing and Managing Supply Chain, Tata McGraw Hill New Delhi, 3rd Edition2008.

**Websites**

1. [www.logisticsmanager.com](http://www.logisticsmanager.com).
2. [www.edx.org](http://www.edx.org)

## SEMESTER - II

### PCBAH20 – MARKETING MANAGEMENT

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / II	PCBAH20	Marketing Management	Theory	Core	6	3	100

#### OBJECTIVES

1. To understand the principles, concepts and functions of Marketing and to develop marketing strategies for a dynamic marketing.
2. To learn the behavior of the consumers and to segment the consumers.
3. To attain in depth knowledge on the 4 P's of marketing mix.
4. To identify the needs and ways of building relationship with customers and to study the distribution system.
5. To update about the recent types and trends in marketing and to learn the importance of marketing research

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Demonstrate the strong conceptual knowledge in marketing and its functions.

**CO2:** Be able to segment the customer and identify their behavior.

**CO3:** Aware of all the 4 P's of marketing mix and its importance in implementing marketing strategies.

**CO4:** Utilize the available marketing channels in optimum levels.

**CO5:** Updated with the recent types of marketing and will be motivated towards marketing research.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	H	M	H	M	H	H
CO3	H	M	H	H	H	M
CO4	H	M	M	H	M	H
CO5	M	H	H	H	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	L	M	M
CO2	H	M	M	L	H	L
CO3	H	H	H	L	M	L
CO4	M	H	M	M	M	M
CO5	H	H	H	L	H	M

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

### **Unit I – Introduction**

**(15 hours)**

- 1.1 Introduction to Market and Marketing (K1, K2, K3)
- 1.2 Marketing Mix - Functions of Marketing -Importance of Marketing (K1, K2, K3)
- 1.3 Marketing Environment – Micro and Macro Environment (K1, K2, K3, K4)
- 1.4 Consumer Market and Industrial Market – Consumer Goods and Industrial Goods (K1, K2, K3)
- 1.5 Marketing strategy formulations (K1, K2, K3)
- 1.6 Key Drivers of Marketing Strategies - selling versus marketing, (K1, K2, K3, K4)

### **Unit II - Consumer Buyer Behavior and Segmentation**

**(15 hours)**

- 2.1 Types of Buying Decision Behavior (K1,K2, K3)
- 2.2 Factors affecting Consumer Behavior - Buyer Decision process (K1,K2, K3, K4)
- 2.3 Business Buying Behavior - Buying Motives (K1,K2,K3, K4)
- 2.4 Market Segmentation (K1,K2,K3)
- 2.5 Consumer Market Segmentation (K1,K2,K3)
- 2.6 Effective Segmentation, Targeting, Positioning and Differentiation. (K1,K2,K3)

### **Unit III - Marketing Mix Decisions**

**(15 hours)**

- 3.1 Product Planning and Development (K1,K2,K3)
- 3.2 Product and Services classification (K1,K2,K3)
- 3.3 Product Mix- Product Life Cycle (K1,K2,K3)
- 3.4 New Product Development and Management (K1,K2,K3)
- 3.5 Branding – Labeling (K1,K2,K3)
- 3.6 Pricing -Objectives and strategies – Types- Policies – Methods. (K1,K2,K3)

### **Unit IV - Marketing Channels and Relationship Marketing**

**(15 hours)**

- 4.1 Marketing Channels - Retailing and Wholesaling (K1,K2,K3, K4)
- 4.2 An Introduction to Retail System, Retailing, Definition, Nature, Importance (K1,K2,K3)
- 4.3 The Retailing Environment - Personal Selling (K1,K2,K3)

4.4 Advertising and Sales promotions (K1,K2,K3, K4)

4.5 Building customer relationship – Building and measuring customer satisfaction - Customer Acquisition and Retention (K1,K2,K3,K4)

4.6 Customer Relationship Management (K1,K2,K3,K4)

## **Unit V - Types of Marketing and Marketing Research**

**(15 hours)**

5.1 Direct Marketing - Digital Marketing - Online Marketing (K1,K2,K3,K4)

5.2 Green Marketing –Services Marketing- Rural Marketing (K1,K2,K3,K4)

5.3 Virtual Marketing – B2B Marketing- B2C Marketing (K1,K2,K3,K4)

5.4 International Marketing - Cause related marketing (K1,K2,K3,K4)

5.5 Marketing Information System – Market Research Process (K1,K2,K3,K4)

5.6 Competition Analysis and Strategies - Marketing Ethics – Future of marketing. (K1,K2,K3,K4)

**Note:** Case studies for all units. (K5,K6)

### **Text Books**

1. Philip Kotler, Kevin Lane Keller, Principles of Marketing, South Asian Perspective, Prentice Hall, 12<sup>th</sup> Edition, 2012.
2. Rajan Saxena , Marketing Management,McGraw-Hill Education,.5<sup>th</sup> Edition 2016.

### **References**

1. Douglas J. Darympia, Marketing Management, John Wiley and Sons, 2008.
2. Paul Baines, Chris fill, Kelly Page, Marketing, Oxford University Press, 2<sup>nd</sup> Edition, 2011

### **Websites**

1. [www.marketingpower.com](http://www.marketingpower.com)
2. [www.edx.org](http://www.edx.org)

## SEMESTER - II

### PCBAI20 - HUMAN RESOURCE MANAGEMENT

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / II	PCBAI20	Human Resource Management	Theory	Core	6	3	100

#### OBJECTIVES

1. To Provide insights on the basics of Human Resource Management.
2. To acquire skills on theoretical concepts for being a better employee in an organization.
3. To ascertain the significance of orientation and development of an employee with in an Organization.
4. To familiarize the methods to retain the skilled professionals within the Organization.
5. To absorb the outline of HRM in technically upgraded Business world.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Acquire Knowledge on the perspectives of HRM

**CO2:** Understand the formation of the concept of Best Fit Employee for a job

**CO3:** Study the Process of Executive and Career Development Programme

**CO4:** Understand the concepts, Benefits, of Sustaining Employee Interest

**CO5:** Acquires knowledge on Challenges in HRM .

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	M
CO2	H	H	H	H	H	M
CO3	M	H	H	M	H	H
CO4	M	M	M	M	M	H
CO5	H	H	H	H	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	L	M
CO2	H	H	H	H	L	H
CO3	H	H	H	M	H	H
CO4	H	H	H	H	L	H
CO5	H	H	H	M	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I: Perspectives in HRM****(15 hours)**

- 1.1 Evolution of HRM, Introduction, Functions and Objectives of HRM (K1,K2)
- 1.2 Qualities, Personnel Policies and Principles (K1, K2)
- 1.3 Human Resource Accounting and Audit,(K1, K2)
- 1.4 Importance, Factors affecting HRP, (K1, K2, K3)
- 1.5 Planning Process of HRP (K1, K2, K3)
- 1.6 HRIS, Requisites, Barriers to HRP (K1, K2, K3, K4)

**Unit II: Elements of Supply & Demand(15 hours)**

- 2.1 Recruitment, Importance, Factors Governing Recruitment, Internal and External factors, Recruitment Process, Internal & External Recruitment(K1, K2, K3, K4)
- 2.2 Selection, Process, Barriers to effective Selection (K1, K2, K3)
- 2.3 Inputs in Training & Development, Training Process, Types, Impediments (K1, K2, K3,)
- 2.4 Transfer - (K1, K2, K3)
- 2.5 Promotion (K1, K2)
- 2.6 Demotion. (K1, K2)

**Unit III: Executive Development****(15 hours)**

- 3.1 Executive Development Programme, Process (K1, K2, K3,K4)
- 3.2 Orientation, Purpose, Requisites of an effective orientation Programme (K1, K2, K3)
- 3.3 Placement (K1, K2, K3)
- 3.4Performance Appraisal, Objectives, Process, Methods (K1, K2, K3)
- 3.5 Career Development (K1, K2, K3)
- 3.6 Career Planning (K1, K2, K3)

**Unit IV: Sustaining Employee Interest****(15 hours)**

- 4.1 Remuneration, Rewards, Components, Factors , Challenges (K1, K2,K3,K4)
- 4.2 Concepts of Wages (K1, K2,)
- 4.3 Employee benefits and Services, Importance and Types (K1, K2)
- 4.4 Empowering employees, Scope and ways, Importance and Limitations - (K1, K2, K3)
- 4.5 Disputes, Causes, Settlement (K1, K2, K3)
- 4.6 Grievance Procedure (K1, K2, K3)

**Unit V: Challenges in HRM****(15 hours)**

- 5.1 HR Ethics (K1, K2,K3)
- 5.2 e HR activity(K1, K2,K3)
- 5.3 Challenges of HR, Global HR (K1, K2, K3)
- 5.4 Workforce Diversity (K1, K2, K3)
- 5.5 Competency Mapping (K1, K2, K3, K4)
- 5.6 Knowledge Management (K1, K2, K3)

**Note:** Case studies for all Units.(K5.K6)

### **Text Books**

1. Aswathappa – Human Resource Management, 6<sup>th</sup> Edition & 8<sup>th</sup> Edition – Tata McGraw Hill Publication,2010.
2. Dessler, Garry V – Human Resources Management, 7<sup>th</sup> Edition – PHI,2010

### **References Books**

1. Memoria C.B. and Memoria .S. – Personnel Management, 21<sup>st</sup> Edition – Himalaya publishing House,2010
2. Bernadin, Human Resource Management, Tata McGraw Hill,2006.

### **Websites**

1. [www.network.hrmtoday.com](http://www.network.hrmtoday.com).
2. [www.edx.org](http://www.edx.org)

## SEMESTER –II

### PCBAJ20 - FINANCIAL MANAGEMENT

Year/Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I / II	PCBAJ20	Financial Management	Problem	Core	6	3	100

#### COURSE LEARNING OBJECTIVES

1. To enable the learners understand the concept of financial management, scope, objectives and time value of money. Also valuation of bonds and shares.
2. To help the learners to acquire knowledge over evaluation of capital investment.
3. To make the learners understand the classification of cost of capital, its features and importance.
4. To make the learner understand the capital structure theories and practical. Also dividend theory and policy.
5. To enable the students understand the working capital and enable then to estimate working capital requirements.

#### COURSE OUTCOMES

The Learners will be able to

**CO1:** Be well-versed in the financial decision, functions and organization of financial managements. The can also come out with knowledge to value bonds and shares in practice.

**CO2:** Can come out with the practical knowledge of evaluating capital investment using traditional and modern capital budgeting methods.

**CO3:** Gain practical knowledge in calculating cost of different capitals.

**CO4:** Acquire knowledge over capital structure and work out capital structure under different approaches. Students also gain practical knowledge over dividend policy and its determinants.

**CO5:** Gain both theoretical and practical knowledge on working capital management including receivables, payables, inventory and cash management.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	M	H	H
CO2	M	L	H	H	H	H
CO3	H	L	H	M	H	H
CO4	H	M	M	M	H	M
CO5	H	M	L	H	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I – Foundations of Finance****(15 Hours)**

- 1.1: Financial Management – Scope – Objectives – Profit Maximization – Wealth Maximization (K1, K2, K3)
- 1.2: Financial Decisions (K1, K2, K3)
- 1.3: Functions of Financial Management (K1, K2, K3)
- 1.4: Organization of Financial Management – Functions of Treasurer and Controller (K1, K2, K3)
- 1.5: Time Value of Money – Concept – Reasons for time preferences of money (K1, K2, K3, K4)
- 1.6: Valuation of bonds and shares – Concept of value – Book value – Market value – Liquidation value – Replacement value – Going concern value – Bonds or debentures value. (K1, K2, K3, K4)

**Unit II – Capital Budgeting****(15 Hours)**

- 2.1: Capital budgeting – Concept – Need of capital budgeting (K1, K2, K3, K4)
- 2.2: Pay back (K1, K2, K3, K4)
- 2.3: ARR (K1, K3, K4)
- 2.4: NPV (K1, K3, K4)
- 2.5: IRR (K1, K3, K4)
- 2.6: PI (K3, K4)

**Unit III – Cost of Capital****(15 Hours)**

- 3.1: Cost of capital – Features – Importance (K1, K2, K4)
- 3.2: Classification of cost (K1, K2, K4)
- 3.3 Cost of Debt (K1, K2, K3, K4)
- 3.4: Cost of Preference share capital (K1, K2, K3, K4)
- 3.5: Cost of Equity share capital (K1, K2, K3, K4)
- 3.6: Retained Earnings – CAPM – WACC. (K1, K2, K4)

**Unit IV – Financial and Dividend Decisions****(15 Hours)**

- 4.1: Leverage – Meaning – Types – Financial – Operating leverage and combined leverage (K1, K2, K3, K4)
- 4.2: Capital structure – Designing capital structure (K1, K2, K3, K4)
- 4.3: Theories of Capital structure – Net Income approach- Net operating income approach (K1, K2, K3, K4)
- 4.4: Traditional Approach - Modigliani Miller approach (K1, K2, K3, K4)
- 4.5: Dividend policy – Determinant of dividend policy – forms of dividend policy – form of dividends  
Dividend theory (K1, K2, K3, K4)
- 4.6: Walter model, Gordon model. (K1, K2, K3, K4)

**Unit V – Working Capital Management****(15 Hours)**

- 5.1: Principle of Working capital – Concept – Need (K2, K3, K4, K5)
- 5.2: Determinants – Issues and estimation of working capital (K2, K3, K4, K5)
- 5.3: Account receivables management and factoring (K2, K3, K4, K5)
- 5.4: Inventory management EOQ (K2, K3, K4, K5)
- 5.5: Stock levels (K2, K3, K4, K5)
- 5.6: Cash management. (K2, K3, K4, K5)

**Note:** 80% problems and 20% theory

**Text Books:**

1. Dr. S. N. Maheswari – Financial Management Principle And Practice, 2<sup>nd</sup> Edition Sultan Chand & Sons Educational Publishers, New Delhi 2004.
2. M.Y.Khan and P.k.Jain – Financial Management: Text, problems and cases, 5<sup>th</sup> Edition – Tata Mc Graw Hill, 2008.

**Reference Books**

1. M. Pandey – Financial Management – Vikas publishing House, 2007.
2. Chandra. P. Financial Management , New Delhi: Tata Mc Graw Hill, 8<sup>th</sup> Edition 2012.

**Websites**

1. [www.tutu.net](http://www.tutu.net).
2. [www.udemy.com](http://www.udemy.com)

## SEMESTER -II

### PCBAL20 – ENTERPRISE RESOURCE PLANNING

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / II	PCBAL20	Enterprise Resource Planning	Theory	Core	6	2	100

#### OBJECTIVES

1. To enable the evolution and role of ERP in business integration.
2. To integrate emerging technologies into ERP systems including supply chain management and customer relationship management
3. To understand Transition of ERP architecture, design, development, implementation, and project management. To choose perfect project team.
4. To find out the Effective Management concepts implemented in ERP after implementation
5. To get an idea with enterprise software from SAP.

#### COURSE OUTCOME

The learners will be able to

**CO1:** Understand how ERP is evolved and analyze various risk in ERP

**CO2:** Be able to integrate and analyze related technologies with ERP and also to understand the entire product life cycle starting from manufacturing till SCM and CRM

**CO3:** Be able to classify the legacy system with ERP system and able to apply various transition strategies according to the organization

**CO4:** Can analyze the success and failure factors and will be able to apply the success factors in post implementation phase

**CO5:** Understand and use the idea of SAP AG, SAP Net weaver in the enterprise.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	H	H	H	M	H	L
CO3	M	M	H	H	M	H
CO4	H	H	H	H	M	M
CO5	M	M	H	H	M	L

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	M	M	L
CO2	M	L	H	H	M	L
CO3	H	M	H	M	M	M
CO4	M	M	M	H	M	M
CO5	H	L	M	M	H	H

**H-HIGH (3), M-MODERATE(2), L-LOW(1)**

### **Unit I: Introduction**

**(15 hours)**

- 1.1 Introduction to ERP —Common ERP Myths (K1, K2, K3)
- 1.2 History and Evolution of ERP - Reasons for the Growth- Advantages(K1, K2, K3)
- 1.3 Why ERP- Roadmap for successful ERP Implementation (K1, K2, K3)
- 1.4 Basic ERP Concepts - ERP Fit (K1, K2, K3)
- 1.5 Importance - Create Value (K1, K2, K3)
- 1.6 ERP Architecture- Risks of ERP(K1, K2, K3)

### **Unit II: ERP and Technology**

**(15 hours)**

- 2.1 Benefits of ERP- ERP and related technologies (K1, K2, K3,K4)
- 2.2 Business Process Reengineering -Business Intelligence (K1, K2, K3,K4)
- 2.3 Product life cycle management (K1, K2, K3)
- 2.4 Customer Relationship Management (K1, K2, K3)
- 2.5 Supply Chain Management (K1, K2, K3)
- 2.6 Advanced technology and ERP Security- Business models of an ERP packages (K1, K2, K3)

### **Unit III: ERP Implementation**

**(15 hours)**

- 3.1 ERP Implementation Transition Strategies (K1, K2, K3)
- 3.2 Life Cycle (K1, K2, K3,K4)
- 3.3 Implementation Process (K1, K2, K3,K4)
- 3.4 Training and Education (K1, K2, K3,K4)
- 3.5 Data Migration (K1, K2, K3,K4)
- 3.6 ERP Project Teams (K1, K2, K3,K4)

### **Unit IV: Operation, Maintenance and Future Trends in ERP**

**(15 hours)**

- 4.1 ERP Operation (K1, K2, K3,K4)
- 4.2 ERP Maintenance (K1, K2, K3,K4)
- 4.3 Success factors of ERP implementation (K1, K2, K3,K4)
- 4.4 Failure factors of an ERP Implementation (K1, K2, K3,K4)
- 4.5 Future directions in ERP (K1,K2, K3,K4,)
- 4.6 Trends in ERP(K1,K2,K3,K4)

## **Unit V: SAP**

**(15 hours)**

- 5.1 SAP AG -SAP Business Basics (K1, K2, K3,K4)
- 5.2 SAP Technology Basics- SAP Project Basics (K1, K2, K3,K4)
- 5.3 Overview of SAP Applications and Components (K1, K2, K3,K4)
- 5.4 A Business User Perspective on Implementing SAP (K1, K2, K3,K4)
- 5.5 Logging On and Using SAP's User Interface (K1, K2, K3,K4)
- 5.6 SAP User Roles and Authorizations (K1, K2, K3,K4)

**Note:** Case Studies for all Units. (K5.K6)

### **Text books**

1. Alexis Leon -ERP Demystified, Tata McGraw Hill Education Private Limited, Third Edition, 2014.
2. Dr. George W. Anderson - Sams Teach Yourself-in 24 hrs. , Fourth Edition , SAMS publication, 5<sup>th</sup> Edition ,2011

### **Reference Books**

1. Anthony T Veltro, Toby J Veltro,Robert Elsenpeter -Cloud Computing - A practical Approach, Tata Mc Graw Hill,2010
2. Marainne Bradford - Modern ERP , lulu.com; Third Edition (January 2,2015)

### **Websites**

1. [www.coursera.org](http://www.coursera.org)
2. [www.udemy.com](http://www.udemy.com)

## SEMESTER – II

### PJBAC20 - INNOVATION AND START-UP MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / II	PJBAC20	Innovation and Start-Up Management	Theory & Practical	Skill Based Elective	4	2	40+60

#### OBJECTIVES

1. The students develop and can systematically apply an entrepreneurial way of thinking that will allow them to identify and create business Opportunities that may be commercialized successfully.
2. The students will nurture the entrepreneurial skills and help to identify the new business opportunity.
3. The students can able to tap the new Governmental schemes available to kindle the interest of emerging entrepreneur.
4. The students will generate the interest and for patent and trade mark registration.
5. The students can design their business plan for getting institutional support.

#### COURSE OUTCOMES

The Learner will be able to

**CO1:** Have the ability to discern distinct entrepreneurial traits

**CO2:** Write a business plan.

**CO3:** Be able to know the parameters to assess Opportunities for new business ideas.

**CO4:** Understand the Governmental schemes for entrepreneurial growth in India.

**CO5:** Know to register in e-commerce, trade mark and patent.

CO	PO					
	1	2	3	4	5	6
CO1	M	M	H	H	M	H
CO2	H	H	H	M	H	M
CO3	H	M	M	H	M	H
CO4	H	M	M	H	M	H
CO5	M	H	H	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	M	M	M
CO2	H	H	M	L	H	H
CO3	M	H	M	H	H	H
CO4	M	H	H	H	M	M
CO5	M	M	H	H	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I - Introduction to Entrepreneurship** (12 Hours)

- 1.1 Definition- Characteristics of entrepreneurship(K1)
- 1.2 Types of Entrepreneur(K1, K2)
- 1.3 Benefits and drawbacks of entrepreneurship(K1, K2)
- 1.4 Technopreneurs(K1)
- 1.5 Characteristics of technopreneur(K1, K2)
- 1.6 Women Entrepreneurship- Success stories of Women Entrepreneur(K1, K2)

**Unit II - Crafting a winning business plan** (12 Hours)

- 2.1 Need and importance of business plan(K1, K2)
- 2.2 Elements of a business plan(K1, K2)
- 2.3 Ascertain initial viability of a business proposal(K1)
- 2.4 Enlisting technical aspects of business Plan(K1, K2, K3)
- 2.5 Financial aspects of business Plan (K1, K2, K3)
- 2.6 Marketing and Commercial business Profitability aspects of business Plan (K1, K2, K3)

**Unit III - Institutional Support System for Entrepreneurs** (12 Hours)

- 3.1 Central Government Support System - National Board for Micro, Small and Medium Enterprises (NBMSME)-Small Scale Industries Board (SSIB) (K1, K2)
- 3.2 National Bank for Agriculture and Rural Development (NABARD) (K1, K2)
- 3.3 Small Industries Development Organisation (SIDO) - National Small Industries Corporation (NSIC) - Small Industries Development Bank of India (SIDESI) (K1, K2)
- 3.4 Khadi and Village Industries Commission (KVIC) (K1, K2)
- 3.5 State Government Support System - State Financial Corporation (SFC) - State Small Industries Development Corporation (SSIDC) (K1, K2)
- 3.6 Non-Government Support System -District Industries Centres (DIC). (K1, K2)

**Unit IV - Governmental Schemes** (12 Hours)

- 4.1 Prime Minister Employment Generation Programme and Other Credit Support Schemes (K1, K2)
- 4.2 Start-Up India- Make In India – Atal Innovation Mission (AIM) (K1, K2)
- 4.3 Support To Training And Employment Programme For Women (STEP) - Jan Dhan- Aadhaar Mobile (JAM) (K1, K2)
- 4.4 Biotechnology Industry Research Assistance Council (BIRAC) (K1, K2)
- 4.5 Stand-Up India -Trade Related Entrepreneurship Assistance And Development (TREAD) (K1, K2)
- 4.6 Pradhan Mantri Kaushal Vikas Yojana (PMKVY)-National Skill Development Mission. (K1, K2)

**Unit V - E-entrepreneur (Practical)** (12 Hours)

Basic approaches to launch an E-commerce effort - Trade Mark and Patent registration process- Business Incubation centre (K1, K2, K3)

**Note:** 60% Theory, 40% Practicals.

### **Text Books**

1. Thomas W. Zimmerer, and Norman M. Scarborough Essentials of Entrepreneurship and Small Business management 5<sup>th</sup> Edition , PHI,2016
2. Jayashree Suresh – Entrepreneurial Development, 1<sup>st</sup> Edition – Margham Publication, , Latest Edition, 2012

### **Reference Books**

1. Kathleen R. Allen- Bringing New Technology to Market, Prentice Hall,2003
2. Mary Coulter -Entrepreneurship in Action, 2<sup>nd</sup> Edition , Prentice Hall,2001

### **Websites**

1. [www.bplan.com/](http://www.bplan.com/) [Businessplan]
2. [www.entrepreneur.com/businessplan](http://www.entrepreneur.com/businessplan) [Businessplan]
3. <https://msme.gov.in/all-schemes> [GovernmentalSchemes]
4. [www.businessmanagementideas.com](http://www.businessmanagementideas.com) [Institutional Support System forEntrepreneurs]

**SEMESTER – II**  
**PJBAD20 - ACCOUNTING SOFTWARE**

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / II	PJBAD20	Accounting Software	Theory & Practical	Skill	4	2	100

**OBJECTIVES**

1. To introduce the students to the basic of accounts and the usage of accounting software for accounting purpose.
2. To acquaint students with the accounting concept, tools and techniques influencing business organization will be liable for preparation of financial statements in the modern technological era.
3. To enable the students to record the business transactions and manage the accounts information for an organization using the Business Accounting Software.
4. To enable the students to explore to and acquire skills in respect of most sophisticated computerized accounting procedures and practices

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Understand and learn the various accounting packages and the basics of Tally Erp 9.0

**CO2:** Be able to enter accounting vouchers and to print profit and loss and Balance Sheet.

**CO3:** Be able to prepare inventory and stock items for an organization and print the stock summary report.

**CO4:** Understand how to create and maintain cost categories, cost centres of a product for easy processing of sales and purchase inventories.

**CO5:** Analyze the financial statements using ratio analysis and interpreting the results thereof.

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	M	H	M
CO2	M	H	H	M	H	L
CO3	M	H	L	H	H	H
CO4	H	M	L	H	M	M
CO5	H	M	H	L	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	M	H	H	M	H	H
CO3	H	H	H	H	M	H
CO4	M	M	M	H	H	M
CO5	L	M	M	H	H	H

**H-HIGH (3), M-MODERATE(2), L-LOW(1)**

## **Unit I - Introduction**

Introduction to Tally - Journal, ledger accounts - Trial Balance – Trading and profit and Loss account – Profit and Loss account – Balance Sheet

## **Unit II - Creation of Accounts Master**

Fundamentals of Inventory - Accounts Master Creation: Accounts Information – Groups (Create, Display, and Delete) – Multiple groups – Ledgers (Create, display, Alter) – Multiple Ledgers.

## **Unit III - Cost categories**

Cost Categories – Cost Centers. Inventory Master Creation: Stock groups – Entering Vouchers; Voucher types – How to enter Voucher – Different Types of Accounting Vouchers (Payments / Receipt, Journal, Sales and purchase)

## **Unit IV - Inventory and stock accounts**

Preparation of inventory and stock accounts - Inventory Master Creation: Stock groups, stock items and units of measurement – Entering Vouchers- Results in trail balance and stock summary

## **Unit V - Ratio Analysis**

Preparation of Ratio analysis - Inventory Master Creation- Entering Vouchers- Checking Results

### **Lab Exercises:**

1. Trading and profit and loss account of a company.
2. Balance sheet of the company
3. Cost category and cost center
4. Inventory and stock
5. Ratio Analysis

### **Text Books**

1. Namrata Agarwal, Tally 9, Dream tech press 2<sup>nd</sup> Edition,2013
2. A.K.Nadhani, K.K.Nadhani, Implementing Tally 9, BPB Publications – 2<sup>nd</sup> Edition,2018

### **Reference Books**

1. Kogent Learning solutions Inc., Tally-ERP 9 in simple steps – 1<sup>st</sup> Edition,2012
2. Law point , Guide to Tally 9, 2<sup>nd</sup> Edition,2007

### **Websites**

1. [www.tally9book.com](http://www.tally9book.com)
2. [tallytraining.in](http://tallytraining.in)

## SEMESTER III

### PCBAM20 – BUSINESS LAW

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PCBAM20	Business Law	Theory	Core	6	3	100

#### OBJECTIVES

1. To Prepare the learners with Legal Knowledge of Business
2. To imbibe the wards on executing a Company according to the law.
3. To familiarize the Learners with the essentials of Negotiable Instrument Act at the registration.
4. To inhibit knowledge on valuable information Act and Tax to enforce a Profitable Business
5. To generate awareness on Consumer Protection Act and Cyber laws of firms

#### COURSE OUTCOMES (CO)

The learners will be able to

**CO1:** Acquire Knowledge on Commercial law

**CO2:** Understand the formation and need for Company law

**CO3:** Study the requisites of Negotiable Instrument and registration of firm

**CO4:** Understand the concepts and scope of Value Added Tax and Information Act

**CO5:** Acquires knowledge on Consumer Protection Act and Cyber Laws.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	H
CO2	H	M	H	M	H	M
CO3	H	M	M	H	M	H
CO4	M	H	M	H	M	H
CO5	L	H	H	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	H	H	M	H	H
CO3	H	M	H	M	M	H
CO4	H	M	H	M	M	H
CO5	H	H	H	H	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I: Commercial Law****(15 hours)**

- 1.1 The Indian Contract Act 1872, Definition, Essentials of a Valid Contract, Void Agreements, Formation of a Contract (K1,K2, K3)
- 1.2 Offer, Legal rules (K1,K2)
- 1.3 Acceptance, Legal Rules,(K1, K2)
- 1.4 Consideration, Legal Rules, (K1,K2)
- 1.5 Contractual Capacity, Discharge, Breach of Contract and its Remedies (K1,K2,K3)
- 1.6 Sales Contract, Transfer of Title & Risk of Loss, Conditions and Warranties in Sales Contract, Rights of an Unpaid Seller, Electronic Contracts.(K1,K2,K3,K4)

**Unit II: Company Law****(15 hours)**

- 2.1 Definition, Characteristics, Types, Formation, Incorporation (K1, K2,K3,K4)
- 2.2 Memorandum and Articles of Association Contents (K1, K2)
- 2.3 Prospectus, Definition, Contents, Statement in Lieu of Prospectus (K1, K2,K3,)
- 2.4 Meetings, Kinds of Meetings, (K1, K2, K3)
- 2.5 Power, Duties and Liabilities of Directors (K1, K2,K3)
- 2.6. Winding up of Companies (K1, K2,K3)

**Unit III: Law of Partnership and Negotiable Instruments Act 1881****(15 hours)**

- 3.1 Law of Partnership – Meaning, Nature of Partnership, Registration of Firms, Partnership Deed- Dissolution (K1, K2, K3,K4)
- 3.2 Negotiable Instruments, Meaning, Characteristics, Types, Parties (K1, K2, K3)
- 3.3 Holder and holder in Due Course (K1, K2)
- 3.4 Negotiation and Types of Endorsements (K1, K2, K3)
- 3.5 Dishonor of Negotiable Instrument (K1, K2,K3)
- 3.6 Noting and Protest. (K1, K2, K3)

**Unit IV: Value Added Tax Act and Information Act****(15 hours)**

- 4.1 Value Added Tax, Concepts, (K1, K2)
- 4.2 Scope (K1, K2)
- 4.3 Practical Implications of VAT (K1,K2, K3) (K1, K2,K3)
- 4.4 Right to Information act 2005 (K1, K2, K3, K4)
- 4.5 Information Technology Act 2000 (K1, K2, K3)
- 4.6 Information Technology Act 2002 (K1, K2, K3)

**Unit V: Consumer Protection Act and Introduction of Cyber Law****(15 hours)**

- 5.1 Consumer Protection Act, Consumer rights, Procedures, Types of Consumer Redressal Mechanisms and Forums, Cyber Crimes (K1, K2,K3, K4)
- 5.2 Cyber Crimes, Meaning, Types, Cyber Laws (K1, K2,K3)
- 5.3 Introduction of IPR (K1, K2)

5.4 Copy Rights, Ownership Infringement of Copyright (K1, K2, K3)

5.5 Trademarks(K1, K2,K3)

5.6 Patent Act- Legal Aspects of Patent - Filing of Patent Application-Infringement of Patent (K1, K2, K3)

**Note:** Case Studies for all Units.(K5.K6)

### **Text Books**

1. P. Saravanavel and Sumathi – Business Law – Himalaya Publishing House, Reprint2012.
2. N.D.Kapoor- Elements of Mercantile Law, 33rd Revised Edition – Sultan Chand and Company,2012.

### **References Books**

1. P.P.S.Gogna – Mercantile Law, 4th Edition – Sultan Chand & Co., Ltd, India,2008
2. Akhileswar Pathak – Legal Aspects of Business, 7th Edition, McGraw-Hill Education2018.

### **.Websites**

1. [www.lawteacher.net](http://www.lawteacher.net)
2. [www.coursera.org](http://www.coursera.org)

## SEMESTER – III

### PCBAN20 – STRATEGIC MANAGEMENT

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PCBAN20	Strategic Management	Theory	Core	6	3	100

#### OBJECTIVES

1. To help the students in formulating, implementing and evaluating the corporate business strategies.
2. To expose students to the environment and understand on distinctive competencies.
3. The course would enable the students to understand the principles of strategy formulation, implementation and control in organizations.
4. To help students develop skills for applying the nuances of strategic implementation to problems in the Organization.
5. To help students master the analytical tools of strategic management.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand the strategic decisions that organizations make and have an ability to engage in strategic planning.

**CO2:** Explain the basic concepts, principles and practices associated with competitive advantage.

**CO3:** Integrate and apply knowledge gained in basic courses to the formulation and implementation of strategy from holistic and multi-functional perspectives

**CO4:** Analyze and evaluate critically real life company situations and develop creative Solutions, using a strategic management perspective.

**CO5:** Understand the crucially important role that the HRM function plays in the setting and implementation of an organization's strategy.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	H
CO2	H	M	H	M	H	H
CO3	H	H	M	H	H	M
CO4	M	H	H	H	M	M
CO5	H	H	H	H	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	L	M	L
CO2	H	L	M	L	H	M
CO3	H	M	M	M	M	L
CO4	H	M	M	L	M	L
CO5	M	L	L	L	L	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit - I Strategic Process & Formulation (15 hours)**

- 1.1 Conceptual framework for strategic management (K1, K2, K3 )
- 1.2 the Concept of Strategy and the Strategy Formation Process (K1, K2, K3 )
- 1.3 Stakeholders in business, Vision, Mission and Purpose (K1, K2, K3 )
- 1.4 Business definition, Objectives and Goals (K1, K2, K3 )
- 1.5 Corporate Governance and Social responsibility (K1, K2, K3 )
- 1.6 Environmental Appraisal, Environmental scanning (K1, K2, K3 )

**Unit - II Competitive Advantage (15 hours)**

- 2.1 External Environment, Porter's Five Forces Model (K1, K2, K3, K4)
- 2.2 Globalization and Industry Structure, National Context (K1, K2, K3, K4)
- 2.3 Competitive advantage Resources, Capabilities and competencies (K1, K2, K3, K4)
- 2.4 Core competencies, Low cost and differentiation (K1, K2, K3, K4)
- 2.6 Generic Building Blocks of Competitive Advantage, Distinctive Competencies, Resources and capabilities durability competitive advantage (K1, K2, K3, K4)
- 2.6 Avoiding failures and sustaining competitive advantage (K1, K2, K3, K4)

**Unit - III Strategy Formulation (15 hours)**

- 3.1 Generic strategic alternatives, Stability, Expansion, Retrenchment and Combination strategies, Business level strategy (K1, K2, K3, K4)
- 3.2 Strategy in the Global Environment, Vertical Integration-Diversification and Strategic Alliances, Building and Restructuring the corporation (K1, K2, K3, K4)
- 3.3 Strategic choice, Environmental Threat and Opportunity Profile (ETOP), Organizational Capability Profile (K1, K2, K3, K4)
- 3.4 Strategic Advantage Profile, Corporate Portfolio Analysis, SWOT Analysis, GAP Analysis, Mc Kinsey's 7s Framework (K1, K2, K3, K4)
- 3.5 GE 9 Cell Model, Distinctive competitiveness (K1, K2, K3, K4)
- 3.6 Selection of matrix, Balance Score Card (K1, K2, K3, K4)

**Unit - IV Strategy Implementation (15 hours)**

- 4.1 Nature, Barriers, Model, Major themes (K1, K2, K3, K4)
- 4.2 Regulatory mechanisms, Procedural implementation (K1, K2, K3, K4)
- 4.3 Project implementation, Resource Allocation, Structural implementation (K1, K2, K3, K4)
- 4.4 Types of structure, Structure for strategies (K1, K2, K3, K4)
- 4.5 Behavioral implementation, Stakeholders, Corporate governance (K1, K2, K3, K4)
- 4.6 Culture, Politics and power, Values and ethics (K1, K2, K3, K4)

**Unit - V Strategy Evaluation and Control (15 hours)**

- 5.1 Strategic Choice, Nature, Importance, Participants (K1, K2, K3, K4)
- 5.2 Barriers, Requirements, Strategic Control and Evaluation (K1, K2, K3, K4)
- 5.3 Operational Control, Process of Evaluation, Techniques (K1, K2, K3, K4)
- 5.4 Managing Technology and Innovation (K1, K2, K3, K4)
- 5.5 Strategic issues for Non Profit organizations (K1, K2, K3, K4)

## 5.6 New Business Models and strategies for Internet Economy (K1, K2, K3, K4)

**Note:** Case studies for all units. (K5.K6)

### **Text Books**

1. Azhar Kazmi, Strategic Management and Business Policy, Tata McGraw Hill, 3<sup>rd</sup> Edition, 2008.
2. N.Chandrasekaran & P.S.Ananthanarayanan, Strategic Management, Oxford University press, 1<sup>st</sup> Edition 2011.

### **References**

1. Upendra kachru, Strategic Management Concepts & Cases, Excel Books,1<sup>st</sup> Edition,2009.
2. Adrian Haberberg and Alison Rieple, Strategic Management- Theory and application, Oxford University Press, Reprint 2010.

### **Websites**

1. [www.coursera.com](http://www.coursera.com)
2. [www.edx.org](http://www.edx.org)

## SEMESTER – III

### PJBAE20 - STOCK TRADING

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II /III	PJBAE20	Stock Trading	Theory	Skill Paper	4	2	100

#### OBJECTIVES

1. To learn the skill in trading and investing in the stock markets
2. To practice trading in a virtual stock market game
3. To gain experience and knowledge to be successful in stock market
4. To understand the derivative market
5. To practice the Systematic investments plan

#### COURSE OUTCOMES

**The learners will be able to**

**CO1:** Understand the basics in stock market and stock exchanges

**CO2:** Study the capital market and trading settlement

**CO3:** Understand the stock charts and signals.

**CO4:** Understand the financial derivatives contracts

**CO5:** Learn the mutual funds and its investment modes

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	M	H	H	M	M	H
CO3	H	M	H	H	H	M
CO4	H	M	H	H	H	H
CO5	M	H	M	L	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	M	H	M	H	H
CO3	H	M	M	H	H	H
CO4	M	H	H	M	H	M
CO5	M	H	M	H	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I - Introduction about Stock**

Meaning of stock exchange – Classification of Stocks – Investing Strategies – Framework for intelligent stock market- How to invest in stock market with little money – Stock Quotations - Face Value of Share

## **Unit II - Market Intermediaries**

Capital Market and Its Types - Broker – Sub-Broker – Depository – Depository Participants – Procedures- Different type of orders – Clearing and Settlement – Demat A/c – Rolling Settlement – Internet Trading

## **Unit III - Fundamental and Technical Analysis**

Importance of rupee value – When to sell a stock – Fundamentals signals - Technical Signals - Share market chart - How to read stock charts for beginners

## **Unit IV - Understanding Derivatives**

Derivatives – Features – Types – Derivatives vs. Stock

## **Unit V - Understanding Mutual Fund**

Mutual Fund – Evolution – Types – How to Select a good Mutual fund – Invest in Mutual Fund through SIP – Mutual Fund ranking – Calculation of Risk Adjusted Return – Newspaper and Internet games.

## **Text Books**

1. N.J. Yaraswy, Stock Market Investing, Vision Books, Reprinted2013.
2. Uma Shashikanth, SUnitha Abraham, Arti Anand Bhargava, Understanding Mutual Funds,Tata Mc Graw Hill Education Private Limited,2011.

## **Reference Books**

1. Sundar Sankaran,Mutual Funds, Vision Books Private Limited, 3<sup>rd</sup> Edition2012.
2. Van K. Tharp- Trade Your way to Financial Freedom, McGraw-Hill Education; 2 edition  
(December 13,2006)

## **Websites**

1. [www.nseindia.com](http://www.nseindia.com)
2. [www.mashable.cpm/2010/stockmarketgames](http://www.mashable.cpm/2010/stockmarketgames)

### SEMESTER III

#### PJBAF20 – INSTITUTIONAL TRAINING

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II /III	PJBAF20	Institutional Training	Practical	Skill Paper	2	2	100

#### OBJECTIVES

1. To integrate theory and practice
2. To assess interests and abilities in their field of study.
3. To learn to appreciate work and its function in the organization
4. To develop work habits and attitudes necessary for job success.
5. To develop communication, interpersonal and other skills in the job

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Integrate the theoretical knowledge with the real work experience

**CO2:** Create interest in the area of specialization

**CO3:** Experiential learning in the various functions of the organization.

**CO4:** Build a record of work experience and to develop habits and attitudes necessary for job success

**CO5:** Acquire employment contacts leading directly to a full-time job following graduation

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	H
CO2	H	M	M	H	H	M
CO3	M	H	M	H	H	M
CO4	M	H	M	H	H	H
CO5	M	H	H	M	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	H	M	M	M
CO2	L	M	M	L	M	M
CO3	L	H	H	M	M	M
CO4	L	H	H	M	M	L
CO5	M	H	H	M	M	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

Each student shall be required to prepare the report on the basis of training undergone by her in a business or industrial organization. The report should demonstrate the capability of the students in studying the organization and its process in totality.

### **Evaluation Pattern**

- Each student should undergo the training separately.
- The mode of evaluating the student will consist of two parts. One on the basis of report writing and the other will be through Viva Voce.
- The valuation of the report writing will be done by the internal examiner while for the oral examination an external examiner will be called for.
- 60 marks will be awarded for the report writing and for oral examination 40marks.
- Training will be for a period of 30 days which will be during the month of May- June of every academic year.
- Each student should find a reputed organization which carries out the important functions like Production, Human Resource, Finance and Marketing to carry out her investigation with the approval of the department.
- Records should be maintained for daily activities signed by the concerned authorities in the organization
- After completion of the training, the student should get Completion Certificate and Attendance Certificate from the company when she comes back to the college.
- Any change of the organization during the course of the Training should be done only after getting the consent from the Head of the Department of the College in writing.
- Training report is to be submitted by the students within 30 days from the commencement of the 3<sup>rd</sup> semester.
- Evaluation of the report should be sent to the Controller of Examinations through the Head of the Department, before the last working day of the 3<sup>rd</sup> semester
- The following are the components for report writing (60Marks)
  - Content - 40Marks
  - Layout - 10Marks
  - Grammar - 10 Marks
- Viva -Voce – (40Marks)
  - Oral Presentation - 30Marks
  - Question and Answer - 10Marks

**SEMESTER IV**  
**PCBAO20 – PRODUCTION AND OPERATIONS MANAGEMENT**

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II/IV	PCBAO20	Production and Operations Management	Theory	Core	6	3	100

**OBJECTIVES**

1. To understand the concept and techniques of production and operations management.
2. To be aware about Forecasting and capacity building.
3. To understand plant location and design.
4. To have an in depth knowledge on Inventory Management.
5. To apply various tools of TQM.

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Appreciate the principles and applications relevant to the production and operation systems of manufacturing/service firms.

**CO2:** Reveal the ability to apply some forecasting techniques, enlarge basic materials requirement schedules and develop an aggregate plan and describe the boundaries of an operations system, and recognize its interfaces with other functional areas within the organization and with its external environment.

**CO3:** To understand techniques of location and facility planning; line balancing; job designing; and capacity planning in operations management.

**CO4:** Plan and implement suitable materials handling principles and practices in the operations.

**CO5:** Plan and implement suitable quality control measures in Quality Circles to TQM.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	M	H	H	H	H	M
CO3	M	H	H	H	H	M
CO4	M	H	M	M	M	H
CO5	H	M	M	M	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	L	M	L
CO2	H	M	H	L	M	L
CO3	H	L	M	L	H	M
CO4	H	M	M	M	M	L
CO5	M	L	L	L	L	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit - I Introduction to Production and Operations Management (15 hours)**

- 1.1 Production systems , Nature, Importance and Organizational function (K1, K2, K3)
- 1.2 Characteristics of Modern production and operation function (K1, K2, K3)
- 1.3 Recent trends in production and operation management (K1, K2, K3)
- 1.4 Role of operations in Strategic management (K1, K2, K3)
- 1.5 Production and operation strategy (K1, K2, K3)
- 1.6 Nature of International operations management. (K1, K2, K3)

**Unit – II Forecasting, Capacity and Aggregate Planning (15 hours)**

- 2.1 Demand Forecasting, Needs, Types (K1, K2, K3, K4)
- 2.2 Objectives and steps, Capacity Planning, Long range, types (K1, K2, K3, K4)
- 2.3 Rough cut plan, CRP, Types of capacity, Process (K1, K2, K3, K4)
- 2.4 Master Production Scheduling, Objectives, Functions (K1, K2, K3, K4)
- 2.5 Developing capacity alternatives, Aggregate planning (K1, K2, K3, K4)
- 2.6 Approaches – Costs – overview of MRP, MRP II, ERP (K1, K2, K3, K4)

**Unit – III Plant Location, Design of Product and Process (15 hours)**

- 3.1 Meaning, Steps in location selection, Importance of location factors (K1, K2, K3, K4)
- 3.2 Plant layout models, Meaning, Objectives, Types, Importance (K1, K2, K3, K4)
- 3.3 Principles of plant layout, Layout planning, Tools & techniques (K1, K2, K3, K4)
- 3.4 Criteria for selection and design of layouts (K1, K2, K3, K4)
- 3.5 Product design, Importance, Factors, Characteristics, Approaches (K1, K2, K3, K4)
- 3.6 Process planning – Process selection – Process decisions. (K1, K2, K3, K4)

**Unit – IV Operations and Materials Management (15 hours)**

- 4.1 Inventory management, Meaning, Objectives (K1, K2, K3, K4)
- 4.2 Factors, Process, Inventory control techniques, Purchase (K1, K2, K3, K4)
- 4.3 Definition, Objectives, Functions, Purchasing cycle, Vendor rating (K1, K2, K3, K4)
- 4.4 Techniques, Value Analysis, Stores Management, Nature, Layout (K1, K2, K3, K4)
- 4.5 Classification and Coding, JIT, Materials management (K1, K2, K3, K4)
- 4.6 Objectives, Planning, Budgeting and control. (K1, K2, K3, K4)

**Unit – V Total Quality Management (15 hours)**

- 5.1 Definition, Quality, TQM framework (K1, K2, K3, K4)
- 5.2 Dimensions of product and service quality (K1, K2, K3, K4)
- 5.3 Contribution of Deming, Crosby, Ishikawa, Quality Circle (K1, K2, K3, K4)
- 5.4 Japanese 5s Principle, 8D Methodology (K1, K2, K3, K4)
- 5.5 KAIZEN, Key elements, Classification (K1, K2, K3, K4)
- 5.6 Six Sigma concepts of process capability, TPM principles, Benefits, BPR. (K1, K2, K3, K4)

**NOTE:** Case studies for all units. (K5.K6)

**Text books**

1. Aswathappa K and Shridhara Bhat K, Production and Operations Management, Himalaya Publishing House, Revised 2<sup>nd</sup> Edition, 2008.
2. Dale H. Besterfield et al, Total Quality Management, Third Edition, Pearson Education (First Indian Reprint 2004)

**References**

1. Pannerselvam R, Production and Operations Management, Prentice Hall India, 2<sup>nd</sup> Edition, 2008.
2. Jacobs & Aquilano, Operations management for competitive management, chase, Tata McGraw Hill Publication, 11<sup>th</sup> Edition.

**Websites**

1. [www.poms.org](http://www.poms.org)
2. [www.edx.org](http://www.edx.org)

**SEMESTER IV**  
**PCBAP20 - INTERNATIONAL BUSINESS AND ETHICS**

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II/IV	PCBAP20	International Business and Ethics	Theory	Core	6	3	100

**COURSE LEARNING OBJECTIVES**

1. To Develop Knowledge on Business Strategies and Culture in International Aspect and Familiarise the Learners with the International Trade and Business.
2. To acquire Skills on Foreign Direct Investments to implement in International Business.
3. To comprehend ethics in the work place.
4. To assist the students to know about emotional intelligence, IQ, Coping strategies, conflict resolution, effective communication.

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Understand the emergence and needs of Globalization in Business and acquire the concepts of International Business theories and Strategies.

**CO2:** Study the requisites of FDI & Global Monetary System.

**CO3:** Understand the Culture Differences in Business.

**CO4:** Acquire the knowledge on Ethics in the workplace.

**CO5:** Analyze the Ethical issues and challenges.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	M	H
CO2	H	M	H	M	M	M
CO3	M	M	H	M	H	M
CO4	M	H	M	H	H	H
CO5	M	H	M	H	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	L	M	H
CO2	H	M	H	L	M	H
CO3	H	L	M	L	H	H
CO4	H	M	M	M	M	H
CO5	H	L	L	L	L	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I: Introduction and Trade Theory (15 hours)**

- 1.1 Evolution of International Business, Nature of International Business (K1, K2, K3)
- 1.2 Emergence of Globalization, Managing Across Cultures - Strategies for Going International (K1, K2, K3)
- 1.3 International trade theory, Benefits of Foreign Trade, New Trade Theory (K1, K2, K3)
- 1.4 Globalization- Drivers & Restrainers of International Globalization (K1, K2, K3)
- 1.5 International Business, Types (K1, K2, K3)
- 1.6 Comparison between International and Domestic Business (K1, K2, K3)

**Unit II: Foreign Direct Investment (15 hours)**

- 2.1 Nature , Need , Theories of FDI (K1,K2, K3,K4)
- 2.2 Factors Influencing FDI. (K1, K2, K3, K4)
- 2.3 The Global Monetary System (K1,K2,K3,K4)
- 2.4 Foreign Exchange Market (K1,K2,K3,K4)
- 2.5 Functions of Foreign Exchange Market(K1,K2,K3,K4)
- 2.6 Major International Financial Markets. (K1,K2,K3,K4)

**Unit III: Differences in Culture (15 hours)**

- 3.1 Need , Cultural Predispositions (K1,K2,K3,K4)
- 3.2 Cultural Models (K1,K2,K3,K4)
- 3.3 Communicating Across Cultures (K1,K2,K3,K4)
- 3.4 Barriers to Effective Cross(K1,K2,K3,K4)
- 3.5 Cultural Communication (K1,K2,K3,K4)
- 3.6 Human Resource Practices in the National Context(K1,K2,K3,K4)

**Unit IV: Ethics in Workplace (15 hours)**

- 4.1 Business Ethics , Importance , Levels (K1,K2,K3,K4)
- 4.2 Myths , Law versus ethics , Legal versus moral business (K1,K2,K3,K4)
- 4.3 Rights and duties of employees (K1,K2,K3,K4)
- 4.4 Personnel policies , Trade unions (K1,K2,K3,K4)
- 4.5 Workplace ethics ,Health and Safety (K1,K2,K3,K4)
- 4.6 Conflict Discrimination , Sexual Harassment. (K1,K2,K3,K4)

**Unit V: Ethical Challenges (15 hours)**

- 5.1 Environmental Challenges (K1,K2,K3,K4)
- 5.2 Role of Government (K1,K2,K3,K4)
- 5.3 Challenges of cyber Act (K1,K2,K3,K4)
- 5.4 Challenges of Violence (K1,K2,K3,K4)
- 5.5 Business and Terrorism (K1,K2,K3,K4)
- 5.6 Multinational Challenges of Gender rights and Human rights. (K1,K2,K3,K4)

**Note:** Case Studies for all Units(K5.K6)

**Text Books:**

1. Francis Cherunilam., International Business: Text and Cases, 5<sup>th</sup> Edition, PHI Learning,2010.
2. K.Aswathappa, International Business, 6<sup>th</sup> Edition, McGraw Hill Education,2015

**Reference Books:**

1. Hill, C.W.L. and Jain, A.K., International Business: Competing in the Global Marketplace, 6th Edition, Tata McGraw-Hill Education,2008.
2. Ball, D., Geringer, M., Minor, M. and McNett, J., International Business: The Challenge of Global Competition, 11<sup>th</sup> Edition, Tata-McGraw-Hill Education,2009.

**Websites**

1. [www.globethics.net](http://www.globethics.net),
2. [www.mhhe.com/aswathappaib6e](http://www.mhhe.com/aswathappaib6e)

**MARKETING SPECIALIZATION**  
**SEMESTER – III**  
**PEMKA20 - ELECTIVE I A - RETAIL MARKETING**

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PEMKA20	Retail Marketing	Theory	Core Elective	6	3	100

**OBJECTIVES**

1. To introduce the student to the role of retailing and rural retailing in the distribution component
2. To know about the various operational and administrative aspects of the ever growing retailing.
3. To guide the student through the development and understanding of implementing a retail strategy through Logistics and supply chain management.
4. To provide Opportunities for the student to view the globalization of the retail industry.
5. To assist the student in understanding the evolving role of the internet in retailing and the use of technology in the field of retailing

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Be provided with a comprehensive view of retailing and rural marketing in the distribution component.

**CO 2:** Come to know about the various operational and administrative aspects of the ever growing retailing.

**CO3:** Come to know the application of marketing concepts in a practical retail managerial environment

**CO4:** Gains understanding about the globalization of the retail industry and its Opportunities

**CO5:** Understand and investigate the changing role of internet and use of technology in Retailing.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	M
CO2	H	M	H	M	H	M
CO3	M	H	H	M	H	M
CO4	M	H	H	H	H	H
CO5	M	M	H	H	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	M	M	M
CO2	M	H	M	M	M	L
CO3	L	H	M	L	M	M
CO4	H	H	M	L	H	M
CO5	M	M	M	L	M	M

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

### **Unit I - Retail in India**

**(15 hours)**

- 1.1 Meaning - Opportunities in retail marketing - Importance (K1, K2, K3)
- 1.2 Functions performed by retailers – Different types of retail stores (K1,K2, K3)
- 1.3 Multichannel retailing - Product retailing vs. Service retailing (K1,K2,K3)
- 1.4 Retail marketing issues and challenges in India. Role of Rural retailing in India (K1,K2,K3)
- 1.5 Challenges in Indian Rural Market- Rural retail Players in India (K1,K2,K3)
- 1.6 Rural Retail Strategies.Types of Retailers - Retailing Environment, Indian vs. Global Scenario (K1,K2,K3)

### **Unit II - Retail Location and Layout**

**(15 hours)**

- 2.1 Retail location & layout –Types of locations (K1,K2,K3)
- 2.2 Location strategy and legal consideration – Location Opportunities (K1,K2,K3)
- 2.3 Evaluation – Factors Affecting Retail Location Decisions, Country/Region Analysis, Trade Area Analysis (K1,K2,K3,K4)
- 2.4 Site Location – Store layout- Store design – Store operations - Role of store manager - Interior and exterior design layout (K1,K2,K3,K4)
- 2.5 Retail store - Management planning and Administration – Visual and display methods in retailing (K1,K2,K3,K4)
- 2.6 Store maintenance – Vendor relationship and customer service. (K1,K2,K3,K4)

### **Unit III - Retail Logistics and Supply chain management**

**(15 hours)**

- 3.1 Retail Logistics - Meaning – Types – Need and Importance (K1,K2,K3)
- 3.2 Logistical activities – Reverse logistics – Outsourcing logistics(K1,K2,K3)
- 3.3 Meaning of Supply Chain Management –Need — Supply chain integration Push and Pull Supply Chain Management (K1,K2,K3)
- 3.4 Challenges in developing effective Supply chains in India(K1,K2,K3)
- 3.5 Cross docking – Food and Grocery supply chain - Retail Planning Process, Retail Models, Retail “EST”model (K1,K2,K3)

3.6 Understanding Merchandising Management, Activities of a Merchandiser, Retail Merchandising Management Process(K1,K2,K3)

#### **Unit IV - International Retailing and Rural Retailing**

**(15 hours)**

4.1 Introduction, Stages in Retail Global Evolution - Reasons for Going Global (K1,K2,K3)

4.2 Benefits of Going Global, Other Opportunities and Benefits of Going Global, Market Entry Methods. (K1,K2,K3)

4.3 Introduction, an Overview of the Indian Rural Market, Role of Rural retailing in India, (K1,K2,K3)

4.4 Challenges in Indian Rural Market, Periodic Markets (K1,K2,K3)

4.5 Rural retail Players in India, Rural Retail Strategies, (K1,K2,K3,K4)

4.6 Future of Rural retailing(K1,K2,K3,K4)

#### **Unit V -E-Tailing and CRM**

**(15 hours)**

5.1 E-Tailing- Introduction, Role of Technology in Satisfying Market Demand (K1,K2,K3)

5.2 Technology in Retail Marketing Decisions, Structure and Developments in E-tailing (K1,K2,K3)

5.3 Factors Influences the Growth of E- Tailing, Advantages & Disadvantages of E-Tailing (K1,K2,K3)

5.4 Future of Electronic Retailing. Benefits of Relationship Marketing (K1,K2,K3)

5.5 Management of Relationship, Principles of CRM, Customer Relationship Management Strategies (K1,K2,K3)

5.6 Components of CRM, Customer Service in Retailing, CRM and Loyalty Program (K1,K2,K3)

**Note:** Case studies for all Units. (K5.K6)

#### **Text Books**

1. Levy & Weirtz, Barton A Weitz, Ajay Pandit, Retail Management, Tata McGraw Hill Publications 6<sup>th</sup> Edition,2008.
2. Dunne, Lusch, Retail Management, Cengage Publications, 5<sup>th</sup> Edition,2011.

#### **Reference Books**

1. SwapnaPradhan,RetailingManagement,TataMcGrawHillPublications,3<sup>rd</sup>Edition,2009
2. K.Shridhara Bhat, Logistics and Supply Chain Management, Himalaya Publishing House, 1<sup>st</sup> Edition, 2009.

#### **Websites**

1. [www.dmsretail.com](http://www.dmsretail.com)
2. [www.udemy.com](http://www.udemy.com)

## SEMESTER – III

### PEMKB20 - ELECTIVE I B - SERVICES MARKETING

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PEMKB20	Services Marketing	Theory	Core Elective	6	3	100

#### OBJECTIVES

1. To have a thorough understanding of services marketing and its challenges.
2. To acquire the knowledge of services and marketing mix strategies
3. To study the competition and learn the strategies.
4. To understand the service rendered to customers and to fill the service gaps.
5. To identify the challenges in managing and delivering the quality services.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Have thorough understanding of services marketing,

**CO2:** Acquires knowledge of services strategies including service product and delivery

**CO3:** Gains knowledge of competitors and learns the strategies to be adopted

**CO4:** Come to know the Customer Service oriented mindset and fill the service gaps.

**CO5:** Acquire in depth understanding of the challenges in managing and delivering the quality services.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	H
CO2	H	H	H	H	M	H
CO3	H	H	M	H	H	M
CO4	M	H	M	H	H	M
CO5	M	H	M	H	M	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	L	M	M
CO2	H	M	M	L	M	L
CO3	M	H	M	L	M	L
CO4	M	H	M	L	H	H
CO5	H	H	M	M	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I - Marketing of Services**

**(15 hours)**

- 1.1 Definition – Growth of service sector – Characteristics of services (K1,K2,K3)
- 1.2 Classification – Concept of service marketing triangle, Service marketing mix (K1, K2, K3, K4)
- 1.3 GAP models of service quality. Challenges and issues in services marketing (K1, K2, K3, K4)
- 1.4 Career Opportunities in service sector (K1,K2, K3, K4)
- 1.5 The Service Sector in the Indian Economy Overview of Different Service Sectors, Marketing of Banking Services, Marketing in Insurance Sector, Marketing of Education Services, Marketing of Tourism and Airlines (K1,K2, K3,K4)
- 1.6 Tourism marketing, Airlines marketing, marketing of Hospitality Services, Healthcare Marketing, Social Service by NGOs, Marketing of Online Services, Marketing of Professional Services (K1,K2,K3,K4)

## **Unit II - Building Service Model – 4Ps**

**(15 hours)**

- 2.1 Planning and creating services- Flower of service (K1,K2,K3,K4)
- 2.2 Planning and branding service products - Development of new services (K1,K2,K3,K4)
- 2.3 Types of New Service- Development and its Stages, Service Costs Incurred by the Service Provider, service Blue Printing (K1,K2,K3)
- 2.4 Physical Evidence-Distribution of services - Setting prices – Role of price (K1,K2,K3)
- 2.5 Role of non-monitory cost, Price as an indicator of service quality –Approaches to pricing services, pricing strategies. (K1,K2,K3,K4)
- 2.6 Promoting services – Designing and managing service processes(K1,K2,K3,K4)

## **Unit III - Competition Analysis and Quality Services**

**(15 hours)**

- 3.1 Competitive Threats - Competition Analysis - Strategies (K1,K2,K3)
- 3.2 Competitive Advantage - Managing relationship and building loyalty (K1,K2,K3)
- 3.3 Customer feedback- - Complaint handling (K1,K2,K3,K4)
- 3.4 Marketing Information System and Research (K1,K2,K3,K4)
- 3.5 Service Quality Dimensions, Service Quality Measurement and Service Mapping, (K1,K2,K3,K4)
- 3.6 Improving Service Quality and Service Delivery, Service Failure and Recovery. (K1,K2,K3,K4)

## **Unit IV - Customer Behavior and Market segmentation**

**(15 hours)**

- 4.1 Consumer behavior in services - Customer expectations and perceptions of service (K1,K2,K3,K4)
- 4.2 Two levels of expectation, Zone of tolerance, Service encounters(K1,K2,K3,K4)
- 4.3 Customer satisfaction, Service Costs Experienced by Consumer, the Role of customer in Service Delivery(K1,K2,K3,K4)
- 4.4 Conflict Handling in Services, Customer Responses in Services, Managing relationship- Customer Relationship Management (K1,K2,K3,K4)
- 4.5 Consumer Protection in Services - Market (K1,K2,K3,K4)
- 4.6 Segmentation- Base for segmentation - Criteria for Segmentation. (K1,K2,K3,K4)

## **Unit V - Delivering and performing of services**

**(15 hours)**

- 5.1 Managing demand – Managing capacity - Inventory Demand (K1,K2,K3)
- 5.2 Employees role in service deliver- Customer's role (K1,K2,K3)
- 5.3 Intermediaries role- Strategies for enhancing (K1,K2,K3)
- 5.4 Customer participation, Delivery through intermediaries - Key intermediaries for service delivery, Intermediary control strategies. (K1,K2,K3,K4)
- 5.5 Internal Marketing - External Marketing - Interactive marketing - International Marketing of Services (K1,K2,K3,K4)
- 5.6 Emerging Issues in Service Marketing Introduction, Service Marketing in e-Commerce and e-Marketing, and Telemarketing Services, Service Marketing for Global Markets and Rural Markets, Innovations in Services Marketing, Ethical Aspects in Service Marketing (K1,K2,K3,K4)

**Note:** Case studies for all Units. (K5.K6)

### **Text Books**

- 1. Rama Mohana Rao, KRM, Services Marketing, 2<sup>nd</sup> Edition, 2011.
- 2. Lovelock, Services Marketing - People, Technology, & Strategy, 7<sup>th</sup> Edition, 2011

### **Reference Books**

- 1. K. Douglas Hoffman et al, Essentials of Service Marketing - Concepts, Strategies and cases, Thomson Learning, 2<sup>nd</sup> Edition, 2010
- 2. Kenneth E Clow, et al, Services Marketing Operation Management and Strategy, Biztantra, New Delhi, 2<sup>nd</sup> Edition, 2011.

### **Websites**

- 1. [www.referenceforbusiness.com](http://www.referenceforbusiness.com)
- 2. [www.edx.org](http://www.edx.org)

## SEMESTER – IV

### PEMKC20 - ELECTIVE I C - ADVERTISING AND SALES PROMOTION

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PEMKC20	Advertising and Sales Promotion	Theory	Core Elective	3	4	100

#### OBJECTIVES

1. To enlighten and to identify managerial issues in advertising management.
2. To learn how to design media planning and analyse the creative strategies.
3. To imbibe the ethical behaviour among the students regarding advertising and advertisements.
4. To discover and demonstrate various sales promotion techniques (consumer and trade).
5. To inculcate the knowledge of budget and its implementation in the promotional techniques.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand advertising management with regard to 4 P's of marketing mix.

**CO2:** Be able to design an advertising for the different media.

**CO3:** Gain importance of practicing ethical behaviour in advertising.

**CO4:** Acquire knowledge in various types of promotional techniques in detail.

**CO5:** Be able to estimate and allocate the budget in adopting promotional techniques.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	H
CO2	M	H	M	H	M	H
CO3	M	M	H	H	M	H
CO4	M	H	H	M	H	H
CO5	H	H	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	L	M	M
CO2	M	H	H	M	M	H
CO3	M	M	L	M	H	H
CO4	H	H	M	M	L	L
CO5	M	M	H	L	H	M

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I – Introduction****(15 hours)**

- 1.1 Introduction to advertising – Definition – Product life cycle and Advertising (K1,K2,K3)
- 1.2 Advertising to Persuade the Buyer; Importance of Advertising in Marketing (K1,K2,K3)
- 1.3 Advertising classification - Function and benefits (K1,K2,K3,K4)
- 1.4 Economic, social and Ethical issues-Role of advertising in Marketing Mix (K1,K2,K3)
- 1.5 Advertising Emerging Areas of Growth, Shifting patterns of consumption (K1,K2,K3)
- 1.6 Factors that Affect Marketing and Advertising (K1,K2,K3)

**Unit II - Advertising Agency and Media****(15 hours)**

- 2.1 Introduction - Overview of an Advertising Agency (K1,K2,K3,K4)
- 2.2 Departments of an Advertising Agency - Creative department, Media department (K1,K2,K3)
- 2.3 Client servicing department - Media Planning – Types of media – Media strategies (K1,K2,K3)
- 2.4 Media evaluation –Support media – Internet - Advertising Research (K1,K2,K3,K4)
- 2.5 Advertising response process – Attention and recall. Advertising Copy, Types of advertising copy (K1,K2,K3,K4)
- 2.6 Creativity in Advertising; Copy Testing Methods; Visual Strategies, Art department specialists, Developing a layout, Power of synergy (K1,K2,K3,K4)

**Unit III - Advertising Objectives and Ethics****(15 hours)**

- 3.1 Introduction - Marketing Objectives - Advertising Objectives -Sales-oriented / Behavioural objectives-Communication Oriented objectives (K1,K2,K3,K4)
- 3.2 The DAGMAR Approach to Setting Objectives and Measuring - Advertising Effectiveness (K1,K2,K3,K4)
- 3.3 Kinds of Advertising Objectives - Budget allocation- Approaches (K1,K2,K3)
- 3.4 Ethics in Advertising – Introduction - The Advertising Standards Council of India (ASCI) (K1,K2,K3)
- 3.5 Forms of Ethical Violations - Misleading advertising - Advertising to children (K1,K2,K3,K4)
- 3.6 Product endorsements – Stereotyping - Cultural, religious and racial sensitivity in advertising. (K1,K2,K3,K4)

**Unit IV - Sales Promotion****(15 hours)**

- 4.1 Objectives – Definition – Promotion Mix (K1,K2,K3)
- 4.2 Factors influencing Promotion – Advantages and disadvantages (K1,K2,K3,K4)
- 4.3 Types of Sales promotion – Pull and Push (K1,K2,K3,K4)
- 4.4 Sales Promotion and consumer Behavior (K1,K2,K3,K4)
- 4.5 Impact of Sales Promotion in Sales.(K1,K2,K3,K4)
- 4.6 Difference between Sales Promotion and Advertising (K1,K2,K3,K4)

## **Unit V - Sales Promotion Planning and Budget Allocation**

**(15 hours)**

5.1 Budgets – Sales promotion budget – Sales Promotion Design (K1,K2,K3,K4)

5.2 Promotion choice – Evaluation - Planning guidelines (K1,K2,K3,K4)

5.3 Sales Promotion Tools and Techniques.(K1,K2,K3,K4)

5.4 Sales promotion – Requirement identification – Designing of sales promotion campaign – Involvement of salesmen and dealers (K1,K2,K3,K4)

5.5 Out sourcing sales promotion national and international promotion strategies – Integrated promotion (K1,K2,K3,K4)

5.6 Coordination within the various promotion techniques – Online sales promotions (K1,K2,K3,K4)

**Note:** Case studies for all Units. (K5.K6)

### **Text Books**

1. S.H.H. Kazmi And Satish K. Batra, Advertising and Sales Promotion, Excel Books, 3rd Edition 2008.
2. William D. Wells/ 9John Burnett/ Sandra Moriarty, Advertising – Principles and Practice, Pearson Education, 7th Edition,2011.

### **Reference Books**

1. George E Betch/Michael A Belch/Kapoor Purani, Advertising and Promotion, Tata McGraw Hill, 7th Edition, 2010.
2. Jaishri Jethwaney- Advertising Management Oxford University Press India; 2 edition (5 November2012

### **Websites**

1. study.com
2. www.udemy.com.

**FINANCE SPECIALISATION  
SEMESTER – III**

**PEFNA20 - ELECTIVE II A - SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT**

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PEFNA20	Security Analysis and portfolio Management	Theory	Core Elective	6	3	100

**OBJECTIVES**

1. To focus on introducing the various aspects of securities analysis and portfolio management.
2. To gain the knowledge on advanced practical concepts, tools and applications to the Indian Securities Market.
3. To make aware about the functioning of securities market alongside the theories and concept involved in portfolio management.
4. To familiarize the student with basic concepts of Securities Analysis and Portfolio Management.
5. To learn the various tools and techniques to facilitate the managers in managing their portfolio.

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Understand the various alternatives available for investment. Gain knowledge of the various strategies followed by investment practitioners.

**CO2:** Gain knowledge in the financial market and SEBI regulations.

**CO3:** Understand fundamental analysis in the Economy, Industry and company

**CO4:** Identify the chart patterns used to depict the stock market.

**CO5:** Measure risk and return and find the relationship between risk and return.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	H	M	H	H	M
CO3	M	H	H	H	M	M
CO4	M	M	H	M	H	M
CO5	H	M	H	M	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	H
CO2	M	H	H	H	L	H
CO3	M	H	H	H	M	M
CO4	M	H	H	M	H	M
CO5	H	H	H	M	H	H

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

**Unit I - Investment Setting****(15 Hours)**

- 1.1 Financial and economic meaning of investment (K1)
- 1.2 Characteristics and objectives of investment(K1,K2,K3)
- 1.3 Aspects of investment planning (K1,K2,K3)
- 1.4 Features of investment planning – Investment vs. Speculation (K1,K2,K3)
- 1.5 Types of investors (K1,K2,K3,K4)
- 1.6 Investment alternatives (K1,K2,K3,K4)

**Unit II - Securities Markets****(15 Hours)**

- 2.1 Financial market – Segments – Types – Participants in financial Market – Regulatory Environment (K1,K2,K3)
- 2.2 Primary market – Recent trends in primary market - Types of investors - Relationship between primary and secondary market (K1,K2,K3)
- 2.3 Methods of floating new issues – Role of primary market – Regulation of primary market and secondary market (K1,K2,K3)
- 2.4 Stock exchanges in India – BSE, OTCEI, NSE, ISE, and Regulations of stock exchanges(K1,K2,K3,K4)
- 2.5 Trading system in stock exchanges – Depositories –DP- Benefits of DP services - DP a/c opening (K1,K2,K3,K4)
- 2.6 SEBI(K1,K2)

**Unit III - Fundamental Analysis****(15 Hours)**

- 3.1 Fundamental analysis-EIC Analysis (K1,K2)
- 3.2 Economic Analysis – Economic Variables (K1,K2,K3,K4)
- 3.3 Economic Forecasting techniques(K1,K2,K3)
- 3.4 Industry Analysis- Industry life cycle (K1,K2,K3,K4)
- 3.5 Industry Characteristics(K1,K2,K3)
- 3.6 Company Analysis(K1,K2,K3,K4)

**Unit IV - Technical Analysis****(15 Hours)**

- 4.1 Fundamental Analysis vs. Technical Analysis (K1)
- 4.2 Charting methods (K1,K2,K3,K4)
- 4.3 Trend – Trend reversals – Chart patterns – Market Indicators (K1,K2,K3,K4)
- 4.4 Mathematical Indicators Moving Average – Exponential Moving Average – Oscillators (K1,K2,K3,K4)
- 4.5 Efficient Market theory – Dows Theory (K1,K2,K3)
- 4.6 Random Walk. (K1,K2,K3)

## **Unit V - Portfolio Management**

**(15 Hours)**

5.1 Portfolio Analysis(K1,K2)

5.2 Portfolio Selection (K1,K2,K3)

5.3 Capital Asset Pricing model (K1,K2,K3)

5.4 Portfolio Revision – Markowitz risk return (K1,K2,K3,K4)

5.6 Adjusted risk return ratios– Sharpe – Treynor – Jensen(K1,K2,K3,K4)

5.6 Portfolio Evaluation. (K1,K2,K3,K4)

**Note:** Case studies for all Units. (K5.K6)

### **Text Books**

1. Prasanna chandra , Investment Analysis and Portfolio Management,Fifth edition, McGraw Hill Education 2017.
2. S. Kevin, Securities Analysis and Portfolio Management, PHI Learning,2008.

### **Reference Books**

1. Donald E. Fischer & Ronald J. Jordan, Security Analysis & Portfolio Management,PHI Learning, New Delhi, 6<sup>th</sup> Edition, 2005.
2. V.A. Avadhan, Securities Analysis and Portfolio Management, Himalaya Publishing House, 2008.

### **Websites**

1. [www.equitymaster.com](http://www.equitymaster.com)
2. [nptel.ac.in](http://nptel.ac.in)

## SEMESTER – III

### PEFNB20 - ELECTIVE II B– MERCHANT BANKING AND FINANCIAL SERVICES

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II /III	PEFNB20	Merchant Banking and Financial Services	Theory	Core Elective	6	3	100

#### OBJECTIVES

1. To acquaint the students about merchant banking concepts
2. To enable the student to understand the capital market instruments
3. To acquire the knowledge of various fund based and fee based financial services
4. To familiarize the students with credit rating services and agencies
5. To acquaint the students about credit rating and its regulations

#### COURSE OUTCOMES (CO)

The learners will be able to

**CO1:** Understand the role of merchant bankers in the issue management activities and familiarize with the SEBI regulation

**CO2:** Know about the capital market and its functioning

**CO3:** Examine financial services as an important and contemporary area of financial management

**CO4:** Acquire the financial evaluation technique of leasing, venture capital and hire purchase

**CO5:** Gain a deep understanding on credit rating and its regulations

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	H
CO2	H	M	H	H	M	H
CO3	M	M	H	H	M	H
CO4	M	H	M	M	H	M
CO5	M	H	M	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	M
CO2	H	H	H	L	H	H
CO3	H	M	H	M	H	H
CO4	H	L	H	H	H	H
CO5	H	H	M	M	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I Introduction to Merchant Banking**

**(15 Hours)**

- 1.1: Definition of Merchant Banking – Functions (K1, K2, K3, K4, K5, K6)
- 1.2: Responsibilities of Merchant Bankers (K1, K2, K4, K5, K6)
- 1.3: SEBI guidelines (K1, K2, K4, K5)
- 1.4: Defaults of Merchant bankers and penalty points (K1, K2, K3, K4, K5, K6)
- 1.5: Code of conduct for merchant bankers (K1, K2, K3, K4)
- 1.6: Difference between Merchant banking and commercial banking (K1, K2, K4, K5)

## **Unit II Capital Market Instruments**

**(15 Hours)**

- 2.1: Capital Market instruments – Meaning - Types: Preference shares - Equity shares (K1, K2, K3, K4)
- 2.2: Nonvoting equity shares - Cumulative Convertible preference shares (K1, K2, K3, K4)
- 2.3: Company fixed deposits – Warrants (K1, K2, K3, K4)
- 2.4: Debentures and Bonds (K1, K2, K3, K4)
- 2.5: Innovative Debt Instruments (K1, K2, K3, K4)
- 2.6: Shares vs. Debentures (K1, K2, K3, K4)

## **Unit III Fund Based Services**

**(15 Hours)**

- 3.1: Factoring – Meaning – Mechanism - Features (K1, K2, K3, K4)
- 3.2: Legal aspects of factoring (K1, K2, K3, K4)
- 3.3: Types – Advantages – Disadvantages of factoring (K1, K2, K4)
- 3.4: Players – Functions of factoring (K1, K2, K3, K4, K5)
- 3.5: Forfeiting – Definition – Steps – Mechanics (K1, K2, K3, K4, K5)
- 3.6: Advantages - Factoring vs. Forfeiting (K1, K2, K3, K4, K5)
- 3.7: IDR (K1, K2, K4, K5)
- 3.8: Book Building (K1, K2, K3, K4, K5, K6)
- 3.9: Green shoe Option (K1, K2, K3, K4, K5, K6)

## **Unit IV Fund Based Services**

**(15 Hours)**

- 4.1: Merger – Acquisition – Takeover - Types of merger (K1, K2, K3, K4, K5, K6)
- 4.2: Venture capital – Meaning - Stages of venture capital finance (K1, K2, K3, K4, K5, K6)
- 4.3: Leasing – Meaning - Essential elements (K1, K2, K3, K4, K5, K6)
- 4.4: Types of leasing (K1, K2, K3, K4, K5, K6)
- 4.5: Players - Merits and demerits of leasing (K1, K2, K3, K4, K5, K6)
- 4.6: Hire purchase finance – meaning (K1, K2, K3, K6)
- 4.7: Consumer finance – Meaning - Types (K1, K2, K3, K4, K6)

## **Unit V Credit Rating**

**(15 Hours)**

- 5.1: Credit Rating – Definition – Features (K1, K2, K3, K4)
- 5.2: Advantages of credit rating (K1, K2, K3, K4)
- 5.3: Domestic credit rating Agencies: CRISIL (K1, K2, K4, K5)
- 5.4: ICRA (K1, K2, K4, K5)
- 5.5: CARE (K1, K2, K4, K5)
- 5.6: CIBIL – Objectives and Services (K1, K2, K4, K5)

**Note:** Case Studies for all Units (K5.K6)

**Text Books**

1. Dr S Gurusamy – Merchant Banking and Financial Services, Latest Edition – McGraw Hill Education,2009
2. D. Joseph Anbarasu, V.K. Boominathan, P. Manoharan, G. Gnanaraj, FinancialServices, Sultan Chand & Sons,2003.

**Reference Books**

1. M Y Khan – Financial Services, Latest Edition – McGraw Hill Education, 5<sup>th</sup> Edition,2011
2. H R Machiraju – Merchant Banking, Latest Edition – New Age International Publishers, 4<sup>th</sup> Edition, 2010

**Websites**

1. [www.edx.org](http://www.edx.org)
2. [www.learnwithflip.com](http://www.learnwithflip.com)

## SEMESTER – IV

### PEFNC20 - ELECTIVE II C - RISK MANAGEMENT AND DERIVATIVES

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PEFNC20	Risk and Derivatives Management	Theory	Core Elective	6	3	100

#### OBJECTIVES

- 1 To provide knowledge, understanding of practical investments and corporate financial management strategies using various derivatives in a manner which will allow students to apply these concepts and skills in their careers.
- 2 To provide a basic understanding of financial derivatives as well the application of derivatives.
- 3 To know the trading mechanism and uses as hedging instruments and regulatory framework.
- 4 To manage the assets and liabilities of private enterprises, banks, insurance companies, pension funds, and other financial institutions
- 5 The students will learn the fundamental concepts of derivative pricing and hedging and apply them to a variety of financial instruments.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand the concepts on risk and its sources

**CO2:** Gain knowledge in risk management techniques

**CO3:** Understand the concepts of financial derivatives.

**CO4:** Gain knowledge in the derivatives markets in India

**CO5:** Acquire knowledge and skills in the advanced financial derivatives.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	M
CO2	H	H	M	H	H	M
CO3	M	H	M	H	H	M
CO4	M	M	H	H	M	H
CO5	H	M	H	H	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	M	H	M	H	H	H
CO2	H	H	M	H	L	M
CO3	H	H	H	H	M	H
CO4	M	M	H	H	M	H
CO5	H	M	H	M	H	L

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

**Unit I - Introduction to Risk Management (15 Hours)**

- 1.1 Risk – Types of Risk (K1,K2)
- 1.2 Objectives of risk management (K1,K2,K3)
- 1.3 Sources of risk (K1,K2,K3)
- 1.4 Risk identification (K1,K2,K3)
- 1.5 Measurement of risk(K1,K2,K3)
- 1.6 Risk Management Process(K1,K2,K3,K4)

**Unit II - Risk Management Techniques (15 Hours)**

- 2.1 Risk Avoidance (K1,K2,K3,K4)
- 2.2 Loss Control (K1,K2,K3,K4)
- 2.3 Risk retention (K1,K2,K3,K4)
- 2.4 Risk transfer (K1,K2,K3,K4)
- 2.5 Cost of risk management (K1,K2,K3,K4)
- 2.6 Pooling and diversification of risk. (K1,K2,K3,K4)

**Unit III – Derivatives Management – I (15 Hours)**

- 3.1 Derivatives – Definition (K1)
- 3.2 Types (K1,K2,K3)
- 3.3 Uses (K1,K2,K3)
- 3.4 Forward contracts (K1,K2,K3)
- 3.5 Future Contracts – SWAPS – Hedging with options (K1,K2,K3)
- 3.6 Sophisticated Hedging Strategies with option(K1,K2,K3,K4)

**Unit IV – Derivatives Management – II (15 Hours)**

- 4.1 Evolution of derivatives in India (K1,K2,K3)
- 4.2 Recommendations of L.C.Gupta Committee (K1,K2,K3)
- 4.3 Categories of derivatives traded in India (K1,K2,K3)
- 4.4 Derivatives trading at BSE/NSE (K1,K2,K3)
- 4.5 Strengthening of cash market (K1,K2,K3)
- 4.6 salient features of index futures contract at BSE/NSE(K1,K2,K3)

**Unit V - Advance Financial Derivatives (15 Hours)**

- 5.1 Advance Financial Derivatives-Introduction(K1)
- 5.2 Interest Rate Options(K1,K2,K3)
- 5.3 Interest Rate Caps(K1,K2,K3)
- 5.4 Terms Of Interest Rate Agreement(K1,K2)
- 5.5 Types Of Interest Rate Caps-Interest Rate Guarantee and Cap(K1,K2,K3,K4)
- 5.6 Other advanced derivatives. (K1,K2,K3,K4)

**Note:** Case studies for all Units. (K5.K6)

**Text Books**

1. Trieschmann, Hoyt, Sommer, Risk Management and Insurance, Cengage Learning, 12<sup>th</sup> Edition, 2009
2. S.L.Gupta, Financial Derivative – Theory, Concepts and Practice, Prentice Hall of India, 11<sup>th</sup> Edition,2011.

**Reference Books**

1. Mark S. Dorfman, Introduction to Risk Management and Insurance, Prentice hall of India, 8<sup>th</sup> Edition, 2005.
2. Stulz, Risk Management and Derivatives, Cenagage Learning, 1<sup>st</sup> Edition,2008.

**Websites**

1. [www.indiaipo.com](http://www.indiaipo.com)
2. Indian institute of finance and banking. <http://www.iibf.org.in/>

**HUMAN RESOURCE SPECIALISATION  
SEMESTER-III**

**PEHRA20 – ELECTIVE IIIA - COMPENSATION MANAGEMENT**

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PEHRA20	Compensation Management	Theory	Core Elective	6	3	100

**COURSE OBJECTIVES**

1. To gain knowledge about the basic concepts of the compensation system and the pay model.
2. To attain in depth understanding of the evaluation of the job and its description
3. To acquire the knowledge about the design and examine the pay level based on the person competencies.
4. To acquire and the absorb knowledge based on the benefits and services provided in the form of wages and salaries.
5. To empower the students about the level of pay based on the performance and the market competitiveness

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Understand the concept of the compensation system and the pay model.

**CO2:** Attain in depth understanding of the evaluation of the job and its description

**CO3:** Acquire the knowledge about the design and examine the pay level based on the person competencies.

**CO4:** Acquire and absorb knowledge based on the benefits and services provided in the form of wages and salaries

**CO5:** Acquires the knowledge about the level of pay based on the performance and the market competitiveness

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	M	H
CO3	H	M	H	H	M	H
CO4	M	H	M	H	H	M
CO5	M	H	H	H	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	L	L	M	L
CO2	H	M	M	L	M	L
CO3	H	L	H	L	L	L
CO4	H	M	M	L	M	L
CO5	H	L	M	H	M	L

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit – 1 Concepts of Compensation System and the Pay Model (15 hours)**

- 1.1 : Definition – concept (K1)
- 1.2 : Forms of pay (K1, K2)
- 1.3: Pay model (K2)
- 1.4: Developing a total compensation strategy (K2, K3)
- 1.5: Compensation strategy – internal structure (K1, K2, K3)
- 1.6: Strategic choices and consequences (K2, K3)

**Unit- II Job valuation & Job Description (15 hours)**

- 2.1: Job Analysis – procedure – information collected (K1)
- 2.2: Methods of collecting the information (K1, K2)
- 2.2: Job description (K1)
- 2.3: Judging job analysis (K2, K3)
- 2.3: Job evaluation process (K2, K3)
- 2.4: Major decisions in the process of job evaluation. (K2, K3, K4)

**Unit- III Person Based Structures (15 hours)**

- 3.1: Designing pay level, mix, structures – major decision (K1)
- 3.2: Person Based Structures (Skill) – introduction – skill plans (K1, K2, K3)
- 3.4: Types – purpose – analysis (K2, K3)
- 3.5: Competencies – defining competencies – purpose (K2, K3)
- 3.6: Competency analysis – administering the plan (K2, K3)
- 3.5: Bias in internal structures (K2, K3, K4)

**Unit – IV Benefits and Services (15 hours)**

- 4.1: Concept – reason for growth in the employee’s benefits (K1, K2)
- 4.2: Key considerations (K2)
- 4.3: Components of wages and benefits structure – components of a benefit plan (K2, K3)
- 4.4: Benefit administering (K2, K3)
- 4.5: The Indian Constitution and Social Security – legislations (K2, K3)
- 4.6: Trends and issues.(K3, K4)

**Unit- V Pay Level and Market Competitiveness (15 hours)**

- 5.1: Pay for performance plans – concept – specific pay for performance plans (K1, K2)
- 5.2: Team incentives plans (K2, K3)
- 5.3: Gain-sharing plans (K1, K2)
- 5.4: Profit Sharing Plans - ESOPs – BBOPs (K2, K3)
- 5.5: Competitiveness – external competitiveness – labour market factor – product market factors  
organizational factors – relevant markets (K2, K3, K4)

## 5.6 Competitive pay policy alternatives (K2, K3)

**Note:** Case studies for all units. (K5.K6)

### **Text Books:**

1. George T Milkovich, Jerry M Newman, C.S.Venkata Raman, Compensation, Tata McGraw Hill, 9<sup>th</sup> Edition, New Delhi, 2009
2. B. D. Singh, Compensation & Reward Management, Excel Books, 2<sup>nd</sup> Edition,2012

### **Reference Books:**

1. Aswathappa K, Human Resource & Personnel Management, Tata McGraw Hill, 9<sup>th</sup> Edition, New Delhi,2010
2. Dipak Kumar Battacharya Compensation Management, Oxford University Press (16 February 2009)

### **Websites**

1. [www.coursera.org](http://www.coursera.org)
2. [www.edx.com](http://www.edx.com)

## SEMESTER IV

### PEHRB20 - ELECTIVE III B - TRAINING AND DEVELOPMENT

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PEHRB20	Training and Development	Theory	Core Elective	6	3	100

#### OBJECTIVES

1. Impart the concept and approaches to training
2. Discuss the importance of training and development from a HR perspective.
3. Identify training plans and effectively implement them.
4. Define the different types of training.
5. Outline the different types of training delivery methods

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand the concepts, process, models and approaches involved in training

**CO2:** Explain the training design and interpret the various learning dimensions.

**CO3:** Apply training methods based on the nature of the groups.

**CO4:** Integrate various training methods in classroom and professional environment

**CO5:** Understand and apply the assessment and model of evaluation.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	M
CO2	H	H	M	H	M	H
CO3	M	H	H	M	H	H
CO4	M	M	H	M	H	H
CO5	H	M	H	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	L	M	M
CO2	H	H	H	M	M	M
CO3	H	M	L	H	M	M
CO4	H	H	M	L	M	M
CO5	H	H	H	L	M	M

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

**Unit – I Introduction****(15 hours)**

- 1.1 Training - Concept – Benefits (K1, K2, K3)
- 1.2 Characteristics – Process – Types (K1, K2, K3)
- 1.3 Models - Approaches (K1, K2, K3)
- 1.4 Functions of training – Levels – Prepositions (K1, K2, K3)
- 1.5 Stakeholders - Competency based training (K1, K2, K3)
- 1.6 Roles and responsibilities of training manager -Training of training mangers – Challenges (K1, K2, K3)

**Unit – II Training Programme and Learning****(15 hours)**

- 2.1 Training needs – Methods (K1, K2, K3)
- 2.2 Training Design –Strategy and Training (K1, K2, K3)
- 2.3 Competency based training programme (K1, K2, K3)
- 2.4 Learning – Concepts – Adult learners – Learning process (K1, K2, K3)
- 2.5 Dimensions – Domains of Learning (K1, K2, K3)
- 2.6 Learning modes – Learning styles – Barriers (K1, K2, K3)

**Unit – III Training Methods – I****(15 hours)**

- 3.1 Lecture method – Team building (K1, K2, K3, K4)
- 3.2 Question answer (K1, K2, K3, K4)
- 3.3 Learning in groups (K1, K2, K3, K4)
- 3.4 Buzz group – In basket (K1, K2, K3, K4)
- 3.5 Panel Discussions – Case Method (K1, K2, K3, K4)
- 3.6 Special Training Programmes (K1, K2, K3, K4)

**Unit – IV Training Methods – II****(15 hours)**

- 4.1 Seminar – Symposium (K1, K2, K3, K4)
- 4.2 Role Play – Simulation (K1, K2, K3, K4)
- 4.3 Game – Force Field Analysis (K1, K2, K3, K4)
- 4.4 Assignment (K1, K2, K3, K4)
- 4.5 Action Learning (K1, K2, K3, K4)
- 4.6 Training Trends Worldwide (K1, K2, K3, K4)

**Unit – V Assessment and Evaluation of Learning****(15 hours)**

- 5.1 Assessment – Concept – Process (K1, K2, K3)
- 5.2 Assessment tools – Assessment Guidelines (K1, K2, K3)
- 5.3 Evaluation – Definition – Purpose (K1, K2)

5.4 Principles – Framework – Model (K1, K2, K3)

5.5 Management Development – Purpose – Factors – Process (K1, K2, K3)

5.6 Methods - Politicking - Meaning and Purpose (K1, K2, K3)

**Note:** Case studies for all units. (K5.K6)

### **Text Books**

1. B.L. Gupta, Management Training and Development, Vrinda Publications, 1<sup>st</sup> Edition, 2011.
2. Stephen P Robbins and Philip L Hunsaker, Training in Interpersonal Skills, PHI, New Delhi, 5<sup>th</sup> Edition,

### **References**

1. Rolf P Lynton and Udai Pareek, Training for Development, Sage Publications, 3<sup>rd</sup> Revised Edition, 2011.
2. Dr. R.K. Sahu, Training for Development, Excel Books, New Delhi, 1<sup>st</sup> Edition, Reprint 2010.

### **Websites**

1. [www.maximatrain.in](http://www.maximatrain.in)
2. [www.managementstudyguide.com](http://www.managementstudyguide.com)

## SEMESTER – IV

### PEHRC20 – ELECTIVE I C- INDUSTRIAL RELATIONS

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PEHRC20	Industrial Relations	Theory	Core Elective	6	3	100

#### OBJECTIVES

1. To acquire knowledge on the contextual and constitutional framework of Industrial relations.
2. To familiarize with the trade unions in India.
3. To imbibe the methods of maintaining harmony within the Industry.
4. To ascertain the procedure of effectively dealing with grievances and collective bargaining in an organization.
5. To upgrade and expertise on technical advances to maintain good Industrial Relations in an organization
- 6.

#### COURSE OUTCOMES (CO)

The learners will be able to

**CO1:** Expertise on Industrial Concept and Labour Force in India

**CO2:** Understand the concept, formation, types of Trade Union in India and its Functions

**CO3:** It enables learners to gain in depth acquaintance on resolution of Disputes and  
Maintain Industrial harmony

**CO4:** Understand the nature, causes of Grievance Procedure and the maintenance of  
Successful Collective Bargaining

**CO5:** Learners acquire essential awareness on the Technological changes involved in maintaining Industrial Relations.

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	H	H	M
CO2	M	H	H	H	H	M
CO3	H	M	M	H	H	H
CO4	H	H	M	M	H	H
CO5	H	H	H	H	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	L	M
CO2	H	H	M	M	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	M	L	H
CO5	H	H	H	M	H	H

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

**Unit I: Industrial Concept and Labour Force in India (15 hours)**

- 1.1 Industrial Relation, Evolution of Industrial Relations, Concept, Scope and aspects, Components of IR system (K1, K2)
- 1.2 Factors affecting Industrial Relation, Approaches to Industrial Relations (K1, K2)
- 1.3 Labour Force in India: Structure, Composition and Trends, (K1,K2,K3)
- 1.4 Critical Challenges (K1, K2, K3)
- 1.5 Future of Industrial Relations (K1, K2, K3, K4)
- 1.6 Role of Government of in Industrial Relations (K1,K2, K3)

**Unit II: Trade Unionism (15 hours)**

- 2.1 Trade union, Concept, Features (K1, K2)
- 2.2 Functions, Challenges (K1, K2)
- 3.3 Trade Union Recognition (K1, K2, K3,)
- 2.4 Trade Unions in India: ILO-AITUC- CTUO- CITU- INTUC (K1, K2, K3,K4)
- 2.5 Managerial Trade Unions (K1, K2, K3)
- 2.6 Women in Trade Union (K1, K2, K3)

**Unit III: Dispute Resolution and Industrial Harmony (15 hours)**

- 3.1 Industrial Conflicts, Causes and Consequence, Classification(K1, K2,)
- 3.2 Industrial Disputes Act 1947, Software Professionals, Authorities under This Act (K1, K2, K3)
- 3.3 Notice of Change, Reference of Disputes to Boards, Courts, or Tribunals, Procedure, Powers and Duties of Authorities (K1, K2, K3,K4)
- 3.4 Unfair Labour Practices (K1, K2, K3)
- 3.5 General Prohibition on Strikes and Lockouts, Forms of Strike, (K1, K2, K3)
- 3.6 Tripartite - Types and Levels. (K1, K2, K3)

**Unit IV: Grievances Procedures and Collective Bargaining(15 hours)**

- 4.1 Grievances, Nature, Causes, Grievance Procedure,(K1, K2)
- 4.2 Misconduct, Approaches to deal with Indiscipline (K1, K2,)
- 4.3 Punishment-Procedure for punishment, Types of punishment under standing Orders (K1, K2,K3)
- 4.4 Collective Bargaining and Stake Holders (K1,K2, K3)
- 4.5 Negotiating Techniques and Skills- Stages of Negotiation (K1, K2, K3,K4)
- 4.6 Factors Contributing to Success or failure of collective bargaining. (K1, K2, K3)

**Unit V: Technological Change and Settlement of Machinery (15 hours)**

- 5.1 Technological Change, Management Strategy, Management Strategy and approach, Managing Good Industrial Relations, Ten Golden Rules for Good Industrial Relations(K1, K2, K3, K4)
- 5.2 Conciliation(K1, K2)
- 5.3 Mediation (K1, K2)
- 5.4 Arbitration, concept, Approaches, Advantages & Disadvantages, Types, Qualification, Procedure for investigation Submission of Awards (K1, K2, K3,K4)
- 5.5 Adjudication, Socio-economic importance, Types, Three tier system of Adjudication (K1, K2, K3)

5.6 Model principles for reference of disputes of adjudication, Central IR Machinery in India (K1, K2, K3)

**Note:** Case studies for all Units. (K5.K6)

### **Text Books**

1. C.S.Venkata Ratnam - Manoranjan Dhal –Industrial Relations, 2nd Edition- Oxford Higher Education,2017
2. S.C.Srivastava - Industrial Relations and Labour Laws, 5th Edition - Vikas Publication,2007

### **Reference Books**

1. Dwivedi R.S. - Human Relations and Organizational Behaviour, 14th Edition - MacMillan India Ltd., New Delhi,1997.
2. Ratna Sen - Industrial Relations in India: Shilling Paradigms, 2"d Edition Macmillan India Ltd., New Delhi,2011.

### **Websites**

1. [www.industrialrelations.nsw.gov.au](http://www.industrialrelations.nsw.gov.au)
2. [www.coursera.org](http://www.coursera.org)

**SYSYTEM SPECIALIZATION**  
**SEMESTER -III**  
**PESSA20- ELECTIVE IV A - CLOUD COMPUTING**

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PESSA20	Cloud Computing	Theory	Core Elective	6	3	100

**OBJECTIVES**

1. To enable the evolution and role of Cloud Computing in business integration.
2. To integrate Cloud architecture with various virtualized datacenters.
3. Able to understand Cloud architecture, design, development and implementation
4. To enable the students understand the concept of Grid Computing and Networking.
5. To get an idea on the concept Internet of things.

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Understand how Cloud is evolved and will come out with good conceptual knowledge in Cloud Computing

**CO2:** Analyze the services, and platforms in Cloud

**CO3:** Come with awareness on various cloud providers

**CO4:** Attain knowledge of Gridding and networking

**CO5:** Enable the students to have a skill with Internet of Things

CO	PO					
	1	2	3	4	5	6
CO1	M	H	M	H	H	H
CO2	H	H	M	H	M	H
CO3	H	H	M	M	M	H
CO4	M	M	H	H	H	H
CO5	H	M	H	M	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	M	M	L
CO2	H	M	H	H	M	L
CO3	M	M	H	M	H	H
CO4	H	M	M	H	H	H
CO5	M	L	H	M	H	L

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

**Unit I –Introduction (15 hours)**

- 1.1 Cloud Computing Basics – Overview (K1, K2, K3)
- 1.2 Applications – Benefits (K1, K2, K3)
- 1.3 Limitations – Security Concerns (K1, K2, K3)
- 1.4 Clustering – Virtualization (K1, K2, K3)
- 1.5 Types of Cloud Services (K1, K2, K3)
- 1.6 Cloud Titans (K1, K2, K3)

**Unit II - Cloud Architecture over Virtualized Data Centers (15 hours)**

- 2.1 Cloud Computing and Service Models (K1, K2, K3)
- 2.2 Data Center Design and Interconnection Network (K1, K2, K3, K4)
- 2.3 Architectural Design of Compute and Storage Clouds (K1, K2, K3, K4)
- 2.4 Public Cloud Platform (K1, K2, K3)
- 2.5 Inter Cloud Resources Management (K1, K2, K3)
- 2.6 Cloud Security and Trust Management (K1, K2, K3, K4)

**Unit III -Cloud Programming and Software environment (15 hours)**

- 3.1 Services and Service Oriented Architecture (K1, K2, K3, K4)
- 3.2 Features of Cloud and Grid Platforms (K1, K2, K3, K4)
- 3.3 Programming support of Google App Engine (K1, K2, K3, K4)
- 3.4 Programming on Amazon AWS (K1, K2, K3, K4)
- 3.5 Programming on Microsoft Azure (K1, K2, K3, K4)
- 3.6 Emerging Cloud Software environment (K1, K2, K3)

**Unit IV -Grid computing and Peer to peer computing (15 hours)**

- 4.1 Grid Architecture and Services modeling (K1, K2, K3, K4)
- 4.2 Grid Application Trends and Security Measures (K1, K2, K3, K4)
- 4.3 Peer to Peer Computing Systems (K1, K2, K3, K4)
- 4.4 P2P Overlay Network and Properties (K1, K2, K3, K4)
- 4.5 Routing and Proximity- Fault tolerance (K1, K2, K3, K4)
- 4.6 Securing Overlays to Prevent DDoS Attack (K1, K2, K3, K4)

**Unit V -Ubiquitous cloud and Internet of Things (15 hours)**

- 5.1 Ubiquitous Computing - Cloud trends in supporting ubiquitous computing (K1, K2, K3)
- 5.2 Performance of distributed systems and cloud (K1, K2, K3)
- 5.3 Internet of Things Concepts (K1, K2, K3)
- 5.4 Enabling technologies for the Internet of Things (K1, K2, K3, K4)

5.5 Innovative applications of Internet of things (K1, K2, K3, K4)

5.6 Online social and professional networking (K1, K2, K3).

**Note:** Case studies for all units. (K5.K6)

### **Text Books**

1. Anthony T. Velte ,Toby J. Velte, RobertElsenpeter -Cloud Computing : A practical approach – Tata McGrawHill, 2010
2. Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra- Distributed and Cloud Computing : From Parallel Processing to the Internet of Things–, 1<sup>st</sup> Edition Elsevier2017

### **Reference Books**

1. JohnW. Rittinghouse and James F. Ransome, -Cloud Computing Implementation,Management and Securityll, CRC Press, Taylor & Francis Group, Boca Raton London, New York, 2010.
2. Cloud Computing: From Beginning to End – Ray J Rafels CreateSpace Independent Publishing Platform, April 1,2015

### **Websites**

1. [www.coursera.org](http://www.coursera.org)
2. [www.edx.org](http://www.edx.org)

**SEMESTER - III**  
**PESSB20 – ELECTIVE IV B - DIGITAL BUSINESS AND E COMMERCE**

Year/ Sem	Course Code	Title of the Course	Course Category	H/W	Credits	Marks
II / III	PESSB20	Digital Business and E Commerce	Core Elective	6	3	100

**OBJECTIVES**

1. To gain domain knowledge in all aspects of Digital and E-Commerce environment.
2. To enhance the technologies used in digital business.
3. To implement the conceptual and practical knowledge of E- CRM and E- SCM concepts in the workplace
4. To establish awareness of using digital payment methodologies from diverse aspects of technology.
5. To enhance various E- commerce strategies to master in the digital business environment.

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Understand about emergence of E-commerce

**CO2:** Analyze various technologies used to develop digital business environment

**CO3:** Understand the concepts of E- marketing and Digital payment

**CO4:** Students adhere to the values and ethics relevant to the digital payment in business environment

**CO5:** Have knowledge to establish new strategies and master in E- Commerce.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	M	H
CO3	M	M	H	M	H	H
CO4	M	M	H	M	H	H
CO5	H	H	M	H	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	M	M	M
CO2	H	M	H	H	H	M
CO3	H	M	H	M	H	L
CO4	L	M	M	M	H	H
CO5	L	M	H	M	H	M

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

## **Unit I - Introduction to E-Commerce**

**(15 hours)**

- 1.1 Emergence of the Internet – Emergence of the World Wide Web (K1, K2, K3)
- 1.2 Advantages and Disadvantages of E- commerce (K1, K2, K3)
- 1.3 BAM Model - Online Extension of a BAM Model (K1, K2, K3)
- 1.4 Transition of E-commerce in India – E-Transition Challenges for Indian Corporates (K1, K2, K3)
- 1.5 E- Business Models Based on Transaction Parties (K1, K2, K3, K4)
- 1.6 E- Business Models Based on Transaction Types (K1, K2, K3, K4)

## **Unit II - E-Commerce Enabling Technologies and E-Security**

**(15 hours)**

- 2.1 Digital Business concepts -Internet Client-Server Applications (K1, K2, K3)
- 2.2 Networks and Internets: Communication Switching (K1, K2, K3)
- 2.3 Developments in Transmission – Network Routers – The Internet Protocol Suite (K1, K2, K3)
- 2.4 Naming Conventions – URLs – Search Engines (K1, K2, K3)
- 2.5 Software Agents – Internet Service Provider (K1, K2, K3)
- 2.6 Information Security Environment in India (K1, K2, K3)

## **Unit III - Digital Business Ecosystems**

**(15 hours)**

- 3.1 E-Marketing: Traditional Marketing –Identifying Web Presence Goals (K1, K2, K3,K4)
- 3.2 The Browsing Behavior Model – Online Marketing – E-Advertising (K1, K2, K3, K4)
- 3.3 E-Payment Systems: Main Concerns in Internet Banking – People Drive Change – Digital Payment Requirements (K1, K2, K3, K4)
- 3.4 Digital Token-based E-payment Systems – Classification of New Payment Systems (K1, K2, K3, K4)
- 3.5 Properties of Electronic Cash – Cheque Payment Systems on the Internet (K1, K2, K3, K4)
- 3.6 Risk and E-Payment Systems- E Procurement (K1, K2, K3)

## **Unit IV - E-CRM & E-SCM**

**(15 hours)**

- 4.1 E-Customer Relationship Management: Introduction- Typical Business Touch Points(K1, K2, K3, K4)
- 4.2 CRM and workflow Automation – Customer Relationship Management System for a Bank (K1, K2, K3)
- 4.3 Social Media Marketing (K1, K2, K3, K4)
- 4.4 E-Supply Chain Management: Supply Chain – Fulfilling Customer’s Needs – Smart Chains, Smarter Gains (K1, K2, K3,K4)
- 4.5 SCM in Wal-Mart World – The pay-off –Seven Ways to Reduce Inventory –E-SCM Provides “Real-time”Benefits(K1, K2, K3)
- 4.6 The Strategic Advantage - E-Supply Chain Components and Architecture –Major Trends in E-SCM (K1, K2, K3)

## **Unit V - Digital Business Web Design**

**(15 hours)**

- 5.1 E-Strategy: Information and Strategy- The Virtual Value Chain (K1, K2, K3)
- 5.2 Seven Dimensions of E-Commerce Strategy (K1, K2, K3)
- 5.3 Value Chain and E-Strategy (K1, K2, K3)
- 5.4 Planning the E-Commerce Project. (K1, K2, K3, K4)
- 5.5 Effective Web Design: Requirements of Intelligent Websites (K1, K2, K3)
- 5.6 Setting Website Goals and Objectives – Strategies for Website Development (K1, K2, K3)

**Note:** Case studies for all Units. (K5.K6)

### **Text Books**

- 1. P.T. Joseph, S.J. - E-Commerce, An Indian Perspective, PHI Publications, 4<sup>th</sup> Edition 2012.
- 2. Gary.P.Schneider - Ecommerce, Cengage Learning, 9<sup>th</sup> Edition, 2011

### **Reference Books**

- 1. Ravi Kalakota- Electronic Commerce, Pearson Education, 10<sup>th</sup> Edition, 2012..
- 2. Bharat Bhasker- Electronic Commerce, Frame Work Technologies and Applications, Tata McGraw Hill Publications, 3rd Edition, 2008.

### **Websites**

- 1. [www.shopify.com](http://www.shopify.com)
- 2. [www.coursera.org](http://www.coursera.org)

## SEMESTER - IV

### PESSC20 - ELECTIVE IV C - DECISION SUPPORT AND BUSINESS INTELLIGENCE

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PESSC20	Decision Support and Business Intelligence	Theory	Core Elective	6	3	100

#### OBJECTIVES

1. To gain domain knowledge in all aspects of Decision Support system and Business Intelligence.
2. To enhance the data mining skills
3. To implement the conceptual and practical decision making in the workplace
4. To establish awareness in various decision modeling technology.
5. To master in decision making skills to work in an organization as a team or to start an enterprise.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Enable the student to understand about decision support systems

**CO2:** Able to analyze various phases of decision making and components of decision support system

**CO3:** Understand the modeling approaches of decision making and can implement in their organization.

**CO4:** Be able to enhance the data mining skills by applying knowledge discovery

**CO5:** Master in decision making skills on analyzing the data warehousing and mining concepts.

CO	PO					
	1	2	3	4	5	6
CO1	M	H	H	H	M	H
CO2	H	H	M	H	M	H
CO3	H	H	H	M	H	M
CO4	H	M	H	H	H	M
CO5	M	M	M	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	M	M	L
CO2	H	M	M	M	H	L
CO3	M	M	H	H	H	M
CO4	L	M	M	M	H	M
CO5	M	L	H	M	H	L

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

**Unit I - Introduction to Decision Support Systems (15 hours)**

- 1.1 Introduction – Changing Business Environments and Computerized Decision Support (K1, K2, K3)
- 1.2 Managerial Decision Making – Computerized Support for Decision Making (K1, K2, K3)
- 1.3 An Early Framework for Computerized Decision Support – Concept of Decision support Systems (K1, K2, K3)
- 1.4 System View of Decision Support (K1, K2, K3)
- 1.5 Tools & Techniques of Managerial Decision Support (K1, K2, K3)
- 1.6 Implementing Computer Based DSS–Models (K1, K2, K3)

**Unit II - DSS Phases & Components (15 hours)**

- 2.1 Phases of the Decision Making Process: The Intelligent Phase – The Design Phase (K1, K2, K3, K4)
- 2.2 The Choice Phase – The Implementation Phase (K1, K2, K3, K4).
- 2.3 How are Decisions Supported DSS Configurations – Characteristics & Capabilities (K1, K2, K3, K4)
- 2.4 Components: The Data Management Subsystem – The Model Management Subsystem (K1, K2, K3, K4)
- 2.5 The User Interface Subsystem – The Knowledge Based Management Subsystem (K1, K2, K3, K4)
- 2.6 The Decision Support System: User- Hardware (K1, K2, K3, K4)

**Unit III - DSS: Modeling & Analysis (15 hours)**

- 3.1 Management Support Systems Modeling – Static & Dynamic Models (K1, K2, K3, K4)
- 3.2 Static & Dynamic Models- Certainty, Uncertainty & Risk V
- 3.3 Management Support Systems Modeling with Spreadsheets – Decision Analysis with Decision Tables & Decision Trees (K1, K2, K3, K4)
- 3.4 The Structure of Mathematical Models – Mathematical Programming Optimization (K1, K2, K3, K4)
- 3.4 Multiple Goals, Sensitivity Analysis, What – IF Analysis & Goal Seeking (K1, K2, K3, K4)
- 3.6 Problem Solving Search Methods –Simulation (K1, K2, K3, K4)

**Unit IV - Introduction to Data Mining (15 hours)**

- 4.1 Introduction to Data Mining (K1, K2, K3, K4)
- 4.2 Knowledge Discovery (K1, K2, K3, K4)
- 4.3 Patterns that can be Mined (K1, K2, K3, K4)
- 4.4 Technologies used (K1, K2, K3)
- 4.5 Applications in data mining (K1, K2, K3)
- 4.6 Issues in Data Mining (K1, K2, K3)

**Unit V - Introduction to Data Warehousing (15 hours)**

- 5.1 Data Warehouse Basic Concepts –Difference between Operational Database and Data ware house (K1, K2, K3, K4)
- 5.2 Data Warehousing A multitier Architecture – Data Warehouse models Enterprise Warehouse, Data mart and Virtual Ware house - Meta data repository (K1, K2, K3, K4)
- 5.3 Data Warehouse Modeling : Data Cube (K1, K2, K3, K4)
- 5.4 Data Warehouse Modeling OLAP (K1, K2, K3, K4)
- 5.5 Data Warehouse Design- Business Analysis Framework- Design Process (K1, K2, K3, K4)

## 5.6 Data Warehouse Usage for Information Processing – OLAP to Multidimensional Data mining (K1, K2, K3, K4)

**Note:** Case studies for all Units. (K5.K6)

### **Text Books**

1. Efraim Turban and Jay E. Aronson - Decision Support System and Intelligent Systems - Prentice Hall International, 15<sup>th</sup> Edition,2002.
2. Jaiwei Ham and Micheline Kamber -Data Mining concepts and techniques, Kauffmann Publishers, 3<sup>rd</sup> Edition, 2012.

### **Reference Books**

1. Janakiraman V. S and SarukesiK- Decision Support Systems , Prentice Hall of India, 11<sup>th</sup> Edition,2009.
2. George.M.Marakas - Decision Support System , PHI Learning, 2<sup>nd</sup>Edition,2003.

### **Websites**

1. [www.dssresources.com](http://www.dssresources.com)
2. [www.coursera.org](http://www.coursera.org)

**HOSPITAL ADMINISTRATION SPECIALIZATION  
SEMESTER - III**

**PEHCA20 - ELECTIVE V A - HOSPITAL DESIGN AND OPERATION MANAGEMENT**

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PEHCA20	Hospital Design and Operation Management	Theory	Core Elective	6	3	100

**OBJECTIVES**

1. To recognize the importance and need for planning of hospital services and the factors involved
2. To identify, differentiate and interrelate the steps and roles of various personnel involved in overall planning and implementation of the hospital
3. To identify, differentiate and evaluate the functions and requirements for clinical, engineering and support services in the hospital
4. To identify and plan for compliance of the hospital and services to legal requirements
5. To develop, organize and implement a hospital design plan

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Understand and infer the importance of hospital planning and identify the factors influencing outcomes To identify, understand and differentiate the various steps involved in hospital planning

**CO2:** Understand, recognize and interrelate the steps involved in hospital planning

**CO3:** Gain the knowledge in the functions and requirements of various clinical services in the hospital

**CO4:** Understand the functions and requirements of various support services in the hospital

**CO5:** Be able to develop, plan and implement engineering services for the hospital.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	H	M	M
CO2	H	H	M	H	M	H
CO3	M	H	M	H	H	H
CO4	H	H	M	M	H	H
CO5	M	M	H	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	L	H
CO2	H	L	H	M	M	M
CO3	H	H	L	L	M	L
CO4	H	H	L	L	M	L
CO5	M	H	M	M	H	L

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

**Unit 1: Introduction to Hospital Planning (15 hours)**

- 1.1 Market survey - Assessment of the demand and need for hospital services (K1, K2, K3, K4)
- 1.2 Factors influencing hospital utilization (K1, K2, K3, K4)
- 1.3 Steps In Hospital Planning: Need Assessment - Bed planning – Land requirements (K1, K2, K3, K4)
- 1.4 Project cost – Space requirements –Hospital drawings - Documents- (K1, K2, K3, K4)
- 1.5 Project management & implementation (K1, K2, K3, K4)
- 1.6 Project Management tools - Gantt chart and other project planning tools (K1,K2,K3,K4)

**Unit 2: Hospital planning (15 hours)**

- 2.1 Principles of hospital planning(K1,K2,K3,K4)
- 2.2 Formation of Hospital Planning Team- Financial Planning (K1,K2,K3,K4)
- 2.3 Statutory legal requirements - Hospital planning (K1,K2,K3,K4)
- 2.4 Planning process – size of the hospital – site selection - Specialties – Bed allocation (K1,K2,K3,K4)
- 2.5 Human Resource in hospitals - Equipment planning - Conception to commissioning (K1,K2,K3,K4)
- 2.6 Site development - Construction of Hospital–Commissioning(K1,K2,K3,K4)

**Unit 3: Planning for Clinical services (15 hours)**

- 3.1 Planning, - Design layout - functional flow of clinical services (K1,K2,K3,K4)
- 3.2 Outpatient Services - Accident and Emergency (K1,K2,K3,K4)
- 3.3 Inpatient Services – Nursing services (K1,K2,K3,K4)
- 3.4 Hospital Infection Control(K1,K2,K3,K4)
- 3.5 Intensive Care Unit (K1,K2,K3,K4)
- 3.6 Operation Theatre - Day care (K1,K2,K3,K4)

**Unit 4: Planning for Support services (15 hours)**

- 4.1 Planning, Design, layout (K1,K2,K3,K4)
- 4.2 Functional flow of support services: Pharmacy (K1,K2,K3,K4)
- 4.3 Diagnostic labs - Radiology - Cath labs (K1,K2,K3,K4)
- 4.4 Physiotherapy - Blood bank - Central Sterile Supply Department (K1,K2,K3,K4)
- 4.5 Medical records - Hospital Information System (K1,K2,K3,K4)
- 4.6 Mortuary - Central Medical Gas System(K1,K2,K3,K4)

**Unit 5: Planning for Ancillary support services (15 hours)**

- 5.1 Planning, Design, layout (K1,K2,K3,K4)
- 5.2 Functional flow of ancillary support services(K1,K2,K3,K4)
- 5.3 Engineering Services (Biomedical Engineering, Mechanical Engineering & HVAC, Water Supply and Sanitary Service, Electrical Engineering, Civil Engineering) (K1,K2,K3,K4)
- 5.4 Communication Service - Biomedical Waste Disposal – Transport Service - Laundry Services - Dietary Service (K1,K2,K3,K4)

5.5 Administrative Services - Quality Services - House Keeping Department (K1,K2,K3,K4)

5.6 Hospital Maintenance – Estates management (K1,K2,K3,K4)

**Note:** Case studies for all Units. (K5.K6)

**Text books:**

- 1.Kunders G.D, Gopinath S, and Katakama, Hospital Planning, Design and Management, Tata Mc.Graw Hill, New Delhi, 1999.
- 2.Arun Kumar, (ed) Encyclopedia of Hospital Administration and Development, Anmol Publications, New Delhi, 20009

**References**

- 1.Srinivasan A. V. (ed) Managing a modern hospital, Response Books New Delhi, 2000
- 2.Sakharkar B.M. Principles of Hospital Administration and Planning, Jaypee publication, 2009

**Websites**

- 1.swayam.gov.in
- 2.www.wbdg.org

## SEMESTER - III

### PEHCB20- ELECTIVE V B - HOSPITAL MATERIALS AND EQUIPMENT MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / III	PEHCB20	Hospital Materials and Equipment Management	Theory	Core Elective	6	3	100

#### OBJECTIVES

- 1.To understand the structure and overall functioning of the materials management
- 2.To identify, differentiate and analyze the functions of materials management departments
- 3.To recognize, evaluate and design the inventory control system for economical functioning of the hospital
- 4.To categorize, plan and implement audits of inventory and materials system
- 5.To develop, organize and implement the materials management system in the hospital

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand and interpret the role of materials management in the hospital. To understand, recognize and interrelate the components of purchase system in materials management

**CO2:** Understand, recognize and interrelate the components of purchase system in materials management. To develop and critique a purchase system for the hospital

**CO3:** Understand, interrelate aspects, develop and critique the stores system for the hospital

**CO4:** Be able to plan and implement equipment purchase and utilization assessment systems

**CO5:** Recognize the importance of new technologies and trends in materials management and select the appropriate methods for sustainable economic and efficient functioning To plan and develop long term strategies for materials planning in the hospital.

CO	PO					
	1	2	3	4	5	6
CO1	M	H	M	H	M	H
CO2	M	H	M	H	M	H
CO3	H	M	H	H	M	H
CO4	H	M	H	M	H	H
CO5	M	H	H	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	L	H	M
CO2	H	M	H	L	M	M
CO3	H	M	H	L	M	M
CO4	M	H	H	L	H	M
CO5	M	H	M	M	M	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit – I Introduction****(15 hours)**

- 1.1 Material - Functions of materials management (K1,K2,K3)
- 1.2 Objectives of material management – Material management in health care (K1,K2,K3,K4)
- 1.3 Integrated material management – Myths and realities of material management (K1,K2,K3,K4)
- 1.4 Hospital Stores - Functions and types of hospital stores (K1,K2,K3,K4)
- 1.5 Planning of hospital stores – Indenting of stores – Duties of store keeper (K1,K2,K3,K4)
- 1.6 Control of stores – Location and layout - legal aspects of purchasing. (K1,K2,K3,K4)

**Unit – II Purchase and Procurement****(15 hours)**

- 2.1 Purchasing - Principles of purchasing – Purchase Cycle (K1,K2,K3,K4)
- 2.2 Fundamentals of purchasing – Advantages and disadvantages – Rules regarding purchase order (K1,K2,K3,K4)
- 2.3 Tender System & process – Types of contracts (K1,K2,K3,K4)
- 2.4 Inspection of articles – Payment terms
- 2.5 Registration of Vendors – Advantages and disadvantages -Centralization and decentralization (K1,K2,K3,K4)
- 2.6 Group purchasing –Purchase selection and audit committees (K1,K2,K3,K4)

**Unit – III Inspection and Stores****(15 hours)**

Store –Principles - Functions of store- Types of store (K1,K2,K3,K4)

- 3.1 Inventory - inventory control – Types of Inventory cost (K1,K2,K3,K4)
- 3.2 Types of Inventory Control Pareto analysis -ABC/VED/SDE/XYZ/HML/GOLF/MNG/SOS (K1,K2,K3,K4)
- 3.3 Analysis – Lead Time – Buffer stock – Reorder level – Economic Order Quantity (EOQ) – Ordering system – Bin system – Stock verification – Need (K1,K2,K3,K4)
- 3.4 Techniques. (K1,K2,K3,K4)
- 3.5 Types of Inventory Control systems (K1,K2,K3,K4)
- 3.6 Preventive measures- Condemnation and disposal (K1,K2,K3,K4)

**Unit – IV Equipment management****(15 hours)**

- 4.1 Equipment planning and selection – Steps in equipment selection (K1,K2,K3,K4)
- 4.2 Equipment utilization – Repair and maintenance of equipment (K1,K2,K3,K4)
- 4.3 Equipment audit - Equipment Planning and Procurement(K1,K2,K3,K4)
- 4.4 Importing – Import procedures - Import documentation(K1,K2,K3,K4)
- 4.5 Methods of payment – Letter of credit – Foreign currency-payments(K1,K2,K3,K4)
- 4.6 Planning and procurement of spares/accessories/consumables(K1,K2,K3,K4)

## **Unit – V Recent trends in Materials Management**

**(15 hours)**

- 5.1 Concept and frame work of Supply Chain management (K1,K2,K3,K4)
- 5.2 Logistics Management - concept of Just in time and central purchasing (K1,K2,K3,K4)
- 5.3 Integrated Materials Management – RFID - The Internet of Things (K1,K2,K3,K4)
- 5.4 Strategies for Hospital Equipment planning and Selection (K1,K2,K3,K4)
- 5.5 Quality improvement tools in stores management (K1,K2,K3,K4)
- 5.6 Innovation in warehouse and Distribution centers – Material data analytics (K1,K2,K3,K4)

**Note:** Case studies for all Units. (K5.K6)

### **Text Books**

1. Shakti Gupta, Sunil Kant, Hospital Stores Management, Jaypee Publishers, 2007.
2. Sadiwala C.M & Sadiwala R.C. Materials and Financial Management, New Age International Publishers, 2007

### **Reference Books**

1. Magad E.L. and Amos J.M. Total Materials Management. Springer Science+Business Media. 1989.
2. Gopalkrishnan P. and Haleem A. Handbook of Materials Management. PHI publishers. 2015.

### **Websites**

1. [www.acgil.com](http://www.acgil.com)
2. [apps.who.int](http://apps.who.int)

## SEMESTER – IV

### PEHCC20- ELECTIVE V C - HOSPITAL QUALITY MANAGEMENT AND LEGAL ASPECTS

Year/ Sem	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II / IV	PEHCC20	Hospital Quality Management and Legal Aspects	Theory	Core Elective	6	3	100

#### OBJECTIVES

1. To understand the structure and overall functioning of various healthcare systems
2. To identify, differentiate and analyze the functions of clinical and non-clinical departments in the hospital
3. To recognize, interrelate, differentiate, evaluate quality standards for hospital and design the an appropriate quality system to comply with standards
4. To plan and develop effective systems for legal compliance in hospital
5. To develop, organize and implement various clinical and non-clinical services in the hospital

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand and distinguish the role of management and healthcare indicators in the hospital

**CO2:** Understand, recognize and interrelate the functions of various clinical services in the hospital

**CO3:** Recognize and interrelate the functions of various non-clinical services in the hospital

**CO4:** Gain knowledge various aspects of quality in the hospital from the viewpoint of accreditation and certification

**CO5:** Understand the various legal requirements for hospitals and design effective methods to ensure legal compliance in the hospital.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	H	M	H	M
CO3	H	H	H	H	H	H
CO4	M	H	M	H	M	H
CO5	M	M	M	H	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	H	L	M	L
CO2	H	H	L	L	M	L
CO3	H	H	L	L	M	L
CO4	M	H	M	M	L	L
CO5	H	M	M	H	M	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit 1: Quality Management & Safety****(15 hours)**

- 1.1 Principles of Quality Management (K1,K2,K3,K4)
- 1.2 Structure, Process and Outcome - Quality / Customer Service (K1,K2,K3,K4)
- 1.3 Quality Foundation, Tools and Techniques - Flow Chart Cause -Effect Diagram - Pareto Diagram  
Statistical Process Control - Healthcare Quality (K1,K2,K3,K4)
- 1.4 Business Process Reengineering & other relevant tools and techniques, Safety (K1,K2,K3,K4)
- 1.5 International Patient Safety Goals (IPSG) – Occupational Health (K1,K2,K3,K4)
- 1.6 Disaster management – Facility safety: Security - Fire hazards – Engineering Hazards – Radiological hazards. (K1,K2,K3,K4)

**Unit 2: Accreditation and Certification****(15 hours)**

- 2.1 ISO Certification - ISQua (K1,K2,K3,K4)
- 2.2 Accreditation – NABH - QCI - NABL – JCI (K1,K2,K3,K4)
- 2.3 Accreditation process – NABH Chapters (K1,K2,K3,K4)
- 2.4 Key Performance Indicators - Gap audit – Clinical audit (K1,K2,K3,K4)
- 2.5 Management audit – Audit process - Levels of accreditation (K1,K2,K3,K4)
- 2.6 Tools and methods used for quality assessment and sustainment for accreditation (K1,K2,K3,K4)

**Unit 3: Healthcare Laws****(15 hours)**

- 3.1 Clinical Establishments Act - Consumer Protection Act (K1,K2,K3,K4)
- 3.2 Medical Termination of Pregnancy Act- Prenatal Preconception Diagnostic Techniques Act (K1,K2,K3,K4)
- 3.3 Human Organ Transplantation Act – Pharmacy Act – Drugs and Cosmetics Act (K1,K2,K3,K4)
- 3.4 Biomedical Waste Management Handling Rules (K1,K2,K3,K4)
- 3.5 Registration of Births and Deaths Act (K1,K2,K3,K4)
- 3.6 Licenses/certificates to be maintained: lifts, boilers, pharmacies, biomedical waste disposal, blood bank, radiation related services, generator fuel etc. (K1,K2,K3,K4)

**Unit 4: Legal Aspects of Healthcare****(15 hours)**

- 4.1 Rights and responsibilities of patients (K1,K2,K3,K4)
- 4.2 Doctor patient contract - Law of torts(K1,K2,K3,K4)
- 4.3 Informed Consent – Confidentiality (K1,K2,K3,K4)
- 4.4 Medical Malpractice & Negligence (K1,K2,K3,K4)
- 4.5 Doctrines of jurisprudence in medical profession – Types of offences – Charge Sheet (K1,K2,K3,K4)
- 4.6 Evidence – Witness (K1,K2,K3,K4)

## **Unit 5: Ethical Aspects of Healthcare**

**(15 hours)**

5.1 Healthcare Ethics – Principles of Ethics (K1,K2,K3,K4)

5.2 Code of Conduct (K1,K2,K3,K4)

5.3 Irrational Drug Therapy (K1,K2,K3,K4)

5.4 Reproductive Medicine – Euthanasia (K1,K2,K3,K4)

5.5 Organ donation and transplantation – Alternative medicine (K1,K2,K3,K4)

5.6 Human experimentation - Technology (K1,K2,K3,K4)

**Note:** Case studies for all Units. (K5.K6)

### **Text Books**

1. Joseph, Juran's Quality Handbook: The Complete Guide to Performance Excellence, 7<sup>th</sup> Edition, 2016
2. Nash D.B., Joshi M.S., Ransom E.R. and Ransom S.B (eds). The Healthcare Quality Book. Health Administration Press. 2017

### **Reference Books**

1. National Accreditation Board for Hospitals and Healthcare Providers, NABH Accreditation Standards for Hospitals (5e), 2020
2. Francis C.M, Medical Ethics, Jaypee Publishers, 2007

### **Websites**

1. [www.ahaindia.org](http://www.ahaindia.org)
2. [apps.who.int](http://apps.who.int)

## LOGISTICS SPECIALIZATION

### SEMESTER III

#### PELMA20 - ELECTIVE VI A – LOGISTICS MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PELMA20	Logistics Management	Theory	Core Elective	6	3	100

#### OBJECTIVES

1. The course provides the analytical framework for understanding the basic concepts and evolution of logistics.
2. Develop knowledge about the interconnectedness of packaging and logistics with the latest trends.
3. Develop knowledge about key elements of Containers.
4. Enhance analytical skills and capability to synthesize information related to logistics re-engineering.
5. Enhance and develop the skills on international logistics functions.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Analyze how logistical decisions (e.g., facilities, inventory, and transportation) impact the performance of the firm as well as the entire supply chain.

**CO2:** Analyze the strengths and weaknesses of packing and the emerging trends in the same.

**CO3:** Develop the strategies that can be taken to find the best paths to route vehicles to deliver and collect goods at multiple stops.

**CO4:** Develop strategies logistics reengineering and compete with the latest technology.

**CO5:** Know the basic characteristics of inbound and outbound logistics.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	H	M	H	M
CO3	H	M	H	M	M	H
CO4	H	H	M	H	H	H
CO5	M	H	M	H	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	M	L
CO2	H	L	L	L	L	H
CO3	H	M	M	L	M	L
CO4	H	M	H	L	M	L
CO5	H	L	M	L	H	M

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I : Introduction****(15 hours)**

- 1.1 Logistics: Definition, Evolution, Concept, Components (KI, K2, K3)
- 1.2 Importance, Objectives Logistic Subsystem, the work of Logistics (KI, K2, K3)
- 1.3 Integrated Logistics, Barrier to Internal Integration (KI, K2, K3)
- 1.4 Logistics as a Support/Interface/Enabler of Marketing function (KI, K2, K3)
- 1.5 Logistics as a Support function of Order Fulfillment (KI, K2, K3)
- 1.6 Assembling & Labeling from Multi storage points, Consignment convergence/divergence and Delivery. (KI, K2, K3)

**Unit II: Packaging****(15 hours)**

- 2.1 Packaging, Perspectives, Damage protection (KI, K2, K3, K4)
- 2.2 Material Handling efficiency / Utility, Product characteristics (KI, K2, K3, K4)
- 2.3 Unitization, Communication, Channel Integration, Alternative materials (KI, K2, K3, K4)
- 2.4 Traditional materials, Emerging Trends, The purposes of packaging (KI, K2, K3, K4)
- 2.5 The packaging industry: structure and dynamics, Returnable packaging (KI, K2, K3, K4)
- 2.6 General packaging principles, Retail logistics packaging, Fresh foods applications (KI, K2, K3, K4)

**Unit III : Containerization****(15 hours)**

- 3.1 Major container trades, Two container operators (KI, K2, K3, K4)
- 3.2 Container ships; terminals, Container distribution (KI, K2, K3, K4)
- 3.3 Container types, Non - containerizable cargo (KI, K2, K3, K4)
- 3.4 Features of containerization (KI, K2, K3, K4)
- 3.5 Container bases (KI, K2, K3, K4)
- 3.6 International Convention for Safe Containers.(KI, K2, K3, K4)

**Unit IV : Logistics Positioning****(15 hours)**

- 4.1 Logistics reengineering, Reengineering procedure, Logistics environmental assessment, Industry competitive Assessment (KI, K2, K3, K4)
- 4.2 Geo market differentials, Technology assessment, Material energy assessment, Channel structure (KI, K2, K3, K4)
- 4.3 Economic social projections, Service industry Trends (KI, K2, K3, K4)
- 4.4 Regulatory posture, Conclusion (KI, K2, K3, K4)
- 4.5 Time based logistics, alternative logistics strategies (KI, K2, K3, K4)
- 4.6 Strategic integration, Logistics time based control techniques (KI, K2, K3, K4)

**Unit V – International Logistics Functions****(15 hours)**

- 5.1 Introduction (KI, K2, K3, K4)
- 5.2 Outbound Logistics Functions (KI, K2, K3, K4)
- 5.3 Inbound Logistics Functions (KI, K2, K3, K4)
- 5.4 Overall Logistics Activities (KI, K2, K3, K4)
- 5.5 Logistics Intermediaries (KI, K2, K3, K4)

**Note: Case studies for all units. (K5.K6)**

### **Text Books**

1. Burt, Dobbler and Starling, World Class Supply Chain Management, TMH 2005Edition
2. Donald J. Bowerson, David J Closs, Logistical Management, Tata McGraw Hill Edition, Reprint2011.

### **Reference Books**

1. Alan E. Branch, Global Supply Chain Management and International Logistics, Routeledge, 2009
2. Levi, Kaminsky& Levi, Managing the Supply Chain: The Definitive Guide, Mcgraw-Hill, 2003.

### **Websites**

1. [www.scmdojo.com](http://www.scmdojo.com)
2. [www.edx.org](http://www.edx.org)

## SEMESTER III

### PELMB20 - ELECTIVE VI B – EXPORT AND IMPORT MANAGEMENT

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PELMB20	Export and Import Management	Theory	Core Elective	6	3	100

#### OBJECTIVES

1. To impart the knowledge on the key functions in export and import process and procedures.
2. To provide understanding to the students on the various modes of logistics.
3. To educate the students in solving issues related to requirements in export and import management.
4. To educate the students in solving issues related to requirements in export and import management related to water carriers.
5. To know all the in depth functionalities of Air Carriers.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Remember the basics of global trade and import and export policies

**CO2:** Understand various import process and procedures and agencies involved in EXIM process and their role in the international trade

**CO3:** Acquire knowledge on the various modes of transportation.

**CO4:** Understand the payment methods, risks and various financing of water carriers.

**CO5:** Elaborate the procedures of Air Carriers.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	H	M	M	M
CO3	M	M	H	H	H	M
CO4	M	H	M	H	M	H
CO5	H	H	H	H	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	L	H	M
CO2	H	M	M	M	M	L
CO3	H	L	L	L	L	H
CO4	H	M	H	L	M	L
CO5	H	M	M	L	M	L

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

**Unit I: Introduction (15 hours)**

- 1.1 Export & Import – Introduction (K1, K2, K3, K4)
- 1.2 Definitions - Evolution of Export & Import (K1, K2, K3, K4)
- 1.3 Foreign Trade (K1, K2, K3, K4)
- 1.4 Institutional Framework and Basics (K1, K2, K3, K4)
- 1.5 Multinational Organizations & Structure (K1, K2, K3, K4)
- 1.6 International Business Scenario (K1, K2, K3, K4)

**Unit II – Procedures In Customs Clearance And Documentation (15 hours)**

- 2.1 Export Procedures and Documents , Customs Clearance of Import and Export Cargo (K1, K2, K3, K4)
- 2.2 Methods and Instruments of Payment and Pricing (K1, K2, K3, K4)
- 2.3 INCOTERMS , Marine Insurance , Methods of Financing Exporters (K1, K2, K3, K4)
- 2.4 Export - Import , Documentation and Steps - Export (K1, K2, K3, K4)
- 2.5 Import Strategies and Practice, Export Marketing (K1, K2, K3, K4)
- 2.6 Business Risk Management and Coverage , Export Incentive Schemes (K1, K2, K3, K4)

**Unit III: Transportation (15 hours)**

- 3.1 Role of transportation ,Transport Decision (K1, K2, K3, K4)
- 3.2 Legal classification of carriers , Intermodal transportation (K1, K2, K3, K4)
- 3.3 Transportation management , Documentation (Domestic and International) , Bases for rates (K1, K2, K3, K4)
- 3.4 Transportation services , Characteristics of Modes of Transportation (K1, K2, K3, K4)
- 3.5 Characteristics of Shipping Industry , World Shipping (K1, K2, K3, K4)
- 3.6 Containerization and Leasing Practices. (K1, K2, K3, K4)

**Unit IV: Water Carriers (15 hours)**

- 4.1 Types of ships , Liners , Tramps , Specialized vessels and their trades (K1, K2, K3, K4)
- 4.2 Cargo stowage/packing overview, Stowage of cargo, Types and characteristics of cargo , Cargo and container handling equipment (K1, K2, K3, K4)
- 4.3 Types of packing, Dangerous cargo. , Export controls (K1, K2, K3, K4)
- 4.4 Customs tariff, Customs Freight Simplified Procedures (CFSP) (K1, K2, K3, K4)
- 4.5 New Export System (NES), Unique Consignment Reference (UCR) (K1, K2, K3, K4)
- 4.6 Customs reliefs, Importation and exportation of goods, Ship's papers, Ship's protest (K1, K2, K3, K4)

**Unit V: Air Carriers (15 hours)**

- 5.1 Types of Carriers, Private Carriers, For-Hire Carriers (K1, K2, K3, K4)
- 5.2 Market Structure, Number of Carriers, Characteristics, General (K1, K2, K3, K4)
- 5.3 Speed of Service, Length of Haul and Capacity-Accessibility and Dependability, Equipments (K1, K2, K3, K4)
- 5.4 Types of Vehicles, Terminals, Cost Structure Fixed Versus Variable Cost (K1, K2, K3, K4)
- 5.5 Components, Fuel, Labor , Equipment ,Economies of Scale/Economies of Density ,

Rates, Pricing (K1, K2, K3, K4)

5.6 Operating Efficiency, Current Issues, Safety, Security (K1, K2, K3, K4)

**Note:** Case studies for all units. (K5.K6)

**Text Books :**

1. UshaKiran Rai, \_Export-Import and Logistics Management\_, PHI Learning Pvt. Ltd.,2007
2. John J. Coyle, C. John Langley, Brian J. Gibson, Robert A. Novack, Edward J. Bardi, A logistics approach to supply chain management, Cengage Learning, 2009.

**Reference Books**

1. Rama Gopal. C., \_Export Import Procedures - Documentation And Logistics\_, New Age International,2007
2. MB. Stroh, A Practical Guide to Transportation and Logistics, Logistics Network Inc.2006

**Websites**

1. [howtoexportimport.com](http://howtoexportimport.com)
2. [www.iiem.in](http://www.iiem.in)

## SEMESTER IV

### PELMC20 - ELECTIVE VI C - GREEN SUPPLY CHAIN AND LOGISTICS MANAGEMENT

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PELMC20	Green Supply Chain and Logistics Management	Theory	Core Elective	6	3	100

#### OBJECTIVES

1. To provide foundational knowledge associated with the green supply chain.
2. To teach the implication of today's most pressing environmental issues.
3. To describe how the various green supply chain practices can actually save money, increases efficiency and reduce delivery time.
4. To understand the concepts of green manufacturing.
5. To have an indepth knowledge on environmental impact of green logistics.

#### COURSE OUTCOMES

The learners will be able to

- CO1:** Remember the basics of Green Supply Chain Management.  
**CO2:** Understand various procedures in ECO Design with its drivers.  
**CO3:** Acquire knowledge on green purchasing.  
**CO4:** Understand the concepts in green manufacturing and its challenges.  
**CO5:** Be aware on green logistics and its drivers.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	H
CO2	M	H	M	M	H	M
CO3	H	M	H	H	H	M
CO4	H	M	H	H	M	M
CO5	M	H	M	M	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	L	M	L
CO2	H	L	M	L	H	M
CO3	H	M	M	L	M	L
CO4	H	M	M	M	M	L
CO5	H	L	L	L	L	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I Introduction**

**(15 hours)**

- 1.1 Introduction (KI, K2, K3)
- 1.2 Traditional Supply Chain and Green Supply Chain (KI, K2, K3)
- 1.3 Environmental Concern and Supply Chain (KI, K2, K3)
- 1.4 Closed-loop Supply Chain (KI, K2, K3)
- 1.5 Corporate Environmental Management, Green Supply Chain (GSCM) (KI, K2, K3)
- 1.6 Definition, Basic Concepts, GSCM Practices (KI, K2, K3)

## **Unit II Eco-Design**

**(15 hours)**

- 2.1 Design for the Environment (DFE) or Eco-Design (KI, K2, K3)
- 2.2 Eco-Design and Supplier Relationships (KI, K2, K3)
- 2.3 Definitions of Eco-Design (KI, K2, K3)
- 2.4 Tools of Product Eco-Design (KI, K2, K3)
- 2.5 Involving suppliers in product eco-design (KI, K2, K3)
- 2.6 Drivers, Challenges and Successful factors (KI, K2, K3)

## **Unit III Green Purchasing**

**(15 hours)**

- 3.1 Green Procurement and Purchasing (KI, K2, K3, K4)
- 3.2 Definitions of green purchasing (KI, K2, K3, K4)
- 3.3 Drivers of green purchasing (KI, K2, K3, K4)
- 3.4 Green purchasing strategies (KI, K2, K3, K4)
- 3.5 Green purchasing performance measurement (KI, K2, K3, K4)
- 3.6 Green Supplier Development and Collaboration. (KI, K2, K3, K4)

## **Unit IV Green Manufacturing**

**(15 hours)**

- 4.1 Green Manufacturing or Production (KI, K2, K3, K4)
- 4.2 Evolution, Definitions , 4Re's: recycling, remanufacturing, reuse and reduction (KI, K2, K3, K4)
- 4.3 Closed-loop Manufacturing (KI, K2, K3, K4)
- 4.4 ISO 14000 systems (KI, K2, K3, K4)
- 4.5 Life Cycle Analysis (LCA) (KI, K2, K3, K4)
- 4.6 Lean Manufacturing for Green Manufacturing or Production. (KI, K2, K3, K4)

## **Unit V Green Logistics and Transportation**

**(15 hours)**

- 5.1 Green Logistics and Transportation (KI, K2, K3, K4)
- 5.2 Definitions of Green Logistics (KI, K2, K3, K4)
- 5.3 Critical drivers of Green Logistics (KI, K2, K3, K4)
- 5.4 Green transportation and logistics practices (KI, K2, K3, K4)
- 5.5 Environmental impacts of transportation and logistics (KI, K2, K3, K4)
- 5.6 Closing the Loop: Reverse Logistics. (KI, K2, K3, K4)

**Note:** Case studies for all units. (K5.K6)

**Text Books**

1. Joseph Sarkis, Yijie Dou. Green Supply Chain Management: A Concise Introduction, Routledge, 2017.
2. Charisios Achillas, Dionysis D. Bochtis, Dimitrios Aidonis, Dimitris Folinas. Green Supply Chain Management, Routledge, 2018.

**Reference Books**

1. Hsiao-Fan Wang, Surendra M. Gupta. Green Supply Chain Management: Product Life Cycle Approach, McGraw Hill publishing, 2011
2. Stuart Emmett, Vivek Sood. Green Supply Chains: An Action Manifesto by Stuart Emmett, Wiley publications

**Websites**

1. [www.supplychainbrain.com](http://www.supplychainbrain.com)
2. [www.masterstudies.com](http://www.masterstudies.com)

## PCBAQ20– PROJECT

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II /IV	PCBAQ20	Project	Project	Skill Paper	6	6	100

### OBJECTIVES

1. To discover potential research areas in the field of specialization
2. To offer students a glimpse into real world problems and challenges
3. To motivate students to the vast array of literature available on the various research challenges in the organization
4. To enable students to use analytical techniques and to give solution for a problem
5. To improve the communication and management skills of the students

### COURSE OUTCOMES

The learners will be able to

**CO1:** Compare and contrast several existing solutions for research challenge

**CO2:** Formulate and propose a plan for creating a solution for the research plan identified

**CO3:** Conduct a survey of several available literature in the preferred field of study

**CO4:** Be able to report and present the findings of the study conducted in the preferred domain

**CO5:** Demonstrate an ability to work in teams and manage the conduct of the research study

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	H	H
CO2	H	M	M	H	M	H
CO3	H	H	H	H	H	H
CO4	H	M	H	M	H	M
CO5	H	H	H	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	L	H	H	L	H	M
CO2	L	H	H	L	M	M
CO3	M	H	H	L	M	M
CO4	M	H	H	L	M	L
CO5	M	H	H	L	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## PCBAQ20– PROJECT

Each student is required to do a project and prepare the report on the basis of investigation carried out by her in an institution or industrial organization. The student is expected to identify a problem in the organization based on her area of specialization and provide solutions and suggestions to the management. The report should demonstrate the capability of the students in analyzing and evaluating the problem and to create original approach in providing solutions to the problem.

The project should include field studies, surveys, interpretation, planning and design of the research methodology presented in a comprehensive manner with recommendations for solutions based on scientifically worked out data and viva will be conducted on the basis of the report and presentation.

### Evaluation Pattern

- Each student should carry out her investigation separately.
- The mode of evaluating the student will consist of two parts. One, on the basis of report writing and the other will be through Viva Voce.
- The valuation of the project report writing will be done by the internal examiner while for the oral examination an external examiner will be called for.
- 60 marks will be awarded for project report writing, 20 marks for overall review and for oral examination 20marks.
- Project will be for a period of 3 months which will be during the month of February - April of every academic year.
- Each student should find a reputed industry to carry out her investigation with the approval of the department.
- Records should be maintained for daily activities signed by the concerned authorities in the organization
- Students should report to the college as per the schedule of the review meeting. Attendance will be maintained and marks are allotted for there view
- On completion of the project, the student should get Completion Certificate and Attendance Certificate from the company.
- Any change of the organization during the course of the project should be done only after getting the consent from the Head of the Department and the internal guide of the College in writing.

The following are the components for report writing

- |   |                                      |                          |
|---|--------------------------------------|--------------------------|
| • | Content                              | - 40Marks                |
| • | Methodology                          | - 10Marks                |
| • | Layout                               | - 5Marks                 |
| • | Grammar                              | - 5Marks                 |
| • | Review of the Project and Attendance | -20 Marks (CA – 80Marks) |
| • | Viva-Voce                            | - (Semester - 20Marks)   |
| • | Oral Presentation                    | - 10Marks                |
| • | Question and Answer                  | - 10Marks                |

## INDEPENDENT ELECTIVES

### INDEPENDENT ELECTIVE PAPER - 1

#### PIBAA20 - MANAGEMENT CONCEPTS IN THIRUKKURAL

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / I	PIBAA20	Management Concepts in Thirukkural	Theory	Independent Elective	-	2	100

#### OBJECTIVES

1. To Furnish and Prepare the Learners to expose the students of Management Studies to learn Business Ethics from related Thirukkural Verses
2. To Familiarize the Learners with the Essentials of Goal Setting and Investment Decision through Thirukkural
3. To Imbibe the Wards on Executing Decision Making Process and Leadership
4. To inhibit knowledge on Social Responsibility and Stress Management
5. To Generate Awareness on Personnel Selection and their welfares

#### COURSE OUTCOMES

The learners will be able to

CO1: Acquire Knowledge on Verses of Thirukkural in Business Ethics

CO2: Understand the formation and need for Decision Making Process and Leadership

CO3: Study the requisites of Goal Setting and Capital Investment Decision

CO4: Understand the Concepts and Scope of Social Responsibility and Stress Management

CO5: Acquire knowledge on Personnel Selection and Welfare.

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	H	H	M
CO2	M	M	M	M	H	M
CO3	H	M	H	H	M	M
CO4	H	H	H	M	M	H
CO5	H	H	H	H	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	M	H	H

H- HIGH(3), M-MODERATE(2), L-LOW(1)

## **Unit I - Business Ethics in Thirukkural**

- 1.1 Business Ethics – Definition (K1, K2)
- 1.2 Concept (K1, K2)
- 1.3 Principles (K1, K2, K3)
- 1.4 Ethical Challenges for Business (K1, K2, K3)
- 1.5 Adapting to Changing Environment in Verse 474, 426 and verse 140 (K1, K2, K3)
- 1.6 Learning the Intricacies of Different Tasks in Verse 462 and 677 (K1, K2, K3, K4)

## **Unit II - Decision Making and Leadership in Thirukkural**

- 2.1 Decision Making (K1, K2)
- 2.2 Principles in Decision Making – Verse 948, 472, 467, 663 (K1, K2)
- 2.3 Techniques for Improving Decision Making (K1, K2, K3)
- 2.4 Leadership in Verse 436, 770, and 994. (K1, K2, K3)
- 2.5 Features (K1, K2, K3)
- 2.6 Theories (K1, K2, K3, K4)

## **Unit III - Goal Setting and Investment Decision in Thirukkural**

- 3.1 Goal Setting, Definition (K1, K2)
- 3.2 Guidelines (K1, K2)
- 3.3 Benefits (K1, K2)
- 3.4 Planning Verse 468 (K1, K2, K3)
- 3.5 Types of Plans (K1, K2, K3)
- 3.6 Capital Investment Decision Verse 471, 461 and 478 (K1, K2, K3, K4)

## **Unit IV - Social Responsibility and Stress Management in Thirukkural**

- 4.1 Social Responsibility of Business (K1, K2)
- 4.2 Types (K1, K2)
- 4.3 Examples of Corporate Social Responsibility (K1, K2, K3)
- 4.4 Stress Management (K1, K2, K3)
- 4.5 Ways to Reduce Stress (K1, K2, K3)
- 4.6 Stress Management according to Thiruvalluvar (K1, K2, K3, K4)

## **Unit V - Staffing in Thirukkural**

- 5.1 Selection and Employment Verse 515 (K1, K2)
- 5.2 Importance & Methods of Selection (K1, K2, K3)
- 5.3 Personnel Welfare in Verse 520 (K1, K2, K3)
- 5.4 Staffing in Verse 517 (K1, K2)
- 5.5 Nature of Staffing (K1, K2)
- 5.6 Importance of Staffing (K1, K2, K3)

**Note:** Case Studies for all Units. (K5.K6)

**Text Books:**

1. K.Nagarajan - Management Thoughts in Thirukkural,, ANMOL Publications PVT Ltd 4374/4B Ansari Road, New Delhi 110 002, 2011.

**Reference Books:**

1. SM.Veerappan and T.Srinivasan - Management MANTRAS from Thirukkural — Vikash Publishing House Pvt Ltd, Jangpura – NewDelhi 110 014,2002

**Websites**

1. [www.coursera.org](http://www.coursera.org)

## INDEPENDENT ELECTIVE PAPER - 2

### PIBAB20 – DISASTER MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / I	PIBAB20	Disaster Management	Theory	Independent Elective	-	2	100

#### OBJECTIVES

1. To gain knowledge about the concept of disaster
2. To attain in depth understanding of the various dimensions and typology of disasters
3. To acquire the knowledge different National & International Agencies for disaster Management in India
4. To acquire the knowledge and information related to Disaster Mitigation, Preparedness & Planning
5. To empower and inhibit the knowledge about the Disaster Rehabilitation & Futuristic Sustainable Measures adopted

#### COURSE OUTCOMES

The learners will be able to

CO1: Understand the knowledge about the concept of Disaster

CO2: Attain in depth understanding of the various dimensions and typology of disasters

CO3: Acquire the knowledge different National & International Agencies for disaster Management in India

CO4: Acquire the knowledge and information related to Disaster Mitigation, Preparedness & Planning

CO5: Empower and inhibit the knowledge about the Disaster Rehabilitation & Futuristic Sustainable Measures adopted.

CO	PO					
	1	2	3	4	5	6
CO1	M	H	M	H	M	M
CO2	M	H	M	H	M	M
CO3	H	M	H	M	H	H
CO4	H	H	H	M	H	H
CO5	M	M	M	H	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	L	L	L	M
CO2	H	L	L	M	L	M
CO3	H	L	L	H	M	M
CO4	H	M	L	L	M	H
CO5	H	M	M	L	M	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I - Concepts of Disaster**

- 1.1: Disaster (K1)
- 1.2: Hazards – Emergency vulnerability (K1, K2)
- 1.3: Courses and impact of disaster – Levels of disaster (K2)
- 1.4: Effects of disaster (K2, K3)
- 1.5: Causal factors of disaster (K2, K3)
- 1.6: Phases of disaster (K1, K2, K3)

## **Unit II - Various dimensions and typology of Disasters**

- 2.1: Calamities – Meteorological – Hydrological (K1, K2)
- 2.2: Calamities - Geological – Extra Terrestrial (K1, K2)
- 2.2: Typology of Disaster – Earthquakes – Tsunami – Volcanoes – Landslides – Cyclones – Floods – Droughts (K1, K2, K3, K4)
- 2.3: Environment Pollution (K1, K2, K3)
- 2.4: Deforestation (K1, K2, K3)
- 2.5: Desertification (K1, K2, K3)

## **Unit III - National & International Agencies for Disaster Management in India**

- 3.1: National Crisis Management Committee (NCMC) – The Disaster management Act 2005 – National Civil Defence Organization - Department for Humanitarian Affairs (DHA) (K1, K2)
- 3.2: Inter – Agency Standing Committee (IASC) – Office for the Coordination of Humanitarian Affairs (OCHA) – Food and Agricultural Organization (FAO) (K1, K2, K3)
- 3.3: United Nations Development Programs (UNDP) – United Nations High Commissioner for Refugees (UNHCR) – World Food Programme (WFP) (K1, K2, K3)
- 3.4: World Health Organization (WHO) – International Committee of the Red Cross (ICRC) (K1, K2, K3)
- 3.5: International Federation of Red Cross & Red Crescent Societies (IFRC) – International Organization for Migration (IOM) (K1, K2, K3)
- 3.6: International Atomic Energy Agency (IAEA) – United Nations Sahelian Office (UNSO) – The UN and the role of NGOs (K1, K2, K3, K4)

## **Unit IV - Disaster Mitigation, Preparedness and Planning**

- 4.1: Disaster Mitigation – Meaning – Impact – Menu of mitigation agents (K1, K2, K3)
- 4.2: Disaster management cycle – Classification of mitigation measures – Investing in disaster mitigation (K1, K2, K3)
- 4.3: Disaster Preparedness – Objectives - Principles of disaster planning – Involvement (K1, K2, K3)
- 4.4: Disaster Risk Assessment – Concepts – Factors – Assessing risk – Phases – Steps (K1, K2, K3, K4)
- 4.5: Disaster risk management (K1, K2)
- 4.6: Disaster insurance (K1, K2)

## **Unit V - Disaster Rehabilitation and Futuristic Sustainable Measures**

- 5.1: Meaning – Issues in rehabilitation – Hindrances to normalization (K1, K2)
- 5.2: Rehabilitation approaches (K1, K2)
- 5.3: Rehabilitation from shelter to housing (K1, K2, K3)
- 5.4: Material distribution for rehabilitation (K1, K2, K3)
- 5.5: Role of building Materials and services banks (K1, K2, K3,K4)
- 5.6: Keys to sustainable measures in disaster management (K1, K2, K3)

**Note:** Case studies for all Units (K5,K6)

### **Text Books**

- 1. Modh Satish, Introduction to Disaster Management, Macmilan Publishers India Private Limited, Reprint 2012, NewDelhi

### **Reference Books**

- 1. Ayaz Ahmad, Disaster Management: Through the New Millennium, Anmol Publicaions, 1<sup>st</sup> Edition, New Delhi,2003

### **Websites**

- 1. [www.corsea.org](http://www.corsea.org)

**INDEPENDENT ELECTIVE PAPER - 3**  
**PIBAC20 - INDUSTRIAL SAFETY AND POLLUTION MANAGEMENT**

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / I	PIBAC20	Industrial Safety and Pollution Management	Theory	Independent Elective	-	2	100

**OBJECTIVES**

1. To Acquaint the Students about Safety Management, Responsibilities of Safety, Safety Officer & Committee
2. To Gain Insight on Industrial Accidents
3. To Imbibe the Methods of Maintaining Harmony within the Industry
4. To Ascertain the Procedures of Environmental Safety
5. To Inhibit Knowledge on Environmental Pollution Act

**COURSE OUTCOMES (CO)**

The learners will be able to

**CO1:** Acquire Knowledge on Industrial safety Management

**CO2:** Understand the formation and need for insight on Industrial Accidents

**CO3:** Attain knowledge in the requisites of legal provisions towards Safety

**CO4:** Understand the concepts of Environmental Management

**CO5:** Acquires knowledge on Environmental Pollution Act.

CO	PO					
	1	2	3	4	5	6
CO1	M	M	M	H	M	M
CO2	M	M	H	H	M	H
CO3	H	H	H	H	H	H
CO4	H	H	H	M	H	H
CO5	M	H	M	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	M	M	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	M	H	H

**H-HIGH (3), M-MODERATE (2), L-LOW (1)**

## **Unit I: Management of Safety in Industry**

- 1.1 Concept (K1, K2)
- 1.2 Applicable areas - Unsafe actions and Conditions (K1, K2)
- 1.3 Responsibility of Safety – Society, Government, Management, Union and Employees Appointment (K1, K2, K3)
- 1.4 Qualification (K1, K2)
- 1.5 Duties of Safety Officer (K1, K2)
- 1.6 Safety Committee – Membership - Functions –Scope of Safety – Training of employees for Safety in Industrial Operations (K1, K2, K3, K4)

## **Unit II: Industrial Accidents**

- 2.1 Causes & effects of Industrial Accidents (K1, K2)
- 2.2 Accident Ratio Theory (K1, K2, K3)
- 2.3 Cost of Accidents (K1, K2)
- 2.4 Impact of Accidents on employees (K1, K2, K3)
- 2.5 Responsibility in the prevention of Accidents (K1, K2, K3 )
- 2.6 Union, Management, Society and their role.(K1, K2,K3,K4)

## **Unit III: Legal Provisions Regarding Safety**

- 3.1 Legal provisions regarding safety (K1, K2)
- 3.2 Accident Prevention & Compensation under Factories Act -1948 (K1, K2, K3)
- 3.3 Fatal Accident Act (K1, K2)
- 3.4 Functions of National Safety Council –Accidents – Recording – Investigation – Analysis and Reporting (K1, K2, K3, K4)
- 3.5 Workmen Compensation Act 1923 (K1, K2, K3)
- 3.6 ESI Act Public Liabilities Insurance Act – 1991 (K1, K2, K3)

## **Unit IV: Industrial Enchantment for Environmental Safety**

- 4.1 Environmental Protection Act 1986 (K1, K2)
- 4.2 Definition (K1, K2,)
- 4.3 Occupier (K1, K2)
- 4.4 Handling of Hazardous Substance (K1, K2, K3,K4 )
- 4.5 Offences by Companies (K1, K2, K3)
- 4.6 Penalties for the Contravention of the Act (K1, K2, K3)

## **Unit V: Environmental Pollution Act**

- 5.1 Air Pollution Act 1942- Definition – Air Pollution (K1, K2)
- 5.2 Chimney – Approval & Its Role (K1, K2, K3)
- 5.3 Fuel – Emission, Powers & Functions of Central & State Boards (K1, K2, K3)
- 5.4 Water Pollution Act 1974 – Definition – Sewage & Trade effluent – Outlet stream Offences by Companies, Penalties & Procedures (K1, K2, K3,K4)

5.5 Noise Pollution Act – Definition of Sound & Noise – Sources of Noise –Measurement of Noise – Effect of Noise(K1, K2, K3)

5.6 Physiological, Psychological & Behavioral – Noise Control (K1, K2, K3)

**Note:** Case studies for all Units .(K5.K6)

### **Text Books**

1. Donald Hanter , Health in Industry Penguin, London; 1st Edition edition (1959)

### **Reference Books**

1. P. K. Trivedi Environmental Protections and Law Neha Publishers & Distributors (1994)

### **Websites**

1. [www.coursera.org](http://www.coursera.org)

**INDEPENDENT ELECTIVE PAPER - 4**  
**PIBAD20 - EVENT MANAGEMENT**

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / II	PIBAD20	Event Management	Theory	Independent Elective	-	2	100

**OBJECTIVES**

1. To Comprehend the Event Management in Hospitality Industry
2. To Familiarize the Learners with the Nature of Conference Markets
3. To Perceive the Conception of Contract Negotiations
4. To imbibe the wards on Discerning the Event Business and Customer Care Management
5. To Evaluate the Tourism Growth and Travel Industry Fairs

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Understand the emergence and needs of the Event Management

**CO2:** Analyze the Nature of Conference Markets

**CO3:** Have the ability to understand the Contract Negotiations

**CO4:** Attain the skills in event management and Customer care management

**CO5:** Evaluate the Tourism Growth and Travel Industry Fairs

CO	PO					
	1	2	3	4	5	6
CO1	M	H	M	H	H	H
CO2	M	H	H	H	H	M
CO3	M	H	H	M	M	M
CO4	H	M	M	M	M	H
CO5	H	M	M	H	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	L	M	L
CO2	H	L	H	H	L	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I: Introduction**

- 1.1 Concepts – Planning – Marketing – Maintaining and Development of Resorts (K1, K2)
- 1.2 Types of Resorts (K1, K2)
- 1.3 Major Players in Resort Industry in India – Sterling group, Mahindra group (K1, K2, K3)
- 1.4 Introduction to Conventions (K1, K2)
- 1.5 Exhibitions and Meetings (MICE), Components of the Conference Market (K1, K2, K3, K4)
- 1.6 Introduction to Convention Venues (K1, K2)

## **Unit II: Characteristics of Conference and Convention**

- 2.1 Nature of Conference Markets – Demand for Conference Facilities (K1, K2)
- 2.2 Economical and Social Significance of Conventions (K1, K2, K3)
- 2.3 Impact of Conventions on local and National Communities (K1, K2, K3)
- 2.4 Demographic Trends – Geographical Distributions (K1, K2, K3)
- 2.5 An International Market Perspective (K1, K2, K3)
- 2.6 Introduction to Planning Professional Meets – Management of Conference at site (K1, K2, K3, K4)

## **Unit III: Contract Negotiations**

- 3.1 The law of Professional Meeting and convention Check List (K1, K2)
- 3.2 Development of Convention (K1, K2)
- 3.3 Hotel Sales and Marketing Plan (K1, K2, K3)
- 3.4 Social Media Marketing (K1, K2, K3)
- 3.5 Industry Thinking on Social Media (K1, K2, K3)
- 3.6 Trends and Issues in Social Media (K1, K2, K3, K4)

## **Unit IV: Event Business**

- 4.1 Practices In Event Management (K1, K2, K3, K4)
- 4.2 Organizing and Planning Events (K1, K2,)
- 4.3 Customer care Management (K1, K2)
- 4.4 Starting and Managing Event Business (K1, K2, K3)
- 4.5 Event Marketing, Marketing Equipment and Tools (K1, K2, K3, K4)
- 4.6 Event Coordination (K1, K2, K3)

## **Unit V: Travel Industry Fair**

- 5.1 Global Competition and the Future (K1, K2)
- 5.2 Long term Tourism Growth Trends (K1, K2, K3)
- 5.3 Tourism Growth In Major Regions (K1, K2, K3)
- 5.4 Transportation Developments (K1, K2, K3)
- 5.5 Technology & Automation, Development Issues (K1, K2, K3, K4)
- 5.6 Tourism and the Environment (K1, K2, K3)

**Note:** Case studies for all Units. (K5, K6)

## **Text Books**

- 1. A.K.Bhatia , Event Management, Sterling Publishers Pvt.Ltd.Delhi,200

## **References Books**

1. Avrich, Barry, Event and Entertainment Marketing, Vikas , Delhi, 2010.

## **Websites**

1. study.com

## INDEPENDENT ELECTIVE PAPER – 5

### PIBAE20- FAMILY BUSINESS MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I / II	PIBAE20	Family Business Management	Theory	Independent Elective	-	2	100

#### OBJECTIVES

1. To Develop a Diagnostic and Conceptual Understanding of Family Business
2. To Procure Knowledge on Family Culture and the Family Employment policy
3. To Obtain Comprehensive Understanding of Ownership in Family Business
4. To Embrace the Learning of Succession Planning and Role of CEO spouse
5. To Entitle the Learners the need for strategy in Family Business

#### COURSE OUTCOMES

The learners will be able to

CO1: Understand the emergence and needs of Family Business

CO2: Acquire the concepts of Family Culture, and its Employment Policy

CO3: Gain the knowledge in possession of Family Business

CO4: Understand the progression of Family Business

CO5: Acquires the knowledge on Strategic planning for Family Business

CO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	M	H	H
CO3	M	M	H	H	M	H
CO4	M	M	M	H	M	M
CO5	H	M	M	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	M	H	M	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I: Theories on Family Business**

- 1.1 Nature, (K1, K2)
- 1.2 Importance and uniqueness of Family Business (K1, K2)
- 1.3 Systems Theory Perspectives (K1, K2, K3)
- 1.4 Agency Theory Perspective (K1, K2, K3)
- 1.5 Strategic Perspective: Competitive Advantage (K1, K2, K3, K4)
- 1.6 The Stewardships Perspectives. (K1, K2, K3)

## **Unit II: Family Culture**

- 2.1 Family Culture – Zero Sum Dynamics and Family Culture – Family Systems Perspectives (K1, K2, K3, K4)
- 2.2 Role Family Genograms (K1, K2)
- 2.3 Family Emotional Intelligence (K1, K2, K3,)
- 2.4ECI-U Model – Family Business Interaction Factor (K1, K2, K3)
- 2.5 Benefits of Family Meetings – Unity and Continuity – Family Employment Policy(K1, K2, K3)
- 2.6. Conflict Management (K1, K2, K3)

## **Unit III: Ownership in Family Business**

- 3.1Enterprise ownership (K1, K2)
- 3.2 Shareholder Priorities – Effective Governance of the Shareholder (K1, K2, K3)
- 3.3 Firm Relationship (K1, K2)
- 3.4Role of Board – Role of Shareholder Meetings, Family Meetings, and Meetings of the Family Council (K1, K2, K3,K4)
- 3.5 Ownership Structure – Family Business Consultants - Non – Family Managers (K1, K2, K3)
- 3.6 Boards role in adaptation over the generations (K1, K2, K3)

## **Unit IV: Succession Planning**

- 4.1 Succession Planning and the Family Business – Profile of Successful Successors – Rewards and challenges for latter(K1, K2)
- 4.2 Generation Family Members – Desirable Next – Generation Attributes – Crafting The next – Generation Career Plan (K1, K2,K3)
- 4.3 Vision Plan – Sibling and Cousin Teams (K1, K2)
- 4.4Handling Disagreements (K1, K2, K3)
- 4.5 CEO Exit Styles and Transfer of Power – Role types of the CEO spouse and the Transfer of power (K1, K2, K3, K4)
- 4.6 Estate Planning – Trust – Pitfalls to Avoid in Estate and Ownership Transfer Planning – Measuring Performance of Family Firm (K1, K2, K3)

## **Unit V: Strategic Planning and the Family Business**

- 5.1 Strategic Planning and the Family Business – Zero Sum Family Dynamic –Sources of Value Creation (K1, K2, K3)
- 5.2 The Lifecycle Stages Influencing Family Business Strategy (K1, K2, K3)

5.3 Culture Changing the Culture (K1, K2, K3)

5.4 Three States of Evolution - OD Approach to Change – Business Rejuvenation Matrix (K1, K2, K3)

5.5 Intrapreneurship: Intergenerational growth in Entrepreneurial Families (K1, K2, K3, K4)

5.6 Continuing the Spirit of Enterprise: Lessons from Successful Family businesses (K1, K2, K3)

**Note:** Case studies for all Units. (K5.K6)

**Text Books:**

1. Poza. Ernesto J , Family Business, South – Western, Cengage Learning, USA,2010

**Reference Books:**

1. Collins, J.,Good to Great: Why Some Companies Make the Leap and Others Don't. NewYork: Harper Business,2001.

**Websites**

1. <https://www.familybusinessmatters.consulting/videos/>

## INDEPENDENT ELECTIVE PAPER - 6

### PIBAF20- MALL MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
I/II	PIBAF20	Mall Management	Theory	Independent Elective	-	2	100

### OBJECTIVES

1. To evolve comprehensive information on shopping mall
2. To acquaint the learners with revenue framework
3. To procure efficiency on promotional activities
4. To learn the prerequisites of mall management
5. To educate the learners on future of shopping malls

### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand the Emergence and Development of Shopping Mall

**CO2:** Acquire Knowledge on Revenue Model of the mall

**CO3:** Gain knowledge in the Promotional Activities of Mall

**CO4:** Investigate the Facilities Required for Mall Management

**CO5:** Obtain the Awareness on Upcoming Mall Challenges

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	M	M	H	M
CO3	H	M	H	H	M	H
CO4	M	H	M	H	M	H
CO5	M	H	H	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	L	M	M	H
CO2	H	M	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	M	H	H	H	H
CO5	H	H	H	H	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I: Introduction to Shopping Malls and Development Process**

- 1.1 Definition (K1, K2)
- 1.2 Types of Shopping Malls (K1, K2)
- 1.3 Evolution of Shopping mall (K1, K2)
- 1.4 India's entry into Shopping mall era (K1, K2, K3)
- 1.5 Mall Management (K1, K2, K3)
- 1.6 Factors contributing to growth of Shopping malls in India (K1, K2, K3, K4)

## **Unit II: Revenue Model and Design Planning.**

- 2.1 Capital sources for malls (K1, K2)
- 2.2 Private funds (K1, K2, K3 )
- 2.3 Strategic decisions in mall financing (K1, K2, K3,)
- 2.4 Sources of Revenue (K1, K2, K3)
- 2.5 Planning and Design Decisions (K1, K2, K3, K4)
- 2.6 Design Process – Characteristics of Small Designs (K1, K2, K3)

## **Unit III: Promotional Activities for Shopping Malls**

- 3.1 Marketing activities in Shopping Malls (K1, K2)
- 3.2 Promotion during planning and construction phase (K1, K2)
- 3.3 Importance of Promotional Activities (K1, K2,)
- 3.4 Components of Promotional Activities (K1, K2, K3)
- 3.5 Mall promotion calendar (K1, K2, K3 )
- 3.6 Theme based promotion. (K1, K2, K3, K4)

## **Unit IV: Facilities in Mall Management**

- 4.1 Facilities offered (K1, K2,)
- 4.2 Utilities (K1, K2)
- 4.3 Health and hygiene (K1, K2, K3)
- 4.4 Safety and security (K1, K2, K3)
- 4.5 Parking Ambience (K1, K2, K3)
- 4.6 Building management system. (K1, K2, K3, K4)

## **Unit V: Future of Shopping Malls**

- 5.1 Comparison of Mall development in US and India (K1, K2, K3)
- 5.2 Challenges before Indian shopping malls (K1, K2, K3)
- 5.3 Life cycle stages of Shopping malls. (K1, K2)
- 5.4 Resurgence of Shopping Mall in India (K1, K2, K3)
- 5.5 Predicted Trends of Shopping Mall (K, K2, K3, K4)
- 5.6 Shopping Mall Management. (K1, K2, K3)

**Note:** Case Studies for all Units (K5.K6)

**Text Books**

1. Harvinder Singh, Srini R Srinivasan – Mall Management – Tata McGraw Hill Education, 2012.

**Reference Books**

1. Abhijit Das – Mall Management, 2<sup>nd</sup> Edition – Taxmann Publication, 2011.

**Websites**

1. [www.learnmail.in](http://www.learnmail.in)

## INDEPENDENT ELECTIVE PAPER - 7

### PIBAG20- INNOVATION AND CREATIVITY

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II/ III	PIBAG20	Innovation and Creativity	Theory	Independent Elective	-	2	100

#### OBJECTIVES

1. To provide insights on the basics of creativity
2. To ascertain the structure of Lifelong Creativity
3. To acquire skills on Training and Creativity
4. To familiarize the competencies of Strategy Innovation
5. To cope up with the Innovation Abilities

#### COURSE OUTCOMES (CO)

The learners will be able to

**CO1:** Acquire Knowledge on the Outlook of Creative Thinking

**CO2:** Enrich the Creative Thinking of Individuals

**CO3:** Be able to acquire essential knowledge needed for building creativity lifelong

**CO4:** Gain in depth knowledge in Strategy Innovation

**CO5:** Acquires knowledge on Managing Innovation

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	M
CO2	H	H	M	M	H	M
CO3	M	M	H	M	H	M
CO4	M	M	H	H	M	H
CO5	H	H	H	H	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-HIGH (3), M-MODERATE(2), L-LOW(1)**

## **Unit I: Basics of Creativity**

- 1.1 Creativity – Component Elements (K1, K2)
- 1.2 Attributes of Creative Individuals (K1, K2)
- 1.3 Creativity as a Competitive Resource (K1, K2, K3)
- 1.4 Cultivation of Creativity (K1, K2, K3)
- 1.5 Convergent and Divergent Thinking-Values as Anchors of Creative Thinking (K1, K2, K3, K4)
- 1.6 Creativity Vs Lateral Thinking

## **Unit II: Fostering Individual Creativity**

- 2.1 Enhancing Creative Thinking – Re-definitional Techniques – Random Stimulus Techniques (K1, K2, K3)
- 2.2 Envisionment /Visualization Approach – PMI Method – ISA Perspective –Abstraction Approach (K1, K2, K3, K4)
- 2.3 Thinking Hats Method (K1, K2, K3,)
- 2.4 Creativity Techniques for Groups – Creativity in Uncertainty (K1, K2, K3)
- 2.5 Heuristics for Stimulating Creativity (K1, K2)
- 2.6 Training and Creativity (K1, K2, K3,)

## **Unit III: Building Life Long Creativity**

- 3.1 Existential, Entrepreneurial and Empowerment Creativities (K1, K2)
- 3.2 Quality of Creativity – Lifelong Creativity (K1, K2, K3)
- 3.3 Models of Creative Problem Solving – Enhancing Creative Intelligence (K1, K2, K3)
- 3.4 Motivation and Creativity – Blocks to Creativity (K1, K2, K3)
- 3.5 Acquiring a Creative Persona – Formative Environment and Creativity (K1, K2, K3, K4)
- 3.6 Developing a Creative Work Environment (K1, K2, K3)

## **Unit IV: Power of Strategy Innovation**

- 4.1 Strategy Innovation Vs Strategy Planning (K1, K2)
- 4.2 Purposeful Innovation and the Seven Sources for Innovative Opportunity (K1, K2, K3)
- 4.3 Three levels of Innovation – Fostering Innovation at Various Levels (K1, K2, K3)
- 4.4 Auditing Innovation Management – Rationalist Vs Incremental Strategies for Innovation (K1, K2, K3)
- 4.5 Assessment of Porter's Framework (K1, K2, K3)
- 4.6 Learning from Markets, Alliances and Corporate Ventures. (K1, K2, K3, K4)

## **Unit V: Managing Innovation**

- 5.1 Building an Innovative Organisation – Role of Vision, Structure and Training (K1, K2)
- 5.2 Fostering Creativity (K1, K2)
- 5.3 Innovation in Organization (K1, K2, K3)

5.4 Roles of Organizational Culture, Leadership (K1, K2, K3)

5.5 Managing Style and practices Supportive of Creativity (K1, K2, K3)

5.6 Creativity as the core of Competitive Excellence (K1, K2, K3, K4)

**Note:** Case studies for all Units. (K5.K6)

**Text Books**

1. Rastogi, P.N. Managing Creativity, Macmillan India , Delhi2000.
2. Joe Tid, et.al , Managing Innovation, Wiley India, New Delhi2005.

**Reference Books:**

1. Robert .E.Johnson, Jr.And Doughlas Bate (2007), The Power of Strategy Innovation, Prentice Hall,New Delhi.

**Websites**

- 1 .[www.edx.com](http://www.edx.com)

## INDEPENDENT ELECTIVE PAPER - 8

### PIBAH20 - RURAL MARKETING

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II/ III	PIBAH20	Rural Marketing	Theory	Independent Elective	-	3	100

#### OBJECTIVES

1. To enable students to understand and appreciate the differences and similarities in urban and rural marketing.
2. To understand the rural marketing scenario.
3. Insight about the various aspects of rural consumption pattern and challenges.
4. To diagnose the problems and constraints in rural marketing.
5. To develop marketing strategies that are unique to rural India.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand the factors that influences the rural market environment.

**CO2:** Analyse rural market potential and Opportunities in regard with the consumption pattern of the rural population.

**CO3:** Understand and apply the various pricing in relation to the quality of the product and the need.

**CO4:** Identify the efficient marketing strategies in relation to the channels which influence decision making of the rural customers.

**CO5:** Gain insight about the adequate and effective promotion and distribution strategies

CO	PO					
	1	2	3	4	5	6
CO1	H	M	M	H	M	H
CO2	H	M	M	H	M	H
CO3	M	M	H	M	M	H
CO4	M	H	H	M	H	M
CO5	H	H	H	H	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	M	H	M
CO2	H	M	M	H	H	H
CO3	H	H	M	H	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	M	H	H

H-HIGH(3), M-MODERATE(2), L-LOW(1)

## **Unit I - Introduction**

- 1.1 Nature, Definition, Scope (K1,K2)
- 1.2 Importance and trends (K1,K2,K3)
- 1.3 Factors that influence rural markets (K1,K2,K3)
- 1.4 Understanding the Rural Economy (K1,K2,K3)
- 1.5 Rural Marketing Experiences. (K1,K2,K3)
- 1.6 Agriculture and rural market(K1,K2,K3)

## **Unit II - Buying Behavior**

- 2.1 Understanding the rural consumer (K1, K2)
- 2.2 Aspects of Buying Behavior (K1, K2, K3)
- 2.3 Major influential Buyer Behavior (K1,K2,K3)
- 2.4 Reference Groups and trends in consumer behavior (K1,K2, K3)
- 2.5 Rural Market Buying Decision Process (K1,K2, K3)
- 2.6 Factors Contributing to the Change in the Rural Market (K1,K2,K3)

## **Unit III - Product and Pricing**

- 3.1 Product and pricing decisions for rural markets (K1,K2,K3)
- 3.2 Product developments - Product adoptions (K1,K2,K3)
- 3.3 Modification decisions (including packaging) branding(K1,K2,K3)
- 3.4 Decisions of product augmentation for rural marketing and rural pricing elements and decisions (K1,K2,K3)
- 3.5 Challenges in rural marketing (K1,K2,K3)
- 3.6 Strategies to capture rural marketing. (K1,K2,K3)

## **Unit IV - Marketing Strategies**

- 4.1 Marketing Strategies & Tactics adopted to rural markets (K1,K2,K3)
- 4.2 Regulated markets, co-operative marketing, (K1,K2,K3)
- 4.3 Product marketing & Service marketing in rural India. (K1,K2,K3)
- 4.4 Marketing of Rural & cottage industry products (K1,K2,K3)
- 4.5 Social marketing (K1,K2,K3)
- 4.6 Agricultural marketing (K1,K2,K3)

## **Unit V - Sales Promotion**

- 5.1 Managing the rural promotions (K1,K2,K3)
- 5.2 Understanding rural communication media (Traditional Vs. Current Opportunities) (K1,K2,K3)
- 5.3 Designing & Developing Rural Market promotions, build relationship & Events (K1,K2,K3)
- 5.4 Rural Marketing Promotion Strategies (K1,K2,K3)
- 5.5 Rural Marketing and its Importance (K1,K2,K3)
- 5.6 Problems Faced in Rural Marketing(K1,K2,K3)

**Note:** Case studies for all Units. (K5.K6)

**Text Books**

1. Krishnamacharyulu, C.S.G. and Ramakrishnan, Lalitha, (2002), Rural Marketing - Text and cases, Pearson Education, Indian Branch, New Delhi, 1<sup>st</sup> Edition.

**Reference Books**

1. R.L.Varshney & S.L.Gupta, , Marketing Management, An Indian Perspective, Sultan Chand ,1<sup>st</sup> Edition ,2000

**Websites**

1.[www.edx.org](http://www.edx.org)

## INDEPENDENT ELECTIVE PAPER - 9

### PIBAI20 - TRAVEL AND TOURISM MANAGEMENT

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / III	PIBAI20	Travel and Tourism Management	Theory	Independent Elective	-	2	100

#### OBJECTIVES

1. To develop the ability to understand Travel and Tourism management
2. To accustom the learners on Tourism and Transport
3. To procure knowledge on endorsement of Travel Agents
4. To learn the characteristics of Travel Agencies
5. To educate the learners on Tourists Conduct and Motives

#### COURSE OUTCOMES (CO)

The learners will be able to

**CO1:** Have basic understanding in Travel and Tourism Management

**CO2:** Accustom on Tourism and Transport the different types of transport

**CO3:** Procure knowledge on endorsement of Travel Agents

**CO4:** Gain knowledge in the characteristics of Travel Agencies

**CO5:** Be educated the on Tourists Conduct Motives and behavior

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	H
CO2	H	H	M	H	M	H
CO3	M	H	H	H	M	H
CO4	M	M	M	M	H	M
CO5	H	M	H	M	H	M

CO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	M	L	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I: Introduction**

- 1.1 Evolution of Indian Tourism Industry(K1 , K2)
- 1.2 Definition of Travel and travel agency (K1, K2)
- 1.3 Scope and Importance of Tourism (K1, K2)
- 1.4 Characteristics of Tourism (K1, K2, K3)
- 1.5 Differentiation between Travel Agency and Tour Operation Business (K, K2, K3)
- 1.6 Linkages and arrangements with hotels, airlines and transport agencies and Other segments of tourism sector, (K1, K2, K3, K4)

## **Unit II: Tourism and Transport**

- 2.1 Tourism – Concept of tourism (K1, K2)
- 2.2 Nature of tourism (K1, K2)
- 2.3 Classification (K1, K2, K3)
- 2.4 Tourism regulations (K1, K2, K3)
- 2.5 Transportation and Travel Evolution (K1, K2, K3)
- 2.6 Future of tourism – Road transport – Rail – Sea – Air – Civil Aviations (K1, K2, K3, K4)

## **Unit III: Approval of Travel Agents**

- 3.1 Approval by Department of Tourism, Government of India (K1, K2, K3)
- 3.2 IATA rules and regulations for approval of a travel agency, Approval by Airlines and Railways. (K1, K2, K3, K4)
- 3.3 Guidelines for recognition as a Travel Agent (K1, K2, K3)
- 3.4 Responsibilities of Travel Agent (K1, K2)
- 3.5 Travel and Tourism Organizations (K1, K2, K3)
- 3.6 Types of Travel Agencies (K1, K2)

## **Unit IV: Role of Travel Agency**

- 4.1 Introduction (K1, K2)
- 4.2 Retail travel agents (K1, K2, K3)
- 4.3 Functions of modern Travel Agency (K1, K2,)
- 4.4 Inclusive tours by charters on scheduled services (K1, K2, K3)
- 4.5 Artificial Intelligence Impact on Travel Agencies Role (K1, K2, K3)
- 4.6 Technology Trends Emerging in Travel Industry. (K1, K2, K3, K4)

## **Unit V: Tourist motivation and behavior**

- 5.1 Elements of motivation – Categories of motivation (K1, K2)
- 5.2 Demand for tourism (K1, K2, K3)
- 5.3 Tourism environments (K1, K2, K3)
- 5.4 Youth tourism (K1, K2, K3)
- 5.5 Tourist behavior (K1, K2, K3)
- 5.6 Levels of host irritation – Spending time. (K1, K2, K3, K4)

**Note:** Case studies for all Units (K5.K6)

**Text Books**

1. Biswanath Ghosh, Tourism and Travel management, Vikas Publishing House Pvt Ltd, Second Reprint 2008.

**Reference Books**

1. Chand, Mohinder, Travel Agency Management, Anmol Publication, 2nd Edition, Reprint 2009.

**Websites**

1. [www.coursera.org](http://www.coursera.org)

**INDEPENDENT ELECTIVE PAPER - 10**  
**PIBAJ20 – CYBER SECURITY AND LAWS**

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PIBAJ20	Cyber Security And Laws	Theory	Independent Elective	-	2	100

**OBJECTIVES**

1. To gain domain knowledge in all aspects of Cyber Security.
2. To enhance the security skills against cyber-crime
3. To implement the conceptual and practical cyber security knowledge in the workplace
4. To establish awareness in current issues from diverse aspects of technology.
5. To adhere to the values and ethics relevant to the business environment.

**COURSE OUTCOMES**

The learners will be able to

**CO1:** Enable the student to understand about cybercrime and risk in Systems

**CO2:** Analyze application securities enable students to understand the type of hackers and the techniques

**CO3:** Be able to classify Security threats Security issues in hardware and able to implement in work place

**CO4:** Adhere to the values and ethics relevant to the Cybercrime in business environment.

**CO5:** Establish awareness in current issues from diverse aspects online transactions

CO	PO					
	1	2	3	4	5	6
CO1	H	M	H	M	H	M
CO2	H	M	H	M	H	M
CO3	M	H	H	M	H	M
CO4	M	H	M	H	M	H
CO5	H	H	M	H	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	L	M	M	M	M
CO2	H	L	M	M	H	M
CO3	M	M	M	H	H	M
CO4	L	M	H	M	H	H
CO5	L	L	M	M	H	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit I - Information security**

- 1.1 Introduction – Cyber-crime (K1, K2, K3)
- 1.2 History – Cybercrime threats (K1, K2, K3)
- 1.3 Motives and reasons for Cyber- crime (K1, K2, K3)
- 1.4 Threats to Information Systems (K1, K2, K3)
- 1.5 Information Assurance (K1, K2, K3)
- 1.6 Cyber Security and Security Risk Analysis (K1, K2, K3,K4)

## **Unit II - Application security**

- 2.1 Introduction -Data Security Considerations (K1, K2, K3)
- 2.2 Disposal of Data -Security Technology (K1, K2, K3, K4)
- 2.3 Access Control (K1, K2, K3)
- 2.4 Intrusion Detection (K1, K2, K3)
- 2.5 Types of hackers (K1, K2, K3,K4)
- 2.6 Techniques used for hacking (K1, K2, K3, K4)

## **Unit III - Security threats Security issues in hardware**

- 3.1 Introduction- Data Storage and Downloadable Devices (K1, K2, K3, K4)
- 3.2 Physical Security of IT Assets (K1, K2, K3)
- 3.3 CCTV and Intrusion Detection System (K1, K2, K, K43)
- 3.4 Security Policies (K1, K2, K3)
- 3.5 Networks and Services Attacks (K1, K2, K3, K4)
- 3.6 Security Threats to ecommerce (K1, K2, K3, K4)

## **Unit IV - Information security standards**

- 4.1 Developing Secure Information System (K1, K2, K3)
- 4.2 Key Elements of Information Security Policy (K1, K2, K3)
- 4.3 IT Act 2000- Copyright-Patent (K1, K2, K3)
- 4.4 Intellectual Property Right (K1, K2, K3)
- 4.5 Cyber Law in India (K1, K2, K3)
- 4.6 Software Licensing - Semiconductor Law and Patent Law (K1, K2, K3, K4)

## **Unit V - Online Transactions**

- 5.1 Online transaction – E-commerce (K1, K2, K,K43)
- 5.2 Online banking system (K1, K2, K3, K4)
- 5.3 Real – Time gross settlement system (K1, K2, K3)
- 5.4 Advantages and disadvantages of online transaction (K1, K2, K3)
- 5.5 Electronic card fraud – ATM card (K1, K2, K3)
- 5.6 Credit card– Smart cards (K1, K2, K3)

**Note:** Case studies for all units. (K5.K6)

**Text Books**

1. Mayank Bhushan, Raj Kumar Singh Rathore, Aatif Jamshed , Cyber security – Principles theory and Practices- BPB Publication, 1<sup>st</sup> edition , 2017

**Reference Books**

- 1 M.K. Geetha, Swapna Raman, Cybercrimes and Fraud Management, Macmillan, Indian Institute of Banking and Finance., 1<sup>st</sup> Edition2013.

**Websites**

- 1 [swayam.gov.in](http://swayam.gov.in)

## INDEPENDENT ELECTIVE PAPER 11

### PIBAK20 - MANAGEMENT OF MULTI NATIONAL CORPORATION

Year/ Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II / IV	PIBAK20	Management of Multi National Corporation	Theory	Independent Elective	-	2	100

#### OBJECTIVES

1. To comprehend the origin and development of MNC's.
2. To analyze the issues involved in the growth and development of MNC's.
3. To relate the management practices of different countries.
4. To know about the international business strategy.
5. To acquire skills on Indian policies related to MNC's.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Understand international management with various schools of thoughts along with the problems faced by host countries.

**CO2:** Demonstrate the ability to apply different management styles.

**CO3:** Demonstrate the ability to effectively work in teams in various MNC's.

**CO4:** Demonstrate strategies, ethical values and CSR in business.

**CO5:** Identify and describe the complexities of managing international mergers and acquisitions and understand the challenges and opportunities of global scenario.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	H	M	H
CO2	M	H	M	H	M	H
CO3	M	M	H	H	M	M
CO4	M	M	H	H	H	M
CO5	M	H	M	M	H	H

CO	PSO					
	1	2	3	4	5	6
CO1	H	M	M	L	M	L
CO2	H	M	H	L	M	L
CO3	H	L	M	L	H	M
CO4	H	M	M	M	M	L
CO5	H	L	L	L	L	H

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit-I Introduction to International Business**

- 1.1 International Management (K1, K2, K3)
- 1.2 Trends, challenges and opportunities (K1, K2, K3)
- 1.3 Different schools of thought of international management (K1, K2, K3)
- 1.4 Different types of International business (K1, K2, K3)
- 1.5 Problems faced by MNC's (K1, K2, K3)
- 1.6 Problems posed by MNC's to host countries (K1, K2, K3)

## **Unit-II MNC Growth and Development Strategies**

- 2.1 Growth and Development of MNCs (K1, K2, K3, K4)
- 2.2 Role and Significance of MNCs (K1, K2, K3, K4)
- 2.3 Pattern of Growth (K1, K2, K3, K4)
- 2.4 Country of Origin (K1, K2, K3, K4)
- 2.5 Different Management Styles (K1, K2, K3, K4)
- 2.6 Strategic Issues involved (K1, K2, K3, K4)

## **Unit-III International Corporate Structure**

- 3.1 Comparative Management (K1, K2, K3, K4)
- 3.2 Importance and scope; Methods of comparative management (K1, K2, K3, K4)
- 3.3 Management styles and practices in US ,Japan, China, Korea, India (K1, K2, K3, K4)
- 3.4 Organizational design and structure of international corporations (K1, K2, K3, K4)
- 3.5 Locus of decision making (K1, K2, K3, K4)
- 3.6 Headquarter and subsidiary relations in international firms (K1, K2, K3, K4)

## **Unit-IV Business Strategy Ethics**

- 4.1 International Business Strategy (K1, K2, K3, K4)
- 4.2 Creating strategy for international business (K1, K2, K3, K4)
- 4.3 Management of production, Services technology and operations (K1, K2, K3, K4)
- 4.4 Marketing financial, legal and political dimensions (K1, K2, K3, K4)
- 4.5 Ethics and social responsibility of business (K1, K2, K3, K4)
- 4.6 Strategic Alliances: Acquisitions and mergers, Management of joint ventures and other international strategic alliances (K1, K2, K3, K4)

## **Unit-V Indian Business Perspectives**

- 5.1 Indian Perspectives and Policy (K1, K2, K3, K4)
- 5.2 Internationalization of Indian business firms (K1, K2, K3, K4)
- 5.3 Their operations abroad (K1, K2, K3, K4)
- 5.3 International Mergers (K1, K2, K3, K4)
- 5.5 Acquisitions (K1, K2, K3, K4)
- 5.6 Changing government policy on entry of FIs and FIIs (K1, K2, K3, K4)

**Note:** Case studies for all units. (K5.K6)

**Text Books**

1. Hodgetts, -International management. Tata Mcgraw Hill, New Delhi 5<sup>th</sup> Edition, 2005.

**Reference Books**

1. Koonts And Whelrich ,Management: The Global Perspective ,Tata Mcgraw Hill,Delhi , 1<sup>st</sup> Edition, 2007

**Websites**

1. [nptel.ac.in](http://nptel.ac.in)

## INDEPENDENT ELECTIVE 12

### PIBAL20 WORK LIFE BALANCE AND EMOTIONAL INTELLIGENCE

Year/Sem	Course Code	Title of the Course	Course type	Course Category	H/W	Credits	Marks
II/IV	PIBAL20	Work Life Balance and Emotional Intelligence	Theory	Independent Elective	-	2	100

#### OBJECTIVES

1. To equip the students to manage, time, relationship, work life, conflict and cross culture controversies.
2. To introduce students to theories and problem solving skills and cross cultural etiquette.
3. To develop students' skills related to problem solving.
4. To assist the students to know about emotional intelligence, IQ, Coping strategies, conflict resolution, effective communication.

#### COURSE OUTCOMES

The learners will be able to

**CO1:** Assess an organization and introduce to work life Balance insisting on spirituality in the work place.

**CO2:** Acquire knowledge critical thinking, interpersonal relations and conflict management.

**CO3:** Enhance creativity and get an in depth knowledge on event management.

**CO4:** Ability to comprehend Emotional Intelligence with its concepts and nature.

**CO5:** Assess the potential effects emotions with the various process in the Organization.

CO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	H	M
CO2	H	H	M	M	H	M
CO3	M	H	H	M	H	M
CO4	M	M	H	H	M	H
CO5	M	H	H	H	M	H

CO	PSO					
	1	2	3	4	5	6
CO1	L	L	L	L	L	L
CO2	L	L	M	L	L	M
CO3	L	M	M	M	M	L
CO4	L	M	M	L	M	L
CO5	L	M	L	L	M	L

**H-HIGH(3), M-MODERATE(2), L-LOW(1)**

## **Unit – I Soft skill**

- 1.1 Introduction, Self Image, Self Esteem for image management (K1, K2, K3)
- 1.2 personal branding, Emotional Intelligence in Management– IQ – EQ – SQ (K1, K2, K3)
- 1.3 Introduction, Sources of stress, Effects of stress (K1, K2, K3)
- 1.4 Coping with stress, Work-life balance (K1, K2, K3)
- 1.5 Spirituality at work place, Time management, Importance (K1, K2, K3)
- 1.6 Analysis of time, Planning, Setting and achieving goal (K1, K2, K3)

## **Unit – II Effective Living**

- 2.1 Critical thinking, Decision making (K1, K2, K3, K4)
- 2.2 Problem solving skills, Relationship Management (K1, K2, K3, K4)
- 2.3 Work-life balance, Crisis management, Importance (K1, K2, K3, K4)
- 2.4 Developing interpersonal skills, Conflict management (K1, K2, K3, K4)
- 2.5 Transactional analysis, corporate etiquette (K1, K2, K3, K4)
- 2.6 Cross-cultural intelligence (K1, K2, K3, K4)

## **Unit – III Creativity Management**

- 3.1 Innovation (K1, K2, K3, K4)
- 3.2 Creativity (K1, K2, K3, K4)
- 3.3 Importance (K1, K2, K3, K4)
- 3.4 Developing creativity (K1, K2, K3, K4)
- 3.5 Enhancing creativity (K1, K2, K3, K4)
- 3.6 Event Management (K1, K2, K3, K4)

## **Unit - IV Mind and Emotions**

- 4.1 Concept, Marshmallow experiment (K1, K2, K3, K4)
- 4.2 Consequences of low and high emotional intelligence (K1, K2, K3, K4)
- 4.3 Myths about EI (K1, K2, K3, K4)
- 4.4 Difference between and EI and IQ (K1, K2, K3, K4)
- 4.5 Negative and positive emotions (K1, K2, K3, K4)
- 4.6 Nature of EI, Development of EI (K1, K2, K3, K4)

## **Unit - V Managing Emotions**

- 5.1 Learning emotional skills, recognizing emotions (K1, K2, K3, K4)
- 5.2 Learning to empathize, Measuring EI dealing with emotional upsets (K1, K2, K3, K4)
- 5.3 EI and leadership effectiveness (K1, K2, K3, K4)
- 5.4 Levels of EI required for various jobs (K1, K2, K3, K4)
- 5.5 EI and credibility of managers, EI and conflict resolution (K1, K2, K3, K4)
- 5.6 EI and effective communication (K1, K2, K3, K4)

**Note:** Case studies for all units. (K5.K6)

**Text Books:**

1. Shalini Verma, Enhancing Employability and Soft skills, Always Learning, Pearson Education, 1<sup>st</sup> Edition, 2012.

**Reference Books**

1. Edgar Thorpe, Showick Therpe, Winning at Interviews, Always Learning, Pearson Education 1<sup>st</sup> Edition, 2012.

**Websites**

1. [www.udmey.com](http://www.udmey.com)

# **PG Department of Social Work (M.S.W)**

## **SYLLABUS AND REGULATIONS**

**Under**

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

# **MASTER OF SOCIAL WORK (M.S.W.)**

## **OUTCOME BASED EDUCATION - 2020**

(Effective for those admitted from the Academic Year 2020 - 2021)

### **INSTITUTION LEVEL**

#### **Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

#### **Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighboring districts.

### **NAME OF THE PROGRAMME: M.S.W**

#### **Regulations**

Social work is a profession. It has its theory and practice dimensions. The “Master of Social Work” education programme consists of theoretical and practical teaching and learning components of lectures, fieldwork and research project.

#### **1. Eligibility for Admission**

For the purpose of admission into the MSW Programme a candidate should have:

- A bachelor’s degree preferable in Arts, Science and Commerce of any Indian University (10 + 2 + 3) pattern accepted as equivalent thereto by the syndicate.
- Working Knowledge of Tamil to enable the candidate to do effective fieldwork.
- The course of study for the degree of Master of Social Work shall be a fulltime course extended over four semesters in a period of two years.

#### **2. Objectives of the Postgraduate Course in Social Work**

The Objectives of the MSW course are:

- To prepare candidates for a career in social work through a professional training programme aimed at developing in them.
- Scientific knowledge about the dynamics of problems and issues in our society.
- An ability to critique the ideologies that lead to systematic domination and marginalization of vulnerable groups.
- Necessary skills of awareness, skills aiming at empowerment of people and skills in culture sensitive methods of social change.

- Ability to apply skills in social work practice and social work research in different fields for achieving desirable change and development and empowerment of people.
- Attitudes and values necessary for working with people, and organizations both governmental and non-governmental for achieving the goals of social work profession, namely,
  - To enhance people's capacity for social functioning.
  - To improve the quality of life for everyone.
  - To promote social justice.
  - To provide opportunities for people to develop their capacities to become participating and contributing citizens.

### **Programme Objectives (POs)**

**On completion of the PG Programme, students will be able to:**

**PO1:** Attain an in-depth knowledge in the respective domains augmented through self-learning.

**PO2:** Assimilate and apply principles and concepts towards skill development and employability.

**PO3:** Apply critical and scientific approaches to address problems and find solutions.

**PO4:** Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO5:** Integrate issues of social relevance in the field of study.

**PO6:** Persist in life-long learning for personal and societal progress.

### **Programme Specific Outcomes (PSOs)**

**PSO1:** Apply the knowledge of social work in the domain of community development, human resource management, medical and psychiatric rehabilitation.

**PSO2 :** To enhance the individuals to help themselves with the scientific knowledge about the dynamics of problem and social issues.

**PSO 3:** It brings a change in attitudes and values of individual irrespective of their class, caste or gender

**PSO4:** To utilize the available resources for the empowerment of vulnerable groups and critically analyze the problems, needs to create impact in society.

**PSO5:** To prepare the individual in understanding the human behaviour with the relation to society

**PSO6:** To utilize the opportunity and of professionalism in the development process

PSO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	M	H	H	H	H	H
PSO2	M	H	H	H	H	H
PSO3	M	M	H	H	H	H
PSO4	M	H	H	H	H	H
PSO5	M	H	H	H	H	H
PSO6	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

### 3. Eligibility for Award of MSW Degree

The degree of Master of Social Work is awarded to candidate who as per regulation has:

- Undergone a post-graduate course of study in Social Work extended over four semesters and has earned a minimum of 90 credits.
- Passes the theory examinations.
- Participate in a rural camp and meets the requirement prescribed by the course in relation to fieldwork and research project and passes in them.
- Completes Block Field Practicum for 26 days to the satisfactory level.

### 4. Structure of the Programme

Sem	Code	Title	Hours/Week	Exam Hours		Credits	Marks
				Th	Pr		
I	PCSWA20	Introduction to Social Work and Sociology	5	3	-	4	40+60
	PCSWB20	Social Case Work	5	3	-	4	40+60
	PCSWC20	Social Group Work	5	3	-	4	40+60
	PESWA20	Elective I A: Social Problems	5	3	-	4	40+60
	PISWA20	IEC- Disaster Management					
	PCSWD20	Rural camp	10 days				20
		Concurrent Field Work I	16	-	3	6	40+40

<b>Total</b>						<b>22</b>	<b>500</b>
II	PCSWE20	Human Growth and Personality Development	5	3	-	4	40+60
	PCSWF20	Social Work Research	5	3	-	4	40+60
	PCSWG20	Community Organization and Social Action	5	3	-	4	40+60
	PESWC20	Elective I A- Social Policy and Social Legislation	5	3	-	4	40+60
	PISWB20						
	PNHRA22	Human Rights	2	3	-	2	40+60
	PCSWH20	Concurrent Field Work II	16	-	3	6	60+40
<b>Total</b>						<b>24</b>	<b>600</b>
	PPSWA20	Summer Placement	1 Month (26 days)	-	-	5	-

Sem	Code	Title	Hours/Week	Exam Hours		Credits	Marks
				Th	Pr		
III	PCSWI20	Computer Applications for Social Work	5	3	-	3	40+60
	-	Specialization Paper – I	5	3	-	4	40+60

	-	Specialization Paper – II	5	3	-	4	40+60
	PESWE20	Elective III A: Project Formulation	5	3	-	4	40+60
	PISWC20	IEC - Counseling					
	PCSWJ20	Concurrent Field Work III	16	-	3	6	40+60
<b>Total</b>						<b>21</b>	<b>600</b>
IV	-	Specialization Paper III	5	3	-	4	40+60
	-	Specialization Paper IV	5	3	-	4	40+60
	PESWG20	Elective IV A: Administration of Service Organizations	5	3	-	4	40+60
	PISWD20	IEC - Social Work Profession for Different Settings					
	PCSWK20	Research Project	5	-	3	5	60+40
	PCSWL20	Concurrent Field Work IV	16	-	3	6	60+40
<b>Total</b>						<b>23</b>	<b>500</b>
	PPSWB20	Block Placement	1 Month (26 days)	-	-	5	-
<b>Grand Total</b>						<b>90</b>	<b>2200</b>

**Concurrent Field Work** is carried out on two days in a week for 12 weeks in a semester.

**Block Field Work** is carried out for 1 month (26 working days – 8 hours per day) after the completion of the University Examinations. A report of satisfactory completion of block field work by the agency and the department is required for course completion.

### 5. Field Work:

Concurrent field work is an integral part of the total programme of training in Social Work. Field Work programme consists of observation visits to the agencies, institutions and community settings, rural camp and direct practice of social work skills for intervention under the guidance of professional social workers in selected placements.

Placements provide an opportunity to the learner to apply theory to practice and gain first hand experience. Therefore, fieldwork in each semester is compulsory in this programme and a student is expected to have 100 percent attendance. A student should earn a total of 60 credits in 4 semesters in fieldwork.

In all the 4 semesters 2 working days per week shall be set aside for concurrent fieldwork of per week. Each semester will have a minimum of 24 days of concurrent fieldwork spread over 12 weeks. Block fieldwork is carried out for 1 month (26 days) (8 working hours per day) after the completion of the semester examinations. The credits allotted for Summer Placement and Internship Program are the additional credits earned by the students.

## Concurrent Field Work, Summer Placement and Internship Program (Block Placement)

Semester	No. of Days	No. of Hours	Credits
Field Work I	24	180	6
Field Work II	24	180	6
Summer Placement	26	180	5
Field Work III	24	180	6
Field Work IV	24	180	6
Block Placement	26	180	5
<b>Total</b>	<b>148</b>	<b>1080</b>	<b>34</b>

### 6. Research Project

Research Project Work is to be done during third and the fourth semesters.

Stage 1: Problem Formulation and Introduction.

Stage 2: Review of Literature.

Stage 3: Research Methodology.

Stage 4: Analysis and Interpretation.

Stage 5: Main Findings, Summary and Conclusion.

Examination Pattern of Research Project:

Continuous assessment:      Stage 1: 10 (Max. Marks)  
   Stage 2: 10 (Max. Marks)  
   Stage 3: 10 (Max. Marks)  
   Stage 4: 10 (Max. Marks)  
   Stage 5: 20 (Max. Marks)  
**Total : 60 (Max. Marks)**

Semester Examination:      Viva Voce.  
**Total : 40 (Max. Marks)**

## 7. Credit Based System

<b>Course Details</b>	<b>No. of Papers</b>	<b>Credits per Paper</b>	<b>Total Credits</b>	<b>Sem I</b>	<b>Sem II</b>	<b>Sem III</b>	<b>Sem IV</b>
Theory	15	3-4	43	16	16	13	10
Non-Major Elective	4	4	16	-	-	4	-
Human Rights	1	2	2	-	2	-	-
Field Work	4	6	24	6	6	6	6
Research Project	1	5	5	-	-	-	5
Summer Placement	1	5	5	-	5	-	-
Block Placement	1	5	5	-	-	-	5
<b>Total</b>	<b>24</b>	<b>-</b>	<b>90</b>	<b>22</b>	<b>29</b>	<b>23</b>	<b>26</b>

## SEMESTER I

### PCSWA20 - INTRODUCTION TO SOCIAL WORK AND SOCIOLOGY

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
1	1	PCSWA20	Introduction to Social Work and Sociology	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To gain an understanding of the concepts and the different processes of social work with special reference to Indian society.
- To develop in students a knowledge base about the Indian society.
- To help students understand concepts of social stratification, social control and social change.
- To give an insight to students about the various Indian Social Problems and their role in tackling them.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1 :** Able to Understand Social Work as a Profession.

**CO2 :** Understand various ideologies of social work.

**CO3:** Become aware of the emergence, growth and development of Social Work as a Profession

**CO4:** Consciously use Social Work knowledge and demonstrate professionalism as a trainee

**CO5:** Gain wider knowledge on diverse approaches and be able to appropriately use theories and approaches in her field work placements and Practice Social Work in an International context.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	M	H	H
<b>CO2</b>	H	M	H	H	M	H
<b>CO3</b>	H	H	M	H	H	M
<b>CO4</b>	H	M	H	M	H	M
<b>CO5</b>	H	M	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
<b>CO1</b>	M	H	H	M	H	H
<b>CO2</b>	M	H	H	H	H	H
<b>CO3</b>	M	H	H	H	H	H
<b>CO4</b>	M	H	H	H	H	H
<b>CO5</b>	L	H	H	H	H	H

(Low - L, Medium – M, High - H)

**Unit I : Introduction** (15 hours)

- 1.1 Historical background of Social Work in India - Concept, Philosophy, Principles (K1, K2)
- 1.2 Social Work Profession – Components, Values, (K1, K2, K3,K4)
- 1.3 Status, Code of Ethics, (K1,K2, K3)
- 1.4 Problems (K2, K3, K4)
- 1.5 Methods of Social Work and Changing trends in Social Work - (K1,K2, K3)
- 1.6 Role of Social Worker and the government in promoting Social Work profession in India (K1,K2,K3,K4, K5, K6)

**Unit II: Society:** (15 hours)

- 2.1 Meaning of Society, (K1, K2,)
- 2.2 Major elements of Society(K1,K2,)
- 2.3 Individuals, Group, Association, Institution (K1,K2)
- 2.4 Social System, Status, Role and Role Conflicts. (K1,K2)
- 2.5 Social Processes: Concept (K1, K2)
- 2.6 Social Processes - Co-operation, Competition, Conflict, Accommodation, Assimilation (K1,K2,K3)

**Unit III: Culture:** (15 hours)

- 3.1 Concept of Culture (K1, K2)
- 3.2 Culture as a system of norms, folkways, mores (K1, K2, K3)
- 3.3 Institutions and Laws; (K1, K2)
- 3.4 Functions of culture (K1, K2,K3)
- 3.5 Major elements of Indian Culture (K1,K2)
- 3.6 Cultural lag theory and its application to Indian Society.(K1,K2,K3,K4,K6)

**Unit IV: Social Change** (15hours)

- 4.1 Concept of Social Change (K1, K2, K4)
- 4.2 Factors and process of Social Change in India- (K1, K2, K6)
- 4.3 Urbanization (K1,K2)
- 4.4 Industrialization, (K1,K2)
- 4.5 Modernization, (K1,K2)
- 4.6 Westernization and Sanskritization (K1,K2)

**Unit V: Social Stratification in India:** (15 hours)

- 5.1 Concept of Stratification (K1, K2, K3)
- 5.2 Concept of Class and Caste. (K1, K2, K3)
- 5.3 Social Control: Concept, types and functions (K1, K2,K3)
- 5.4 Major agents of social control – Family, religion (K1, K2,,K4)
- 5.5 Education, law, tradition, customs and mores (K1,K2,K3)
- 5.6 Institutions: Religious, Economic, Educational, Social and Political (K2,K3,K4,K5)

**Books for Study and Reference:**

1. Sharmas G.L. – Caste, Class and Social Inequality in India, Vol. II – Mangal Deep Publications, 2003
2. Rameswari Devi and Ravi Prakash – Social Work Methods and Practices and Perspectives, Vol. I and II - Mangal Deep Publications, 2004.
3. John Allan, Bob Pease and Linda Briskman – Critical social work – an introduction to theories and practice-Mangal Deep Publications, 2003.
4. Dr.S.Radhakrishnan – Encyclopaedia of Social Work in India – Published by the Planning Commission , Govt. of India, 1968.
5. D.Paul Choudhari – Introduction to Social Work – Atmaram & Sons, Delhi, 2005.
6. Surjit S.Dooper, Sharon E.Moore – Social Work Practice with Culturally Diverse People – Sage Publications, New Delhi, 2001.
7. Alice Lieherman – The Social Work Outlook – Pine Forge Press, New Delhi, 1998.
8. Vidhya Bhushan, D.R.Sachdeva – An Introduction to Sociology – Kitab Mahal, Allahabad, 2005.
9. C.N.Sankar Rao – principles of Sociology – S./Chand & Company, New Delhi, 2005.
10. W.S. Wallis, M.N. Willey – Introduction to Sociology – KSK Publishers, New Delhi, 2003.

## SEMESTER I

### PCSWB20 - SOCIAL CASE WOR

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
1	1	PCSWB20	Social Case Work	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To understand the values and principles of social work and to develop the capacity to practice them.
- To develop in students an understanding of and an ability to adopt a multidimensional approach in assessment and intervention.
- To understand and apply the models of case work practice in different settings.
- Comprehend theory, models and approaches of social case work.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,  
**CO1:** Analyze and practice the basic philosophy, principles and values of social work as a method of social work.

**CO2:** Effectively understand the scope of social work

**CO3:** Study and support the application of theories and models in addressing the problems of individuals

**CO4:** Appreciate and practice the basic philosophy, principles and values of social work as a method of social work.

**CO5:** Acquire skills in recording, reflecting and evaluating on the work to grow professionally

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	H	H	M
CO2	H	H	H	M	H	H
CO3	M	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	M	M	H	M	H

(Low - L, Medium – M, High - H)

**Unit I: Historical Development****(15 hours)**

- 1.1 Historical development of social casework as a method of social work practice **(K2,K1)**
- 1.2 Scope and limitations **(K2,K1)**
- 1.3 Objectives of working with individuals **(K3,K2)**
- 1.4 Values Worth and dignity of clients, uniqueness and individuality, problem solving capacity and self-determination, confidentiality and mobilizing resources **(K4,K3)**
- 1.5 Principles of acceptance, individualization, client participation, controlled emotional involvement. **(K5,K3)**

**Unit II: Different Process of Case Work****(15 hours)**

- 2.1 Components: Person and family, problem, agency resources and process **(K5,K3)**
- 2.2 Phase 1 – Exploration of person in environment, multi-dimensional assessment and planning.
- 2.3 Multidimensional intervention **(K6,K5,K3)**
- 2.4 Phase II – Implementing and goal attainment. **(K6,K5,K3)**
- 2.5 Phase III – termination and evaluation, follow up. **(K6,K4)**

**Unit III: Tools and Techniques of Case Work****(15 hours)**

- 3.1 Techniques in Case work **(K5,K3)**
- 3.2 Supportive Techniques: acceptance, assurance, ventilation, emotional support, action oriented support and advocacy **(K5,K3)**
- 3.3 Enhancing resources techniques, procuring material help, environment modification and enhancing information **(K6,K4,K2)**
- 3.4 Counseling techniques- Reflective discussion, advice, motivation, clarification, modeling, role-playing, reality orientation, partialisation, confrontation and reaching out **(K5,K4,K2)**

**Unit IV: Supporting Tools****(15 hours)**

- 4.1 Casework tools: Verbal and non-verbal communication, listing, observation, questioning, giving feedback **(K6,K3)**
- 4.2 Interviewing process, home and collateral contacts. **(K4,K2,K1)**
- 4.3 Recording: Meaning, uses **(K2,K1)**
- 4.4 Principles and types of recording **(K3,K4)**
- 4.5 Narrative, process and summary – **(K3,K1)**
- 4.6 Use of Genogram and Eco map in records. **(K4,K3,K2)**

**Unit V: Rapport building Process****(15 hours)**

- 5.1 Use of relationship in the helping process **(K4,K3,K2)**
- 5.2 Empathy, nurturing **(K3,K2)**
- 5.3 Authority, professional **(K3,K2)**
- 5.4 Fostering clients growth **(K3,K2)**
- 5.5 Problems in helping relationship, resistance, **(K5,K3,K2)**
- 5.6 Transference and counter transference. **(K5,K3,K2)**

**Books for Study and Reference:**

1. P.K.Upadhyey – Social Case Work – Rewat Publications, Jaipur, 2003.
2. Prakash M. Katare – Social Work and Rural Development – Arise Publishers & Distributors, New Delhi, 2006.
3. Sanjay Bhattacharya – Social Work: An Integrated Approach – Deep and Deep Publications, New Delhi, 2005.
4. V.Ramamurthy – Guidance and Counselling of HIV/AIDS – Tarum Offset, New Delhi, 2004.
5. S. Narayanan Rao – Counselling and Guidance, 2<sup>nd</sup> Edition – Tata McGraw Hill Publishing, New Delhi, 2006.
6. Helen Harris Pearlman – Social case work-A problem solving process – university of California press - 2002
7. Grace Mathew – An introduction to Social case work – Tata Institute of social sciences – 1992 -Mumbai

**SEMESTER I**  
**PCSWC20 – SOCIAL GROUP WORK**

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PCSWC20	Social Group Work	Theory	Core	5	4	100

**COURSE OBJECTIVES**

- To understand the significance of the group in the society.
- To acquire knowledge on Group dynamics.
- To understand values and principles of group work.
- To develop skills to apply group method for developmental and therapeutic work.
- To understand social group work as a method of social work

**COURSE OUTCOMES**

After completion of the course the students will be able to attain the following outcomes

**CO1:** Develop the students on the activities of group work process, types of group, characteristics of group, group dynamics and plan interventions based on appropriate

Group Work models

**CO2:** Understand the significance of Social Group Work

**CO3:** Acquire knowledge, skills and values in practicing Social Work with Groups through Programme Planning

**CO4:** Examine the role of group worker in different settings

**CO5:** Acquire skills in recording and evaluation

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	M	H	H	M	H
CO3	M	H	H	M	H	H
CO4	H	H	M	H	H	M
CO5	H	M	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	H	H	M
CO2	M	H	H	H	H	H
CO3	M	H	H	H	H	H
CO4	H	H	H	M	H	H
CO5	M	H	H	H	H	H

(Low - L, Medium – M, High - H)

**Unit I: Social Group** (15 hours)

- 1.1 Meaning, Definition, Characteristics, (K3,K1)
- 1.2 Reasons for group formation, (K3,K2)
- 1.3 Types of groups, (K3)
- 1.4 Stages of group development, (K4,K3,K2)
- 1.5 Models of group work, Group dynamics (K4,K3,K2)
- 1.6 Membership, Cohesiveness, Group norm, Bond, Attraction, Communication and Interaction pattern, Problem solving, Goal setting, Mutual aid. (K5 K3,K2)

**Unit II: Social Group Work** (15 hours)

- 2.1 Definition, Objectives (K3,K1)
- 2.2 Principles of Group work , Historical development of group work in India (K3,K2)
- 2.3 Values and Characteristics of group work(K6,K3,K2)
- 2.4 Goals and Functions of group work (K5,K3)
- 2.5 Relationship between Casework and Group work (K4,K3,K2)
- 2.6 Group work process - Intake, Study, Diagnosis, Treatment, Evaluation, Termination and Follow-up. (K6,K4,K3,K2)

**Unit III: Programme Planning** (15 hours)

- 3.1 Meaning of Programme Planning (K2,K1)
- 3.2 Purpose of Programme Planning (K3,K2)
- 3.3 Principles of program planning (K4,K3,K2)
- 3.4 Importance of programme in group work, (K5,K2)
- 3.5 Role of group worker in programme planning (K4,K2)
- 3.6 Programme laboratory values, tools and techniques - Games, Singing, Dancing, Dramatics, Street play, Puppetry, Role play, Group discussions, Social drama, Brain storming, Camping - Sociometry and Sociogram. (K6,K5,K2)

**Unit IV: Application of Group Work and Role of Group Worker** (15 hours)

- 4.1 Group work in family service agencies, Hospitals, Correctional agencies, Schools, Urban and Rural Community development settings (K6,K4)
- 4.2 Limitation of group work practice ( K3,K2)
- 4.3 Qualities of group worker (K4,K3)
- 4.4 Leadership, Supervision -Meaning and definition(K2,K1)
- 4.5 Theories and qualities of a leader (K5,K3)
- 4.6 Role of group worker. (K6,K2,K1)

**Unit V: Group Work Recording and Evaluation** (15 hours)

- 5.1 Recording in group work, Meaning, (K2,K1)
- 5.2 Purpose, Principles of recording (K5,K4,K2)
- 5.3 Contents of group work records (K3,K2)
- 5.4 Types of records (K2)
- 5.5 Evaluation - purpose, Content of Evaluation, Evaluation of Group, (K4,K3)
- 5.6 Evaluation of Member's contribution to group.( K3,K2,K1)

**Books for Study and Reference:**

1. David W.Johnson, Frank P Johnson – Joining Together Group Therapy and Group Skills – 6<sup>th</sup> edition, Allyn and Bacon Publications, U.S.A., 1997.
2. Sanjay Bhattacharya – Social Work: An Integrated Approach – Deep and Deep Publications, New Delhi, 2005.
3. Mark Doel and Catherine Sawdon – The Essential Group Worker – Teaching and Learning Creative Group Work - Jessica Kinsley Publishers, London, 1999.
4. M.R.Kamble – Social Work with Children – Sheetal Printers, Jaipur, 2007.
5. Gisela Konopka – Social group work – A helping process – prentice hall college div – 1983.
6. Tom Douglas – Basic Group work – Routledge, 2000.
7. S.Rengasamy – Student's Guide to Social Group Work - Second Draft, Tamilnadu, 2010.
8. Charles H.Zastrow – Social Work with Groups - New Delhi, 20

## PESWA20 -ELECTIVE I A - SOCIAL PROBLEMS

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PESWA20	Elective I A: Social problems	Theory	Elective	5	4	100

### COURSE OBJECTIVES

- To expose the students to various social problems.
- To give them knowledge about the weaker sections.
- To develop an understanding on various theories of social problems.

### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1:** Bring changes in the social structure without violence and coercion.

**CO2:** Modify the malfunctioning of the social and economic institutions.

**CO3:** Analyze social problems and highlight the significance of social work intervention in the Indian context.

**CO4:** Understand and keep in pace with the disasters and find ways to handle or manage disasters.

**CO5:** Critically analyze the impact of social problems on the society.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	M	H	H	M	H
CO3	M	H	H	M	H	H
CO4	H	H	M	H	H	M
CO5	H	M	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	H	M	H	H
CO2	H	M	H	M	M	H
CO3	H	H	H	H	H	H
CO4	M	H	H	M	H	H
CO5	H	M	H	H	H	H

(Low - L, Medium – M, High - H)

### Unit I:

(15 hours)

- 1.1 Social Disorganization : Definition and concept (K1,K2)
- 1.2 Social Pathology : Meaning, and concept (K1,K2)
- 1.3 Social problems : Meaning, definition and concept (K1,K2)
- 1.4 Social Deviance: concepts, nature, cause (K1,K2)

- 1.5 Characteristics of social problems and social deviance(**K3,K2**)
- 1.6 Problems resulting from catastrophes: fire, drought, flood, earthquake, war and influx of refugees. (**K2,K4,K3**)

**Unit II: (15 hours)**

- 2.1 Theories of social deviance: biogenic, Psychogenic and sociological (**K6, K4,K5,K3**)
- 2.2 Deviant Sub-culture and their interactions with normal society.( **K5,K4,K3**)
- 2.3 Poverty- concepts, causes, strategies effective measures for poverty alleviation (**K6,K5,K4,K2**)
- 2.4 Over population-Causes, effects, policy (**K6,K5,K4**)
- 2.5 Illiteracy--causes, National policy on education, Adult Education Program— (**K5,K4,K3,K2**)
- 2.6 Unemployment and underemployment- types, causes,consequences and measures taken (**K5,K4,K6,K2**)

**Unit III: (15 hours)**

- 3.1 Problems of vulnerable groups-Women, Child, Youth and Aged (**K5,K4,K2**)
- 3.2 Problems of ill housing and slums—(**K5,K4,K3**)
- 3.3 Morbidity and mortality-(**K6,K2,K4,K5**)
- 3.4 Communicable diseases-(**K6,K2,K4**)
- 3.5 AIDS- (**K6, K4,K2**)
- 3.6 Malnourishment and nutritional disorders (**K6,K4,K3**)

**Unit IV: (15 hours)**

- 4.1 Specially challenged meaning and concepts (**K4,K5,K2**)
- 4.2 Problems of the differently abled and the services available (**K6,K5,K4**)
- 4.3 Crime and correctional administration (**K6,K4,K2**)
- 4.4 Delinquency nature, Types and prevention (**K6,K5,K4,K2**)
- 4.5 Female infanticide—(**K5,K4,K3**)
- 4.6 Common problems street children, beggary,prostitution, LGBT-( **K5,K4**)

**Unit V: (15 hours)**

- 5.1 Problems of social stratification Scheduled caste, Tribe and denotified communities—(**K6,K5,K4**),
- 5.2 Alcoholism (**K6,K5,K4,K3**)
- 5.3 Drug addiction—(**K6,K5,K4.K3**)
- 5.4 Suicide ( **K6,K5,K3**)
- 5.5 Corruption ---(**K6,K4,K5**)
- 5.6 Impact of social media---(**K6,K5,K4,K2**)

### **Books for Study and Reference**

1. D. Rajasekar - Poverty Alleviation, Strategies of NGOs - Concept Publication Company, New Delhi.
2. G.L. Sharma – Caste and Class and Social Inequality in India - Mangal Deep Publishers, Jaipur, 2003
3. Manoranjan Mohanty – Class, Caste, Gender - Sage Publishers, New Delhi, 2004
4. Stephen P. Marks, Harvard University - The Right to Development, Sage Publishers - New Delhi, 2004.
5. G.R.Madan – Indian Social problems – Allied publishers, 1966.

## SEMESTER I

### PISWA20 - IEC- DISASTER MANAGEMENT

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	I	PISWA20	Disaster Management	Theory	Core			100

#### COURSE OBJECTIVES

- To provide students an exposure to disaster management, their significance and types.
- To enhance the awareness of institutional processes in disasters.
- To ensure the students to understand the relationship between vulnerability, disaster, disaster prevention and risk reduction.
- To gain preliminary knowledge of Disaster Risk Reduction(DRR)
- To develop ability to respond to their surroundings with disaster response where they live.

#### COURSE OUTCOMES

After completion of the course the students will be able to attain the following outcomes  
**CO1** :Understanding of the process of Disaster Management and the various types of disasters.

**CO2**: Enhance the students to acquire knowledge on response to disasters and disaster cycle

**CO3**: Practice the role of the Social Worker in Disaster Management and legislation related to it

**CO4**: Equip themselves to work in disaster situations and Expose knowledge on the impact of disaster on individual and community

**CO5**: Develop skills to analyze the factors leading to disaster

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	M
CO2	M	H	M	H	M	H
CO3	H	H	H	H	H	H
CO4	H	M	H	H	L	H
CO5	M	M	H	M	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	M	H	H
CO2	M	H	H	M	H	H
CO3	M	H	H	H	H	H
CO4	M	H	H	H	H	H
CO5	M	M	H	H	H	H

(Low - L, Medium – M, High - H)

## **Unit I: Concept of Disaster Management**

- 1.1 Basic concepts of disaster management (K2,K1)
- 1.2 Definition: Disaster, Hazards, Vulnerability, Risks (K2,K1)
- 1.3 Disaster Types of disaster- natural and manmade disasters-(K3,K2)
- 1.4 Disaster risk Management (K2,K1)
- 1.5 Risk analysis techniques(K6,K5,K3)
- 1.6 Process and steps of Risk assessment. (K4,K2)

## **Unit II: Response to Disaster Management**

- 2.1 Emergency Response (K3,K2)
- 2.2 Crisis management (K2,K3)
- 2.3 Hazards vulnerability, (K2,K3)
- 2.4 Disaster Risk mitigation (K2,K1)
- 2.5 Response, Relief, Reconstruction, Rehabilitation. (K6,K4,K1)
- 2.6 Disaster cycle - Phase,Culture safety, Prevention, Mitigation and Preparedness.(K5,K3)

## **Unit III : Legislation**

- 3.1 Government intervention (K5,K3,K1)
- 3.2 Institutional Mechanisms of Disaster Components of disaster. (K4,K3)
- 3.3 Water, Food, Sanitation, Shelter, Health Institutional Arrangements(K4,K2)
- 3.4 Disaster relief Management Acts (K5,K4,K3)
- 3.5 Policies, Plan for relief (K3,K2,K1)
- 3.6 Programmes and legislation.(K5,K3,K2)

## **Unit IV: Disaster risk management**

- 4.1 Hazards risk management Climate Changes and variability (K2,K1)
- 4.2 causes, impacts of climate changes (K2,K1)
- 4.3 Pollution - Air Pollution, Water Pollution, Soil Pollution. (K2,K1)
- 4.4 Relevance and Disaster risk (K2,K4)
- 4.5 Urban rural risk management(K5,K2,K1)
- 4.6 Role and Responsibilities of community, Panchayat raj institution/ Urban Local bodies. (K6,K4,K3,K2)

## **Unit V: Risk Assessment**

- 5.1 Industrials Hazards risk management process, (K4,K2,K1)
- 5.2 Natural hazard/ risk assessment, (K4,K2,K1)
- 5.3 Understanding climate risk, Mapping of risk assessment, (K6,K2,K1)
- 5.4 Decision making for risk reduction, Problems in risk assessment, (K5,K2)
- 5.5 Activities and roles of the community action on Risk reduction, (K3,K2)
- 5.6 Participatory risk assessment ,Participatory risk assessment methods.(K6,K2)

**Books and Reference:**

1. Singhal J.P Disaster Management, Laxmi Publication,2010.
2. Tushar Bhattacharya, Disaster Mangment and science,McGraw Hill India Education Pvt.Ltd,. 2012
3. Gupta Anil K, Sreeja S.Nair. Environmental Knowledge for Disater Risk Management,NIDM,New Delhi, 2011
4. Kapur Anu Vulnerable India :A Geographical Study of disaters, IIAS.
5. Govt.of India: Disaster Management Act, Government of India, New Delhi, 2005
6. Government of India, National Disaster Management Policy, 2009.

## SEMESTER I

### PCSWD20 – CONCURRENT FIELD WORK

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
1	1	PCSWD20	Concurrent Field Work	Practical	Core	16	6	100

#### COURSE OBJECTIVES

- To develop self as a professional through acquiring knowledge, skills, attitudes and values appropriate for Social Work practice
- To enhance understanding of the socio-economic-cultural –rural realities
- To be oriented to rural life, enhance group living and leadership through planning and organisation of the rural camp
- To analyse the social system and its impact on individuals, groups, family, community and understand the role and functioning of organisations- Governmental and Non- Governmental

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1:** Acquire knowledge, attitude and values for professional practice

**CO2:** Develop skills to analyse socio –economic-cultural-rural realities and their impact on individuals, families, groups and communities

**CO3:** Initiated and use to acquiring skills in systematic observation, critical analysis, develop a spirit of inquiry and document learning through preparation of family and community profile/reports

**CO4:** Understand the role of a Social Worker in an agency and in the community

**CO5:** Enhance their ability to plan, organize programmes and contribute as a team member

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	H	H
CO4	H	M	H	H	L	H
CO5	M	M	H	M	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	H	M
CO2	M	H	M	H	M	H
CO3	H	M	H	M	H	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

The students are involved in supervised visits to a minimum of 15 agencies. NGO's, Hospitals, Industries and Government welfare agencies are visited with the purpose of observing and learning the administrative structure, aims & objectives, general, specific and welfare activities.

In addition the students are taken on a 10 days Rural camp during which they stay in a selected village and study the community living, develop rapport, do a statistical survey, identify specific social problem, organize and conduct an awareness program.

During observation visit students are expected to prepare a field work report for every agency and submit. During rural camp daily activity report and a comprehensive report is prepared and submitted. Regular review conferences are conducted by the field work supervisor. At the end of the semester a viva is conducted by an external examiner and marks are awarded.

Objectives of the Camp:

1. Living out experience
2. Learn, understand and accept different cultures.
3. Learn about basic research methods.
4. Learning skills in PRA methods.
5. Organizing and conducting awareness programmes.

Schedule of the camp:

1. Meeting community leaders and getting help and cooperation in the camp.
2. Observing and familiarizing a new community.
3. Meeting families and building rapport.
4. Preparing a systematic study of the village.
5. Collection of relevant information.
6. Organizing and using PRA tools.
7. Arriving at a community diagnosis.
8. Organizing and conducting awareness program.
9. Organizing small group activities.
10. Feedback and arranging follow up of community organization and development.

## SEMESTER II

### PCSWE20 - HUMAN GROWTH AND PERSONALITY DEVELOPMENT

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PCSWE20	Human Growth and Personality Development	Theory	Core	5	4	100

#### COURSE OBJECTIVES:

- To obtain an understanding of human behaviour in relation to the society.
- To equip the students of social work with understanding of human behaviour and personality development models.
- To introduce the students to the various fields of Psychology.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes.

**CO1:** Summarize the relevance of psychology for social work practice

**CO2:** Understand the psychological bases and processes involved with cognition, learning, behavior and personality development

**CO3:** Obtain an insight to factors contributing to development of personality

**CO4:** Explore the concept of social psychology and application of psychological tests.

**CO5:** Explore the developmental stages of life from a psychological perspective.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	M	H	H	M	H
CO3	M	H	H	M	H	H
CO4	H	H	M	H	H	M
CO5	H	M	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	H	H	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	M	H	H	H
CO5	H	H	H	H	M	H

(Low - L, Medium – M, High - H)

**Unit I: Psychology****(15 hours)**

- 1.1 History of Psychology---(K2,K1,K3)
- 1.2 Definition of psychology—(K1,K2)
- 1.3 Meaning of Psychology—(K2,K1)
- 1.4 Methods of psychology-(K4,K3,K2)
- 1.5 Scope of psychology---(K6,K4,K3)
- 1.6 Relevance of psychology in social work profession---(K6,K5,K4)

**Unit II: Psychological functions****(15 hours)**

- 2.1 Psychological functions (K6,K5,K4)
- 2.2 Memory process—registration, retention and recall---(K6,K4,K3)
- 2.3 Intelligence- concept, levels and influence of hereditary and environment—(K5,K6,K4,K3)
- 2.4 Motivation—concepts types and influence on human behavior—(K4,K2,K3)
- 2.5 Emotions nature and characteristics--- (K4,K3,K2)
- 2.6 Emotional expressions—(K5,K4,K3,K2)

**Unit III: Personality****(15 hours)**

- 3.1 Personality definition, concept, structure---(K3,K2,K1)
- 3.2 Psychoanalytic approach---(K6,K5,K4,K3)
- 3.3 Behavioural approach--- (K6,K5,K4)
- 3.4 Humanistic approach----(K6,K5,K4)
- 3.5 Attitude and Prejudice definition , formation and maintenance—(K4,K5,K2,K1)
- 3.6 Influence of attitude on behavior and factors influencing attitude change (K6,K5,K4)

**Unit IV: Psychological Tests****(15 hours)**

- 4.1 Psychological tests and Aptitude --- (K6,K5,K4)
- 4.2 Psychopathology---(K4,K5)
- 4.3 Scales developed to study human behavior---(K6,K5,K4)
- 4.4 Adjustment and maladjustment—(K5,K4)
- 4.5 Stress, Frustrations, Conflicts---(K5,K4,K3)
- 4.5 Defense Mechanisms—(K5,K4.K2)

**Unit V: Development Psychology****(15 hours)**

- 5.1 Developmental psychology meaning, definitions principles---(K2,K1)
- 5.2 Stages of development conception, prenatal—(K4,K2,K3)
- 5.3 Infancy, Babyhood, childhood---(K4,K3,K2)
- 5.4 Puberty and adolescence---(K5,K4,K3)
- 5.5 Adulthood, middle age and old age—(K5,K4)
- 5.6 Social factors influencing development—(K6,K5,K4)

### **Books for Study and Reference:**

1. Morgan, Clifford .T, King A. Richard Weisz, John.,R. Schopler John - Introduction to Psychology - Ronald Press, New York, 1977.
2. Munn L.Norman, Fernald Dodge C.Fernald Peter S., Leonard Carmicheal - Introduction to Psychology - A.I.T.B.S Publishers, New Delhi, 2007
3. Hurlock Elizabeth B. – Personality Development - Tata, McGraw, Hill Publishing Company, New Delhi, 2005.
4. Park & Park - Textbook of Preventive and Social Medicine - M/S. Banarsidas Bhanot Jabalpur, 2005
5. Shakuntala Devi - Principles of Social Psychology - Raj Publishing house, Jaipur, 2004
6. S. Kumar - Principles of Developmental Psychology - Anmol Publications, New Delhi, 2002.
7. A.R. Rathur - Psychology of Learning and Development - Discovery Publishing house, New Delhi, 2004.
8. N.M. Tiwari - Child Psychology - Saurahb Publishing house, New Delhi.
9. Papalia, Olds Feldman - Human Development, 9<sup>th</sup> Edition - Tata McGraw Hill Publishing Company, New Delhi, 2004.
10. Duane P. Schultz - Theories of Personality, 8<sup>th</sup> Edition - Thomson, Wordsworth India, UK, US, Singapore, 2005.
11. K.c. Shukla, Tarachand - General Psychology - Commonwealth Publishers, New Delhi, 2007
12. Cooper, Mcgaugh - Integrating Principles of Social Psychology - Eurasia Publishing House, New Delhi.
13. Rajiv K. Mishra - Personality Development - Rapa & Co. New Delhi.

## SEMESTER II

### PCSWF20 – SOCIAL WORK RESEARCH

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PCSWF20	Social Work Research	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To understand the nature and importance of the scientific method and appreciate the principles of social work research
- To develop the capacity to independently conceptualize a problem and execute research
- To develop technical competency to assess and analyze social problems, needs and services
- To face the challenge in solving the unsolved social problems
- To develop analytical skills among students

#### COURSE OUTCOMES

After completion of the course the students will be able to attain the following outcomes,

**CO1 :** Demonstrate, develop and understanding the capability to independently conceptualize a problem and execute research

**CO2 :** Provide clear plan of the research and understand framework of research methods and techniques through research design

**CO3 :** Analyzing the concept of Data Collection and Data Processing

**CO4 :** Demonstrate, understanding and mastery of the knowledge, values, skills relevant to research competencies.

**CO5 :** Appropriately apply statistical techniques in Social Work Research

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	M	H
CO5	H	H	M	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	H	H	H
CO2	M	H	H	H	H	H
CO3	M	H	H	H	H	H
CO4	M	H	H	H	H	H
CO5	M	H	H	H	H	H

(Low - L, Medium – M, High - H)

**Unit I: Social Work Research** (15 hours)

- 1.1 Meaning, Definition, (K2,K1)
- 1.2 Purpose of research (K2,K1)
- 1.3 Scope and limitations of research (K3,K2)
- 1.4 Quantitative and qualitative research – (K2,K1)
- 1.5 Steps in research process. (K4,K2)
- 1.6 Conceptualization, operationalization, variables. (K6,K4,K2)

**Unit II: Research Design** (15 hours)

- 2.1 Definition of Research design, Purpose of Research design (K2,K1)
- 2.2 Types of design: exploratory, descriptive, diagnostic and experimental design- (K3,K2)
- 2.3 Sampling: Definition for Sampling , Principles, types of Sampling (K3,K2,K1)
- 2.4 Procedure, universe and sample frame (K4,K2)
- 2.5 Selection of samples - measurements and its level – validity and reliability. (K6,K4,K3)
- 2.6 Rating Scale: meaning and uses (K5,K2)

**Unit III: Data Collection** (15 hours)

- 3.1 Sources and methods of data collection, primary and secondary source (K3,K2)
- 3.2 Methods of data collection, observation, and survey method, personal interview (K2,K1)
- 3.3 Interview: interview guide principles of interview (K4,K2)
- 3.4 Questionnaire: construction of questionnaire, types and format(K5,K2,K1)
- 3.5 Questionnaire their advantages and disadvantages (K6,K2,K1)
- 3.6 Data Processing: Content checking - editing Data - Clarification - Coding- Tabulation –Analysis – Presentation - Interpretation. (K3,K2,K1)

**Unit IV: Elements of Research** (15 hours)

- 4.1 Planning a research project: Project proposal (K6,K4,K1)
- 4.2 Problem formulation, framing objectives, defining concepts (K6,K1)
- 4.3 Hypothesis and its types, (K6,K5,K3)
- 4.4 Review of literature, research design, (K2,K3)
- 4.5 Sampling methods, data collection, (K4,K2)
- 4.6 Analysis, reporting.( K5,K4,K3)

**Unit V: Statistics** (15 hours)

- 5.1 Statistics: Meaning, uses and its limitations (K2,K1)
- 5.2 Measures of central tendency: mean, median, mode. (K6,K5,K3)
- 5.3 Dispersion: Range, Mean deviation- quartile deviation- standard deviation- coefficient of variation. (K6,K5,K3)
- 5.4 Test of significance: t” test , Chi square test. (K6,K5,K3)

5.5 Correlation: meaning, type and uses (K2,K1)

5.6 Karl Pearson's Coefficient of correlation- simple and rank correlation. (K5,K4,K2)

**Books for Study and Reference:**

1. Kothari C. R. - Research Methodology – New Hope International Ltd., 2005.
2. Bruce A Thyer – The Handbook of Social Work Research Methods – Sage Publications Inc, New Delhi, 2001.
3. Ian Shaw and Nick Gould – Quantitative Research in Social Work - Sage Publications Inc, New Delhi.
4. Rafael J Angel & Russel K. Schutt - The Practice of Research in Social Work - Sage Publications Inc, New Delhi.
5. Anantha Kumar Giri - Creative Social Research – Vistaar Pub., New Delhi, 2004.
6. Heather D.Cruz & Marilyn Jones – Social Work Research - Sage Publications Ltd., New Delhi, 2004.
7. Prasanna Chandra – Projects – Tata McGraw Hill Ltd., 2004.
8. K.Sathyamurthi – Contemporary Social Work – Allied Publishers Pvt. Ltd, Chennai, 2010.

## SEMESTER II

### PCSWG20 – COMMUNITY ORGANISATION AND SOCIAL ACTION

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
1	II	PCSWG20	Community Organisation and Social Action	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To develop an understanding of the concepts related to working with communities.
- To gain knowledge of various approaches, skills and techniques of working with Communities.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1:** Able to demonstrate familiarity with community organization and social action as methods of social work Profession

**CO2:** Able to develop skills of collecting and collating information to understand community its structure and Components.

**CO3:** Able to gain the experience and exposure to Practice community organization and social action at Micro and Macro levels

**CO4:** Adapt strategies to solve social problems and bring changes in the social structure without violence and coercion

**CO5:** Modify the malfunctioning of the social and economic institutions

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	M	H	H	H	M
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	H	H	H
CO2	M	H	H	M	H	H
CO3	L	H	H	H	H	H
CO4	M	H	H	H	H	H
CO5	L	H	H	M	H	H

(Low - L, Medium – M, High - H)

**Unit I : Community** (15 hours)

- 1.1 Meaning (K1, K2)
- 1.2 Types (K1, K2)
- 1.3 Characteristics, (K1,K2,K4,)
- 1.4 Community Organization – Concept, Meaning, Definition, (K1,K2, K3)
- 1.5 Scopes, Principles - (K1,K2, K3)
- 1.6 Philosophy and its relevance (K1,K2,K3)

**Unit II: Process or Phases of Community Organization** ( 15hours)

- 2.1 Process or phases of Community Organization - Study and survey, (K2,K4,K5)
- 2.2 analysis, assessment, discussion, organization, (K2,K3,K4,K5)
- 2.3 action, reflection, modification, continuation K2,K3,K4)
- 2.4 Skills in Community Organization: Organizing, communication, training, consultation, (K1,K2,K3)
- 2.5 public relations, resource mobilization, liasoning, conflict resolution (K1, K2)
- 2.6 Models of Community Organization, locality development, social planning (K1,K2,K3)

**Unit III: Participatory Rural appraisal (PRA)** (15 hours)

- 3.1 History, Concept, principles, (K1, K2,K3)
- 3.2 Tools and techniques ( K2, K3,K4)
- 3.3 Methods of PRA- Social Mapping, Venn Diagram, Wealth Ranking, Seasonality Calender, Focus Group Discussion, Indepth Interviews, Key Informant Interviews..etc (K1, K2, K3,K4,K5)
- 3.4 Importance of participation and advantages, difference between PRA and RRA (K1, K2,K4)
- 3.5 Social Action – Definition, principles and scope (K1,K2)
- 3.6 Social Action as a method of social work. (K2,,K4)

**Unit IV: Strategies and Tactics:** (15hours)

- 4.1 Negotiation, advocacy, (K1, K2,)
- 4.2 Social networking ,conflict resolution (K1, K2,K3)
- 4.3 Pressure, individual contact (K1,K2,K3)
- 4.4 Conscientization, legal situation, violence (K2, K4)
- 4.5, Public relations, political organization (,K2,K4)
- 4.6 Collaborative – peace initiative. (K1,K2,K3)

**Unit V: Resource mobilization** (15 hours)

- 5.1 Resource mobilization – Concept, (K1, K2, K3)
- 5.2 people – the most valuable resources ( K2, K3)
- 5.3 process and steps involved in mobilizing community resources (K1, K2,K3,K4,K5)
- 5.4 Techniques and sources of fund raising (K1, K2,,K3,K4,K5,K6)
- 5.5 Corporate Social Responsibility (CSR) initiative – Swatch Bharath (K1,K2,K3)
- 5.6 Social activist – Anna Hazareh, Saul Alansky, Paulo Freire.(K1,K2)

**Books for Study and Reference:**

1. J. Christopher, A. Thomas William - Community Organization and Social Actions - Himalaya Publishing House – Mumbai, Delhi, 2006.
2. C. P. Yadav – Encyclopedia of Social Work and Community Organization, Vol. I, II, III & IV – Anmol Publications Pvt. Ltd. New Delhi, 2007.
3. Somesh Kumar – Methods for Community Participation – Vistaar Publications, New Delhi, 2002.
4. Sulbha Khanna – Participatory Approach to Development – Discovery Publishing House, New Delhi, 2006.
5. Anju Dwiredi – Methods of Participatory Training – Shree Sai Printers, 2002.
6. O. P. Goel – Role of NGOs in Development of Social System – ISHA Books, 2004.
7. Ross M. G., 1955 – Community Organization – Theories, Principles and Practices – Harper and Row, New York.
8. Siddiqui H. Y. (Ed.) – Social Work and Social Action – Harnam Publications, New Delhi, 1984.
9. Murty M. V. – Social Action – Asia Publishing House, Bombay.

## SEMESTER II

### PESWC20 - ELECTIVE II A: SOCIAL POLICY AND SOCIAL LEGISLATION

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
1	II	PESWC20	Social Policy and Social Legislations	Theory	Elective	5	4	100

#### COURSE OBJECTIVES

- To develop the students ability to understand Social Welfare Administration
- To develop in students an understanding of the concepts f social policy and social welfare policy to emphasize the importance of them
- To make aware on the different social legislation, its role to the students.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1** : Obtain knowledge and understand social welfare administration

**CO2** : Understanding of the concepts of social policy and social welfare policy to emphasize the importance of them.

**CO3** : Promote knowledge in understanding the cause and effects of discrimination and oppression.

**CO4** : Able to prepare modules and strategies for advocacy to bring sustainable social change

**CO5** : Obtain knowledge of legislative structure, frame and Process of making legislation.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	M	H	M	H	H
CO4	H	H	H	H	M	H
CO5	H	H	M	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	H	M
CO2	H	M	H	H	M	H
CO3	H	H	H	H	M	H
CO4	H	M	H	M	H	M
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

**Unit I : Social policy and social welfare policy: (15 hours)**

- 1.1 Social policy and social welfare policy: Concept (K1, K2)
- 1.2 Its relation to the constitution (K1, K2)
- 1.3 Need and evolution of social policy in India (K1,K2,)
- 1.4 Fundamental rights and directive principles of state policy (K2, K3,K4)
- 1.5 Policy and planned social change - K1,K2, K3)
- 1.6. A bird's eye view on constitution of India(,K2,K3)

**Unit II: Policies in India ( 15 hours)**

- 2.1 Policies in India regarding - backward classes, (K1,K2,K3)
- 2.2 Schedule classes, (K1,K2,K3,)
- 2.3 Schedule tribes (K1,K2,K3)
- 2.4 Denotified communities (K2,K3)
- 2.5 Women, children, ( K1,K2,K3)
- 2.6 Handicapped, aged (K1,K2,K3)

**Unit III: Social legislation, (15 hours)**

- 3.1, Indian penal code (K1, K2)
- 3.2 Code of criminal procedure ( K2,K3,K4)
- 3.3 family courts (K1, K2)
- 3.4 Lok adalats (K1, K2)
- 3.5 The legal aid movement and public interest litigation (K1,K2,K3)
- 3.6. Role of central social welfare board and state social welfare board (K2,,K3,K4)

**Unit IV: Acts (15hours)**

- 4.1 Dowry Prohibition Act 1961 (K1, K2,K3)
- 4.2 Adoption and Maintenance Act 1986 (K1, K2,K3)
- 4.3 Juvenile Justice Act 1986 (K1,K2,K3)
- 4.4 Child Labour Act 1986 and Bonded Labor Abolition Act 1976 (K1,K2, K3)
- 4.5, Right to Information Act, (K1,K2, K3)
- 4.6 Domestic violence, Sexual harassment Act (K1,K2 K3,)

**Unit V: Acts (15 hours)**

- 5.1 Protection Civil rights Act 1955,(K1, K2, K3,K4)
- 5.2 Prevention of Immoral Traffic Act 1956 (K1, K2, K3,K4)
- 5.3 Protection Consumer Act 1986 - (K1, K2,K3,K4)
- 5.4 Transplant of Human Organ Act 1994 (K1, K2,,K3,K4)
- 5.5 Tamil Nadu Prohibition of Eve Teasing Act 1988 (K1,K2,K3,K4)
- 5.7 Tamil Nadu Prohibition of Ragging Act 1997 (K1,K2,K3,K4)

**Books for Study and Reference:**

1. Velayutham K. Shanmuga – Social Legislation and Social Change - Vazhga, Valamudan Publishers, Chennai, 1998
2. Constitution of India - Govt. of India, 1991
3. Encyclopedia of Social Work - Volumes I, II, III, The Planning Commission Govt. of India. 1968
4. C.B. Raju - Social Justice and the Constitution of India - Serials Publications, New Delhi, 2006.
5. Dr. Durga Das Basu - Introduction to the Constitution of India - Wadhawa & Company, New Delhi, 2005
6. Sibnath Deb - Contemporary Social Problems in India - Anmol Publications, New Delhi, 2006
7. Praveen Yogi - Social Justice and Empowerment - Kalpaz Publications, Delhi, 2000.
8. Dr. S. Mehartaj Begum - Human Rights in India - Efficient Offset Printers, New Delhi, 2000
9. Kalpana Koy - Women's Oppression and Projective Law - Ravat Publications, New Delhi, 1999.

## SEMESTER II

### PISWB20 -IEC - WOMEN AND DEVELOPMENT

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PISWB20	Women and Development	Theory	Core			100

#### COURSE OBJECTIVES: -

- To develop an understanding of the perspective of women and development in Indian society
- To develop an ability to identify areas of work with women and understand strategies to change the situation in terms of personal liberation as well as in terms of making women a part of the developmental process
- To develop a capacity to examine the social systems that effect women in meeting growth needs and special needs.

#### COURSE OUTCOMES

After completion of the course the students will be able to attain the following outcomes,

**CO1** : Examine the concept of women empowerment and development

**CO2** : Analyzing the importance of Education for the development of Women

**CO3** : Identify and understand the different situations and make women a part in development process

**CO4** : Identify and develop the process of protection of women health and environment

**CO5** : Implement the planning skills on development of women and know about the national policies related to women's empowerment

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	M	H	H	H	M
CO3	H	H	H	M	H	H
CO4	H	H	M	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	M	M	H	H	H	H
CO4	M	M	H	H	H	H
CO5	M	H	H	H	H	H

(Low - L, Medium – M, High - H)

### **Unit I : Basic Concept**

- 1.1 The concept of development with reference to women (K2,K1)
- 1.2 Women in development; (K5,K2,K1)
- 1.3 Women and development in society (K3,K2,K1)
- 1.4 Gender in development – (K5,K2)
- 1.5 Patriarchal structure in india- (K3,K1)
- 1.6 Ideological and socio-cultural constructs. (K6,K4,K2)

### **Unit II : Women and Education**

- 1.1 Education and women's development - Definition (K1,K2)
- 1.2 Need and Purpose of Education in development (K3,K2)
- 1.3 Stereotyping : Definition, Meaning (K2,K1)
- 1.4 Sexism in education, education as agent of sex role stereotyping (K4,K2,K1)
- 1.5 Reorganizing and using the education system for raising the status of women (K3,K2)
- 1.6 Alternatives to formal education-non formal education, adult education, continuing education, distance education. (K6, K4,K2)

### **Unit III : Women and Employment**

- 4.1 Women and employment -Definition (K2,K1)
- 4.2 Trends in women's employment (K5,K2)
- 4.3 Feminization of poverty (K6,K4,K1)
- 4.4 The concept of work and worker as defined by national sample survey (nss) (K5,K3,K1)
- 4.5 The census of india and its effect on women's employment (K4,K3)
- 4.6 Women's dual role. (K6,K4,K3)

### **Unit IV : Women and Health**

- 4.1 Women and health – Definition (K2,K1)
- 4.2 Morality and morbidity patterns among women(K4,K3)
- 4.3 Health as a gender issues in society (K6,K5,K3)
- 4.4 Family planning methods and their impact on women (K5,K4,K3)
- 4.5 Differential access to health services, rural and urban differential in health (K4,K3)
- 4.6 Implication for the health of the rural women. (K6,K5,K2)

### **Unit V : Women and Law**

- 5.1 Women and law – Definition (K2,K1)
- 5.2 Safe guards and provisions relation to women in the indian constitution (K4,K3)
- 5.3 A critique of women's legal rights (K5,K2,K1)
- 5.4 Rights of women in india with reference to marriage, divorce and maintenance, inheritance, adoption, employment, maternity benefits – (K6,K3,K4)
- 5.5 Legal provision regarding dowry, sati, rape, prostituiton, eveteasing, sexual harassment and their effect of women- (K5,K2,K1)
- 5.6 violence against women in the family, workplace, media. (K4, K3, K2)

## **Books and Reference:**

1. Bashin, kamala and agarwal ED 1984 Women and the media- analysis, alternatives and actions kali and women New Delhi.
2. Blumbrg R.L & Dwaraki L 1980 India's educated women options and constraints; Hindustan publishing corporation, delhi.
3. Devandhar, kiran 1985 Status and position of women in India; shakthi books, Delhi.
4. Hamilton R. 1978 The liberation of women, A study of Patriarchy; George Allen and Unwin, London.
5. ICSSR Status of women in India; report of the national committee; allied publishers, delhi.
6. Kanhere U.S Women and socialisation; Mittal publications.Delhi.
7. Kausghik, Susheela (Ed) Women's oppression- patterns and perspective; Shakthi books.
8. Kidwai M.H 1979 Women under different social and religious laws; Seema publications, delhi.
9. LWF studies Women human rights; The Lutheran world federation, Geneva.
10. Neera Desai & Mathraj Krishnaraj 1987 Women and society in India; Ajanta publications, New Delhi.
11. Pal B.K Problem and concerns of Indian women; ABC publishing house, New Delhi.
- 5.7.1.1.1.1 **12.** Usha rao N.J 1983 Women in developing society; Ashish publications, New Delhi.

## SEMESTER II

(M.A./M.Sc/M.Com/M.B.A/M.S.W)

### PNHRA22 – HUMAN RIGHTS

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PNHRA22	Human Rights	Theory	Core	2	2	100

#### COURSE OBJECTIVES:

- To develop respect for Human Rights and encourage students to stand for Social Justice
- To create awareness on the Indian legal system, rule of law and human rights perspective in India.
- To make students to understand the goals of Human Rights Education
- To sensitize students for the application of human rights to the various practice domains of the different profession
- To understand the functioning of Union, State and Local Governments in Indian federal system

#### COURSE OUTCOMES :

After completion of the course the students will be able to attain the following outcomes,

**CO1** : Obtain knowledge and understand about fundamental Human Rights

**CO2** : Understanding of the concepts of Indian constitution and to emphasize its importance

**CO3** : Promote knowledge in understanding the concept of Universal Declaration and International Covenants on Human Rights.

**CO4** : To strengthen the promotion and protection of human rights around the globe

**CO5** : Promote awareness on the Indian legal system, rule of law, human rights related policies, Acts and movements

CO/ PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	M	M	H	H	H	H
CO2	H	M	H	H	H	H
CO3	H	M	H	H	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	H	H
CO2	M	M	H	H	H	H
CO3	M	M	H	H	H	H
CO4	M	H	H	H	H	H
CO5	M	H	H	H	H	H

## **UNIT I : INTRODUCTION TO HUMAN RIGHTS**

1. Human Rights – Introduction
2. Meaning and definition
3. Origin and Development
4. Elements of Human Rights
5. Kinds of Human Rights -Civil and Political rights
6. Social ,Economic & Cultural rights

## **UNIT II : INDIAN CONSTITUTION AND HUMAN RIGHTS**

1. Indian Constitution -Meaning- Definition, Classification
2. Features of India Constitution, Federalism
3. Preamble, Fundamental Rights
4. Directive Principles of State policy
5. Right to constitutional Remedies, PIL, Different Courts
6. Constitution of Human Rights Court, Right to Information Act, 2005(RTI)

## **UNIT III : UNIVERSAL DECLARATION AND INTERNATIONAL COVENANTS ON HUMAN RIGHTS**

1. Universal declaration – Meaning & concepts
2. Provisions of universal declaration of Human Rights
3. Effects and influence of Universal Declaration
4. Distinction between the Indian constitution and Universal Declaration
5. International covenants on civil & Political Rights ,1966 (ICCPR)
6. International covenants on Economic, social and cultural rights, 1966 (ICESCR)

## **UNIT IV : UNITED NATIONS AND HUMAN RIGHTS**

1. Provisions relating to human rights under UN charter
2. Through principal organs, UN Commission on Human Rights
3. UN charter based institutions, UN specialized Agencies
4. Human Rights and Domestic Jurisdiction
5. United Nation Convention against Torture (UNCAT)
6. Convention on the Protection of the Migrant Workers

## **UNIT V : HUMAN RIGHTS AND DIFFERENT POLICIES**

1. Anti Human Trafficking and Protection of Human Rights Act,1993
2. Policies and Acts, National Policy for Children 2013, Juvenile Justice Act 2000,
3. POCSO Act 2012
4. National Policy for Empowerment of women 2001, The Sexual Harassment of Women at Workplace Act 2013,
5. National Human Rights commission, State Human Rights Commission
6. Farm Bill 2020, CAA,NRC,NPR, New Educational Policy 2020.

## **REFERENCE ITEMS: BOOKS, JOURNAL**

1. Protection Of Human Rights Act, 1993.
2. Constitutional Law of India (3 Volumes) by Seervai H.M 2015
3. The Human Rights Watch Global Report On Women's Human Rights 2000  
Oxford Publication
4. RS Sharma Perspectives In Human Rights Development
5. Julies Stone Human Law And Human Justice 2000 Universal Publication
6. Research Handbook On International Human Rights Law, Edited By Sarah  
Joseph &
7. Edited By Sarah Joseph, Edward Elgar Publishing Limited USA

**SEMESTER II**  
**PCSWH20– CONCURRENT FIELD WORK II**

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
I	II	PCSWH20	Concurrent Field Work	Practical	Core	16	6	100

**COURSE OBJECTIVES**

- To develop the personal and professional skills in social work profession
- To develop the skills to Identify, form, mobilize and/or strengthen existing groups in the community
- To Organize a community programme/campaign/ awareness using organization principles and programme planning skills.

**COURSE OUTCOME**

After completion of the course the students will be able to attain the following outcomes,

**CO1:** Understand and develop the professional skills in social work profession

**CO2:** Demonstrate ability to analyze the social situations of individuals, groups and communities

**CO3:** Understand the role of organizations and practice the principles of Social Work

**CO4:** Identify and Execute the different methods of Social Work appropriately

**CO5:** Develop and use different skills in planning, identifying and mobilizing resources to organize programmes and meet needs of different groups

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	M	H
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

The students go for practice based social work for two days in a week and expected to spend a minimum of 16 hours per week in the field.

The students are placed in villages or hospitals or schools or NGOs or government offices of counseling centers of welfare organizations or service organization for a semester.

During the placement they have to practice all the primary methods of social work. On has to complete 5 cases in case work, one group following all the stages of group work practice with at least 10 sessions and in the community conduct common programmes or solve an issue of the community following the principles of community organization and social action.

Every week the students write a report of their activities and submit to the concerned fieldwork supervisors. The supervisors conduct individual and group conference regularly.

At the end of the semester viva is conducted by an external examiner and marks are awarded.

### **PPSWA20- SUMMER PLACEMENT**

During the summer holidays the first year students are instructed to go for one month (24 days) field placement training preferably in their respective field of specialization. The students are placed in appropriate agencies as per their specialization for a month.

During the placement the students are expected to learn about the vision, mission, philosophy, administration, strategies, programs, activities, achievements and also involve with the activities of the organization to whatever extent possible.

Students should get their daily activity sheet and daily records which should be submitted to the department. After successful completion of the placement the students are awarded only credits.

### SEMESTER III

#### PCSWI20- COMPUTER APPLICATIONS FOR SOCIAL WORK

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PCSWI20	Computer Applications for Social Work	Theory	Core	5	3	100

#### COURSE OBJECTIVES:

- To gain an understanding of the computer and its usage for social work.
- To enable them to realize the need to have suitable skills for the practice of Statistical package of social sciences.
- To make aware on the different functions of this package for research work.
- To know the features of operating system
- To understand the procedure to enter data through SPSS

#### COURSE OUTCOMES

After completion of the course the students will be able to attain the following outcomes,

**CO1** : Understand, implement, evaluate the basic applications of artificial intelligence

**CO2** : Identify, select, and apply the different tools in SPSS

**CO3** : Understand and develop the basic work of the SPSS and assess the needed data

**CO4** : Formulating the various statistical analysis to test different hypothesis

**CO5** : Analyze the significance of statistical application and data management system

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	M	H	H	M	H
CO3	H	H	H	H	H	H
CO4	M	H	H	H	H	H
CO5	M	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	L	M	H	H	H	H
CO2	L	M	H	H	H	H
CO3	L	H	H	H	H	H
CO4	L	M	H	H	H	H
CO5	L	H	H	H	H	H

(Low - L, Medium – M, High - H)

**Unit I: Fundamentals of a Computer (8 Hours)**

- 1.1 Meaning, characteristics, (K2,K1)
- 1.2 Types of Fundamental data (K2,K3)
- 1.3 Basic operations – input, storage, processing, output, ALU and control (K5,K3,K4)
- 1.4 Word processing – structure of word window, creating document, saving, opening, operating, printing, find and replace (K6,K5,K4)
- 1.5 Spread sheet – Cells, rows, columns - Creating, opening, saving and printing a spreadsheet, creating tables, charts and calculations (K4,K3,K2)
- 1.6 E-mail etiquette and Internet usage. (K5, K3)

**Unit II: Basics of Statistical Analysis (8 hours)**

- 2.1 Population, sample, case, case number, variable, variable level, types of variable, system missing value, scale of measurement, code sheet, types of statistics, statistical tests, types of analysis (K6,K5,K4)
- 2.2 Structure of SPSS window (K6,K5,K4)
- 2.3 Creating data file – define data, variable name, variable label values, value labels, editing data file, saving, printing and recording of data (K6,K5,K3)
- 2.4 Qualitative Data Analysis Software (K6,K4,K2)

**Unit III: Analysis of Data (8hours)**

- 3.1 Single frequency, bivariate analysis, charts and diagrams (K5,K4)
- 3.2 Editing of tables and charts, fixing tables and charts in word document
- 3.3 Interpretation of data (K5,K3)
- 3.4 Application of statistical calculation and test (K5,K4,K3)
- 3.5 measurement of central tendency, dispersion (K6,K5,K4)
- 3.6 chi-square test, “t” test. (K6, K4, K2)

**Unit IV: Data Creation (8hours)**

- 4.1 Practical: (K6)
- 4.2 Creating a document and use of various formatting facilities. (K6,K4, K3)
- 4.3 Create a spreadsheet and produce results. (K6,K4, K3)
- 4.4 Adding word table and Excel chart to power point. (K6,K4)
- 4.5 Creating data file, assigning names and values to variables and saving it. (K6,K3)

**Unit V: Statistical Application (8hours)**

- 5.1 Running a simple analysis to create a frequency table. (K6,K4, K3)
- 5.2 Creating charts for different variables. (K6,K3, K2)
- 5.3 Statistical application to obtain central tendency and dispersion values. (K5,K3,K2)
- 5.4 Creating two-way tables and to obtain chi square values. (K6,K4, K3)

**Books for Study and Reference:**

1. Robert H.Carver, Jane G.Nash - Data Analysis Using SPSS for Windows – Tata McGraw Hill, 2010.
2. Sheridan J.Coakes, Lyndall Steed - SPSS for Windows - Tata McGraw Hill, 2007
3. Darren George, Paul Mallery - SPSS for Windows Step by Step - Tata McGraw Hill, 2009.
4. R.S.N.Pillai and Bagavathi – Statistics – S.Chand and Company – New Delhi – 17<sup>th</sup> Edition, 1984.

## SEMESTER III

### PSCDA20 – SPECIALISATION – I A: RURAL COMMUNITY DEVELOPMENT

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PSCDA20	Rural Community Development	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To develop in students an in-depth understanding of rural communities.
- To provide knowledge of the various methods, programmes, strategies and developmental efforts towards rural community development.
- To understand the role and contribution of professional social work in the development process.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1:** Able to understand the Rural realities and issues prevailing in Rural Areas

**CO2:** To understand the rural development and panchayat raj System

**CO3:** Able to understand Problems and invent solutions for better rural development

**CO4:** Provide Knowledge on the Government and Voluntary efforts towards Rural Community Development.

**CO5:** Demonstrate deep understanding of Primary Health Care Principles.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	H	M	H	M	H	H
CO4	H	H	H	H	M	H
CO5	H	H	M	H	H	H

CO/ PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	H	M	H
CO2	M	M	H	M	H	H
CO3	M	M	H	M	H	H
CO4	M	H	H	H	H	H
CO5	M	M	H	H	M	H

(Low - L, Medium – M, High - H)

**Unit I : Community Development (15 hours)**

- 1.1 Definition, concepts, objectives (K1, K2)
- 1.2 History of Community Development (K1, K2)
- 1.3 Rural Community Development – definition, concepts, objectives (K1,K2,K3,)
- 1.4 Principles and approaches (K2, K3,K4)
- 1.5 Gandhian ideology on Rural Community Development.(K1,K2, K3)
- 1.6 Karlmarx ideology on Rural Community Development (K1,K2,K3)

**Unit II: Concept of Democratic Decentralization (15 hours)**

- 2.1 Concept of democratic decentralization (K1,K2)
- 2.2,Panchayat systems and local self – government in ancient India (K2,K3,K4,K6)
- 2.3 Metha Patkar- Narmada Pachaw report (K2,K3,K4)
- 2.4 Administrative set up and functions –Three tier systems (K1,K2,K3,K4)
- 2.5 Finance and problems of panchayat raj ( K2,K4,K5)
- 2.6 Tamil Nadu Panchayat ACT, 1992 and the 73<sup>rd</sup> amendment.,K2,K3,K3)

**Unit III: Systems of land tenure (15 hours)**

- 3.1 Land reform measures, (K1, K2,K3,K4)
- 3.2 Land alienation ( K2, K3,K4)
- 3.3 Water harvesting and Water management, (K1, K2, K3,K4,K5,K6)
- 3.4 Problems of agriculture in India, (K1, K2,K4,K5)
- 3.5 problems of small and marginal farmers (K1, K2,K4,K5)
- 3.6.. Governments plan to develop agriculture(K2,,K3,K4,K6)

**Unit IV: Poverty alleviation Programmes (15 hours)**

- 4.1 Poverty alleviation programmes ( K2,K3,K4,)
- 4.2 VaznthuKattuvom (K1, K2,K3,K4,K5,K6)
- 4.3 SGSY (K1,K2,K3, K4,K5)
- 4.4 Self-help groups - objectives, characteristics, strategies, organization and administration (K2,K3,K4,K5,K6)
- 4.5, Rural demography – rural socio, economic and political structure K2,K4)
- 4.6 The role of community development worker in rural community development (K1,K2,K3)

**Unit V: Primary Health Care in Rural Area (15 hours)**

- 5.1, Primary Health Care in Rural Area – definition,( K1, K2)
- 5.2 Human Development Index(HDI), ( K1,K2)
- 5.3 constitutional provisions and national policies, right to health ( K2,K3,K4,K5)
- 5.4. National Rural Health Mission [NRHM]. National Health Policies 1983 and 2002, (K2,K3)
- 5.5 Reports on PHC –Bhore Committee(1946), Shrivastav committee(1975 (K1,K2,K3)
- 5.6 Health for all 2000, Community Health Care, Health Care Service Levels (Primary, Secondary and Tertiary) (K2, K3,K5,K6)

**Books for Study and Reference:**

1. Prakash M. Katare – Social Work and Rural Development – Arise Publishers & Distributors – New Delhi, 2006.
2. G. S. Dubey – Sector Reform approach in Rural Development – Mahaveer & Sons – New Delhi, 2006.
3. G. Chandrakumar & N. Mukundan – Water Resource Management – Sarup & Sons – New Delhi.
4. Margaret Ledwith – Community Development – A Critical Approach – Rawat Publications – New Delhi, 2005.
5. Shalini Rajneesh – Rural Development through Democratic Decentralization – Deep & Deep Publications Pvt Ltd – New Delhi, 2002.
6. Surat Singh & S. P. Sinha – Strategies for sustainable for Rural Development – Deep & Deep Publications Pvt Ltd – New Delhi.
7. Nisha Chaudhry – Rural Power structure in India – Common Wealth Publisher, 2005.
8. Shanka- Chatterjee – Development of Rural Poor through SHGS – RBSA Publishers – Jaipur 2004.
9. B. K. Pandey – Rural Development towards Sustainability – Vol I, II, III – Isha Books – Delhi, 2005.

### SEMESTER III

#### PSCDB20 – SPECIALISATION – I B: DEVELOPMENT PLANNING

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PSCDB20	Development Planning	Theory	Core	5	4	100

#### COURSE OBJECTIVES:

- To develop theoretical understanding of development and planning.
- To enable students to gain an understanding on administrative machinery involved in development.
- To provide knowledge on various methods, strategies and developmental efforts.
- To understand the role and contribution of professional social worker in the development process.

#### COURSE OUTCOMES

After completion of the course the students will be able to attain the following outcomes,

**CO1** : Investigating and understand the concept of planning and development

**CO2** : Understand and support the relevance of participation in planning and the tools for enhancing development

**CO3** : Critically analyze the different levels of planning for Development and analyse the knowledge about various schemes available for development for the people

**CO4** : Examine the concept of Cooperative Movement and Acts related to it

**CO5** : Assess the elements of Participatory technology Development and Programme Evaluation

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	M	H	H	H
CO3	H	M	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	M	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	H	H
CO2	M	H	H	H	H	H
CO3	M	H	H	H	H	H
CO4	M	M	H	M	H	H
CO5	M	H	H	H	H	H

(Low - L, Medium – M, High - H)

- Unit I: Basic concept of planning and development** (15 hours)
- 1.1 Planning: Definition, Concept (K2,K1)
  - 1.2 Models and approaches of planning (K4, K3)
  - 1.3 Types planning process , Principles of planning (K4,K2)
  - 1.4 Need and importance of planning for development. (K3, K2)
  - 1.5 Development – definition – concepts – indicators (K1, K3, K2)
  - 1.6 Types and models – need and importance of development planning. (K6,K4, K3)
- Unit II: Participatory Planning** (15 hours)
- 2.1 Definition of Participatory planning and development (K2,K1)
  - 2.2 History of participatory development in India (K2,K1)
  - 2.3 Models of participatory planning (K4,K3)
  - 2.4 Approaches of participatory planning (K4,K3)
  - 2.5 Different methods of Participatory planning (K4,K3)
  - 2.6 Participatory planning in panchayatraj institutions.(K4, K3, K2)
- Unit III: Different Levels of Planning** (15 hours)
- 3.1 National level for development (K4,K3)
  - 3.2 Welfare Schemes and Policies for Development (K5,K3)
  - 3.3 State level organization for planning, (K4,K3)
  - 3.4 NABARD – Objectives and Constrains (K2,K3)
  - 3.5 District and Village level organizations for planning (K2,K1)
  - 3.6 Types of plans. (K6,K4, K3, K2)
- Unit IV: Co-operative Movement** (15 hours)
- 4.1 Cooperative movement in India – History, principles (K3,K2)
  - 4.2 **Tamilnadu Cooperative Societies Act** 1961, 1983,(K3,K2)
  - 4.3 Tamil Nadu Self Reliant Cooperatives Act 1999 (K3,K2)
  - 4.4 Models of Cooperatives, (K3,K2)
  - 4.5 Role and achievements of cooperative, problems and limitations of cooperatives (K5,K4, K3)
  - 4.6 Role of cooperatives to develop the poor. (K5, K3)
- Unit V: PTD and Programme Evaluation** (15 hours)
- 5.1 Participatory technology development (PTD) – definition, history (K1,K2)
  - 5.2 Objectives, process of PTD (K3,K2)
  - 5.3 Programme evaluation – meaning, principles (K1,K2)
  - 5.4 Steps in evaluation – participatory evaluation (K4,K3,K2)
  - 5.5 Four stages in programme evaluation (K3,K2)
  - 5.6 Role of professional social workers in participatory development. (K5,K4,K3)

**Books for Study and Reference:**

1. Jain S. C – Rural Development Institute Strategies – Rawas Publications.
2. C. Karthikeyan – N. Balasubramani, D. Vijayalakshmi – Planning for development – Authors Press – Delhi, 2005.
3. Sulbha Khanna – Participatory Approach to Development – Discovery Publishing House – New Delhi – 2006.
4. D. Sundar Ram – Panchayat Raj Reforms in India – Kanishka Publishers – New Delhi, 2007.
5. B. Suguna – Empowerment of Rural Woman through SHG's – Discovery Publishing House – New Delhi, 2006.
6. Dr. I. A. Khan – Training and Development for cooperative Management – Raj Publishing House – Jaipur, 2004.

### SEMESTER III

#### PSHRA20 – SPECIALIZATION II A: LABOUR LEGISLATIONS

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PSHRA20	Labour Legislations	Theory	Core	5	4	100

#### COURSE OBJECTIVES:

- To make the students aware about the existing labour administrative setup both at the center and the state level.
- To understand the existing structure and functions of industrial and labour judicial system in India.
- To make a detailed study of the basic provisions of labour enactments

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1** : Attain knowledge on labour legislation and labour welfare.

**CO2** : Understand the legal provisions relating to labour welfare in different industries.

**CO3** : Acquire the skills of working with organized sectors.

**CO4** : Examine the existing structures of industrial and labour judicial system in India

**CO5** : Acquire attitudes that are apt in the practice of labor welfare and labour law.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	M	H	H	M	H
CO3	M	H	H	M	H	H
CO4	H	H	M	H	H	M
CO5	H	M	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	H	H	M
CO2	H	H	H	M	H	H
CO3	M	H	M	H	H	H
CO4	H	M	H	H	H	H
CO5	H	H	M	H	H	M

(Low - L, Medium – M, High - H)

#### UNIT – I Labour Legislations

(15 hours)

1.1 History of Labour Legislation—(K2,K1)

1.2 Introduction to ILO---(K6,K5,K4)

1.3 Conventions of ILO—(K6,K5)

1.4 Introduction to Labour legislation---(K5,K4,K3,K2)

1.5 Amalgamation of 44Labour Legislation—(K6,K5,K3)

1.6 Tamil nadu shops and establishments Act 1947—(K6,K5,K4)

**UNIT-II Code on Industrial Relations –2019****(15 hours)**

- 2.1 Trade Union Act 1926- definition—(K2,K1)
- 2.2 Trade Union Act 1926 functions and registration—(K4,K3)
- 2.3 Industrial Disputes Act 1947 definition, classification , causes and types---(K4,K2,K3)
- 2.4 Industrial disputes Act prevention, settlement and suggestion—(K6,K5,K4)
- 2.5 Industrial Employment Standing Orders Act 1946 definition---(K2,K1)
- 2.6 Industrial Employment Standing Orders Act 1946-scope and purpose—(K6,K5,K4)

**UNIT-III Code on occup ational Health, safety and working conditions (15 hours)**

- 3.1 Factories Act 1948 ,History, Applicability and scheme of the Act-( K5,K6,K4)
- 3.2 Factories Act 1948 Authorities under the act, Licensing and registration---(K6,K4)
- 3.3 BOCW Act 1996, registration, applicability--- (K5,k4,K3)
- 3.4 BOCW Act 1996 welfare measures, health and safety measures—(K6,K5,K4,K2)
- 3.5 CLRA Act 1970 definition ,registration and licence,authority under the act---(K6,K5,K4)
- 3.6 Interstate Migrant worker and Regulation Act 1979----(K6,K5,L4,K3)

**UNIT-IV Code on Social Security -2019****(15 hours)**

- 4.1 Employess Compensation Act 1923----(K6,K4,K3,K2)
- 4.2 Employees State Insurance Act 1948---(K6,K5,K4)
- 4.3 Provident Fund and Miscellaneous provisions Act 1952—(K6,K5,K3,K2)
- 4.4 Maternity Benefit Act 1961---(K6,K5,K4,K3)
- 4.5 Payment of Gratuity Act 1972---(K6,K5,K3)
- 4.6 Cine workers welfare fund Act 1981 and Unorganised workers social security Act 2008---(K6,K5,K4,K3)

**UNIT-V Code on wages 2019****(15 hours)**

- 5.1 Minimum wages Act 1948 definition, history----(K2,K1)
- 5.2 Minimum wages Act 1948 authorities and claim---(K5,K4,K3)
- 5.3 The Payment of Wages Act 1936 definition, history---(K2,K1)
- 5.4 The Payment of Wages Act 1936 minimum wages fixation, Machinery for fixation of minimum wages—(K6,K5,K4)
- 5.5 The Payment of Bonus Act 1965---(K6,K5,K4,K2)
- 5.6 The Equal Remuneration Act 1976---(K6,K5,K4,K2 )

**Books for Study and Reference:**

1. Prof. Anil P. – Industrial and Labour Laws – AITBS Publishers, New Delhi, 2011.
2. S.K. Bhatia – Strategic Industrial Relations and Labour Laws – Deep & Deep Publications Pvt. Ltd., New Delhi, 2008.
3. S.C. Srivastava - Industrial Relations and Labour Laws – Vikas Publications, New Delhi, 2007.
4. S.K. Bhatia – Constructive Industrial Relations – Deep & Deep Publications Pvt. Ltd., New Delhi, 2003.
5. Ajay Garg – Labour Laws – Nabhi Publications, New Delhi, 2010.
6. .R.Srinivasan – Industrial Relations and Labour Legislations – Margham Publications, Chennai, 2006.
7. Nirmal Singh Bhatia – Industrial Relations and Collective Bargaining - Deep & Deep Publications Pvt. Ltd., New Delhi, 2005.
8. Govt. of India – Labour Reports of the Committee on Labour Welfare.

### SEMESTER III

#### PSHRB20 – SPECIALIZATION – II B: HUMAN RESOURCES MANAGEMENT

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PSHRB20	Human Resources Management	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To help students acquire knowledge in Human Resources Management.
- To understand the various functions of Human Resources Management.
- To develop the skills and attitudes required of a successful HR professional.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,  
**CO1** : Acquire and build the appropriate knowledge base to Human resource management.

**CO2** : Contribute to the development, implementation and evaluation of employee recruitment, selection and retention plans and processes.

**CO3** : Gain knowledge on corporate culture related to social issues in the work place.

**CO4** : Acquire the skills of comprehending a multi-stakeholder perspective in viewing workplace issues

**CO5** : Develop implement and evaluate organizational development strategies aimed at promoting organizational effectiveness.

CO/ PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	M	H	H	M	H
CO3	M	H	H	M	H	H
CO4	H	H	M	H	H	M
CO5	H	M	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	H	H	M
CO2	M	H	M	H	H	H
CO3	H	M	H	M	H	H
CO4	H	H	M	H	M	H
CO5	H	M	M	H	H	H

(Low - L, Medium – M, High - H)

## **UNIT-I - Introduction To Management Definition**

**(15 hours)**

- 1.1 Definition, Functions and Principles of management----(**K4,K2,K1**)
- 1.2 Role and types of managers and managerial skills and roles----(**K5,K4,K3**)
- 1.3 Evolution of Management, Scientific, human relations, system and contingency approaches—(**K6,K4,K3**)
- 1.4 Types of business organization, Sole proprietorship, partnership and public and private sector enterprises—(**K5,K4,K3**)
- 1.5 Organisational culture and environment---(**K6,K5,K4**)
- 1.6 Current trends and issues in management—(**K6,K5,K4,K3**)

## **UNIT-II - Perceptive In Human Resource Management**

**(15 hours)**

- 2.1 Evolution of human resource management---(**K6,K5,K3**)
- 2.2 Importance of the human factor and objectives of human resource management---(**K5,K4,K2**)
- 2.3 Inclusive growth and affirmative action---(**K6,K4,K3**)
- 2.4 Role of human resource managers---(**K6,K4,K3,K2**)
- 2.5 Human resource policy—(**K6,K5,K4,K2**)
- 2.6 Human Resource Informative System, Human resource accounting and audit---(**K6,K5,K4,K3**)

## **UNIT-III - The Concept Of Best Fit Employee**

**(15 hours)**

- 3.1 Importance of human resource planning (**K4,K5,K3**)
- 3.2 Forecasting human resource requirement, Internal and external sources---(**K4, K5,K3,K2**)
- 3.3 Selection process screening, tests, validation, interview ( **K6,K5,K4**)
- 3.4 Recruitment Introduction and importance----(**K6,K5,K4**)
- 3.5 Medical examination---(**K5 K4**)
- 3.6 Socialization benefits---(**K6,K5 K4**)

## **UNIT-IV - Training And Development**

**(15 hours)**

- 4.1 Types of training methods, training needs and importance- (**K6,K4 K2**)
- 4.2 Common practices, bench marking, competency, mapping and industry practices---(**K5,K4**)
- 4.3 Benefits, self development, knowledge management---(**K5,K4,K3**)
- 4.4 Compensation plan, recognition, reward---(**K5,K4,K6**)
- 4.5 Motivation, theories of motivation---(**K4,K3,K2**)
- 4.6 Career management, Development of mentor, Protégé relationship- (**K6,K5**)

## **UNIT-V - Performance Evaluation And Control Process**

**(15 hours)**

- 5.1 Methods of performance evaluation, feedback- (**K6,K4,K3**)
- 5.2 Industry practices, Promotion, Demotion, Transfer and Separation- (**K5,K4,K3**)
- 5.3 Implication of Job change, control process, importance and method -(**K6,K5,K3**)
- 5.4 Requirement of effective control systems grievances and causes---(**K5,K4**)
- 5.5 Redressal methods- (**K6,K5,K4**)
- 5.6 HR- ethics—(**K6,K5,K3**)

**Books for Study and Reference:**

1. SS.Khanka – Human Resource Management – S.Chand & Company Ltd., New Delhi, 2003, First Edition.
2. P.C.Tripathi – Personnel Management and Industrial Relations – Sultan Chand & Sons, New Delhi, 2005.
3. Flippo Edwin – Personnel Management – Tata McGraw Hill Book Company.
4. K.Aswhathappa - Human Resource Management - Tata McGraw Hill Publishing Company Ltd., New Delhi, 2008.
5. R.N.Gupta – Principles of Management – S.Chand & Company Ltd., New Delhi, 2005.
6. S.Yuvaraj – Human Resource Development – Vrinda Publications (P) Ltd., New Delhi, 2003.
7. P.Parthasarathy – Principles of Management – 2<sup>nd</sup> Edition, Vrinda Publications (P) Ltd.

### SEMESTER III

#### PSMSA20 - SPECIALIZATION - III A MEDICAL SOCIAL WORK

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PSMSA20	Medical Social Work	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To know and understand the beginning of social work in the medical setting and its development and current status.
- To develop a holistic and integrated approach to social work practice in the field of health.
- To develop a deeper understanding of common physical diseases and health problems of vulnerable groups.
- To develop the capacity to perceive the relation of environment and socio cultural and psychological factors in causation, treatment and prevention of diseases.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,  
**CO1:** Understand the various dimensions of health to help people with illness manage the psycho-social impact of the same on their lives

**CO2:** Acquire skills to contribute in a multidisciplinary team to provide the psycho-social dimension of the medical condition affecting the patient and his/her family

**CO3:** Enhance their ability to identify and arrange community supports and resources to facilitate discharge from hospital/transfer to alternate care

**CO4:** Provide support to patient and family during grief, mourning and be able to counsel patients facing death

**CO5:** Enhance their ability to identify and arrange community supports and resources to facilitate discharge from hospital/transfer to alternate care

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	M	H	H	H
CO3	H	M	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	H	M	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	M	M	H	H
CO2	H	H	H	H	H	H
CO3	H	H	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

**Unit I****(15 hours)**

- 1.1 Medical social work; Definition, Importance of medical social work (K1,K2)
- 1.2 Foundation of medical social work (K1, K2)
- 1.3 Historical development of medical social work in west, in India (K2,K3,K4)
- 1.4 Scope of medical social work (K3,K4,K5)
- 1.5 Meaning of Hygiene - Disease and Illness.( K4,K5)

**Unit II: Communicable Diseases:****(15 hours)**

- 2.1 Factors responsible for the spread of Communicable diseases, Disease cycle, Levels of Prevention, Disease Transmission (K1,K2)
- 2.2 Immunity: General measures of control of infectious disease (K1,K2)
- 2.3 Psycho social problems of major communicable diseases, Ebola. (K1,K2,K3)
- 2.4 Respiratory infections: Smallpox, Chickenpox, Measles, Tuberculosis, Influenza, Acute respiratory infections. (K1,K2,K3)
- 2.5 Intestinal infections: Polio, Diarrhoeal diseases, Typhoid, Arthropod - borneinfections: malaria, Zoonoses: Rabies, (K1,K2,K3,K4)
- 2.6 surface Infections: Leprosy, STD, AIDS. (K1,K2,K3)
- 2.7 Major Non communicable disease: Cancer, Diabetes, Hypertension, Cardiovascular diseases.(K2,K3K4 K5)
- 2.8 Health problems of the Aged:-Problems due to the ageing process, Problems associated with long term illness, Psychological problems - Child health problems. (K2,K3,K4,K5)

**Unit III:****(15 hours)**

- 3.1 Health: Meaning, Changing concept of health (K1,K2)
- 3.2 Dimensions of health. Positive health (K2,K3)
- 3.3 Levels of health care - Public Health: Meaning, changing concept
- 3.4 Health care models: Medical, Prevention and Promotion, Integrative model, Developmental health, Holistic approach to Health (K3,K4)
- 3.5 Health status and health problems – (K3,K4)
- 3.6 Health care system - Alternative system of Health, Yoga, Naturopathy.( K2,K4,K5)

**Unit IV:****(15 hours)**

- 4.1 Medical social work in relation to different discipline (K1,K2)
- 4.2 Multi disciplinary approach and Team work (K2,K3)
- 4.3 Medical social work practice in different settings -Hospitals (out patient department, emergency/ crisis care, hospice)Special clinics (K3,K4,K5)
- 4.4 Community health - Use of volunteers, (K3,K4)
- 4.5 Role of medical social worker in a hospital setting. (K3,K5)
- 4.6 Problems encountered by medical social worker in the field. (K3,K4,K5)

**Unit V:****(15 hours)**

- 5.1 Community Health:-Meaning Organization and administration of health care at the center, state, district, municipality and village level Role of Social worker in community health.(K2,K3,K4,K5)

**Books for Study and Reference:**

1. Anderson R. Bun M. (eds) - Living with Chronic Illness: The Experience of Patients and Their Families - London, Unnwin Hymman, 1988.
2. Bajpai P.K. (Ed) - Social Work Perspectives in Health - Rawat Publications, Delhi. 1977
3. Barlett H.M. - Social Work Practice in the Health Field - New York, National Association of Social Workers, 1967.
4. Crowley M.F. - A New Look at Nutrition - London, Pitman Medical Publishing Company Ltd., 1967.
5. Field M. - Patients Are People: A Medical Social Approach to Prolonged Illness - New York. Columbia University Press, 1963.
6. Goldstein D. - Expanding Horizons in Medical Social Work - Chicago, The University Chicago Press - 1955.
7. Narasimhan M.C., Mukherjee A.K. - Disability: A Continuing Challenge - New Delhi. Wiley Eastern Ltd., 1987.
8. Pathak S.H. - Medical Social Work in India-New Delhi, DSSW, 1961.
9. Pokamo K.L. - Social Benefits, Cultural Practices in Health and Diseases - New Delhi. Rawat Publications, 1996.
10. Sweiner C. Sengupta N and Kakula S. - Manual for Child Nutrition in India - New Delhi. VHAI, 1978.
11. Uphoam F. - A Dynamic Approach to Illness: A social Work Guide - New York, Family Service Association of America, 1989.
12. Park and Park - Social and Preventive Medicine.

### SEMESTER III

#### PSMSB20 - SPECIALIZATION - III B - INTRODUCTION TO PSYCHIATRY AND MENTAL HEALTH

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PSMSB20	Introduction to Psychiatry and Mental Health	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To understand the concept of Mental Health, and acquire knowledge in mental disorders, stress and coping in the context of holistic health.
- To develop skills in identifying mental disorders in health settings and community
- To understand the characteristics of positive mental health.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1:** Understand the context of practice of Psychiatric Social Work

**CO2:** Learn and understand the concept of mental disorders and their management

**CO3:** Acquire skills to identify, understand and assess mental disorders

**CO4:** Gain competencies in knowledge, skills and attitude in managing mental disorders through understanding and practice of Psychiatric Social Work approaches

**CO5:** Appreciate the importance and role of psychiatry social worker in development

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	M	H	H	H	H
CO2	H	H	M	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	M	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	M	H	H
CO2	H	H	H	M	M	H
CO3	H	H	H	H	M	H
CO4	H	H	H	H	H	H
CO5	H	M	M	M	M	H

(Low - L, Medium – M, High - H)

**Unit I:** (15 hours)

- 1.1 Definition of Psychiatry, Psychopathology, Psychiatric social work (K1,K2)
- 1.2 History and Scope of Psychiatric Social Work, changing perceptives of psychiatric social work (K2,K3,K4)
- 1.3 Mental Health:- Definitions, meaning, Concept, Principles( K2,K3,K4)
- 1.4 Factors necessary for promotion of Mental Health, (K3,K4,K5)
- 1.5 Characteristic of Mentally Healthy Individual. Misconceptions towards mentally ill - Problems faced by mental ill people (K4,K5,K6)
- 1.6 Introduction ICD and DSM., (K1,K2,K3)

**Unit II:** (15 hours)

- 2.1 Definition of a psychiatric disorder, Features of disturbances in bodily functions (K1,K2)
- 2.2 Signs and symptoms of common mental illness, Causes of mental illness – (K2,K3)
- 2.3 Psychiatric Assessment - History taking and mental status examination - multi dimensional assessment of mental disorder in psychiatric social work. (K3)
- 2.4 Classification of mental disorders:-symptoms, causes and treatment of, (K3,K4)
- 2.5 Psychosis: *Functional* - schizophrenia, *Affective* - Mania, Depression, Unipolar, Bipolar, *Cyclic*, *Organic* - acute and chronic. Neurosis: - Anxiety neurosis, Depressive neurosis, Hysterical neurosis, OCD, Phobic neurosis.(K1,K2)

**Unit III:** (15 hours)

**Special disorders:-**

- 3.1 Causes of psychiatric disturbance in childhood, definition of disturbance( K1,K2)
- 3.2 Childhood disorders:- Autism, Childhood schizophrenia, Attention deficit and hyper activity disorder (K2,K3,K4)
- 3.3 Behavior problems in children:
  1. Problems Antisocial in Nature
  2. Habit disorders
  3. Personality disorders
  4. Psychosomatic complaints
  5. Educational difficulties - Disorders associated with eating, speech, and sleep, scholastic backwardness, identify crisis. (K2,K4,K5,K6)

**Unit IV:** (15 hours)

- 4.1 Personality disorders, psycho-physiological Disorders, alcoholism, Drug abuse,
- 4.2 and suicide (K1,K2)
- 4.3 Mental retardation, Alzheimer's Disease, Sexual Deviation, Epilepsy, Culture
- 4.4 Bound Syndrome (K2,K3)
- 4.5 Different Mental Health Act 2017. (K2, K4)

**Unit V:****(15 hours)**

- 5.1** Stress and coping mechanism, Emergencies in psychiatry **(K2,K3)**
- 5.2** Different kinds of Therapies/ Clinical Social Work **(K2,K3)**
- 5.3** Role and functions of psychiatric social work and the qualities of psychiatric social worker, Act on disaster management and pandemic related act in Medical Social Work. **(K3,K5)**

**Books for Study and Reference:**

1. Abelin T. Brzenski and V.D. Carstaris - Measurements in Health Promotion and Protection - Copenhagen, WHO.
2. Alderson M - An Introduction to Epidemiology - London: Macmillan, 2<sup>nd</sup> Ed. 1983.
3. Francis C.M. - Promotion of Mental Health with Community Participation - Kerala: The Center for Health Care Research and Education, 1997.
4. Jay, Pee - Diagnostic and Statistical Manual of Mental Disorders (DSM IV) - New Delhi: Oxford Press, 1994.
5. Kaplan, Saddock - Synopsis of Psychiatry 7<sup>th</sup> Ed. New Delhi: BI Waverly Pvt. Ltd.,
6. Kappur M. Sheppard Child Mental Health - Proceedings of the Indo - Us symposium.
7. Mane P. & Gandevia K. - Mental Health in India Issues and Concerns - Tata Institute of social sciences, Mumbai, 1994.
8. Shepard, Micheal et al - Childhood Behavior and Mental Health - London: University Press, 1971.
9. World Health Organization. Geneva - The ICD 10 Classification of Mental and Behavioral Disorders, Clinical Description and Diagnostic Guidelines - Oxford University Press, 1992.
10. James Morrison - DSM - IV Made Easy - The Guidford Press, New York / London
11. Dr. S. Radhakrishnan - Encyclopedia of Social Work in India, Vo. I, II & III. - The Planning Commission, Govt, of India, 1968.
12. S.K. Mangal - Abnormal Psychology - Sterling Publisher & Private Limited, 1987.
13. C.P. Yadav - Encyclopedia of Social Work and Community Organization, Vol. II - Anmol Publications (P) Ltd., New Delhi, 2007.

### SEMESTER III

#### PESWE20 - ELECTIVE III A: PROJECT FORMULATION

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PESWE20	Project Formulation	Theory	Elective	5	4	100

#### COURSE OBJECTIVES:

- To know the meaning of planning and components of planning.
- To know the different types of appraisal of projects
- To enhance the students to acquire skills for Project development
- To understand the strategies and techniques involved in project formulation
- To assess and apply the process of project and project cycle

#### COURSE OUTCOMES

After completion of the course the students will be able to attain the following outcomes,

**CO1** : Understanding the basic concepts of Project Formulation and Planning

**CO2** : Develop and support the basic concepts and nature of the project proposal  
Support to Strengthen the individual to work with research.

**CO3** : Understand about the community, different strategies and problem analysis techniques.

**CO4** : Acquire skills of planning and Evaluation to develop project

**CO5** : Analyzing the elements and significance of Project Development

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	M	H	H	H	H
CO3	H	H	H	H	H	M
CO4	H	H	H	M	H	H
CO5	M	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	H	H
CO2	M	H	H	H	H	H
CO3	M	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	M	H	H	H	H	H

(Low - L, Medium – M, High - H)

#### Unit I: Project Formulation: Basic concept

(15 hours)

- 1.1 Meaning of project (K1,K2)
- 1.2 Meaning of project formulation (K1,K2)
- 1.3 Nature of project formulation (K3,K2)

- 1.4 Characteristics of a project (K3,K4)
  - 1.5 **Planning:** Meaning of Planning - nature of planning (K1,K2)
  - 1.6 Principles of planning (K4, K5)
- Unit II: Proposal Writing (15 hours)**
- 2.1 Project Proposal Writing(K5,K4)
  - 2.2 Development of Objectives (K6,K4)
  - 2.3 Review of literature (K5,K4,K3)
  - 2.4 Methodology (K5,K4)
  - 2.5 Funding Strategies. (K3,K4)
  - 2.6 Different methods of funding(K4,K3,K2)
- Unit III: Selection and planning (15 hours)**
- 3.1 Steps in Project planning (K3,K4,K2)
  - 3.2 Selecting a community (K3,K4,K2)
  - 3.3 Community diagnosis (K3,K4,K2)
  - 3.4 Prioritization (K6,K5,K2)
  - 3.5 Problem analysis (K3,K2)
  - 3.6 Goals and objectives ,Strategy (K5,K4, K3)
- Unit IV: Planning and Evaluation (15 hours)**
- 4.1 Action Plan (K3,K4,K2)
  - 4.2 Man power planning (K3,K2)
  - 4.3 Monitoring and evaluation (K3,K2,K1)
  - 4.4 Potential obstacles (K3,K4,K2)
  - 4.5 Budget (K3,K2)
  - 4.6 Executive summary. (K3,K2)
- Unit V: Project Development (15 hours)**
- 5.1 Types of development projects (K6,K4,K5)
  - 5.2 Project Cycle (K4,K2)
  - 5.3 Process of Project (K5,K4,K2)
  - 5.4 Appraisal of projects. (K6,K5,K3)

**Books for Study and Reference:**

1. Ghosh. A.S. - Project Management - Anmol Publishers, New Delhi, 1990
2. Jerome, Levy - Project Management with CPM and PERT - AHI, 1994
3. Prasanna. C. - Project Planning Analysis, Selection - Tata McGraw Hill, 2006.
4. Puneet Srivastava - Accidental Entrepreneur - 2005
5. S.K. Pandey - SWA - Mahaveer & Sons, 2007.
6. Karthikeyan - Planning for Development - Authors Press, 2005
7. P.C. Kesava Rao - Project Management and Control - S. Chand & Sons, 1997
8. Gary R Heerkens - Project Management - Tata McGraw Hill, 2004
9. S.S. Khanka - Entrepreneurial Development - S. Chand & Sons, 2000

## SEMESTER III

### PISWC20- IEC- COUNSELLING

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PISWC20	IEC- Counselling	Theory	Core			100

#### COURSE OBJECTIVES

- To develop a basic understanding of theory and skills in counseling.
- To learn the different approaches and to develop an eclectic approach to counseling.
- To integrate counseling skills in social work practice.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1:** Understand the basics of counseling and Guidance

**CO2:** Obtain knowledge on theories of Counseling.

**CO3:** Able to develop application of various counseling techniques with special groups

**CO4:** Understand linkages of Counseling and Guidance in Social Work

**CO5:** Demonstrate knowledge and skills related to building, maintaining, and utilizing counseling relationship to address mental health issues and meet client goals.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	H
CO2	H	M	H	H	H	H
CO3	H	H	M	H	H	M
CO4	H	H	H	M	H	H
CO5	H	H	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	M	H	H
CO2	M	H	H	M	H	H
CO3	M	H	H	H	H	H
CO4	M	H	H	M	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

#### Unit I : Introduction

1.1 Counseling: Concept ,Definition (K1, K2)

1.2 Principles and goals ( K2,K3)

1.3 Factors influencing counseling process ,(K2,K3,K4,K5,)

1.4 Counselor as a professional; attitudes., values, beliefs, relationship, burn-out stress management, self-renewal. (K1,K2, K3)

1.5 Client as a person: Voluntary and non-voluntary client, (K2, K3,K5)

1.6 ,Expectations and client's behavior.(K2, K4,K5)

## **Unit II: Different Approaches of Counseling**

2.1 : Approaches (K2,K3,K4,K5)

2.2, Over view of alternate approaches: yoga, meditation, storytelling,, psychodrama, medical clowning (K2,K3,K4,K5,K6)

2.3 Art therapy (K2,K3,K4)

2.4 Laughter therapy (K2,K3,K4)

2.5 Movement therapy. (K2,K3,K4)

2.6 .Need for eclectic approach to Counseling (K2,K3)

## **Unit III: Types and Techniques of Counseling**

3.1 Types (K1, K2,K3)

3.2 Directive counseling, non-directive counseling ( K2,,K4,K5)

3.3 Individual counseling, , ( K2, K3,K4,K5)

3.4 Group counseling, community counseling (K2, K3,K4,K5)

3.5 Peer counseling (K2, K3,K4,K5)

3.6. Counseling Techniques: Initiating contact, intake, rapport building, establishing structure, interaction, attending behaviour, observation and responding, SOLER . (K2,,K3,K4,K5,K6)

## **Unit IV: The Eagan Model of Counseling:**

4.1 Stage-I Problem exploration and clarification. ( K2,K4,K5)

4.2 Part I – Attending and listening, orienting oneself to the present, Micro skills- active listening- verbal and non- verbal messages and behaviour (K2,K4)

4.3 Part II – Helper's response and clients self -exploration, Helper's skills – accurate empathy (primary level), respect, genuineness, concreteness, client's skills- self exploration.

S (K2,K4,)

4.4 Stage -2: Integrative understanding/ dynamic self-understanding, Part-I focusing, summarizing, probing for missing experiences, behaviour feelings. (K2, K4,K5)

4.5, Part II- Helper's skills- Skills of stage- 1 self- disclosure, immediacy, confrontation, Client's skill – non- defensive listening, dynamic self – understanding. (K2 K3,K4,K5)

4.6 Stage -3: Facilitating action; developing new perspectives; preferred scenario, Part 1- helping clients see alternatives; choose and formulate action plan, implement evaluate. (K2,K3,K4,K5,K6)

## **Unit V: Counselling in Different Settings**

5.1, Marital, family, HIV/AIDS, Pastoral Counseling (K2, K3,K4,K5)

5.2 Student Guidance and Counseling, career guidance and grief counseling, (K2, K3,K4,K5,K6)

5.3 Counseling suicidal clients, gerontological counseling ( K2,K3,K4,K5)

5.4 Adolescent counseling (K2,,K3,K4,K5,K6)

5.5 De-addiction counseling and disaster counseling (K2, K3,K4,K5)

5.6 Correctional Counselling (K2, ,K4,K5)

**Books for Reference:**

1. Association of Psychological and educational counsellor of Asia (APECA, 198 )  
Counseling in Asia, Perspectives and practices.
2. Bianca cody Murphy, Carolyn Dillion(2003): interviewing in Action  
Relationship,Process and Change. 2<sup>nd</sup> Ed, USA: Thompson Brooks/ cole.
3. Colin feltham (2010): Brief Counselling, New Delhi: Tata McGraw Hill.
4. David R. Evans, Margret T. Hearn, Max R. Ullamann& Allen E. Ivey (2008).  
Essential interviewing: A Programmed Approach to Effective Communication,  
USA: Thompson Brooks/Cole.
5. Dalaganjan Naik,(2004): Fundamentals of Guidance and Counseling.  
Delhi:Adhyayam.
6. Gibson L.Robert & Mitchell, (2008): Introduction to Counseling and  
Guidance.Prentice Hall of India.
7. Jacobs E, Masson L, Harvill L.(1998): Group Counseling Strategies and Skills.  
USA: Brooks/ Cole Publishing Company

**SEMESTER III**  
**PCSWJ20 – CONCURRENT FIELD WORK III**

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	III	PCSWJ20	Concurrent Field Work III	Practical	Core	16	6	100

**COURSE OBJECTIVES**

- To enable the student to analyse and understand the social realities and factor influencing individuals in the contexts of the fields of specialisation.
- To develop competence in analysing the needs and problems of individuals, groups and communities and utilise the appropriate Social Work methods and approaches to address the needs
- To apply the knowledge and skills of the methods according to the fields of specialisation
- To practice Social Work values, principles and ethical standards in working with hospitals, community and related agencies
- To identify and mobilise resources to fulfil needs of people in agencies and communities and to mobilise the community people to participate in the different programmes
- To learn the skills of planning, implementing and evaluating one's work and to become aware of personal resources and potentials and use it to develop oneself professionally

**COURSE OUTCOME**

After completion of the course the students will be able to attain the following outcomes,  
**CO1** : Demonstrate ability to analyse the social situations of individuals, groups and communities

**CO2** : Evaluate and Understand the role of organisations and Practice the values, principles and ethics in fields of Social Work

**CO3** : Organise Work and Develop competency in identifying and applying the different methods of Social Work appropriately

**CO4** : Identify and Develop an individual, group and community problems through the application of Social Work skills

**CO5** : Demonstrate competency in planning, identifying and mobilising resources to organise programmes and meet needs of different target groups

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	H	H
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	H	H	H	H	H
<b>CO4</b>	H	H	H	H	M	H
<b>CO5</b>	H	H	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	H	H
CO2	H	M	H	M	H	H
CO3	H	H	H	M	H	M
CO4	H	H	M	H	H	H
CO5	H	M	H	H	M	H

**(Low - L, Medium – M, High - H)**

The second year students during the third semester go for practice based socialwork for two days in a week and expected to spend a minimum of 16 hours per week in the field. The students are placed in villages or hospitals or schools or NGO's or Government offices or counseling centers or welfare organizations or service organizations or industries for a semester.

During the placement the students are expected to learn about the vision, mission, philosophy, administration, strategies, programs, activities, achievements and also involve with the activities of the organization to whatever extent possible.

The Students also undertake any assignments given to them by the agency, they may also undertake any research for the organization. Every week the students write a report of their activities and submit to the concerned fieldwork supervisor.

The supervisor conducts individual and group conference regularly. At the end of the semester viva is conducted by an external examiner and marks are awarded.

## SEMESTER IV

### PSCDC20 – SPECIALIZATION I C: URBAN COMMUNITY DEVELOPMENT

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PSCDC20	Urban Community Development	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To develop in students an indepth understanding of urbanization and its effects.
- To provide knowledge of the various methods, programmes, strategies and developmental effort towards urban community development.
- To understand the role and contribution of professional social work in the development process.

#### COURSE OUTCOMES

After completion of the course the students will be able to attain the following outcomes,

**CO1:** In-depth knowledge of urbanization and its effects

**CO2:** Obtain knowledge of the various methods, Programs, strategies and development effort towards Urban Community Development

**CO3:** Identifying the community development challenges facing urban and regional communities

**CO4:** Analyze the roles of social justice and diversity in communities, cities and regions

**CO5:** Demonstrate the ability to work in team settings and collaborate with community Groups

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	M	H	M	M	H
CO3	M	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	M	H	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	H	H	H	H
CO2	M	H	H	M	H	H
CO3	M	H	H	H	H	H
CO4	M	M	H	H	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

**Unit I : Introduction (15hours)**

- 1.1 Concepts: Industrialization. (K1, K2)
- 1.2 ,Urbanization, urbanism and urban area (K1, K2)
- 1.3 Urban Local Self – Government: Urban local self – government bodies, (K2,K4,)
- 1.4 Composition and functions ,(K2, K3,K4)
- 1.5 Urbanization – Concept and characteristics K1,K2, K3)
- 1.6 Urbanization and social problems. (K2,K4,K5)

**Unit II: Slum ( 15 hours)**

- Definition, characteristics, types, causes and consequences of growth of slums (K1,K2,K3,K4)
- The Tamil Nadu Slum Areas (Slum Clearance and Improvement) Act ,Structure and functions of Tamil Nadu Slum Clearance Board 1971 (K2,K3,K4,K5)
- Policies and critical analysis of the approach of the government towards slum development (K2,K3,K4,K6)
- Problems of street children and the programmes available for them ,(K2,K4,K5)
- Urban Health Problems (K1, K2)
- Health and sanitation services for urban people (K1,K2,K3)

**Unit III: Urban housing problems and Transportation (15hours)**

- 3.1 Urban housing problems and Transportation (K2,K4,K5)
- 3.2 housing schemes ( K2, K3,K4)
- 3.3 funding agencies for housing – HUDCO, CMDA - Tamil Nadu Housing Board, ( K2,,K4,K5)
- 3.4 Role of government and NGO's in Urban Community development - ( K2,K3,K4)
- 3.5 Problems of Mass Transportation (K2,K4,K5)
- 3.6. Mass Rapid Transit System (MRTS), Ring Road, Smart city concept. (K1,K2,)

**Unit IV: Pavement Dwellers (15hours)**

- 4.1 Pavement Dwellers (K1, K2,)
- 4.2 Employment for Pavement dweller ( K2,K4)
- 4.3 Night Shelters (K2,K3)
- 4.4 Urban Poverty and its impact - (K2, K4,K5)
- 4.5, Urban Poverty eradication programmes in Tamil Nadu (K2,K3,K4)
- 4.6 Air, Water, Soil and Noise Pollution – Pollution Control in Cities.(K2,K4)

**Unit V: People Centered Development (PCD) (15hours)**

- 5.1, People Centered Development (PCD) – Concept, Meaning (K1, K2, K3)
- 5.2 Objectives ( K2, K3)

5.3 Need and importance in urban community development (K2,K3,K4,K5)

5.4 Enlisting people's participation (K2,,K3,K6)

5.5 Utilization of human resource (K2,K3)

5.6 Quality of life index.(K2,K3,K4)

**Books for Study and Reference:**

1. Ashish Bose – India's Urbanization: 1901 – 2001, McGraw Hill, New Delhi, 1971.
2. Bhattacharya B. – Urban Development in India, Shree Publishing House, Delhi, 1979.
3. N.K. Behura, R. P. Mohanty – Urbanization Street Children and Their Problems – Discovery Publishing House, Delhi, 2005.
4. I. Sundar t. Sezhiyan – Disaster Management – Sarup and Sons, Delhi, 2005.
5. Sudha Mohan - Urban Development: New Localism - Rawat Publications, New Delhi, 2005.
6. Ashok Narang – Urban Sociology – Murari Lal & Sons, New Delhi, 2006.
7. Dr. Vatsyanan – Urban Sociology – Kedar Nath, Ram Nath, Meerut, 1981.
8. R.B. Singh – Sustainable Urban Development – Concept Publishing Co, Delhi 2006.
9. Darshna Tyagi – Urban Anthropology – Anmol Publications, Delhi, 2006.
10. Sabir Ali – Dimensions of Urban Poverty – Rawat Publications, 2006.

## SEMESTER IV

### PSCDD20 – SPECIALIZATION I D: ENTREPRENEURSHIP DEVELOPMENT

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credit	Marks
II	IV	PSCDD20	Entrepreneurship Development	Theory	Core	5	4	100

#### COURSE OBJECTIVES:

- To encourage students to become an Entrepreneur
- To develop the Entrepreneurship plan among the students
- To understand the role and contribution of professional social work in the field of Entrepreneurship.
- To encourage women to be economically empowered
- To examine the historical development of Entrepreneurship

#### COURSE OUTCOMES

After completion of the course the students will be able to attain the following outcomes,

**CO1 :** Analyze the basic concept of Entrepreneurship and develop entrepreneurial skills to craft innovative responses to social problems

**CO2 :** Apply social entrepreneurship to both profit and non-profit firms to create social value

**CO3 :** Recognize, evaluate the opportunities, explore innovative approaches, mobilize resources, manage risks, and build viable social enterprises

**CO4 :** Bridge the social, cultural and economic gap by providing opportunities and encourage women to be economically empowered

**CO5 :** Analyze and understand the scope of SmallScale Industries for employment opportunities

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	H
CO2	H	M	H	H	H	H
CO3	H	H	H	H	M	H
CO4	H	H	H	M	H	H
CO5	M	H	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	H	H	H
CO2	M	H	M	H	H	H
CO3	M	H	H	H	H	H
CO4	M	H	H	H	H	H
CO5	M	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

**Unit I: Basic Concept of Entrepreneurship (15 hours)**

- 1.1 Entrepreneur and Entrepreneurship : Definition ,meaning (K2,K1)
- 1.2 Importance of Entrepreneur, (K2,K3)
- 1.3 Characteristics and competencies, (K2,K3)
- 1.4 Enterprise culture, (K5,K3)
- 1.5 Role of Entrepreneurs in economic development, (K6,K5,K2)
- 1.6 Problems of Entrepreneurs. (K4,K2,K1)

**Unit II: Evolution of Entrepreneurship (15 hours)**

- 2.1 Evolution of Entrepreneurship: Definition, (K2,K1)
- 2.2 Concepts of Entrepreneurship (K2,K3)
- 2.3 Nature of Entrepreneurship (K2,K1)
- 2.4 Elements and interactive process (K2,K3)
- 2.5 Qualities of successful Entrepreneur (K4,K3)
- 2.6 Classification and types of Entrepreneurs. (K6,K5,K4)

**Unit III: Entrepreneurship Development (15 hours)**

- 3.1 Developing the Entrepreneurship plan (K6,K3)
- 3.2 Environmental assessment (K5,K3)
- 3.3 Opportunities in education (K2,K4)
- 3.4 Managing Entrepreneurship growth (K4,K3)
- 3.5 Developmental stages (K5,K4,K3)
- 3.6 Motivating factors. ( K5,K3,K2)

**Unit IV: Women Entrepreneurship (15 hours)**

- 4.1 Women Entrepreneurship: Definition (K2,K1)
- 4.2 Concept of Entrepreneurship (K2,K3)
- 4.3 Success of women Entrepreneurship (K2,K3)
- 4.4 Constrains for women entrepreneurs (K2,K3)
- 4.5 Rural Entrepreneurship, approaches to rural Entrepreneurship (K5,K3)
- 4.6 Different governments schemes of welfare development. (K5,K4,K3,K2)

**Unit V: SSI (15 hours)**

- 5.1 Small Scale Industry: Definition and meaning, (K2,K1)
- 5.2 Classification of SSI (K3,K2)
- 5.3 Characteristics of SSI (K2,K3)
- 5.4 Importance of SSI, (K2,K3)
- 5.5 Exports and SSI sector, (K5,K4,K3)
- 5.6 Financial institutions, SSIs , SHGs. (K5,K4)

### **Books for Study and Reference:**

1. Kuratko D.F.etal. –Entrepreneurship: A Contemporary Approach – H.C. Publishers, London, 2001.
2. Gupta M.C – Entrepreneurship in Small Scale Industry – Anmol Publications, New Delhi, 1987.
3. Schumadcher E.F - Small is Beautiful – Harper and Row, NY, 1972.
4. Curtis E.t.etal. - Effective Small Business Management – Business Publications, Texas, 1975.
5. Curtis E.T. et al. – Successful Small Business Management – Business Publications, Texas, 1975.
6. Schumpeter J.A – Management of Small Scale Industries – Harvard University Press, 1949.
7. Lambden J. and Targett D. – Small Business Finance: A Simple Approach – Pitman Publishers, London, 1990.
8. Kuratko – Entrepreneurship Theory, Process - Practice – Sanat Printers, Haryana, 2007.
9. Puneet, Srivastava – Accidental Entrepreneur – Rupa & Co. Delhi, 2005.
10. Vasant Desai – Dynamics of Entrepreneurial Development and Management – Himalaya Publishing House, Delhi, Nagpur, 2006.
11. C.B.Gupta, N.P.Srinivasan – Entrepreneurial Development – Sultan & Sons, Delhi, 2006.
12. 1001 Ideas for Small and Tiny Industries, Govt. Publication.

## SEMESTER IV

### PSHRC20 – SPECIALIZATION – II C: LABOUR WELFARE AND INDUSTRIAL RELATIONS

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PSHRC20	Labour Welfare and Industrial Relations	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To help the student learn the basic facts concerning Industrial relations and Labour welfare
- To sensitize the students to adopt suitable attitudes for the practice of industrial relations and labour welfare.
- To enable them to realize the need to have suitable skills for the practice of Industrial relations and Labour welfare

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,  
**CO1** : Acquire a global as well as a local perspective on Industrial relations and trade unions.

**CO2** : Sensitized to adopt suitable attitude to practice Industrial Relations.

**CO3** : Acquire appropriate and professional skills required for Industrial relations

**CO4** : Attain knowledge on various statutory and legal aspects.

**CO5** : Acquire interpersonal relationship and negotiation skills

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	M	M
CO2	H	H	H	M	M	H
CO3	M	H	M	M	M	H
CO4	H	H	M	H	M	M
CO5	H	H	H	M	H	M

CO/ PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	H	H
CO2	H	M	H	H	H	H
CO3	M	H	H	H	M	H
CO4	H	M	H	M	H	H
CO5	H	M	H	H	M	H

(Low - L, Medium – M, High - H)

## **UNIT-I Industrial Conflicts**

**(15 hours)**

- 1.1 concept, characteristics, objectives and factors affecting industrial relation---  
**(K3,K4,K2)**
- 1.2 Industrial relations in India,IR at Plant and Shop Floor Level—**(K4,K3,K2)**
- 1.3 Industrial Policy,Code of displin,Code of conduct---**(K6 K5 K4)**
- 1.4 Grievance settlement procedure,Domestic enquiry procedure---**(K6,K5,K4)**
- 1.5 Meaning definition factor ( Industrial disputes Acr1947)—**(K4K3K2)**
- 1.6 Definition of workmen,Stikes and lockouts,concepts of Industrial peace cause and consequences of industrial conflict( case study)----**(K6,K5,K4,K3)**

## **UNIT-II Trade Union**

**(15 hours)**

- 2.1 Origin and Growth of Trade Union---**(K2,K1)**
- 2.2 Trade Unionism in India and its role in Industrial Relations----**K4,K2,K3)**
- 2.3 Objectives, Functions and Structure of Trade Union—**(K3,K4,K2)**
- 2.4 Employers rights on Trade Union---**(K6 K5 K4)**
- 2.5 Employers organization, Objectives and functions----**(K4,K3)**
- 2.6 Role in reducing Industrial conflict(Trade Union Act 1926 Case studies)----  
**(K6,K5,K4)**

## **UNIT-III Collective Bargaining**

**(15 hours)**

- 3.1 Meaning, Theories, Objectives, Phases---( **K2,K3 K1)**
- 3.2 Prerequisites, Principles, Strategies and negotiation skills---**(K4,K2K3)**
- 3.3 Factors influencing Collective Bargaining, Collective Bargaining in India---  
**(K5,K4,K3)**
- 3.4 Mediation, Conciliation, Arbitration and Adjudication---**(K5,K4,K3)**
- 3.5 Statutory and Non Statutory machinery for prevention and settlement of disputes,  
Long term settlements---**(K6,K5,K4)**
- 3.6 Case studies Industrial Act 1947,Trade Union Act 1926----**(K6,K5)**

## **UNIT-VI Labor Welfare**

**(15hours)**

- 4.1 Concept, Philosophies, need, objectives principles----**(K3,K2,K1)**
- 4.2 Scope and limitations pf Labour Welfare and Historical Development of Labour  
Welfare in India---**(K5,K4,K2)**
- 4.3 Statutory and Non Statutory Welfare Provisions---**(K6,K5,K3)**
- 4.4 Factories Act 1948,Quality of work life, social security and social security  
measures—**(K6,K5,K4)**
- 4.5 Industrial counseling, Pre-retirement—**(K6,K4,K2)**
- 4.6 CSR activities---**(K6,K4,K3)**

## **UNIT-V Workers Participation in Management**

**(15hours)**

- 5.1 Concept- Aims and Objectives,(k2,K1)
- 5.2 Scope and Levels of participation----(K3,K2,K4)
- 5.3 Conditions essential for working of the Scheme of workers participation in management---(K5,K4,K3)
- 5.4 Management by Objectives---(K6,K4)
- 5.5 Introduction to workmen committee—(K4,K3,K2,K1)
- 5.6 Impact of Globalisation,Liberalisation and privatization of Indian Industry----(K6,K5,K4 )

### **Books for Study and Reference:**

1. S.P.Singh – Industrial Relations – A.I.T.B.S Publishers, India, 2008.
2. N.G.Nair Nad Latha Nair – Personnel Management and Industrial Relations – S.Chand & Company Ltd., New Delhi, 2004.
3. Nirmal Singh and S.K.Bhatia - Industrial Relations and Collective Bargaining – Deep Publications Ltd., New Delhi, 2005.
4. P.C.Tripathi - Personnel Management and Industrial Relations – Stan Chand & Company Ltd., New Delhi, 2006.
5. R.S.Davar - Personnel Management and Industrial Relations – Vikas Publishing House Ltd., New Delhi, 2007.
6. S.K.Bhatia – Constructive Industrial Relations and Labour Laws – Deep and Deep Publications Ltd., New Delhi, 2003.
7. S.C.Srivatsava – Industrial Relations and Labour Law – Vikas Publishing House, New Delhi, 2007.
8. Jagadish – Labour Welfare Administration – Akansha Publishing House, New Delhi, 2004.

## SEMESTER IV

### PSHRD20 – SPECIALIZATION II D: ORGANIZATIONAL BEHAVIOUR

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PSHRD20	Organizational Behaviour	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To help students build a knowledge base appropriate to understand the human behavior in an organization.
- To enable the students to perceive the attitudes required for the successful applications of organizational behavior.
- To present a new perspective for management.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,

**CO1 :** Analyse individual and group behavior and understand the implications of organizational behavior on the process of management.

**CO2 :** Identify different motivational theories and evaluate motivational strategies used in a variety of organisational settings.

**CO3 :** Evaluate the appropriateness of various leadership styles and conflict management strategies used in organizations.

**CO4 :** Explore managerial and interpersonal skills in presenting a new perspective for management.

**CO5 :** Explain how organizational change and culture affect working relationships within organization..

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	M	H	H	M	H
CO3	M	H	H	M	H	H
CO4	H	H	M	H	H	M
CO5	H	M	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	H	M
CO2	M	H	H	M	M	H
CO3	H	M	H	H	H	H
CO4	M	H	H	M	H	H
CO5	H	M	H	H	H	H

(Low - L, Medium – M, High - H)

## **UNIT I - INTRODUCTION TO ORGANIZATIONAL BEHAVIOUR (15hours)**

- 1.1 History, definition, concept(**K2,K1**)
- 1.2 Need and importance of organizational behaviour (**K2,K1**)
- 1.3** Key elements of organizational behaviour (**K2,K1**)
- 1.4 Nature and scope (**K4,K2,K1**)
- 1.5 Frame work (**K4,K2**)
- 1.6 Organizational behaviour models. (**K3,K2**)

## **UNIT II - INDIVIDUAL BEHAVIOUR (15hours)**

- 2.1 Concept of Individual Behaviour – Factors affecting Individual behaviour (**K4,K2,K1**)
- 2.2 Personality – types – Factors influencing personality – Theories(**K3,K2,K1**)
- 2.3 Learning – Types of learners – The learning process – Learning theories – Organizational behaviour modification - Misbehaviour – Types – Management Intervention. (**k5,K4,K2,K1**)
- 2.4 Emotions - Emotional Labour – Emotional Intelligence – Theories. Attitudes – Characteristics – Components – Formation – Measurement- Values. (**K4,k3,K2,K1**)
- 2.5 Perceptions – Importance – Factors influencing perception – Interpersonal perception (**K3,K2,K1**)
- 2.6 Impression Management Motivation – importance – Types – Effects on work behavior – Stress – management of stress. (**K5,K4,K2**)

## **UNIT III - GROUP BEHAVIOUR (15hours)**

- 3.1 Organization structure – Formation (**K2,K1**)
- 3.2 Groups in organizations – Influence (**K4,K3**)
- 3.3 Group dynamics – Emergence of informal leaders and working norms (**K4,K5**)
- 3.4 Group decision making techniques (**K4,K2,K1**)
- 3.5 Group Cohesion - Team building - Interpersonal relations – Communication – Control. (**K5,K4,K6**)

## **UNIT IV - LEADERSHIP AND POWER (15hours)**

- 4.1 Meaning (**K2,K1**)
- 4.2 Importance (**K2,K1**)
- 4.3 Leadership styles – Theories (**K4,K2,**)
- 4.4 Leaders Vs Managers – Sources of power (**K4,K2,K3**)
- 4.5 Power centers (**K5,K2**)
- 4.6 Power and Politics. (**K3,K2**)

## **UNIT V – DYNAMICS OF ORGANIZATIONAL BEHAVIOUR (15 hours)**

- 5.1
- 5.1 Organizational culture and climate – Factors affecting organizational climate – Importance. (**K4,K3**)

- 5.2 Job satisfaction – Determinants – Measurements – Influence on behavior. (K4,K2,K1)
- 5.3 Organizational change – Importance – the change process – Resistance to change – Managing change. (K4,K2,K3)
- 5.4 Stability Vs Change – Proactive Vs Reaction change (K3,K4)
- 5.5 Stress – Work Stressors – Prevention and Management of stress – Balancing work and Life. (K4,K2)
- 5.6 Organizational development – Characteristics – objectives –. Organizational effectiveness.( K5,K2,K3)

**Books for Study and Reference:**

1. P.K.Agarwal – Management Process and Organizational Behaviour – Vrinda Publications (P) Ltd., 2<sup>nd</sup> Edition, New Delhi, 2009.
2. J.Jayashankar – Organizational Behaviour – Margham Publications, Chennai, 1<sup>st</sup> Edition, 2006.
3. M.N.Mishra - Organizational Behaviour – Vikas Publishing House Pvt. Ltd., New Delhi, 2001.
4. Uma Sekaran - Organizational Behaviour – 2<sup>nd</sup> Edition, Tata McGraw Hill Education Pvt. Ltd., New Delhi, 2009.
5. Nirmal Singh - Organizational Behaviour – Deep & Deep Publications (P) Ltd, New Delhi, 1<sup>st</sup> Edition, 2009.
6. Jayantee Mukherjee Saha – Organizational Management and Behaviour – Anurag Jain Excel Books, New Delhi, 2006.
7. P.K.Agarwal, Management Process and Organisational Behaviour – 2<sup>nd</sup> Edition, Vrinda Publications, New Delhi, 2008.
8. Dr.H.L.Kaila – Organisational Behaviour and HRM – 3<sup>rd</sup> edition, AITBS Publishers, New Delhi, 2011.
9. Wendell L. French, Cecil H. Bell – Organizational Development – 6<sup>th</sup> Edition, Dorling Kindersley

## SEMESTER IV

### PSMSC20 - SPECIALIZATION - III C: REHABILITATION STRATEGIES AND TECHNIQUES

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PSMSC20	Rehabilitation strategies and techniques	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To understand on rehabilitation strategies and techniques.
- To highlight the importance of social work profession and role of social worker in the field of rehabilitation.
- To understand the assessment of major disabilities.
- To understand the legal status and welfare schemes for disabled people.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes.

**CO1:** Learn and understand professional rehabilitation strategies and techniques.

**CO2:** Understand the importance of social work profession in rehabilitation.

**CO3:** Examine the role of social workers in the field of rehabilitation.

**CO4:** Analyse the legal status and the welfare schemes for the specially challenged.

**CO5:** Acquire professional skills to examine and assess clients with major disabilities.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	M	H	H	M	H
CO3	M	H	H	M	H	H
CO4	H	H	M	H	H	M
CO5	H	M	H	H	H	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	M	M	H	H
CO2	H	H	M	M	H	H
CO3	H	H	M	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

(Low - L, Medium – M, High - H)

**Unit I:** (15 hours)

- 1.1 Definition of Impairment, Disability, Differently abled - Classification of Differently Children (K1,K2)
- 1.2 Approaches to Prevention (K3,K2)
- 1.3 Models of disability and international classification of functioning and health (K2,K3)
- 1.4 Rehabilitation - Meaning, Definition, Goals, (K3,K2)
- 1.5 Principles - Options of rehabilitation (K1,K2)
- 1.6 Community based and institutional based rehabilitation and History of Rehabilitation.(K3,K6)

**Unit II:** (15 hours)

- 2.1 Fields and Types of Rehabilitation: Medical Rehabilitation, Vocational Rehabilitation, Social Rehabilitation - Psychological Rehabilitation, Physical Rehabilitation, Economic Rehabilitation. (K2,K3)

**Unit III:** (15 hours)

- 3.1 Identification and assessment of major Disabilities:- Hearing Impairment, Visual Impairment, Mental Retardation, Locomotor Disability(K3,K4,K5)
- 3.2 Learning Disability, Leprosy, Cerebral Palsy - Problems And Remedies(K2,K3 K4)
- 3.3 Role of Social Worker In the field, Rehabilitation Counselling.(K2,K3)

**Unit IV:** (15 hours)

- 4.1 Psychiatric Rehabilitation: Principles, concept, process and Programs (K2,K3)
- 4.2 Role of social Worker in Psychiatric Rehabilitation (K3,K4)

**Unit V:** (15 hours)

- 5.1 Rights of people with Disabilities: Legislation for Disabled People (K3,K4)
- 5.2 Rights of Persons with Disability Act 2016 (K2,K3)
- 5.3 Mental Health Act, Autism Act - Welfare Schemes for Disabled (K2,K3,K4)

**Books for Study and Reference:**

1. Advani L. & Chadha A. - You and Your Special Child - New Delhi: UBS Publishers' Distributors Private Ltd., 2003
2. Agarwal, K. - A Handbook for Parents of Children with Disabilities - New Delhi, Planning Commission Government of India, 2002
3. Immanuel S.P. & Agnes, Leela - Community Based Rehabilitation for Disabled, Tiruchirapalli; Holy Cross Service Society, 1996
4. Mohanty, J. and Mohanty B. - Early Childhood Care and Education (ECCE), New Delhi: Deep & Deep Publications,1994
5. Krishna, V.V., Dutt, B.S.V., & Rao, K.H., (Eds) - Disabled Persons, New Delhi; Discovery Publishing House, 2001.

6. Kundu, C.L. - Status of Disability in India - 2000, New Delhi, Rehabilitation Council of India, 2000.
7. Punani B. & Rawal .N. - Community Based Rehabilitation, (Visual Impairment), Bombay; National Association for the Blind, 1997.
8. Punani B., & Rawal N. - Handbook - Visual Handicap, New Delhi, Ashish Publishing House, 1993.
9. Murthy S.P. & Gopalan I - Workbook on Community Based Rehabilitation Services, Bangalore; Vikas CBR Project, 1992.
10. Desai A.N. - Helping the Handicapped: Problems and Prospects - New Delhi: Ashish Publishing House, 1990.
11. Notes on Topics of Paper - IV, Persons with Mental Retardation - Family and Community Interaction, Diploma in Special Education (Mental Retardation) Secunderabad : National Institute for the Mentally Handicapped (NIMH).
12. Kundu C.L. - Disability Status in India - New Delhi, RCI, 2002.
13. Narayan J (Ed.) - School Readiness for Children with Special Needs - Secunderabad, NIMH, 1999.
14. Sunder S. - Textbook of Rehabilitation – New Delhi, Jaypee Brothers Medical Publishers (P) Ltd., 2010.

## SEMESTER IV

### PSMSD20 - SPECIALIZATION - III D: PSYCHIATRIC SOCIAL WORK

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PSMSD20	Psychiatric Social Work	Theory	Core	5	4	100

#### COURSE OBJECTIVES

- To understand Psychiatric Social Work in the context of changing trends in the care.
- To understand the Legal aspects in Psychiatric settings.
- To sensitize the students to the attitudes required for the practice of counseling.
- To engage the students to identify and practice the appropriate skills.

#### COURSE OUTCOME

After completion of the course the students will be able to attain the following outcomes,  
**CO1:** Explore the emerging trends in the care of Psychiatric social work.

**CO2:** Examine the application of counseling with various issues.

**CO3:** Examine the legal aspects in the Psychiatric settings.

**CO4:** Emphasize the provision of competent, ethical clinical competencies of social work.

**CO5:** Sensitized with attitudes and skills required for the practice of counseling.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	M
CO2	H	M	H	H	M	H
CO3	M	H	H	M	H	H
CO4	H	H	M	H	H	M
CO5	H	M	H	H	H	M
CO6	H	M	H	H	M	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	M	M	M	H
CO2	H	H	H	M	M	H
CO3	H	H	H	M	H	H
CO4	H	H	M	M	M	H
CO5	H	H	H	H	M	H

**(Low - L, Medium – M, High - H)**

**Unit I:** (15 hours)

- 1.1 Psychiatry social work in special settings - social work practice in child guidance clinic (K1,K2)
- 1.2 Practice in correctional settings - In de-addiction - Crisis Intervention centre ; and with special groups such as molestation and childhood sexual abused; and HIV / AIDS patients (K2,K3)
- 1.3 Analysis of mental health problems among vulnerable groups such as women, aged, children and disaster victims (K2,K3,K4)

**Unit II:** (15 hours)

- 2.1 Understanding of basic theories in Social work treatment(K1,K2)
- 2.2 Psychoanalytical, psychosocial, transactional analysis (K2,K3,K4)
- 2.3 Life model, family centered treatment, task centered, crisis intervention, behaviour modification and cognitive therapy, Group therapy (K2,K3)

**Unit III:** (15 hours)

- 3.1 Legal status governing admission to and discharge from psychiatric hospitals and psychiatric nursing homes. (K2,K3)
- 3.2 Mental health policies and legislation in India - National mental health programmes (K3,K4)
- 3.3 Case study models of mental health care.(K2,K4)

**Unit IV:** (15 hours)

- 4.1 Counselling: Definition, Goals and Ethics, variables affecting the counselling process, communication (K2,K1)
- 4.2 Counsellee and counsellor relationship (K2,K1)
- 4.3 Counselling skills: respect, authenticity and congruence empathy, availability, concreteness and specificity, avoiding assumptions, recognizing the client potential, immediacy, confrontation.(K3,K1)

**Unit V:** (15 hours)

- 5.1 Counseling Process: Stage - I: Problem exploration and Clarification creating awareness of need for help.(K1,K2)
- 5.2 Stage - II: Self exploration and development of relationship (K1,K2)
- 5.3 Stage - III: Impression of feelings and clarification of problems (K1,K2)
- 5.4 Stage - IV: Exploration of deeper feelings (K1,K2)
- 5.5 Stage - V: Integration process (K2,K3)
- 5.6 Stage- VI: Concerned with time and perspective (K2,K3)
- 5.7 Stage - VII: Developing the awareness of the counsellee (K2,K3,K4)
- 5.8 Stage - VIII: To make use of psychotherapeutic or counselling benefit (K2,K3)

### **Books for Study and Reference:**

1. Hartman and Lairdj - Family Centered Social Work Practice - New York, The Free Press, 1983.
2. Jehu, Derek et al - Behavior Modification in Social Work - London, Wiley Inter Science, 1972.
3. Kaplan, Sadock - Synopsis of Psychiatry, 7<sup>th</sup> Edition, New Delhi, BI Waverly Pvt. Ltd., 1994.
4. Scully, James H. - Psychiatry - New Delhi, BI Waverly Pvt. Ltd., 1995.
5. Jay, Pee - Diagnostic and Statistical Manual of Mental Disorder - New Delhi: Jay Pee Brothers, 1994.
6. Anjal Gandhi - School Social Work - Commonwealth Publishers, New Delhi, 20007.
7. Asha Mans & Annie Patchi - Women Disability and Identity - Sage Publications, New Delhi, 2003.
8. Dr. Rashmi Pathak - Empowerment and Social Governance - Isha Books, Delhi, 2003.
9. Afsar Bano - Indian Women: The Changing Face - Kilaso Books, New Delhi, 2003.
10. Dave, Indu - The Basic Elements of Counseling - Strling, New Delhi.
11. Fullmer, D.W. & Bernard H.W, Counselling Content and Process.
12. Harms E & Schreiber, Handbook of counseling Techniques, Oxford press

## SEMESTER IV

### PESWG20– ELECTIVE IV A: ADMINISTRATION OF SERVICE ORGANIZATION

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PESWG20	Administration of Service Organization	Theory	Elective	5	4	100

#### **COURSE OBJECTIVES:**

- To acquire knowledge on administration of agencies.
- To encourage students to apply administration process into practice
- To develop the skills to start an NGO
- To understand different registration process and the functions of Social welfare board at central and state level
- To motivate students to develop Innovative methods and techniques for effective social welfare services

#### **COURSE OUTCOMES**

After completion of the course the students will be able to attain the following outcomes,  
**CO1 :** Understand and support about the concepts of social welfare and social welfare administration

**CO2 :** Learn and develop the knowledge on actual structure, process and components of welfare administration

**CO3 :** Understand and evaluate the relevance of social welfare administration in the field of Social Work

**CO4 :** Analyse ,Gain knowledge on office procedures, NGO's and role of social worker in different settings.

**CO5 :** Application of Administration process in Service Organizations

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	M	H	H	H
CO2	H	H	H	M	H	H
CO3	H	M	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	M	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	M	H	H
CO2	H	H	H	H	H	H
CO3	M	H	H	H	H	H
CO4	M	H	H	H	H	H
CO5	M	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

**Unit I: Basic concept** (15 hours)

- 1.1 Social Welfare Administration: Definitions, (K2,K1)
- 1.2 Scope and Principles, Purpose, (K2,K3)
- 1.3 Types of administration, Functions of administration (K2,K3)
- 1.4 Democratic nature – Delegation, Decentralization, (K3,K4,K5)
- 1.5 Management by Objectives, (K3,K5)
- 1.6 Sustainable Development Goals. (K4,K3,K6)

**Unit II: Process** (15 hours)

- 2.1 Administration process and Office Administration: Planning, Staffing(K2,K1,K3)
- 2.2 Co-ordination, Communication, (K2,K1,K3)
- 2.3 Public-Relations, Evaluation, (K2,K1,K3)
- 2.4 Budgeting, Accounting, (K2,K1,K3)
- 2.5 Auditing, Fund raising, (K2,K1,K3)
- 2.6 Office procedures and record maintenance. (K5,K2,K1)

**Unit III: Different Registration** (15 hours)

- 3.1 Social Welfare Organization: Registration of societies and trusts (K5,K4)
- 3.2 Foreign contribution and regulation act 1976(K2,K3)
- 3.3 Functions and responsibilities of governing board of FCRA(K2,K1,K4)
- 3.4 committees and office bearers of FCRA(K2,K5)
- 3.5 Organizational structure and programme of central social welfare board and State social welfare board. (K5,K4,K2)

**Unit IV: Starting NGO** (15 hours)

- 4.1 Stating an NGO: Introduction, Board of Directors, (K6,K4)
- 4.2 Developing mission statement, vision statement, values (K6,K5)
- 4.3 NGO Byelaws, (K3,K5)
- 4.4 Register the NGO, (K5)
- 4.5 Funding, Office Management, Networking, (K3,K5,K4)
- 4.6 NGO's in different settings. (K6,K5,K2)

**Unit V: Administration process** (15 hours)

- 5.1 Personnel Administration: Manpower planning, (K2,K1,K3)
- 5.2 Induction, training, (K2,K1,K3)
- 5.3 Supervision, staff welfare(K2,K1,K3)
- 5.4 Service condition and staff morale (K2,K1,K3)
- 5.5 Problems faced by NGOs. (K5,K3,K2)

**Books for Study and Reference:**

1. Chowdry D.Paul - Social Welfare Administration – ATMA Ram & Sons, Delhi, 1992.
2. Dr.Radhakrishnan - Encyclopedia of Social Work - Vol. I, II, III Planning Commission Govt. of India.
3. Madan G.R. – Indian Social Problems - Vol. I, II, Social Work, Allied Publishers, 1987.
4. Susan Erels & Barbara Harriss White – Outcast From Social Welfare – Books for Change, Bangalore, 2002.
5. Shaikh Ashar Iqbal – An Introduction to Social Welfare – Sublime Publishers, Jaipur, 2005.
6. Shaikh Ashar Iqbal – Problems of Social Welfare and Work - Sublime Publishers, 2005.
7. S.K.Pandy - Social Work Administration - Mahaveer & Sons, New Delhi, 2007.

## SEMESTER IV

### PISWD20 -IEC- SOCIAL WORK PROFESSION IN DIFFERENT SETTINGS

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PISWD20	IEC- Social Work Profession in Different Settings.	Theory	Core			100

#### **COURSE OBJECTIVES:**

- To gain knowledge on various approaches, skills and techniques of working with individuals, groups and communities
- To develop an understanding of social work practice in various settings
- To understand the role and contribution of professional social work in different fields
- To provide knowledge on various National and International agencies

#### **COURSE OUTCOME**

After completion of the course the students will be able to attain the following outcomes,

**CO1:** Gain a opportunity in understanding and apply in contemporary fields of social work profession.

**CO2:** Able to influence the practices and the professional skills of social worker in different settings like individual, groups, community, Hospital settings, correctional settings and vulnerable groups.

**CO3:** Understand a roles and functions of social work profession in field.

**CO4:** Gain and understand the knowledge about various national and international agencies.

**CO5:** Able to understand the Problems faced by professional social workers

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	H	H	H	H	H	H
CO2	H	H	H	H	M	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	M
CO5	H	M	H	H	M	M

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	H	H	H	H	H
CO2	M	H	H	H	H	H
CO3	M	H	M	H	H	H
CO4	M	H	H	H	H	H
CO5	M	H	H	H	H	H

(Low - L, Medium – M, High - H)

## **Unit :1 : Basic Concept and Process**

- 1.1 Social work practice with individuals **(K5,K3)**
- 1.2 Approaches to working with individuals - remedies, preventive, promotive and development **(K5,K3)**
- 1.3 Case work Process - Communication in social case work process **(K6,K4)**
- 1.4 Models of case work practice Psycho social, functional life models, problem solving, crisis intervention , family centered approach **(K5,K3)**
- 1.5 Eco-system perspective in social case work. **(K6,K5,K3)**

## **Unit : II : Principles and Skills**

- 2.1 Social work practice with groups-**(K5,K3)**
- 2.2 Principles and skills – **(K4,K3)**
- 2.3 Role of group worker –**(K6,K3)**
- 2.4 Group work process - Group dynamics –**(K2,K3)**
- 2.5 Application of group work: Techniques of group work in community development, medical and Psychiatric, Rehabilitation, Family and child welfare, Correctional, Personnel management and industrial social work settings.**(K6,K5,K4,K2)**

## **Unit : III Social work in community**

- 3.1 Social work Practice with communities**(K5,K3)**
- 3.2 Types of communities and characteristics**(K5,K3)**
- 3.3 Rural, Urban and Tribal communities –**(K5,K3)**
- 3.4 Organization: Fields of social work; Medical, Psychiatric, Correctional, Industrial, Slums; Emergencies like war, drought, fire, famine and flood. **(K6,K4)**
- 3.5 Community dynamics - Skills in community- **(K5,K3)**
- 3.6 Process of community organization - Application of Community **(K5,K3,K2)**

## **Unit : IV Practice in different settings**

- 4.1 Social work Practice in medical settings; Hospitals, Medical Psychiatry and rehabilitation units**(K5,K4,K3)**
- 4.2 Social work Practice Industry settings **(K5,K3)**
- 4.3 Social work Practice NGOS **(K5,K3)**
- 4.4 Social work Practice Welfare (Child, Women, Transgender, Elderly, Specially challenged) **(K5,K2,K1)**
- 4.5 Social work Practice Community settings**(K5,K3)**
- 4.6 Skills needed for social workers **(K5,K4,K2)**

## **Unit: V :Limitations**

- 5.1 Problems faced by professional social workers (**K5,K3**)
- 5.2 Limitations in social work practice(**K5,K3**)
- 5.3 National and International Agencies in the field of social work (**K4,K3,K2**)
- 5.4** Role and functions of different agencies(**K4,K3,K2,K6**)

### **Books for Study and Reference:**

1. R. K. Upadhyey- Social Case Work - Rewat Publications, Jaipur, 2003
2. Helen Harris Pearlmén – Social Case Work - A Problem Solving Process - Universi. of California Press, 2002
3. Gisela Konopka - Social Group Work- A Helping Process - Prentice Hall, 1983
4. S. Rengasamy - Student's Guide to Social Group Work - Second Draft, Tamilnadu. 2010
5. Siddiqui. H. Y. (Ed.) - Social Work and Social Action, Harnam Publication NewDelhi, 1984
6. Sanjay Bhattacharya - Social Work: An Integrated Approach - Deep and Deep Publications, NewDelhi, 2005

## **SEMESTER IV**

### **PCSWK20- RESEARCH PROJECT**

#### **COURSE OBJECTIVES:**

- To understand application of Social Work research
- To apply learning of research methodology, tools , techniques
- To undertake a research study on relevant social issues applying ethics and principles
- To consolidate, analyse and interpret data collected
- To understand and apply statistics where appropriate
- To apply skills in report writing in research and to provide workable solutions and effect social change

The students are placed under a supervisor for the research project work. The students start the project work in the third semester itself. Each student identifies a research problem, defines the problem, collect the review of literature, objectives, prepare a proposal, formulate the research problem and construct a tool for data collection.

After the completion of the third semester and before starting the fourth semester the students collect the data. In the fourth semester the students complete the data processing and complete the research study and submit the final copy of valuation.

At the end of the semester viva is conducted by an external examiner and the marks are awarded. (60 marks record by the supervisor and 40 marks for viva voce)

**SEMESTER IV**  
**PCSWL20- CONCURRENT FIELD WORK IV**

Year	SEM	Course Code	Title of the Course	Course Type	Course Category	H/W	Credits	Marks
II	IV	PCSWL20	Concurrent Field Work	Practical	Core	16	6	100

**COURSE OBJECTIVES**

- To enable the student to analyze and understand the social realities and factor influencing individuals in the contexts of the fields of specialization.
- To develop competence in analyzing the needs and problems of individuals, groups and communities and utilize the appropriate Social Work methods and approaches to address the needs.
- To apply the knowledge and skills of the methods according to the fields of specialization.
- To practice Social Work values, principles and ethical standards in working with hospitals, community and related agencies
- To identify and mobilize resources to fulfil needs of people in agencies and communities and to mobilize the community people to participate in the different programmes.
- To learn the skills of planning, implementing and evaluating one's work and to become aware of personal resources and potentials and use it to develop oneself professionally.

**COURSE OUTCOME**

After completion of the course the students will be able to attain the following outcomes.

**CO1:** Demonstrate ability to analyze the social situations of individuals, groups and communities.

**CO2:** Understand the role of organizations and practice the values, principles and ethics in fields of Social Work.

**CO3:** Work and Develop competency in identifying and applying the different methods of Social Work appropriately.

**CO4:** Identify and facilitate solutions of individual, group and community problems through the application of Social Work skills.

**CO5:** Demonstrate competency in planning, identifying and mobilizing resources to organize programmes and meet needs of different target groups.

CO/PSO	PSO					
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
<b>CO1</b>	H	H	H	H	M	H
<b>CO2</b>	H	H	H	H	H	H
<b>CO3</b>	H	M	H	H	H	M
<b>CO4</b>	H	H	H	M	H	H
<b>CO5</b>	H	H	M	H	H	H

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	M	H	M	H	H
CO2	H	M	H	M	H	H
CO3	H	M	H	M	H	H
CO4	H	H	H	M	H	H
CO5	H	H	H	H	H	H

**(Low - L, Medium – M, High - H)**

The second-year students during the third semester go for practice based social work for two days in a week and expected to spend a minimum of 16 hours per week in the field. The students are placed in villages or hospitals or schools or NGO's or Government offices or counseling centers or welfare organizations or service organizations or industries for a semester.

During the placement the students are expected to learn about the vision, mission, philosophy, administration, strategies, programs, activities, achievements and also involve with the activities of the organization to whatever extent possible.

The students also undertake any assignments given to them by the agency, they may also undertake any research for the organization.

Every week the students write a report of their activities and submit to the concerned fieldwork supervisor. The supervisor conducts individual and group conference regularly.

At the end of the semester viva is conducted by an external examiner and marks are awarded.

### **PPSWB20 – INTERNSHIP PROGRAM (BLOCK PLACEMENT)**

Immediately after the fourth semester written examination the students are placed for a month for compulsory Internship Program.

The students are placed in suitable agencies based on their specialization. The student has to be part of the organization and take part in all the activities of the organization and undertake the assignment given to them.

After completion of placement the student submits an activity sheet, daily reports which are assessed and certified by the department stating the successful completion of the placement. Only credits are awarded thereafter. If the performance of the student is not satisfactory the placement should be repeated.

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## SEMESTER - III

### PGTRA20 - TEACHING AND RESEARCH APTITUDE

<b>Year: II</b> <b>Sem: III</b>	<b>Course Code</b> PGTRA22	<b>Title of the Course</b> Teaching and Research Aptitude	<b>Course Type</b> Theory	<b>Course Category</b> Core	<b>H/W</b>	<b>Credits</b>	<b>Marks</b> 40+60 =100
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#### **Unit I – Teaching and Research Methodology**

- 1.1 Teaching : Nature, objectives, characteristics and basic requirements
- 1.2 Learner’s Characteristics
- 1.3 Factor’s affecting teaching, methods of teaching, Teaching aids and Evaluation System
- 1.4 Research, meaning, characteristics and types
- 1.5 Steps of research and methods of research
- 1.6 Paper, article, workshop, conference and symposium, thesis writing, its Characteristics and format

#### **Unit II – Reading Comprehension and Communication**

- 2.1 Reading Comprehension
- 2.2 Passage to be set with questions to be answered
- 2.3 Communication, its nature, characteristics and objectives
- 2.4 Types and barriers of communication
- 2.5 Effective classroom communication
- 2.6 Mass media and society

#### **Unit III – Reasoning ability and Data Interpretation**

- 3.1 Number series and Letter Series
- 3.2 Codes, Relationships and Classification
- 3.3 Verbal Analogies, Inductive and Deductive Reasoning
- 3.4 Sources, acquisition and interpretation of data
- 3.5 Quantitative and Qualitative data
- 3.6 Graphical representation and mapping of data

## **Unit IV – Information and Communication Technology**

- 4.1 General abbreviations in ICT
- 4.2 ICT – Terminologies
- 4.3 Basics of Internet and Intranet
- 4.4 Basics of E-mail – Audio and Video conferencing
- 4.5 Digital Initiatives in Higher Education
- 4.6 ICT and Governance

## **Unit V – People Development and Environment**

- 5.1 Development and Environment
- 5.2 Human and environment interaction
- 5.3 Environmental issues
- 5.4 Natural and energy resources
- 5.5 Natural hazards and disasters
- 5.6 Environmental Protection Act and Action Plan

## SEMESTER II

(M.A./M.Sc./M.Com./M.B.A./M.S.W)

### PNHRA20 – HUMAN RIGHTS

Year: I	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
Sem: II	PNHRA22	Human Rights	Theory				100

#### Course Objectives:

1. To provide a perspective and foundation for a human rights culture among students.
2. To create awareness on the Indian legal system, rule of law and human rights perspective in India.
3. To equip students with knowledge about the human rights movements and new rights gained.

#### Course Learning Outcome:

After completion of the course the students will be able to attain the following Outcomes,

1. Obtain knowledge and understand about fundamental human rights
2. Understanding of the concepts of Indian constitution and to emphasize the importance of them.
3. Promote knowledge in understanding the concept of human rights and its significance to the present scenario
4. Able to sensitize students for the application of human rights to the various practice domains of the different profession
5. Develop an Understanding on Human Right based on different cultural aspects.
6. Promote awareness on the Indian legal system, rule of law, human rights related movements

#### Unit I: Introduction to Human Rights

- 1.1 Human Rights – Introduction
- 1.2 Meaning and definition
- 1.3 Origin and Development
- 1.4 Elements of Human Rights
- 1.5 Kinds of Human Rights -Civil and Political rights
- 1.6 Social ,Economic & Cultural rights

#### Unit II: Indian Constitution and Human Rights

- 2.1 Indian Constitution -Meaning- Definition, Classification
- 2.2 Features of India Constitution, Federalism
- 2.3 Preamble, Fundamental Rights
- 2.4 Directive Principles of State policy
- 2.5 Right to constitutional Remedies, PIL, Different Courts

2.6 Constitution of Human Rights Court, Right to Information Act, 2005(RTI)

### **Unit III: Universal Declaration and International Covenants on Human Rights**

- 3.1 Universal declaration – Meaning & concepts
- 3.2 Provisions of universal declaration of Human Rights
- 3.3 Effects and influence of Universal Declaration
- 3.4 Distinction between the Indian constitution and Universal Declaration
- 3.5 International covenants on civil & Political Rights ,1966 (ICCPR)
- 3.6 International covenants on Economic, social and cultural rights, 1966 (ICESCR)

### **Unit IV: United Nations and Human Rights**

- 4.1 Provisions relating to human rights under UN charter
- 4.2 Through principal organs, UN Commission on Human Rights
- 4.3 UN charter based institutions, UN specialized Agencies
- 4.4 Human Rights and Domestic Jurisdiction
- 4.5 United Nation Convention against Torture (UNCAT)
- 4.6 Convention on the Protection of the Migrant Workers

### **Unit V: Human Rights and Different Policies**

- 5.1 Anti-Human Trafficking and Protection of Human Rights Act,1993
- 5.2 Policies and Acts, National Policy for Children 2013, Juvenile Justice Act 2000,
- 5.3 POCSO Act 2012, Criminal Procedure and Amendment Act 2013,
- 5.4 National Policy for Empowerment of women 2001, The Sexual Harassment of Women at Workplace Act 2013,
- 5.5 National Human Rights commission, State Human Rights Commission
- 5.6 Farm Bill 2020, CAA,NRC,NPR, New Educational Policy 2020.

### **Reference Items: Books, Journal**

- 1. Protection of Human Rights Act, 1993.
- 2. Constitutional Law of India (3 Volumes) by Seervai H.M 2015
- 3. The Human Rights Watch Global Report On Women's Human Rights 2000 Oxford Publication
- 4. RS Sharma Perspectives In Human Rights Development
- 5. Julies Stone Human Law And Human Justice 2000 Universal Publication
- 6. Research Handbook On International Human Rights Law, Edited By Sarah Joseph & Edited By Sarah Joseph, Edward Elgar Publishing Limited USA



**AUXILIUM COLLEGE (Autonomous)**  
**(Accredited by the NAAC with A+ Grade with a CGPA of 3.55 in**  
**the 3<sup>rd</sup> Cycle) Gandhi Nagar, Vellore – 632 006**

**ACADEMIC PROGRAMME – REGULATIONS (PG)**

**With effect from the Academic Year 2021 - 2022**

Auxilium College, an autonomous institution, follows the Semester pattern with Choice Based Credit System (CBCS) of evaluation, requiring 3 years of study for an Undergraduate Degree Programme and 2 years of study for a Postgraduate Degree Programme. The duration of a semester is 90 days of instruction.

The CBCS offers internal assessment, inter-departmental academic collaboration and course credits. It offers freedom to the departments to design the course structure, to frame rules pertaining to academic programmes and also to introduce new study programmes. It aims at making the academic programme student-oriented, interdisciplinary, flexible and relevant to the times. Under this system, the students will have ample freedom to select the electives to suit their interest, aptitude and needs.

A curriculum is a programme of studies and/or activities (curricular, co-curricular and extra curricular). Arising from the basic needs and moving on to individual, social and cultural needs, the curriculum attempts to fulfill the ideal needs also, such as moral, intellectual, aesthetic and spiritual needs.

### **Credit System**

The Autonomous status of the College offers a student the benefits of Choice Based Credit System. Every paper is allotted a certain number of credits. A student is awarded the specified credits on obtaining a pass in the respective paper.

The student has abundant opportunities during the course of study to obtain additional credits by doing Optional Certificate Courses offered by different Programmes of the College. This facility will strengthen the academic potential of the student, as it provides flexibility in the choice of courses offered beyond the framework of the respective discipline of study. The introduction of the CBCS ensures compatibility with the academic norms practiced in other educational institutions of repute in India and abroad.

The structure of undergraduate programmes provides a wide range of choice for students to opt for courses based on their eligibility, aptitude and career goals. The undergraduate curriculum will include the following categories of courses in order to accomplish a holistic approach to undergraduate education.

**Structure of Postgraduate Degree Programmes as  
per R.C. No. 2909/M1/08 dated 02.05.2008**

**(a) Core Courses**

**(b) Major Electives**

**(c) Human Rights**

**(i) Core Course**

Each Programme has a set of Core courses spread over four Semesters. The syllabi of the Core courses will help the student to acquire an in-depth knowledge in the course and to stay abreast with the recent developments in the respective discipline. This Programme includes Project work.

**(ii) Major Electives**

Each department offers a course in Major electives which consists of three/four papers spread over the course of study.

**(iii) Human Rights Education**

A course in Human Rights Education is offered in the II Semester. It is mandatory for every student to obtain a pass in this Paper.

**(iv) Teaching and Research Aptitude**

A course in Teaching and Research Aptitude is offered in the III Semester. It is aimed to assess the teaching and research capabilities of the students. Common classes will be held outside normal working hours.

**(v) Independent Elective course**

It was made mandatory for all the Pg Students to take up one independent elective course every semester with effect from 2018 onwards.

**(vi) Online Course**

Each semester a student should complete one course conducted by -----  
This is to make the student gain more knowledge other than their own courses.

**Medium of Instruction and Examination**

The medium of instruction and examination will be English.

**Distribution of Hours:**

Postgraduates: 15 Weeks/Semester

Course	Hours/Week				Total Credits
	Sem I	Sem II	Sem III	Sem IV	
Core (Including Practical and Project)	25	23	25	25	65

<b>Major Electives</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>20</b>
<b>Human Rights</b>	-	<b>2</b>	-	-	<b>2</b>
<b>Teaching and Research Aptitude</b>	-	-	-	-	<b>3</b>
<b>Total</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>30</b>	<b>90</b> <b>Credits</b>

### Requirements of Attendance

1. The minimum requirement of attendance for a candidate is 75% per semester, to enable her to appear for the Semester Examinations.
2. If the attendance of a candidate is between 65 - 75%, due to any of the following reasons, the candidate is eligible to appear for the current Semester Examinations only after obtaining condonation from the Principal, by payment of the prescribed Condonation Fee:
  - a. Prolonged illness
  - b. Major surgery**
  - c. Accident, which requires a long period of rest**

The reason for the long period of absence should be informed to the Principal and the sanction obtained, within a week from the commencement of absence.

If the attendance of a candidate is between 50% - 65% in a semester, she is not eligible to appear for the current Semester Examinations. But she is permitted to appear for the arrear courses, if any. She is also permitted to move to the next Semester.

If the attendance of a candidate is below 50%, she is not eligible to continue her studies but can complete the Programme by re-joining the same Semester in the following academic year, if vacancy is available. She should obtain the approval from the University through the concerned Head of the Department and the Principal.

## **TESTING, ASSESSING AND VALUATION**

There are two components in the Valuation and Assessment of a student - Internal and External. These are implemented through

1. Continuous Assessment (CA) during the Semester for 40 marks. It consists of two written tests and an innovative component.
2. Semester Examination (SE) at the end of the Semester for 100 marks which will be converted to 60.

The maximum marks for each Paper shall be 100.

Each Postgraduate Programme consists of four Semesters.

### **Continuous Assessment (CA):**

1. The Continuous Assessment of each student will be done by the respective Departments.
2. Each written test is of two hours duration for 50 marks. The tests will be conducted centrally. The average of two such CA is calculated for 35 marks.

3. The innovative component is for 5 marks, conducted during the class hours by the Staff member in charge of the course, in the form of assignments/ quiz/ seminars /presentations/Online/Open Book/Viva Voce/ Group work/ Mini Project/Exhibition, etc. The topic and time for submission/ presentation will be announced by the staff member in charge of the course in advance. Each student should explain and defend her presentation.
4. **Syllabus of not less than two units shall be included for each CA.**
  5. **A retest for CA will be conducted for a student only if a student is absent due to NSS/NCC/Sports camps on prior written permission obtained through the concerned staff member.**
  6. **There is no passing minimum for CA.**
  7. **There is no provision for improvement in CA.**

#### **Semester Examinations (SE)**

1. A student should register herself to appear for the Semester Examinations by payment of the prescribed fee.
2. The Semester Examinations will be in the form of a comprehensive examination covering the entire syllabus in each course. It will be of 3 hours duration, irrespective of the number of credits allotted to it.

#### **Valuation of Answer Scripts**

1. There shall be single valuation for Postgraduate Courses. The Panel of Examiners will consist of internal and external examiners.
2. The valuation will be centralised.
3. A student has a maximum period of five years from the Date of Admission to clear all the courses prescribed for the Programme at the time of her admission. After the fifth year, to complete the programme, the student has to appear for an examination in the same/equivalent paper offered under the revised syllabus structure.
4. Fraction of final marks in CA and SE shall be rounded off to the nearest integer.

***Revaluation***

1. A student can apply for the photocopy of answer scripts, if needed, on payment of the prescribed fee.
2. A student can apply for revaluation of any paper, on payment of the prescribed fee within the specified date. Receipt of the photocopy of the answer script is a pre-requisite for revaluation.

**Supplementary Examination**

After the declaration of the results of the final semester, a student who has only one paper in any semester can apply by the specified date, for Supplementary Examination, either for reappearance or for improvement. This facility is available only for those students who have not obtained a pass due to one paper. The examination will be conducted and results published within a month of the first publication of the result.

**Improvement:**

The facility to improve one's performance in any paper(s) is offered to all the students. A student, who wishes to improve her performance in any paper(s), may apply for the examination in the same, if the examination is conducted in that paper(s) during that particular semester/ Supplementary Examination.

This provision is available till the Supplementary Examination after the final semester examination.

**Note:**

A student can report any grievance regarding CA or SE, to the Controller of Examinations, who in turn, will present the same to the Examination Committee, chaired by the Principal.

**CA and SE for Laboratory and Practical Work**

CA		SE	
Components	Marks	Components	Marks
Performance during regular practicals	10	Record	10
Regularity and submission of Observation Notebook and Record	5	Practical Examination	45
Practical Examination	25	Viva Voce	5
<b>Total</b>	<b>40</b>	<b>Total</b>	<b>60</b>

**Passing Minimum:**

A candidate shall be declared to have passed in a course if she secures 50% and above in the SE. If a candidate fails in any paper, she shall be required to appear only for the SE in the respective paper.

**Classification of Successful Candidates:**

**Conversion of Marks to Grade Points and Letter Grade:**

Range of Marks	Grade Points	Letter Grade	Description
90 - 100	9.0 – 9.5	O	Outstanding
80 – 89	8.0 – 8.9	D+	Excellent

75 – 79	7.5 – 7.9	D	Distinction
70 – 74	7.0 – 7.4	A+	Very Good
60 – 69	6.0 – 6.9	A	Good
50 – 59	5.0 – 5.9	B	Average
00 – 49	0.0	U	Re-appear
ABSENT	0.0	AA	ABSENT

### Calculation of Grade Point Average

Based on the grades obtained by a candidate, the Grade Point Average (GPA) is calculated as follows:

Grade Point Average (GPA) =

$$\frac{\sum C_i G_i}{\sum C_i}$$

i.e., GPA = Sum of the multiplication of  
Grade Points by

the credits of the  
courses Sum of  
the credits of the  
courses in a  
Semester

Where

$C_i$  = Credits earned for course  $i$  in any semester

$G_i$  = Grade Point obtained for course  $i$  in any semester

For the Entire Programme:

Based on the grades obtained by a candidate for the entire programme, the Cumulative Grade Point Average (CGPA) is calculated as follows:

Cumulative Grade Point Average (CGPA) =

$$\frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$$

**i.e., CGPA = Sum of the multiplication of Grade Points by  
the credits of the entire programme  
Sum of the credits of the courses of the  
entire programme**

**Where**

**$C_i$  = Credits earned for course  $i$  in any semester**

**$G_{nj}$  = Grade Point obtained for course  $i$  in any semester**

**$n$  refers to the Semester in which such courses were credited.**

**The final classification is based on the following Grade Conversion Table:**

<b>CGPA</b>	<b>GRADE</b>	<b>CLASSIFICATION OF FINAL RESULT</b>
<b>9.5 – 10.0</b>	<b>O+</b>	<b>First Class with Exemplary *</b>
<b>9.0 and above but below 9.5</b>	<b>O</b>	
<b>8.5 and above but below 9.0</b>	<b>D++</b>	<b>First Class with Distinction *</b>
<b>8.0 and above but below 8.5</b>	<b>D+</b>	
<b>7.5 and above but below 8.0</b>	<b>D</b>	
<b>7.0 and above but below 7.5</b>	<b>A++</b>	<b>First Class</b>
<b>6.5 and above but below 7.0</b>	<b>A+</b>	
<b>6.0 and above but below 6.5</b>	<b>A</b>	
<b>5.5 and above but below 6.0</b>	<b>B+</b>	<b>Second Class</b>
<b>5.0 and above but below 5.5</b>	<b>B</b>	
<b>0.0 and above but below 5.0</b>	<b>U</b>	<b>Re-appear</b>

**\* The candidates who have passed in the first appearance and within the prescribed semester of the P.G. programme only are eligible.**

## Ranking of Successful Candidates

**Ranking will be based on CGPA. Candidates who passed in all the examinations prescribed for the Programme in the very first appearance only are eligible for ranking.**

### **Malpractices:**

**Resolved that the following norms be followed in dealing with the cases of malpractices in CA/Semester Examinations.**

<b>S.No.</b>	<b>Nature of Malpractice</b>	<b>Action Suggested</b>
<b>1.</b>	<b>Appeal by a candidate for favourable consideration or mercy in the answer script</b>	<b>Warn the candidate</b>
<b>2.</b>	<b>Letter of appeal for favourable consideration, promising bribe in cash or kind.</b>	<b>Cancel the examination taken in that particular Course only</b>
<b>3.</b>	<b>Candidate writing her own name in any part of the answer book</b>	<b>Warn the candidate</b>
<b>4.</b>	<b>Candidate writing her own Register Number in any part of the answer book other than on the front page</b>	<b>Warn the candidate</b>
<b>5.</b>	<b>Possessing notes or books relevant to the course of the examination</b>	<b>Cancel the examination taken in that particular Course only</b>
<b>6.</b>	<b>Possessing notes or books relevant to the course of the examination (repeated)</b>	<b>Cancel the examinations taken previously and not to allow to appear for the remaining</b>
		<b>examinations in that Semester</b>

7.	Using or copying from notes or books relevant to the course of the examination	Cancel the examination taken in that particular Course only
8.	Using or copying from the answer scripts of other candidates	Cancel the examination taken by both the candidates in that particular Course only
9.	Inserting pre-written answer sheet(s) brought from outside, in the main answer book.	Cancel the examinations taken previously and not to allow to appear for the remaining examinations in that Semester
10.	Threatening or assaulting the Invigilator or behaving in any insubordinate manner	Cancel the examination taken
11.	Manhandling or injuring any examination personnel	Cancel the examination taken
12.	Impersonation	Cancel the examination taken and debar from the examination for the next three years
13.	Tampering with spelling/ name/initials in any certificate	The candidate has to produce fresh certificates and a fine of 1,000/-
14.	Tampering with the Date of Birth in the certificate issued by the College	The candidates should not be permitted to appear for any examination of this College for a period of two years from the date of submission of documents and not to pursue any course of studies for the corresponding period
15.	Tampering with the Grade Certificate or any other Certificate issued by the College	The College will retain the tampered certificate and duplicate certificate will not be issued for three years from the date of presentation of documents. The candidate should not pursue any

		<b>course of studies in this College for the corresponding period</b>
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**Important Note:**

**The decision of the Principal shall be final in all matters pertaining to the Academic Programme.**

**M.A..English  
Outcome Based Education Syllabus (with effect from 2021-2022)**

<b>Sem</b>	<b>Paper Code</b>	<b>Title</b>	<b>Hours/ Week</b>	<b>Exam Hours</b>	<b>Credits</b>	<b>Marks</b>
<b>I</b>	<b>PCENA20</b>	<b>Chaucer and Elizabethan Literature</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PCENB20</b>	<b>Restoration Literature and Eighteenth Century</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PCENC20</b>	<b>Classical Literature of the World</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PCEND20</b>	<b>Indian Literature in English</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENA20</b>	<b>Elective I A: Essential English Grammar</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>

	<b>PEENB20</b>	<b>Elective I B:Modern English Grammar</b>				
	<b>PIENA20</b>	<b>Independent Elective I A:  Literary Skills for Employability –I</b>				<b>40+60</b>
	<b>PIENB20</b>	<b>Independent Elective I B: Technical and Business Writing</b>				<b>40+60</b>
		<b>Total</b>	<b>30</b>		<b>20</b>	<b>500</b>

<b>Sem</b>	<b>Paper Code</b>	<b>Title</b>	<b>Hours/ Week</b>	<b>Exam hours</b>	<b>Credits</b>	<b>Marks</b>
<b>II</b>	<b>PCENE20</b>	<b>American Literature</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENF20</b>	<b>Literary Criticism</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENG20</b>	<b>Language and Linguistics</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PCENH20</b>	<b>Women’s Writing</b>	<b>5</b>	<b>3</b>	<b>4</b>	<b>40+60</b>

<b>PEENC20</b>	<b>Elective II A: Postcolonial Literature</b>	<b>5</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
<b>PEENE20</b>	<b>Elective II B: Literature of the Marginalised</b>				
<b>PIENC20</b>	<b>Independent Elective II A:  Literary Skills for Employability -II</b>				<b>40+60</b>
<b>PIEND20</b>	<b>Independent Elective II B:  Creative Writing</b>				<b>40+60</b>
<b>PNHRA20</b>	<b>Human Rights</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>40+60</b>
		<b>30</b>		<b>24</b>	<b>600</b>

<b>Sem</b>	<b>Paper Code</b>	<b>Title</b>	<b>Hours/Week</b>	<b>Exam Hours</b>	<b>Credits</b>	<b>Marks</b>
<b>III</b>	<b>PCENI20</b>	<b>Romantic and Victorian Literature</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENJ20</b>	<b>Shakespeare Studies</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENK20</b>	<b>Contemporary Critical Theory</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENL20</b>	<b>Research Methodology</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENF20</b>	<b>Elective III A: Translation Studies</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENG20</b>	<b>Elective III B:  Literature For Academic And Professional Purposes</b>				
	<b>PIENE20</b>	<b>Independent Elective III A:  Literary Skills for Employability -III A</b>				<b>40+60</b>
	<b>PIENF20</b>	<b>Independent Elective III B: Content Writing</b>				<b>40+60</b>
			<b>30</b>		<b>23</b>	<b>500</b>

<b>Sem</b>	<b>Paper Code</b>	<b>Title</b>	<b>Hours/Week</b>	<b>Exam Hours</b>	<b>Credits</b>	<b>Marks</b>
<b>IV</b>	<b>PCENM20</b>	<b>Literature of the Modern Age</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENN20</b>	<b>Contemporary Writing</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENO20</b>	<b>English Language Teaching</b>	<b>6</b>	<b>3</b>	<b>5</b>	<b>40+60</b>
	<b>PCENP20</b>	<b>Project</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENH20</b>	<b>Elective IV A: History of Ideas</b>	<b>6</b>	<b>3</b>	<b>4</b>	<b>40+60</b>
	<b>PEENI20</b>	<b>Elective IV B: Cultural Theory and Popular Culture</b>				
		<b>PIENG20</b>	<b>Independent Elective IV A: Literary Skills for Employability –IV</b>			
	<b>PIENH20</b>	<b>Independent Elective IV B: Literature and Environment</b>				<b>40+60</b>
			<b>30</b>		<b>23</b>	<b>500</b>

### **Programme Outcomes (POs)**

**On completion of the PG Programme, students will be able to:**

**PO1:**Attain an in-depth knowledge in the respective domains augmented through self-learning.

**PO2:**Assimilate and apply principles and concepts towards skill development and employability.

**PO3:**Apply critical and scientific approaches to address problems and find solutions.

**PO4:**Develop research skills through multi/inter/trans-disciplinary perspectives.

**PO5:**Integrate issues of social relevance in the field of study.

**PO6:**Persist in life-long learning for personal and societal progress.

**On completion of M.A. Programme in English, students will be able to**

**PSO1:** Demonstrate wide knowledge of literary periods and movements, intellectual, linguistic, religious, and artistic influences

**PSO2:**Analyse and interpret Literature using traditional, modern, and contemporary theories and approaches

**PSO3 -** Appreciate and discuss varying opinion of literary works (K4)

**PSO4:** Critically interpret emerging traditions of literature, culture and thought in the canon of new literatures

**PSO5:** Demonstrate skills in Research Methods and tools to initiate and attempt research projects in Literature and Language

**PSO6:** Innovate and apply the skills of oral, written communication and analytical skills in the prospective areas of teaching, training, writing, editing, translating, publishing, advertising etc.

**PO-PSO MAPPING**

	PO1	PO2	PO3	PO4	PO5	PO6
PSO1	H	H	H	M	M	M
PSO2	H	H	H	M	M	M

PSO3	H	H	<b>H</b>	M	M	M
PSO4	H	H	H	<b>H</b>	M	M
PSO5	H	H	H	H	<b>H</b>	M
PSO6	H	H	H	H	H	<b>H</b>

**H - High – (3), M - Moderate (3), L - Low (1)**

**SEMESTER - I**  
**PCENA20 - CHAUCER AND ELIZABETHAN LITERATURE**

<b>Year: I</b> <b>SEM : I</b>	<b>Course Code:</b> PCENA20	<b>Title Of The Course:</b> Chaucer and Elizabethan Age	<b>Course Type :</b> Theory	<b>Course Category :</b> Main	<b>H/W</b> 6	<b>Credits</b>	<b>Marks</b> <b>100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Recall the historical, social and biographical Influence
2. Discuss the literary significance of the Era
3. Interpret literary texts
4. Analyse the evolution of English Language in Literature
5. Assimilate writing and analytical Skills

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Age of Chaucer                      K1-K6                      (10 hours)**

1.1 The Age of Chaucer: from Anonymity to Individualism (pg 22-50)      **K4, K5, K6**

(Carter, Ronald. & McRae, John. *The Routledge History of Literature in English*. London: Routledge, 2001. Print)

1.2 Geoffrey Chaucer :The Prologue to Canterbury Tales (Detailed Study) -  
The Knight

1.3Geoffrey Chaucer : The Wife of Bath (Detailed Study)

1.4Geoffrey Chaucer: The Pardoner(Detailed Study)

1.5Geoffrey Chaucer: The Miller(Detailed Study)

1.6 Geoffrey Chaucer:The Summoner(Detailed Study)

**Unit II: Renaissance Poetry                      K1-K6                      (10hours)**

2.1 Introduction to Elizabethan Poetry **K4, K5, K6**

2.2 Renaissance Poetry (pg 57-61; 94-101) **K4, K5, K6**

(Carter, Ronald. & McRae, John. *The Routledge History of Literature in English*.  
London: Routledge, 2001. Print)

2.3 Edmund Spenser: Epithalamion(Detailed Study)

2.4John Donne : Canonization(Detailed Study)

2.5John Donne: A Valediction: Forbidding Mourning(Detailed Study)

2.6John Donne: The Flea(Detailed Study)

**Unit III: Prose K1-K6 (10 hours)**

3.1The Decline of the Renaissance – The Art of Criticism (pg 146-170) **K4, K5, K6**  
(Compton-Rickett, Arthur. “A History of English Literature”.New Delhi:  
UBSPA, 2014. Print)

3.2Renaissance Prose (pg 70-79) **K4, K5, K6**  
(Carter, Ronald. & McRae, John. *The Routledge History of Literature in English*.  
London: Routledge, 2001. Print.)

3.3 The Bible:St. Mark’s Gospel(Detailed Study)

3.4Francis BaconOf Truth (Detailed Study)

3.5Francis BaconOf Revenge, Of Love (Detailed Study)

3.6Francis BaconOf Unity in Religion (Detailed Study)

**Unit IV:Drama K1-K6 (50 hours)**

4.1 Introduction to Elizabethan Drama **K4, K5, K6**

4.2 Jacobean Drama - To the Closure of the theatres (1642) (pg 101 – 113) **K4, K5, K6**  
(Carter, Ronald. & McRae, John. *The Routledge History of Literature in English*.  
London: Routledge, 2001. Print.)

4.3Thomas KydThe Spanish Tragedy (Act I & II Detailed Study) **K4, K5, K6**

4.4 Thomas KydThe Spanish Tragedy (Act III, IV& VDetailed Study)

4.5.John WebsterThe Duchess of Malfi (Act I & II Detailed Study detailed Study)**K4, K5, K6**

4.6 John WebsterThe Duchess of Malfi (Act III, IV & V Detailed Study)

**Unit V: Reading and Interpreting Playwrights K4-K6 (10 hours)**

- 5.1 Introduction to Jacobean Drama
- 5.2 Thomas Dekker
- 5.3 Middleton and Rowley
- 5.4 Beaumont and Fletcher
- 5.5 Christopher Marlowe
- 5.6 Edmund Spenser Prothalamion (Essential Reading)

**Books for Study:**

1. Compton-Rickett, Arthur. *"A History of English Literature."* New Delhi: UBSPA, 2014. Print
2. Carter, Ronald. & McRae, John. *The Routledge History of Literature in English.* London: Routledge, 2001. Print.

**Books for Reference:**

1. Fermor, Una Ellis. *The Jacobean Drama.* London: University Paperback, 1965.
2. Ford, Boris. *A Guide to English Literature. Vol I The Age of Chaucer.* London: Penguin, 1961.
3. Grierson H.J.C. *Metaphysical Lyrics and Poems of the Seventeenth Century.* Oxford University Press, 1972.
4. Jonathan Dollimore(1984). *Radical Tragedy – Religion Ideology and power in the Drama of Shakespeare and his contemporaries.*
5. Lovelock, Julian. *Donne: Songs and Sonnets.* London: Macmillan, 1989.
6. Rickert, Edith. *Chaucer's World.* London: Columbia University Press, 1964.
7. *Representative Poetry - Vol I.* Canada: The University of Toronto Press, 1941.
8. Jonathan Golding and the Politics of Literature: Jonson, Shakespeare, Donne and their contemporaries John Hopkins.
9. Montrose Louis (1983) Shaping Fantasies Figuration of Gender and Power in Elizabethan Culture Representation1-2, 61-94

**PCENB20 - RESTORATION AND EIGHTEENTH CENTURY LITERATURE**

<b>Year: I Sem: I</b>	<b>Course Code:</b> PCENB20	<b>Title Of The Course :</b> Restoration And Eighteenth Century Literature	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Explain the characteristics of the Eighteenth century and Restoration Literature
2. Identify and analyze the writer's perspective, expression and their reflection of life representing the Restoration age
3. Critically interpret the variety of literary genres, new trends, themes and style in Literature of this age
4. Analyze the ways in which the authors from the Restoration constructed the literary values and to trace their influence upon the age
5. Evaluate the traditional, religious, political, and aesthetic authority of this age

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

- 1.1** Transitions (Pg 1 – 15) The Era of Sincerity (Pg 98-118)  
 [Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]  
 The Century's End (Pg 193-201)  
 [from Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]

**Poetry – (Detailed Study)**

- 1.2** John Milton Paradise Lost Book IX (1-200 lines)  
**1.3** John Milton Paradise Lost Book IX (201-403 lines)  
**1.4** Alexander Pope Essay on Man- Epistle I (I-V)  
**1.5** Alexander Pope Essay on Man- Epistle I (VI-X)  
**1.6** Thomas Gray Elegy written in the Country Churchyard

**Unit II: k2-k6 (40 Hours)**

- 2.1** The Age of Dryden (Pg 196 – 201)  
 [Compton-Rickett, Arthur. *A History of English Literature*. New Delhi: UBSPD. 2014. Print]  
 The Century's End (Pg 201-203)  
 [from Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]

**Drama – (Detailed Study)**

- 2.2** John Dryden All for Love (Act I- III)  
**2.3** John Dryden All for Love (Act IV- V)

**Poetry – (Detailed Study)**

- 2.5** William Blake The Little Black Boy  
**2.6** William Blake The Little Girl is Lost

**Unit III k2-k6 (10 Hours)**

- 3.1** Samuel Johnson: His Time and His Circle (Pg 161-170)  
**3.2** Samuel Johnson: His Time and His Circle (Pg 171-182)  
**3.3** The Age of Disguise (Pg 16 – 36) Mid-century Fiction and Drama (Pg 119-129)  
**3.4** The Age of Disguise (Pg 16 – 36) Mid-century Fiction and Drama (Pg 130-139)  
 [Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]

**Prose (Detailed Study)**

- 3.5** Samuel Johnson Preface to the Plays of Shakespeare (Three Unities)

3.6 Samuel Johnson Preface to the Plays of Shakespeare (Tragic-comedy)

**Unit IV** **k2-k6** **(10 Hours)**

**Non Detailed Study**

**Poetry**

4.1 George Herbert The Collar  
4.2 Andrew Marvel The Garden

**Prose**

4.3 Jonathan Swift The Battle of Books  
4.4 Addison and Steele Coverley Papers 1-4

**Drama**

4.5 William Congreve The Way of the World  
4.6 R.B. Sheridan The Rivals

**Unit V** **k2-k6** **(10Hours)**

**5.1 Fiction** The Century's End (Pg 183-193)

[from Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983]

**5.2 Focused study of writers of personal choice**

Daniel Defoe - Henry Fielding - Samuel Richardson - Laurence Sterne - Horace Walpole - Oliver Goldsmith

**5.3 Reading and Interpreting fiction**

**5.4 Formal Elements of Fiction:** Plot Construction, Narrative point of View, Characterization

**5.5 Formal Elements of Fiction:** Setting, Tone, Style, Symbolism and Irony.

**5.6 Close Reading & Critical Interpretation:**

To facilitate a deeper understanding of the period when the novel rose to dominate the literary marketplace, defining the form and its modes of representing the private lives of individuals. The critical reading includes the late eighteenth century which saw a medieval revival, in which writers venerated and imitated archaic language and forms. The important development of this movement was the Gothic novel, which typically features such forbidden themes as incest, murder, necrophilia, atheism, and sexual desire.

**Books for study:**

1. Novak, Maximillian E. *Eighteen Century English Literature*. London: Macmillan Publishers, 1983
2. Dryden, John, *All for Love*. Indian Private Limited, Bloomsbury, 2014

**Books for Reference:**

1. Compton-Rickett, Arthur. *A History of English Literature*. New Delhi: UBSPD. 2014. Print
2. Bottrall Margaret. Ed. *Songs of Innocence and Experience*. New York: Macmillan, 1970.
3. Clifford L., James. Ed. *Eighteenth Century English Literature*. London: OUP, 1977.
4. Dobree, Bonamy and Wilson F. P. Ed. *English Literature*. London: OUP, 1963.
5. Hammond, Gerald. Ed. *The Metaphysical Poets*. New York: Macmillan, 1974.
6. Sanders, Andrews. *English Literature*. India: OUP, 2011.
7. Tillyard, E.M. Milton. London: Chatto & Windus Ltd, 1966.
8. Bottrall Margaret. Ed. *Songs of Innocence and Experience*. New York: Macmillan, 1970.
9. Clifford L., James. Ed. *Eighteenth Century English Literature*. London: OUP, 1977.
10. Dobree, Bonamy and Wilson F. P. ed. *English Literature*. London: OUP, 1963.
11. Hammond, Gerald. Ed. *The Metaphysical Poets*. New York: Macmillan, 1974.
12. Sanders, Andrews. *English Literature*. India: OUP, 2011.
13. Tillyard, E.M. Milton. London: Chatto & Windus Ltd, 1966.

**PCENC20 - CLASSICAL LITERATURE OF THE WORLD**

<b>Year :</b> <b>I</b>	<b>Course Code :</b> PCENC20	<b>Title Of The Course :</b> Classical Literature of the World	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>4</b>	<b>Marks</b> <b>100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Explain the greatness of literary works and their influence on world literature
2. Interpret the best that was known and thought in the world
3. Apply the knowledge gained through plots, characters, themes etc. to real life situations
4. Analyse literary works to understand the world and interpret everyday situations
5. Evaluate human life and experience in texts and in reality

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	M	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	M	M	H
CO4	H	H	H	H	M	H
CO5	H	H	H	H	H	H

## Course Syllabus

### Unit I

**(10 hours)**

#### Introduction

1.1 T.S.Eliot What is a Classic? (pg 95 -104) **[K2]**  
From Walder, Dennis. Literature in the Modern World: Critical Essays and Documents.OUP.  
New York .2004

1.2 Italo Calvino Why read the Classics? (pg 3-9) **[K2]**  
[Calvino, Italo. *Why Read the Classics?* Great Britain: Penguin Books, 1999]

#### Fiction

##### Focused study of writers of personal choice

1.3 Voltaire,Miguel De Cervantes

1.4 Dostoevsky, Kafka

1.5 Honoré De Balzac, Leo Tolstoy

1.6 Gabriel Garcia Marquez,Herman Hesse

##### Formal Elements of Fiction: **[K2,K3,K4]**

Plot Construction, Narrative point of View, Characterization,  
Setting, Tone, Style, Themes Symbolism and Irony.

**Close Reading & Critical Interpretation: [K2,K3,K4]**

language, originality, freshness, seminal,  
longevity, identity, eternal truths, grand themes

**Unit II [K2-K5] (20 hours)**

**Greek and Roman**

- |     |              |  |
|-----|--------------|--|
| 2.1 | Homer        | The Odyssey - Book IX, XVIII[Comprehensive view] |
| 2.2 | Homer        | The Odyssey - Book XXIII [Comprehensive view]    |
| 2.3 | Sophocles    | Antigone   |
| 2.4 | Virgil       | Aeneid Book IV                                   |
| 2.5 | Ovid         | Metamorphosis Book 6                             |
| 2.6 | Aristophanes | The Wasps  |

**Unit III (20 hours)**

**European [K2-K5]**

- |     |              |   |
|-----|--------------|---|
| 3.1 | Dante        | The Divine Comedy [Comprehensive view]                          |
| 3.2 | Goethe       | Faust   |
| 3.3 | Moliere      | The Miser   |
| 3.4 | Albert Camus | The Myth of Sisyphus - An Absurd Reasoning (pg 17-32)           |
| 3.5 | Anton Chekov | The Bet, The Student and other stories                          |
| 3.6 | Leo Tolstoy  | Alyosha the Pot, God Sees the Truth but Waits and other stories |

**Unit IV (20 hours)**

**Indian & Asian [K2-K5]**

- |     |   |  |
|-----|---|--|
| 4.1 | Thiruvalluvar                           | Impartiality                             |
| 4.2 | Thiruvalluvar                           | Listening, Folly                         |
| 4.3 | Vyasa                                   | The Mahabharata (Retold by R.K. Narayan) |
| 4.4 | Murasaki Shibuki                        | The Tale of Genji                        |
| 4.5 | Shi Nai'an                              | Water Margin                             |
| 4.6 | Panchatantra Tales [Comprehensive view] |  |

**Unit V [K2-K5] (20 hours)**

**Others**

- |     |   |  |
|-----|---|--|
| 5.1 | Omar Khayyam  | The Rubaiyat of Omar Khayyam (Trans. Fitzgerald) |
| 5.2 | Khalil Gibran   | Giving, Joy and Sorrow, Crime and Punishment     |
| 5.3 | From The Bible Genesis (Creation) and The Sermon on the Mount |  |
| 5.4 | Rumi  | Be Lost in the call                              |
| 5.5 | The Arabian Nights  |  |
| 5.6 | <i>Kebra Negast</i> , or Book of Kings                        |  |

**Internal Assessment**

Paper Presentation  
Group Discussion  
Individual Author Study, Analysis and Presentation

### Reference Books

1. Bhattecharji, Amal. *Four Essays on Tragedy*. Calcutta: OUP, 1977.
2. Bloom, Harold. *The Rubaiyat of Omar Khayyam*. India: Viva Books, 2007.
3. Canning, John, ed. *Hundred Great Books*. New Delhi: Rupa & co, 1993.
4. Croally, Neil and Roy Hyde. *Classical Literature*. London: Routledge Publications, 2011.
5. Fischer, Carl. *The Myth and Legend of Greece*. Geo A, Pflaum, Publisher, Inc, 1968.
6. Hornstein, Lillian Herlands, Leon Edel and Horst Frenz. *World Literature*. New York: New American Library, 1973.
7. Kirk, G.S. *The Nature of the Greek Myths*. Great Britain: Penguin Books, 1982.
8. McGrady S.H. *Legends and Myths of Greece and Rome*. Longmans.
9. Trawick, Buckner B. *World Literature*. New York: Barnes & Noble, 1967.
10. Narayan, R.K. *The Mahabharata*. New Delhi: Vision Books. 1987. Print.

### PCEND20 - INDIAN LITERATURE IN ENGLISH

<b>Year:</b> <b>I</b>	<b>Course Code:</b> PCEND20	<b>Title of the Course:</b> Indian Literature in English	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W:</b> <b>6</b>	<b>Credits:</b> <b>4</b>	<b>Marks:</b> <b>100</b>
<b>Sem - I</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Recognize the characteristics of major movements and figures of Indian Literature in English through the study of selected literary texts
2. Explain different literary genres; poetry, fiction and non-fiction
3. Interpret different styles of writing: expository, narrative and descriptive

4. Analyse literary concepts and underlying aesthetics
5. Evaluate original writing in English by Indian authors and translated texts from regional languages

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	M	M
CO5	H	H	H	H	M	M

## **D) Course Syllabus**

### **Unit I: Poetry**

**(15 Hours)**

- |   |  |       |
|---|--|-------|
| 1.1 Introduction to English writing before independence |  | K1,K2 |
| 1.2 Kalidas   | Meghadhutham (Detailed)                              | K2,K4 |
| 1.3 Toru Dutt   | Lotus (Detailed)                                     | K2,K4 |
| 1.4 A.K.Ramanujam                                       | Snakes (Detailed)                                    | K2,K4 |
| 1.5 Sarojini Naidu                                      | Palanquin Bearers                                    | K2,K4 |
| 1.6 IlangoAdikal  | Prologue: The Cilappatikaram Tr.<br>R. Parthasarathy | K2,K4 |

### **Unit II: Poetry**

**(15 Hours)**

- |  |                          |       |
|--|--------------------------|-------|
| 2.1 Introduction to English writing since independence |                          | K1,K2 |
| 2.2 Critical appreciation of Poetry                    |                          | K5,K6 |
| 2.3 Nizzim Ezekiel                                     | Lawn (Detailed)          | K2,K4 |
| 2.4 Kamala Das   | Old Playhouse (Detailed) | K2,K4 |

2.5 Arun Kolatkar	Sarpasarita	K2,K4
2.6 Keki N. Daruwalla	Boat Ride along the Ganga	K2,K4

**Unit III: Post World War Dramatists (25 Hours)**

3.1 Life and Works of Rabindranath Tagore		K1,K2
3.2 Rabindranath Tagore	The King of the Dark Chamber (Detailed)	K5,K6
3.3 Life and Works of Girish Karnad		K1,K2
3.4 Girish Karnad	The Dreams of Tipu Sultan (Detailed)	K5,K6
3.5 Life and Works of Mahesh Dhattani		K1,K2
3.6 Mahesh Dhattani	Dance Like a Man	K5,K6

**Unit IV: Prose and Criticism (25 Hours)**

4.1 Spiritual Writing		K3,K4
4.2 Autobiography as a genre		K2,K4
4.3 Sri Aurobindo	The Essence of Poetry (Detailed) From Future Poetry	K5
4.4 M.K. Gandhi	My Experiments with Truth (Detailed)	K5
4.5 Anandha Coomarasamy	The Dance of Siva	K5
4.6 Nirad C. Chaudhari	The Autobiography of an Unknown Indian	K5

**Unit V: Novelists after 1950's (10 Hours)**

**Reading and Interpreting fiction**

5.1 How to read fiction critically		K5
5.2 Introduction to Diasporic Writing		K2
5.3 Focused study of writers of personal choice:		K4
Raja Rao, Mulk Raj Anand, R. K. Narayan, Amitav Ghosh, Vikram Seth, Rohinton Mistry		
<b>5.4 Focused study of women writers of personal choice:</b>		K4
Anitha Desai, Kamala Markandaya, Shashi Deshpande, Chitra Banerjee Divakaruni, Manju Kapoor		

**5.5 Formal Elements of Fiction:** Plot Construction, Narrative point of View, Characterization, Setting, Tone, Style, Symbolism and Irony K6

**5.6 Close Reading & Critical Interpretation:** K6

To enhance a comprehensive understanding of fiction written in English in India since its emergence in the 19th century. Apart from a chronological survey, to focus on the historical and literary origins of the genre, its political and economic underpinnings, the debates and controversies such as Post-independence writing, women and the question of gender, feminist concerns, the idea of 'home', caste, secularism, region and identity, nationalism and postcolonial nation.

**Books for Reference:**

**Secondary Texts:**

1. Arvind Krishna Mehrota Ed ‘ An Illustrated History of Indian Literature in English’ , Permanent Black Publishers, New Delhi,2003.
2. Ilankoatikal, TheCilappatikaram: The Tale of an Anklet
3. Translated, with an introduction and postscript, byR. Parthasarathy
4. Penguin books, New Delhi, 1993.

### **PEENA20 - ESSENTIAL ENGLISH GRAMMAR**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> PEENA18	<b>Title of the Course:</b> Essential English Grammar	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W:</b> 6	<b>Credits:</b> 4	<b>Marks:</b> 100
<b>Sem - I</b>							

#### **Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Discuss grammatical structures common to British English
2. Interpret how the various systems of English grammar function in relation to one another
3. Apply both traditional and contemporary methods in written and oral presentations
4. Practice all covered material through classroom activities and presentations and achieve linguistic competence in using language effectively, efficiently and appropriately

5. Edit written and spoken performance and present original research and analysis in standard written academic language

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit: I Words and Phrases**

**(15 Hours)**

- 1. 1 Nouns, Pronouns, Determiners, Verbs, Adverbs K2, K3
- 1.2 Prepositions, Conjunctions, Interjections K2, K3
- 1.3 Phrases: Noun, Verb, Adjective, Adverb, Preposition K2, K3
- 1.4 Word formation: Acronyms, Analogy, Back formation, Blending K3, K4
- 1.5 Borrowing, Clipping, Coining K3, K4
- 1.6 Compounding, Reduplication, Prefixes, Suffixes K3, K4

**Unit II: Sentences And Clauses**

**(15 Hours)**

- 2.1 Major and Minor, Simple and Multiple, Clauses K3, K4

2.2 Sentence types- Positive and Negative - Active and Passive	K4, K5
2.3 Clause elements: Subject- Predicate -Verb- Object- Complement- Adverbial	K3, K4
2.4. Compound and Complex, Independent and Dependent, Coordination- Subordination, Subordinate clauses	K4, K5
2.5 Nominal or Noun clause- Adverbial, Relative, Comparative, Finite and Non Finite clauses	K4, K5
2.6 Restrictive and Non Restrictive clauses- Dangling Modifiers- Readability	K3, K4

**Unit III: Punctuation (15Hours)**

3.1 Apostrophe, Brackets,	K4, K5
3.2 Capital Letters, Colon,	K4, K5
3.3 Comma, Dash, Ellipsis, Exclamation mark	K4, K5
3.4 Full stop, Hyphen	K4, K5
3.5 Paragraph, Question mark	K4, K5
3.6 Quotation marks- Semicolon- Slash K4,K5	

**Unit IV: Figures of Speech And Literary Devices (20 Hours)**

4.1 Allegory, Alliteration, Anacoluthon, Analogy, Anticlimax, Antithesis	K3, K5
4.2 Apostrophe, Assonance, Bathos, Catch phrases, Clerihew, Cliché, Colloquialism	K3, K5
4.3 Dead Metaphor,Doubles,Epigram,Euphemism, Haiku, Hyperbole,Idiom,	K4, K5
4.4 Innuendo,Irony,Limerick,Litotes,Malapropism, Meiosis,Metaphor,Metonymy	K4, K5

- 4.5 Metre, Onomatopoeia, Oxymoron, Palindrome, Paradox, Personification, Proverb K4, K5
- 4.6 Pun, Rhetorical question, Simile, Spoonerism, Syllepsis, Synecdoche, Zeugma. K4, K5

**Unit V:** K2, K6 (20 Hours)

- 5.1. Elementary Rules of Usage
- 5.2. Elementary Principles of Composition
- 5.3. A Few Matters of Form
- 5.4. Words and Expressions Commonly Misused
- 5.5. An Approach to Style (70-75)
- 5.6. An Approach to Style (76-81)

Strunk, Oliver. Strunk and White. *The Elements of Style*, ALLYN & BACON, 'A Pearson Education Company' & 'The New Yorker Magazine', 2000,

**Books for Study:**

1. Jarvie, Gordon. *Bloomsbury Grammar Guide*, second Edition, New Delhi. Bloomsbury. 2007
2. Strunk, Oliver. Strunk and White. *The Elements of Style*, ALLYN & BACON, 'A Pearson Education Company' & 'The New Yorker Magazine', 2000,

**Books for Reference:**

1. Eastwood, John. *Oxford Guide to English Grammar*. India: OPU, 2003.
2. Fitikides. T. J. *Common Mistakes in English*. Mumbai: Orient Longman, 1997
3. Leech, Geoffrey, Deucher Margeret, Robert Hoogenrad. *English Grammar for Today*. New York: Palgrave Macmillan, 2011
4. Palmer, Frank. *Grammar - Great Britain*: Viney Ltd, 1978
5. Palmer, Richard. *The Good Grammar Guide*. London: Routledge, 2005.

**PEENB20 - MODERN ENGLISH GRAMMAR**

Year: 2020	Course Code:	Title of the Course: Modern	Course Type:	Course Category:	H/W: 6	Credits: 5	Marks: 100
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Semester -IV	PEENB20	English Grammar	Theory	Elective - I B			
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Establish the feasibility of following the rules and concepts that aid in usage
2. Identify grammar learning strategies to aid in comprehensibility
3. Explore learning strategies that integrate language and grammatical construction for standard language acquisition
4. Justify the application of grammar for best outcomes in language learning
5. Create activities that have a great impact to develop grammatical usage to suit student's ability

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit: I**

**(15 Hours)**

1.1. Introduction to English Language and its Grammar

K2.

2.2. Good grammar, bad grammar	K3,
3.3. Grammar – Rules and Problems	K3,
4.4. Prescriptive and Descriptive Grammar	K3,
5.5. Influences in Grammar	K4
6.6. Summary	K4

**Unit: II** **(20 Hours)**

2.1. Part A: What Grammar Is and Is Not	K3
2.2. Variation in language	K3
2.3. Part B: Analysis	K4
2.4. Sentences and Their Parts	K4
2.5. Words – Parts of Speech	K4
2.6. Phrases – Form, Function and Meaning	K5

**Unit: III** **(15 Hours)**

3.1. Part B: Clauses: Identification and Function	K4
3.2. Elements of the clause	K4
3.3. Complex sentences, Finite and non-finite clauses	K4
3.4. Clause patterns	K5
3.5 Parsing a simple sentence	
3.6. Clauses: Subordination and Coordination	K5

**Unit: IV** **(15Hours)**

4.1. Transformation and Generative Grammar	K3
4.2. Syntactic structures	K3
4.3. Surface and Deep Structure	K4
4.4. Rules in Generative grammar	K4
4.5. Generative patterns	K5
4.6. Immediate Constituent Analysis	K3

**Unit: V** **(20 Hours)**

5.1. Elementary Rules of Usage	
5.2. Elementary Principles of Composition	
5.3. A Few Matters of Form	
5.4. Words and Expressions Commonly Misused_	
5.5. An Approach to Style (70-75)	
5.6. An Approach to Style (76-81)	

Strunk, Oliver. Strunk and White. *The Elements of Style*, ALLYN & BACON, 'A Pearson Education Company' & 'The New Yorker Magazine', 2000,

**Primary Texts:**

Leech, Geoffrey, Deucher Margeret, Robert Hoogenrad, (2011). *English Grammar for Today*. New York: Palgrave Macmillan.

Palmer, Frank (1978). *Grammar*. Great Britain: Viney Ltd.

**Secondary Texts:**

Eastwood, John (2003). *Oxford Guide to English Grammar*. India: OUP.

Krishnaswamy L. and Lalitha Krishnaswamy (2011). *Methods of Teaching English*. Chennai: Macmillan Publishers India Limited.

Palmer, Richard (2005). *The Good Grammar Guide*. London: Routledge.

Tickoo, M. L (2010). *Teaching and Learning English*. New Delhi: Orient Blackswan

**PIENA20 - INDEPENDENT ELECTIVE I A: LITERARY SKILLS FOR EMPLOYABILITY –I**

Year: 2020 Sem -I	<b>Course Code:</b> PIENA20	<b>Title of the Course:</b> Literary Skills For Employability –I	<b>Course Type:</b> Theory	<b>Course Category:</b> Independent Elective - I A	<b>H/W:</b> 6	<b>Credits:</b> 5	<b>Marks:</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Remember and recall names of authors, literary works, dates, facts, terms and concepts
2. Demonstrate knowledge of English Language and Linguistics
3. Apply knowledge of literary criticism to analyse literary works

4. Demonstrate knowledge in Application-oriented areas like Research Methodology, Translation and English Language Teaching
5. Develop effective strategies to prepare for competitive examinations

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Ancient, Medieval and Anglo-Norman Drama    k2-k6            (18 Hours)**

- 1.1.Drama: An Introduction, Origin, Growth and Development,
- 1.2.Functions of Drama, Types of Drama, Elements of Drama
- 1.3. Ancient and Medieval Drama, Anglo-Norman Literature
- 1.4.Drama of the Age of Revival
- 1.5.Important Dramatists of the Age of Revival
- 1.6.Model Questions & Solved Question papers

**Unit II: Elizabethan to Jacobean Drama                            k2-k6            (18 Hours)**

- 2.1.Elizabethan Age, Literature of the Elizabethan Age
- 2.2. Main Dramatists of Elizabethan Age
- 2.3. Shakespeare
- 2.4. Shakespeare’s Literary Life
- 2.5. Shakespeare’s Contemporaries
- 2.6. Model Questions & Solved Question papers

**Unit III: Restoration to Neo-Classical Drama**                      **k2-k6**                      **(18 Hours)**

- 3.1. Restoration Age, Drama of the Restoration Age
- 3.2. Main Dramatists of the Elizabethan Age
- 3.3. Dramatists of the Restoration Age
- 3.4. Neo-Classical Drama
- 3.5. Samuel Johnson
- 3.6. Model Questions & Solved Question papers

**Unit IV: Victorian and Modern Drama**                      **k2-k6**                      **(18 Hours)**

- 4.1. The Victorian Drama
- 4.2. Modern Age Drama
- 4.3. Major Dramatists of the Modern Age
- 4.4. T.S. Eliot
- 4.5. Noel Coward, Samuel Beckett
- 4.6. Model Questions & Solved Question papers

**Unit V: Contemporary Drama**                      **k2-k6**                      **(18 Hours)**

- 5.1. Drama in Contemporary Period, Epic Theatre
- 5.2. Contemporary Dramatists: Bertolt Brecht, John Arden, Arnold Wesker, David Storey
- 5.3. Tom Stoppard, John Clifford Mortimer, Edward Bond
- 5.4. Peter Nichols, John Osborne, Shelagh Delaney
- 5.5. Harold Pinter, Arthur Miller, Tennessee Williams, Eugene O’Neil
- 5.6. Model Questions & Solved Question papers

**Books for Reference:**

1. Albert, Edward. *A History of English Literature*. Oxford: Oxford University Press, 1979. Print.
2. Chowdhury, Aditi and Rita Goswami. *A History of English Literature: Traversing the Centuries*. Hyderabad: Orient Blackswan, 2014. Print.
3. Daiches, David. *A Critical History of English Literature*. London: Secker & Warburg, 1960. Print.
4. Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford, UK: Oxford University Press, 1994. Print
- A. P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
5. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
6. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.

7. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
8. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
9. Yule, George. *The Study of Language*. Cambridge University Press, 1985.

**PIENB20 - INDEPENDENT ELECTIVE I B: TECHNICAL AND BUSINESS WRITING**

<b>Year :2020 SEM :I</b>	<b>Course Code :PIENB20</b>	<b>Title Of The Course :Independent Elective: Technical and Business Writing</b>	<b>Course Type : Theory</b>	<b>Course Category : Self- Study</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to::

1. Recognize, analyze, and accommodate diverse audiences and produce documents appropriate to audience, purpose, and genre and edit for appropriate style, including attention to word choice, sentence structure, punctuation, and spelling
2. Acquire communication Skills – to include effective development, interpretation, and expression of ideas through written, oral, and visual communication
3. Develop critical Thinking Skills – to include creative thinking, innovation, inquiry and analysis, evaluation and syntheses of information
4. Analyze the ethical responsibilities involved in technical communication
5. Analyze an audience, both domestic and international, and write effective technical and business documents for that audience and locate, evaluate, and incorporate pertinent information

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

### Unit I : Writing And Reading

**K3,K4,K5**

- 1.1 Introduction to writing
- 1.2 Writing in Everyday Life
- 1.3 Writing in the Workplace
- 1.4 Writing in the Public Sphere
- 1.5 Understanding the Rhetorical Situation
- 1.6 Persuasion and Responsibility

### Unit II : Writing Projects

**K3,K4,K5**

**(18 hours)**

- 2.1 Genres of Writing
- 2.2 Letters
- 2.3 Memoirs
- 2.4 Public Documents
- 2.5 Profiles
- 2.6 Plagiarism

**Unit III : Writing Projects**

**K3,K4,K5**

**(18 hours)**

- 3.1 Critical Essays
- 3.2 Reports
- 3.3 Commentary
- 3.4 Proposals
- 3.5 Reviews
- 3.6 Research Projects

**Unit IV : Writers At Work**

**K3,K4,K5**

**(18 hours)**

- 4.1 The shape of the Essay: How Form Embodies Purpose
- 4.2 Planning
- 4.3 Drafting
- 4.4 Revising
- 4.5 Working Together: Collaborative Writing Projects
- 4.6 Online Collaboration

**Unit V : Presentation Of The Work**

**K3,K4,K5**

**(18 hours)**

- 5.1 Delivering the Message
- 5.2 Visual Design
- 5.3 Web Design
- 5.4 Oral and PowerPoint Presentations
- 5.5 Writing Portfolios
- 5.6 Writing Essay

**Books for Study:**

1. Trimbur, John. *The Call to Write*. Wadsworth Cengage Learning. U.S.A 2011

**Books for Reference:**

1. Rizvi, M. Ashraf. *Effective Technical communication*. Chennai: McGraw Hill Education Pvt. Ltd. 2018.
2. Pal, Rajendra, J.S. Korlahalli *Essentials of Business Communication*. New Delhi: Sultan Chard a sons, 1998.
3. Kapoor, A.N. *Bussiness Letter for Different Occasions*, New Delhi: S. Chard and Company Pvt. Ltd. 1987.
4. Ramesh, M.S. C.C. Pattarshetti, *Business Communications*, New Delhi: R. Chard & Co Publishers, 1997.

## SEMESTER II

### PCENE18 - AMERICAN LITERATURE

<b>Year :2020 SEM :II</b>	<b>Course Code :PCENE18</b>	<b>Title Of The Course : American Literature</b>	<b>Course Type :Theory</b>	<b>Course Category :Core</b>	<b>H/ W 6</b>	<b>CREDIT S 5</b>	<b>MARKS 100</b>
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Interpret American life and Culture against the background of History and Literary development

2. Discuss American Literary artists, who were innovative in their outlook and literary temper.
3. Identify key ideas, representative authors and works, significant historical or cultural events, and characteristic perspectives or attitudes expressed in the literature of different periods or regions
4. Analyze literary works as expressions of individual or communal values within the social, political, cultural, or religious contexts of different literary periods
5. Write research-based critical papers about the assigned readings in clear and grammatically correct prose, using various critical approaches to literature

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Transcendentalism And Romanticism (K2,K3,K4)**

**(15 Hours )**

**Poetry**

- 1.1. Edgar Allan Poe Raven (Detailed)

**Prose**

- 1.2. Emerson Nature
- 1.3. Transcendentalism
- 1.4. Romanticism
- 1.5. Henry David Thoreau Where I lived and What I lived for (Detailed)

**Short Fiction**

1.6. Nathaniel Hawthorne      Young Goodman Brown

**Unit II: The Humanitarian Sensibility And Inevitable Conflict (K3,K4,K5)      (15 Hours)**

**Poetry**

2.1. H. W. Longfellow                      Seaweed (Detailed)

2.2. Russell Lowell                      A Fable for Critics (846-847)

**Prose**

2.3. Fredrick Douglas                      Narrative of the Life of Fredrick Douglas –Ch I & II

2.4. Harriet A. Jacobs                      I. Childhood

II. The New Master And Mistress

III. The Slaves' New Year's Day

From *Incidents in the Life of A Slave Girl*

**Age Of Expansion: Realists And Regionalists**

**Poetry**

2.5. Walt Whitman                      Beat! Beat! Drums (Detailed)

2.6. Emily Dickinson                      There came a Day at Summer's Fall (Detailed)

**Unit III -Poets Of Idea And Order (K3,K4,K5)      (20 Hours)**

3.1. Wallace Steven                      Anecdote of the Jar (Detailed)

William Carlos Williams                      Portrait of a Lady

3.2. Hart Crane                      To Brooklyn Bridge

Robert Frost                      Home Burial (Detailed)

3.3. Carl Sandburg                      Chicago

Ezra Pound                      The Seafarer

3.4. Amy Lowell                      Meeting House Hill

**Prose**

Frank Norris                      A Plea for Romantic Fiction

**Short Fiction**

3.5. Edith Wharton                      Roman Fever

3.6. Jack London                      To Build a Fire

**Unit IV: Literature Of Socio And Cultural Challenges (K3,K4,K5)      (25 Hours)**

**Poetry**

4.1. E.E.Cummings                      Anyone who Lived in a Pretty Howtown (Detailed)

**Drama**

4.2. Eugene O' Neil                      The Hairy Ape (Detailed)

**Second World War And Its Aftermath**

**Poetry**

- |                       |                           |
|-----------------------|---------------------------|
| 4.3. Theodore Roethke | In a Dark Time            |
| Elizabeth Bishop      | The Fish (Detailed)       |
| 4.4. Robert Lowell    | Reading Myself (Detailed) |
| Denise Levertov       | The Goddess.              |

**Drama**

- |                         |                            |
|-------------------------|----------------------------|
| 4.5. Tennessee Williams | The Streetcar named Desire |
|-------------------------|----------------------------|

**Short Fiction**

- |                   |               |
|-------------------|---------------|
| 4.6. Eudora Welty | The Worn Path |
|-------------------|---------------|

**Unit V Fiction (K4,K5,K6)**

**(15Hours)**

- 5.1 Plot Construction
- 5.2 Narrative point of View
- 5.3 Characterization
- 5.4 Setting
- 5.5 Tone and Style
- 5.6 Symbolism and Irony

**Close Reading & Critical Interpretation:** To recognize and understand the ideas of innocence, tradition, salvation, and industrialism and the loss of innocence in the works of well-known American authors whose writings meet the criteria of great literature.

**Focused study of writers of personal choice**

Ernest Hemingway- William Faulkner- Mark Twain – John Steinbeck – Edith Wharton – Saul Bellow – John Updike – J.D.Salinger – Nathaniel Hawthorne – Willa Cather – Vladimir Nabokov - Herman Melville – Alice Walker – Harper Lee - Kurt Vonnegut – Sinclair Lewis – James Fenimore Cooper – Norman Mailer – Philip Roth – Don Delillo

**Books For Study And Reference**

1. Mac Gowan, Christopher. Twentieth- Century American Poetry. London: Blackwell Publishing, 2004.
2. Vinson, James. Twentieth Century American Literature. London: Great Writers Students Library. Macmillan, 1980.
3. Donald, Heiney and Lenteil H. Essentials of Contemporary Literature of the Western World, (Vol. 3 & 4). USA: Barron’s Educational Series.
4. Gray, Richard. A Brief History of American Literature. UK: Wiley – Blackwell, 2011.
5. Hoffmann, Daniel. ed. Harvard Guide to Contemporary American Writing. London: Oxford University Press, 2004.
6. Massa, Ann. American Literature in Context. London and New York: Methuen & Co. Ltd., 1982.

**PCENF20 - LITERARY CRITICISM**

<b>Year :</b> <b>I</b> <b>Sem :</b> <b>II</b>	<b>Course Code :</b> PCENF20	<b>Title Of The Course</b> Literary Criticism	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss the characteristics of the works of seminal literary critics
2. Explain critical concepts and literary genres through literary criticism
3. Apply Critical concepts to literary texts
4. Analyse literary texts and critical works
5. Evaluate literary texts based on critical ideas acquired from seminal works

CL//PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

CL//PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I**

**K1 – K5**

**(18 hours)**

#### **1.1 Introduction – Definition, Types**

**Classical**

1.2 Plato

From *Republic* Book II (pg 45-52) [Comprehensive View]



- 4.2 William Wordsworth                      From Preface to Lyrical Ballads, with Pastoral and Other Poems (1802) (pg 559-564) [Comprehensive View]
- 4.3. From Biographia Literaria: from Part II – Chapter 1 and 4 (pg 584 -585) [Comprehensive View]
- 4.4. From the Function of Criticism at the Present Time (pg 712 – 7144) [Comprehensive View]
- 4.5 Henry James                                From the Art of Fiction (744-759)
- 4.6 Oscar Wilde                                The Critic as Artist: From Part 2 (pg 803 – 806)

## Unit V

**K1 – K5**

**(18 hours)**

### New Criticism

- 5.1. Introduction to New Criticism- Tenets – Critics
- 5.2. Tradition and Individual Talent (pg 955- 961) [Comprehensive View]
- 5.3 John Crowe Ransom                      Criticism, Inc 4 (pg 978- 980)
- 5.4 Cleanth Brooks    From the Well Wrought Urn Chapter 11 – The Heresy of Paraphrase (pg 1217- 1220)
- 5.5 William K. Wimsatt Jr and              The Intentional Fallacy – I (pg 1232- 1235)
- 5.6 Monroe C. Beardsley                      The Affective Fallacy – IV (pg 1257-1261)

### Books for Study

1. *The Norton Anthology of Theory and Criticism*. Vincent B. Leitch Ed. New York: W.W. Norton & Company. 2010. Print.

### Books for Reference

1. Das and Kumar, Bijay - Twentieth Century Literary Criticism -Atlantic Publishers,
2. Habib, M. A. R. *A History of Literary Criticism*. Black Publishing, USA. 2006
3. ... *Modern Literary Criticism and Theory*. Blackwell Publishing, New Delhi. 2008.
4. Lodge, David, ed. *Modern Criticism and Theory - II edition*, New Delhi: Pearson Education, 1998.
5. Ramaswami and Seturaman V.S. ed. - *The English Critical Tradition: An Anthology of English Literary Criticism: Vol. 1.* - Macmillan, 1986.
6. Seturaman, ed. – *Indian Aesthetics: An Introduction*-New Delhi: Macmillan, 2005
7. Waugh, Patricia - *Literary Theory and Criticism* - New Delhi: Oxford University Press, 2006.

8. Wolfreys, Julian. *Modern European Criticism and Theory – A Critical Guide*. Edinburgh University Press. 2006.

**PCENG20 - LANGUAGE AND LINGUISTICS**

<b>Year :</b> <b>I</b>	<b>Course Code :</b> PCENG20	<b>Title Of The Course :</b> Language and Linguistics	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>5</b>	<b>Marks</b> <b>100</b>
<b>SEM :</b> <b>II</b>							

**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Recognize the structure, function and varieties of language
2. Demonstrate knowledge of the English language in terms of its history, structure, acquisition and applications
3. Understand the speech mechanism of language
4. Demonstrate knowledge of the sound structure of the English language and pronounce English vowels and consonants individually and in connected speech accurately
5. Distinguish and accurately enunciate voiced and voiceless sounds

<b>CO/PSO</b>	<b>PSO</b>					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

<b>CO/PO</b>	<b>PO</b>
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	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit – I: The History Of English Language K1 – K5**

**(18 hours)**

1. The Descent of the English language
2. The Old English (Anglo-Saxon) Period
3. The Middle English Period
4. The Renaissance and After
5. Evolution of Standard English
6. The Foreign Contribution

**Unit – II: Phonetics**

**K1 – K5**

**(18 hours)**

- 2.1. Introduction, Air Stream Mechanisms
- 2.2. The Organs of Speech
- 2.3. Classification and Description of Speech Sounds I: Consonants
- 2.4. Classification and Description of Speech Sounds II: Vowels
- 2.5. Phonetic Transcription
- 2.6. The International Phonetic Alphabet

**Unit – III: Phonology**

**K1 – K5**

**(18 hours)**

- 3.1. Phonology
- 3.2. The Syllable
- 3.3. Accent and Rhythm
- 3.4. Intonation
- 3.5. Assimilation and Elision
- 3.6. Practice in Phonetic Transcription

**Unit – IV: Levels Of Linguistic Analysis K1 – K5**

**(18 hours)**

- 4.1. Morphology
- 4.2. Syntax
- 4.3. Semantics
- 4.4. Pragmatics
- 4.5. Discourse Analysis
- 4.6. First Language Acquisition

**Unit – V: Multilingualism In India****K1 – K5****(18 hours)**

- 5.1. Contexts of Multilingualism
- 5.2. Demographic Context
- 5.3. Communicative Context
- 5.4. Functional Context
- 5.5. Political Context
- 5.6. Cultural Context

**Books For Study**

1. Balasubramanian T., *A Textbook of English Phonetics for Indian Students*. Madras: Macmillan, 1993.
2. Connor, J.D.O., *Better English Pronunciation*. Cambridge : Cambridge University Press, a. 1980.]
3. Kachru, Braj B, Yamuna Kachru, and S N Sridhar (Eds). *Language in South Asia*. Cambridge and New York: Cambridge University Press. 2008.
4. Krishnaswamy N., S.K. Verma – *Modern Linguistics* – New Delhi: Oxford University Press, 1989.
5. Wood F.T., *An Outline History of the English Language*. Madras: Macmillan, 2001.
6. Yule, George. *The Study of Language*. 6<sup>th</sup> Ed., Cambridge University Press, 2017.

**Books For Reference**

1. Jones, Daniel. *English Pronouncing Dictionary*. 17<sup>th</sup> Ed., Cambridge University Press, 2006.

**Web sources**

1. The History of Teaching English as a Foreign Language, from a British and European Perspective A. P. R. Howatt& Richard Smith  
<<http://www.tandfonline.com/doi/pdf/10.1179/1759753614Z.00000000028?needAccess=true>>  
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**PCENH18 - WOMEN'S WRITING**

<b>Year:</b> <b>I</b>	<b>Course Code:</b> PCENH18	<b>Title of the Course:</b> Women's Writing	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W:</b> 5	<b>Credits:</b> 4	<b>Marks:</b> 100
<b>Sem – II</b>							

## Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss aspects of women's writing
2. Explain diversity of women's experiences and their varied cultural moorings
3. Interpret different forms of literature: poetry, fiction, short fiction and critical writings
4. Analyse women's literary history and feminist criticism
5. Evaluate literary works by women

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

H - High – (3), M - Moderate (3), L - Low (1)

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## Course Syllabus

### Unit I: Poetry

(10 Hours)

1.1 Maya Angelou

Still I Rise

K2,K4

1.2 Wendy Cope

Difference of Opinion

K2,K4

1.3 E.B. Browning

From Aurora Leigh

K2,K4

1.4 Sylvia Plath	Mad Girls Love Song	K2,K4
1.5 Carole Ann Duffy	Little Red Cap	K2,K4
1.6 MeenaKandasamy	Apologies of Living on	K2,K4

## Unit II: Prose

(20 Hours)

2.1	Literary Background - Victorian Age- Angel in the House	K2,K4
2.2	Virginia Woolf Profession for Women	K5,K6
2.3	Marx's Critique – Commodity in Capitalism	K1,K2
2.4	Luce Irigrary Women on the Market	K5,K6
2.5	The Stereotypical Idea of Feminism And The Word Feminist	K1,K2
2.6	ChimamandaNgoziAdichie We all should be Feminist	K5,K6

## Unit III: Drama

(25 Hours)

3.1	Oppression of women on the basis of caste, class and gender.	K3,K6
3.2	Susan Glaspell Trifles	K4.K6
3.3	Subaltern Literature	K1, K2
3.4	Mahasweta Devi Rudali	K6
3.5	Poile Sengupta Mangalam	K1, K2
3.6	Poile Sengupta and the Theatre of Protest	K6

## Unit IV

(25 Hours)

### Feminism

4.1	Historical Background	K6
4.2	Different waves of feminism	K2, K4
4.3	Terms:	K1, K4

Androcentric; androgyny; biocriticism; biologism/biological; body consciousness-raising;



1. Gilbert, Sandra and Susan Gubar, *The Mad Woman in the Attic: The Women Writer and the Nineteenth Century Literary Imagination*. Yale: Yale Nota Bene, 2000
2. Hansberry Lorraine. *A Raisin in the Sun*. ed, Robert Nermiroff. New York: Vintage Books, 1958
3. Devi, Mahasweta and UshaGanguli, Rudali. Seagull Books, 1997.
4. Wandor, Michelene. *Post-War British Drama: Looking Back in Gender*. London : Routledge, 2001
5. Showalter, Elaine. *Inventing Herself*. New York : Scribner, 2001
6. Eagleton, Mary Ed. *Feminist Literary Theory: A Reader*. 2<sup>nd</sup> edition. Blackwell Publishers: UK, 1994.
7. Jaidka, Manju. *From Slant to Straight: Recent Trends in Women's Poetry*. New Delhi: Prestige Books, 2000.
  
8. *Body Blows Women, Violence and Survival - Three Plays* , Ed.by Poile Sengupta Manjula Padmanabhan, Dina Mehta (Author)Seagull Books; 2000th Edition (January 1, 2000)

### PEENC20 - POSTCOLONIAL LITERATURE

<b>Year: I SEM: II</b>	<b>Course Code :</b> PEENC20	<b>Title Of The Course :</b> Elective II A: Postcolonial Literature	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>5</b>	<b>Credits</b> <b>4</b>	<b>Marks</b> <b>100</b>
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Trace the aspects of subjectivity, race, class and feminism in the Postcolonial space
2. Understand how literature shapes ideas about society and social identities in interaction with other discourses such as history and politics
3. Analyse the history of Colonial rule, liberation movements in various nations and develop a critical thinking on the movement of Postcolonialism
4. Possess a coherent knowledge and a critical understanding of Postcolonial literature and its historical, cultural and theoretical developments.
5. Reinterpret and examine the values of literary texts, by focusing on the contexts in which they were produced, and reveal the colonial ideologies that are concealed within.

CO/PSO	PSO					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>



**Unit II** **K1-K6** **(15 hours)**

- 2.1 Meena Alexander Atmospheric Embroidery (Detailed Poetry)  
2.2 Nissim Ezekiel Goodbye Party for Ms Pushpa (Poetry ND)  
2.3 Manjula Padmanabhan Harvest (Drama Act II)  
2.4 Formal Elements of Fiction: Plot Construction, Narrative point of View  
2.5 Identity crisis, Homelessness, Partition, Violence  
2.6 Bapsi Sidwa Ice candy Man

**Unit III** **KI - K5** **(20 hours)**

- 3.1. Judith Wright Woman to Man (Detailed Poetry)  
3.2. Gabriel Okara The Mystic Drum (ND)  
3.3 Manjula Padmanabhan Harvest (Drama Act III)  
3.4 Edward Said Crisis: Orientalism  
3.5 Characterization and Setting  
3.6 Amitav Ghosh The Hungry Tide

**Unit IV** **K1-K5** **(20 hours)**

- 4.1 Jessie MacKay The Grey Company(Detailed Poetry)  
4.2 Derek Walcott A Far Cry from Africa (ND)  
4.3 Jane Harrison Stolen (Drama)  
4.4 Ashcroft, Griffin and Tiffin The Empire Writes Back: Introduction(Prose)  
4.5. Tone, Style, Symbolism  
4.6 Yann Martel Life of Pi

**Unit V:** **K1 – K5** **(20 Hours)**



### PEEND18 - LITERATURE OF THE MARGINALIZED

<b>Year:</b> <b>I</b>  SEM: II	<b>Course Code :</b> PEEND18	<b>Title Of The Course :</b> Literature of the Marginalized	<b>Course Type</b> :Theory	<b>Course Category :</b> Elective II A	<b>H/W</b> <b>5</b>	<b>Credits</b> <b>4</b>	<b>Marks</b> <b>100</b>
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#### **Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Discuss the concept of 'marginalized' and 'subaltern' from the socio-cultural and literary context

2. Identify and analyze the themes of place, gender, class, caste, class and nationality in literature from subaltern perspective
3. Apply subaltern theories and critically interpret the nuances of subaltern elements in literature
4. Analyze the voice of marginalized recorded in literature from the global and local context with comparative and analytical methodology
5. Create an oral and written form of interpretation on subaltern literature

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

## Unit I

**K1 – K5**

**(15 Hours)**

### Poetry

- 1.1 N.D. Raj Kumar (Tamil- India)
- 1.2 Ravi Kumar (Tamil- India)
- 1.3 S. Sukirtharani (Tamil- India)
- 1.4 Samuel Wagan Watson (Australia)

You, My Demon who Delights in Dancing  
 Have you Heard the Rain Crying?  
 Portrait of My Village  
 Last exit to Brisbane

### Prose

- 1.5 Arundhati Roy (India) The Doctor and the Saint- Arundhati Roy's  
Introduction to B.R.Ambedkar's  
Annihilation of Caste (pg: 1-20)
- 1.6 Arundhati Roy (India) The Doctor and the Saint- Arundhati Roy's  
Introduction to B.R.Ambedkar's  
Annihilation of Caste (pg: 21-47)

**Unit II K1 – K5 (20 Hours)**

**Autobiography, Drama and criticism  
Criticism**

- 2.1 Nellie McKay and Culture in Black The Narrative Self: Race, Politics,  
American Women's Autobiography – Part I

- 2.2 Nellie McKay The Narrative Self: Race, Politics,  
and Culture in Black  
American Women's Autobiography- Part II

**Autobiography**

- 2.3 Urmila Pawar (Marathi- India) The Weave of My Life
- 2.4 Living Smile Vidhya (Tamil- India) I am Vidhya; A Transgender's Journey

**Drama**

- 2.5 Hansberry (Afro-American) A Raisin in the Sun
- 2.6 Athol Fugard (Africa) Sizwe Bansi is Dead

**Unit III K1 – K5 (15 Hours)**

**Short Story and Criticism**

- 3.1 Gayatri Spivak Translator Foreword- Draupadi by Mahasweta Devi

- 3.2 Mahasweta Devi Draupadi (Short Story)

- 3.3 Gayatri Spivak Translator's Preface and Afterword to Mahasweta  
Devi, Imaginary Maps

- 3.4 The Legend of Pawngvina (oral tales - Mizoram) Translated by Lalrindiki T. Fanai

- 3.5 Basil Fernando (Sri Lanka) When Will They Be Free?

- 3.6 Flora Nwapa (Nigeria) Wives at War

**Unit IV Theory and Criticism K1 – K5 (20 Hours)**

- 4.1 Sharankumar Limbale Dalit Aesthetics

4.2 David Ludden	Reading Subaltern Studies- Introduction : Part I
4.3 David Ludden	Reading Subaltern Studies- Introduction : Part II
4.4 David Ludden	Reading Subaltern Studies- Introduction : Part III
4.5 David Ludden	Reading Subaltern Studies- Introduction : Part IV
4.6 Dua and Lawrence	Understanding the Indigenous Struggle: The Limitation of Postcolonial Theory (Pg 13-27)

## Unit V Fiction

**K1 – K5**

**(20 Hours)**

5.1 Nadia Hashimi (Afghanistan)	The Pearl that Broke its Shell
5.2 MohjaKahf (Syria)	The Girl in the Tangerine Scarf
5.3 Elif Shafak (Turkey)	Three Daughters of Eve
5.4 Laura Esquivel (Mexico)	Like Water for Chocolate
5.5 Meena Kandasamy (India)	The Gypsy Goddess
5.6 Bama (Tamil)	Sangati

### Books for study:

1. Devi, Mahasweta. Bitter Soil (trans) Ipsita Chanda, Calcutta: Seagull,2009
2. Vidhya, Living Smile. I am Vidhya, New Delhi: Rupa Publication India, 2013
3. Pawar, Urmila. The Weave of My Life,(trans) Maya Pandit, Kolkata: Mandira Sen for STREE,2018
4. Fugard, Athol. Sizwe Bansi is Dead, London: Oberon Books, 2009
5. Hashimi, Nadia. The Pearl that Broke its Shell, London and New York: Harper Collins, 2015
6. Kahf, Mohja. The Girl in the Tangerine Scarf, London and New York: Carroll & Graf, 2006
7. Shafak, Elif. Three Daughters of Eve, Bloomsbury USA, 2017
8. Esquivel, Laura. Like Water for Chocolate, USA: Radom House, 1995
9. Meena Kandasamy, The Gypsy Goddess, London and New York: Harper Collins, 2015
10. Bama, Sangati. (trans) Lakshmi Holmstrom, OUP, 2005
11. Ch. Zama, Margaret (ed). Contemporary Tales from Mizoram, Chennai: Sahiya Akademi,2017.

### Books for Reference:

1. Landry, Donna and Maclean, Gerald (ed) The Spivak Reader Gayatri Chakravorty. New York and London: Routledge, 1996.
2. Limbale, Sharankumar. Towards an Aesthetics of Dalit Literature (trans) Alok Mukherjee, New Delhi: OUP, 2012
3. Ravikumar and R.Azhagarasn (ed). The Oxford India Anthology of Tamil Dalit Writing. New Delhi: Oxford University Press,2012.
4. Amedekar, B.R. Annihilation of Caste. New Delhi: Navayana, 2014
5. Devy, G.N (ed) From Voice and Memory: Indigenous Imagination and Expression. Hyderabad: OBS, 2011
6. Mckay, Nellie Y.The Narrative Self: Race, Politics, and Culturein Black American Women's
7. Autobiography. Smith, Sidonie and Watson, Julia (ed). Women, Autobiography, Theory: A Reader,
8. Madison: University of Wisconsin Press, 1998

**PEENE20 - INDEPENDENTELECTIVE II A: LITERARY SKILLS FOR EMPLOYABILITY-II**

<b>Year:</b> <b>I</b>	<b>Course Code :</b> PEENE20	<b>Title Of The Course :</b> Literary Skills for Employability- II	<b>Course Type</b> :Theory	<b>Course Category :</b> Elective II A	<b>H/W</b>	<b>Credits</b>	<b>Marks</b> <b>100</b>
<b>SEM:</b> <b>II</b>							

**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Remember and recall names of authors, literary works, dates, facts, terms and concepts

2. Demonstrate knowledge of English Language and Linguistics
3. Apply knowledge of literary criticism to analyze literary works
4. Discover interest and demonstrate knowledge in literature in English outside Britain and America
5. Demonstrate knowledge in Application-oriented areas like Research Methodology, Translation and English Language Teaching

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: English Poetry**

**k2-k6**

**(18 Hours)**

- 1.1. English Poetry, Elements of Poetry
- 1.2. Other Forms of Poetry, Figurative/Connotative Devices
- 1.3. History of Poetry in English: Pre-Chaucerian Age, Anglo-Norman Poets
- 1.4. Age of Chaucer, Geoffrey Chaucer
- 1.5. The Canterbury Tales, Other Poets of the Age of Chaucer
- 1.6. Model Questions & Solved Question papers

**Unit II: Poetry in the Age of Revival**

**k2-k6**

**(18 Hours)**



- A. P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
5. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
6. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
7. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
8. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
9. Yule, George. *The Study of Language*. Cambridge University Press, 19

**PIEND19 - INDEPENDENT ELECTIVE II B: CREATIVE WRITING**

<b>Year:</b> <b>2020</b>	<b>Course Code:</b>	<b>Title of the Course:</b>	<b>Course Type:</b>	<b>Course Category:</b>	<b>H/W:</b>	<b>Credits:</b>	<b>Marks:</b>
Sem - II	PIEND19	Independent Elective: Creative Writing	Theory	Independent ElectiveIIB			100

**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Understand how to describe critical ideas
2. Apply critical and theoretical approaches to the reading texts

3. Examine the relationship between the individual works and conventional literary work
4. Evaluate how ideas, themes and values create an impact on societies
5. Create poems or literary non-fictional pieces those are original and engaging

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	M	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	M	H

**Unit I Introducing Creative Writing (18 Hours)**

- 1.1 Analyze Purpose of writing K4
- 1.2 Learning to Write K3
- 1.3 Inventions of Creative Writing K1
- 1.4 Rhetoric's Play K1
- 1.5 Reading and the Individual writer K1
- 1.6 Publishing and Editing K2

**Unit II Challenges of Creative Writing**

- 2.1 Reflective Criticism K3
- 2.2 Challenges to Writer K4
- 2.3 Challenges of Translation K4
- 2.4 Challenges of Experiment K4
- 2.5 The Challenge of Design K4
- 2.6 The Challenge of Quality K4

**Unit III Process of Creative Writing K3, K4 (18 Hours)**

- 3.1 Seven Processes (Preparing, Planning, Incubation, Beginning, Flowing, Breakthroughs and finish lines, On titles)
- 3.2 The writer post- performance
- 3.3 Precisions of Process
- 3.4 Confidence and Practise
- 3.5 'Method' Writing
- 3.6 Effacement

**Unit IV Composition and Creative Writing K5, K6 (18 Hours)**

- 4.1 Habits of mind, Principles of practice
- 4.2 Discipline
- 4.3 Notebooks and rituals
- 4.4 Compositions and action
- 4.5 Language's Mercury
- 4.6 Influence and Imitation

**Unit V: Practice of Poetry, Fiction and Nonfiction K6 (18 Hours)**

- 5.1 Writing literary fiction (Flash fiction- Short story- Novel- Character- Story making)
- 5.2 Writing literary fiction (Novel- Character- Story making)
- 5.3 Writing creative nonfiction (writing about yourself- writing about people and the world)
- 5.4 Writing poetry (listening to language- finding language- awakening language- shaping language- playing with language- poetry's reason)
- 5.5 Form and Structure
- 5.6 Subverting the form

**Books for Study:**

Morley, David. *The Cambridge Introduction to Creative Writing*. Cambridge: CUP, 2007.

**Books for Reference:**

1. Best, Wilfred D. *The Students Companion*. London: Rupa Paperback, 1984.
2. Dawson S.W. *Drama and Dramatic: The Critical Idiom Series*. London: Methuen & Co, 1984.
3. Doubtfire, Dianne. *Creative Writing*. Britain: The Chaucer Press Ltd, 1983.
4. Evans, Ifor B. *The Use of English*. London and New York: Staples Press, 1949.
5. Hall Donald and Sven Birkerts. *Writing Well*. New York: Harper Collins Publishers, 1991.
6. Kahn John Ellison (Ed.) *Reader's Digest: How to Write and Speak Better*. New York: Reader's Digest, 1993.
7. Millward Celia. *Handbook for Writers, 2<sup>nd</sup> Edition*. New York: Holt, Rinehart & Winston, 1980.
8. Reid Ian. *The Short Story: The Critical Idiom Series*. London: Methuen & Co, 1986.
9. Saxena Sunil. *Headline Writing*. New Delhi: Sage Publications, 2006.
10. Schwartz Helen J. *Interactive Writing: Composing with a Word Processor*. New York: Saunders College Publishing, 1985.
11. Scott Bill. *The Skills of Communicating*. Mumbai: Jaico Publishing House, 1995.

### SEMESTER III

#### PCENI20 - ROMANTIC AND VICTORIAN LITERATURE

<b>Year : II Sem III</b>	<b>Course Code :</b> PCENI20	<b>Title Of The Course :</b> Romantic and Victorian Literature	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>4</b>	<b>Marks</b> <b>100</b>
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Explain the nature of Industrial Revolution, the subsequent scientific and material progress and to explore a society that was being re-organized around Science, Factories and Business.
2. Connect the works of the Romantics and Victorians to their social and historical backgrounds and evaluate it
3. Analyse and appreciate the interconnectedness of human life and nature as reflected in works written during the Romantic period.
4. Differentiate the traits of Romanticism and Victorianism in English literature with emphasis on concepts of self, imagination, and the unconscious.
5. Evaluate the impact of Romanticism and Victorianism on the development of English literature, with emphasis on development of literary forms and literary modes of expression.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M

<b>CO5</b>	H	H	H	H	H	M
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**H - High – (3), M - Moderate (3), L - Low (1)**

<b>CO/PO</b>	<b>PO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	M	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

## **Unit I**

**K1 – K6**

**(18 hours)**

- 1.1 Introduction to Key Concepts and Ideas of Romantic age Didacticism, Hellenism, Philosophic Content
- 1.2 William Wordsworth      The World is too much with us (Detailed Romantic Poetry)
- 1.3 Robert Browning          Fra Lippo Lippi (Lines 1- 60) (Detailed Victorian Poetry)
- 1.4 Charles Lamb              Dream Children (Detailed Romantic Prose)
- 1.5 Emily Bronte (Romantic)
- 1.6 Jane Austen (Romantic)

## **Unit II**

**K1-K5**

**(18 hours)**

- 2.1 Mysticism, Pathetic Fallacy, Pastoral Elegy
- 2.2 S. T. Coleridge              Kubla Khan (Detailed Romantic Poetry)
- 2.3 Matthew Arnold          Dover Beach (Detailed Victorian Poetry)
- 2.4 William Hazlitt            On Going a Journey (Detailed Romantic Prose)



## Imagery

- 5.2 Tennyson MorteD'Arthur (Detailed Victorian Poetry)  
P. B. Shelley To a Skylark (Detailed Romantic Poetry)
- 5.3 Reading and Interpreting fiction, Setting, Tone, Style, Symbolism and Irony
- 5.4 Oscar Wilde The Importance of Being Earnest(Detailed Victorian Drama)
- 5.5 Thomas Hardy (Victorian)
- 5.6 George Eliot(Victorian)

### Books for Study:

1. Raymond Wilson Ed., *A Coleridge Selection*. London: Macmillan Ltd., 1988.
2. John Beeg Ed., *Coleridge Poems*. An Everyman Paperback Publication, New York, 1973.
3. Edmund Blunden Ed., *The Poems of John Keats*. New Delhi: Rupa Publication, 2000.
4. Philip Wayne Ed., *William Wordsworth's Poems*. London: J. Mocerent & Sons Ltd., 1907.
5. Jane Austen, *Persuasion*. New Delhi: Rupa Co. Publication House, 2000.
6. Thomas Hardy, *Far From the Madding Crowd*. New York: Oxford University Press, 2008.
7. George Eliot, *Middlemarch*. London: Macmillan, 1972.
8. Charles Lamb, *Essays of Elia*. Bombay: Macmillan, 1895.
9. Charles Dickens, *Oliver Twist*. London: Thomas Nelson & Sons Ltd, 1958.
10. John Holloway, *Selected Poems of Percy Bysshe Shelley* – Ed Heinemann. London: Publication, 1960.

### Books for Reference:

1. Geoffrey Durant *William Wordsworth* — Cambridge: Cambridge University Press, 1969.
2. Kelvin Everest, *John Keats* — New Delhi: Atlantic Publication, 2002.
3. J.M. Johri, *Shelley's Adonais* –, Bareilly: Prakash Book Depot, 1996
4. *Critical Essays on the poetry of Tennyson*, Ed by John Killbam, Routledge & Kegan Paul. London: 1960.
5. Geoffrey H. Hartman, *Hopkins: A Collection of Critical Essays*, Ed by. New Delhi: Prentice-Hall of India Pvt Ltd., 1980.
6. Birjadesh Prasad, *Arnold's Thesis*, Bombay: B.I. Publication, 1982.
7. Andrew H. Wright, *Jane Austen's Novels*. A Peregrine Book, Middlesex: Penguin Books Ltd., 1953.
8. Rod Mengham, *Charles Dickens*. New Delhi: Atlantic Publishers, 2001.
9. R.T. Jones, *British Authors, Introductory Critical Studies, George Eliot*. London: Cambridge University Press, 1970.
10. Graham Handley, *Middlemarch by George Eliot*. Hampshire: Palgrave Macmillan, 1985.
11. Lance St. John Butler, *Studying Thomas Hardy*. Essex: Longman York Press – 1986.

## PCENJ20 - SHAKESPEARE STUDIES

<b>Year:</b> <b>II</b>  <b>Sem -</b> <b>III</b>	<b>Course Code:</b> PCENJ20	<b>Title of the Course:</b> Shakespeare Studies	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W:</b> 6	<b>Credits:</b> 5	<b>Marks:</b> 100
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss Elizabethan and Jacobean context in connection with the ideas of culture, history and politics of these periods
2. Understand and explore the language, key terms, concepts, dramatic genres and themes of Shakespearean theater thus gaining an insight into the age of Shakespeare.
3. Analyze verbally and in writing Shakespeare as a product of his society
4. Read analytically to determine Shakespeare's purpose, historical and cultural perspective, and use of rhetorical and dramatic strategies in creating a play.
5. Evaluate Shakespeare's contribution to the English language and to the development of the modern drama and recognize various theories of literary criticism applied to Shakespeare's plays

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	M	M	M	M
<b>CO2</b>	H	H	H	H		M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H		M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## Course Syllabus

### Unit I

Introduction to William Shakespeare K1,K2,K3,K4 (10 Hours)

1.1 Life

1.2 Plays & Sonnets

1.3 Language, Audience and Theatre

**(Detailed Plays)**

Tragedy: Hamlet K3.K4,K5 (10 Hours)

1.4 Shakespearean Tragedy

1.5 Sources, Plot, overview and Themes

1.6 Analysis and Criticism

### Unit II

Comedy: Twelfth Night K3,K4,K5 (15 Hours)

2.1 Shakespearean Comedy

2.2 Sources, Plot, overview and Themes

2.3 Analysis and Criticism

Last Plays: The Tempest K3,K4,K5 (15 Hours)

2.4 Tragicomedy

2.5 Sources, Plot overview, Themes and Motifs

2.6 Analysis and Criticism

### Unit III

K2,K3,K4 (10 Hours)

**(Non - Detailed Plays)**

3.1 Roman Plays

3.2 Antony and Cleopatra

3.3 Sources, Plot Overview, Themes and Motifs

3.4 Analysis and Criticism

3.5 Problem Plays

3.6 Measure for Measure

**Unit IV Shakespeare and Theory I      K3,K4,K5,K6      (10 Hours)**

4.1 Structuralism

4.2 Roman Jakobson – The Structures of Sonnet 129.

4.3 Freudian Psychoanalysis

4.4 Ernest Jones – Reading the Oedipus Complex in Ernest Jones .

4.5 Feminism - Virginia Woolf

4.6 Shakespeare and the Question of Female Authorship. From Jonathan Gil Harris, *Shakespeare and Theory*. New York: Oxford University Press, 2012.

**Unit V Shakespeare and Theory II      K3,K4,K5,K6      (10 Hours)**

5.1 Maxism

5.2 Karl Marx

5.3 *Timon of Athens* and the Power of Money

5.4 Post Structuralist Marxism

5.5 Terry Eagleton

5.6 Language and Reification in *Macbeth* and *Twelfth Night*.

**Books for Study:**

1. Shakespeare, William, Ed Chaise McEacheru. *The Tempest*. New Delhi: The Arden Shakespeare Bloomsbury, 2013.
2. Shakespeare, William, Ed Chaise McEacheru. *Twelfth Night*. New Delhi: The Arden Shakespeare Bloomsbury, 2013.
3. Shakespeare, William, Ed John Wilder. *Antony and Cleopatra*. The Arden Shakespeare New Delhi: Bloomsbury, 2013.
4. Shakespeare, William, Ed By J.W. Lever. *Measure for Measure*. London & New York: Rutledge, 1988.

5. Shakespeare, William, Ed by Ann Thompson and Neil Taylor. *Hamlet*. New Delhi: Bloomsbury, 2006.
6. Shakespeare, William. *Antony and Cleopatra*. New York: Palgrave Macmillan, 1987.
7. Jonathan Gil Harris, *Shakespeare and Theory*. New York: Oxford University Press, 2012.

### Books for Reference

1. Dover Wilson, *What Happens in Hamlet*. London: Cambridge University, 1974.
2. G.K. Stead, *Measure for Measure: A Selection of critical Essays*. London: Macmillan, 1971.
3. Nigel Alexander, *Shakespeare's Measure for Measure*. London: Studies in English Literature Edward Arnold, 1986.
4. Ania Loomba, *Shakespeare, Race and Colonization*. New York: Oxford University Press 2012.
5. John Russell Prown, *Shakespeare's Antony and Cleopatra*. London: Macmillan Press Ltd., 1977.
6. Diana Henderson Ed. *Alternative Shakespeare 3*. Oxford: Routledge Abington, 2008.
7. A.C. Bradley, *Shakespeare Tragedy*. New Delhi: Atlantic Publishers and Distributors Pvt. Ltd., 2010.
8. Robin Lee, *Shakespeare's Antony and Cleopatra – Studies in English Literature*. London: Edward Arnold, 1984.

### PCENK20 - CONTEMPORARY CRITICAL THEORY

<b>Year : II SEM : III</b>	<b>Course Code : PCENK20</b>	<b>Title Of The Course : Contemporary Critical Theory</b>	<b>Course Type : Theory &amp; Practical</b>	<b>Course Category : Core</b>	<b>H/W 6</b>	<b>Credits 5</b>	<b>Marks 100</b>
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss the role of historical context in the interpretation of literary texts
2. Examine various critical theories for their success, drawbacks and influence
3. Analyse critical ideas for an accurate understanding of literary works
4. Compare and Contrast various critical theories and the practice
5. Evaluate literary works using appropriate critical ideas/concepts/theories

<b>CO/PSO</b>	<b>PSO</b>	
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	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

H - High – (3), M - Moderate (3), L - Low (1)

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

## Unit I

K2-K5 (18 hours)

### 1.1 Introduction

Jonathan Culler

Literary Theory (Pg. 201 – 216)

From Joseph Gibaldi *Introduction to Literary Scholarship in Modern Languages and Literatures*

### Structuralism and Post structuralism

1.2 Historical Background - Structuralism

1.3 Historical Background – Post Structuralism

1.4 **Terms/ Concepts:** Allography; arbitrariness; author; bricoleur; convention; deviation; diachronic and synchronic; diacritical; difference; digital and analogic communication; écriture; formulaic literature; function; functions of language; heterobiography, homology; hymen; langue and parole; linguistic paradigm; nominalism; post-structuralism; reference; sign; speech; structure in dominance; syntagmatic and paradigmatic; structuralism; textualist; transgressive strategy.

### 1.5 Structuralism

**Text:** Roland Barthes

The Death of the Author

**Analysis**

Micheal Ryan pg. 25-31

## 1.6 Poststructuralism

**Text:** Jacques Derrida                      Structure, Sign and Play in the Discourse of Human Sciences

**Analysis**                      Micheal Ryan Pg.83-84

### Unit II

**K2-K5**

**(18 hours)**

#### Psychoanalysis

##### 2.1 Historical Background

**2.2 Terms:** Abject; alterity; archetypal criticism; arche-writing; body; censorship; chora; condensation and displacement; contiguity; cross talk; desire; disavowal; double-bind; fetishism; figure and ground; fort/da; gaze; Gestalt; hommelette; imaginary/symbolic/real; intersubjectivity; jouissance; linguistic paradigm; méconnaissance; mirror stage; *Nachtraglichkeit*; Name-of-the – Father; object-relations theory/ criticism; objet a/objet A; other; overdetermination; panoptism/ panopticism; phallogentrism; pleasure; point de capiton; primary process, projection characters; psychoanalytic criticism; repression; revisionism; schizoanalysis; scopophilia/scopophobia; scotomization; sinthom; slippage; solution from above/below; subject and subjectivity; symptom; syntagmatic and paradigmatic; topographical model of the mind, transference; True-Real; Unconscious.

**2.3 Text:**Harold Bloom                      Poetry, Revisionism and Repression

**Analysis:***Young Goodman Brown*: Id versus Superego

Guerin Wilfred L., Earle Labour et al. *A Handbook of Critical Approaches to Literature*. New York: OUP, 1999

#### Marxism

##### 2.4 Historical Background

**2.5 Terms:** Absence; against the grain; alienation; alienation effect; always-already; aura; base and superstructure; class; coherence; co-optation; Copernican revolution; critical theory; dialectics; economism; English; epistemological break; fetishism; flaneur; formation; Frankfurt school; gest; hegemony ; homology; ideologeme; ideology; incorporation; instance; intellectuals; interpellation; legitimation; literary mode of production; Marxist literary theory and criticism; materialism; moment; Montage; myth; popular; praxis; problematic; realism; reification; slippage; structure in dominance; structure of feeling; subject and subjectivity;

**2.6 Text:** Marxist Criticism                      Terry Eagleton

From Welder, Dennis. *Literature in the Modern World: Critical Essays and Documents*.

Reprinted. New York: Oxford UP, 2008. Print.

Analysis: Silence, Violence and Souther Agrarian Class Conflict in William Faulkner's *Barn Burning*

### Unit III

**K2-K5**

**(18 hours)**

#### Post colonialism

##### 3.1 Historical Background

**3.2 Terms:** Affiliation; Africanist/Nationalist; Alterity; Authenticity; Bolekaja Critics; Comprador; Contamination; Creolization; Diaspora literature; Disidentification; Double Colonization; Double consciousness; double-voiced; dubbing; ethnoscope; Eurocentric; fictograph; hybrid/hybridization; imagined community; liminal; marvellous realism; master narrative; mediascape; mimicry; nation/nationalism; nativism; négritude, neo-Tarzanism; Nomad; orature; orientalism; other; passing; postcolonialism; relativism; relexification; subaltern; transculturation; west.

**3.3 Text:** Chinua Achebe Colonialist Criticism  
From Chinua Achebe. *Hope and Impediments. Selected Essays 1965-87*  
**Analysis:** Colonialism and Authenticity: V.S. Naipaul's *The Mimic Men*  
From *The Empire Writes Back* –Pg 87-90

### **Multiculturalism**

3.4 Historical Background

**3.5 Terms** Binary/binarism; bricoleur; culture; cultural studies; fiction; formulaic literature; myth; New Historicism and cultural materialism; Sapir-Whorf hypothesis; script; structures of feeling; thick description/thin; utterance.

**3.6 Text:** Overlapping Territories, Intertwined Histories – Edward W. Said

**Analysis:** Victims Already: Violence and Threat in Nadine Gordimer's *Once upon a Time*

## **Unit IV**

**(18 hours)**

### **Reader Response Theory**

4.1 Historical Background

**4.2 Terms/ Concepts** Appreciation; code; coduction; cross talk; ecological validity, exegesis; genre; hermeneutics; ideation; interpretation; intrepertative communities; interrogate; intersubjectivity; jouissance; meaning and significance; ontological status; open and closed texts; oppositional reading; parabolic text; performance; politeness; prepublication/postpublication reading; punctuation; readerly and writerly text; readers and reading; reading community; reading position; reception theory; self consuming art/craft; sense and reference; sub-text; suspense; theme and thematics; topic; transactional theory of the literary work.,

4.3 Stanley Fish

Is There a Text in the Class?

### **New Historicism**

4.4 Historical Background

**4.5 Terms:** Circulation; emplotment; energy; exchange; New Historicism and Cultural Materialism; resonance; structure

4.6 Text: *Professing the Renaissance: The Poetics and Politics of Culture* – Louis A. Montrose

**Analysis:** *To His Coy Mistress: Implied Culture versus Historical Fact*

## **Unit V**

**K2-K5**

**(18 hours)**

### **Ecocriticism**

5.1 Historical Background



4. Dobie, Ann B. *Theory into Practise: An Introduction to Literary Criticism*. New Delhi: Cengage Learning, 2012.
5. Guerin Wilfred L., Earle Labour et al. *A Handbook of Critical Approaches to Literature*. New York: OUP, 1999.
6. Ryan, Michael. *Literary Theory: A Practical Introduction*. Oxford: Blackwell Publishing, 2007.
7. Woods, Tim. *Beginning Postmodernism*. New Delhi: Viva Books, 2011.
8. Webster, Roger. *Studying Literary Theory: An Introduction*. London: Hodder Headline Group. 1996.
9. Newton, K.M. *Twentieth Century Literary Theory: A Reader*. New York: St. Martin's Press, 1997.
10. Dobie, Ann B. *Theory into Practise: An Introduction to Literary Criticism*. New Delhi: Cengage Learning, 2012.
11. Guerin Wilfred L., Earle Labour et al. *A Handbook of Critical Approaches to Literature*. New York: OUP, 1999.
12. Ryan, Micheal . *An Introduction to Criticism : Literature/Film/Culture*. West Sussex: Wilsey Publishing, 2012.
13. Welder, Dennis. *Literature in the Modern World: Critical Essays and Documents*.
  - a. Reprinted. New York: Oxford UP, 2008. Print.

#### **Books for Reference:**

1. Hawkes, Terence. *Structuralism and Semiotics*. London and New York: Routledge, 1977.
2. Holquist, Michael. *Dialogism*. London and New York: Routledge, 1990.
3. Allen, Graham. *Roland Barthes*. London and New York: Routledge, 2003.
4. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
5. Belsey, Catherine. *Critical Practice*. London and New York: Routledge, 1980.
6. Bennett, Tony. *Formalism and Marxism*. London and New York: Routledge, 1979.
7. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
8. Culler, Jonathan Barthes. *A Very Short Introduction*. New York: OUP, 2002.
9. Fillingham, Lydia Alix and MousheSusser. *Foucault for Beginners*. India: Orient Longman, 2000.
10. Iyengar, Srinivasa K.R. *The Adventure of Criticism*. New Delhi: Sterling Publishers, 1985.
11. Krishnaswamy N. John Varghese and Sunita Mishra. *Contemporary literary Theory: A Student's Companion*. New Delhi: Macmillan, 2001
12. Kundara, Milan. *The Art of the Novel*. New York: Penguin Books & Faber & Faber, 1986.
13. Lane, J. Richard. *Fifty Key Literary Theorists*. New York and London: Routledge, 2006.
14. Murfin, Ross and Supriya M. Raj. *The Bedford Glossary of Critical Terms*. Boston and New York: Bedford, 1998.
15. Nagarajan M.S. *English Literary Criticism and Theory*. Hyderabad: Orient Longman, 2006.
16. Norris, Christopher. *Deconstruction*. London and New York: Routledge, 1982.
17. Powell, Jim and Van Howell. *Derrida for Beginners*. India: Orient Longman, 2000.
18. Powell, Jim. *Postmodernism*. Chennai: Orient Longman, 1998.
19. Rainbow, Paul. *The Foucault Reader*. New York: Pantheon Books, 1984.

20. Royle, Nicholas. *Jacques Derrida*. London and New York: Routledge, 2003.

### **PCENL20 - RESEARCH METHODOLOGY**

<b>Year :</b> <b>II</b> <b>SEM :</b> <b>III</b>	<b>Course Code :</b> PCENL20	<b>Title Of The Course :</b> Research Methodology	<b>Course Type :</b> Theory & Practical	<b>Course Category :</b> Core	<b>H/W</b> <b>6</b>	<b>Credits</b> <b>4</b>	<b>Marks</b> <b>100</b>
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#### **Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Identify and contextualize research problems
2. Identify the tools specific to the research problem
3. Collect and catalogue data and gather the inference
4. Develop research questions for qualitative and quantitative research
5. Formulate a hypothesis, write a research proposal and Plan out the research

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	M	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

H - High – (3), M - Moderate (3), L - Low (1)

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	M	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Introduction**

**K2-K5**

**(18 hours)**

1. Research Skills, Methods, and Methodologies



## 5.6. Citations in forms other than print

### **Internal Assessment: Summer Internship Project**

#### **Books for Study**

1. Brown, James Dean, Theodore S. Rodgers, *Doing Second Language Research*. New York: OUP, 2003.
2. DaSousa, Delia Correa and W.R.Owens. *The Handbook to Literary Research*, second Edition. Routledge: Taylor and Francis Group, The Open University Abingdon-Oxon. 2010.
3. Gabriele Griffin. *Research Methods for English Studies: An Introduction*. UK: Edinburgh University Press, 2005.
4. George. Watson. *Writing a Thesis: A Guide to Long Essays and Dissertations*. London and New York: Longman, 1987.
5. Gibaldi, Joseph - *M.L.A: Handbook for Writers of Research Papers, 7<sup>th</sup> Edition*. New Delhi: Affiliated East-West Press Pvt. Ltd., 2003.
6. Gibaldi, Joseph - *M.L.A: Handbook for Writers of Research Papers, 8<sup>th</sup> Edition* . New York: Affiliated East-West Press Pvt. Ltd., 2016.
7. Pirie, David B. *How to Write Critical Essays: A Guide for Students of Literature*. London and New York: Routledge, 2002
8. Correa, Delia Da Sousa and W.R.Owens (Eds). *The Handbook to Literary Research, 2<sup>nd</sup> Edition*. London: Routledge, 2010.

#### **Books for Reference**

1. Anderson, Janathan, Berry H. Durston and Millicent Poole. *Thesis and Assignment Writing*. New York: Wiley Eastern Limited, 1988.
2. Anthonyswamy K.S. *Doing Research in ELT – Vijay Nicole Imprint Pvt Ltd Chennai*. 2014
3. Eliot Simon ed. *A Hand Book to Literary Research*. London: Routledge, 1998.
4. Fabb Nigel and Durant Allan. *How to Write Essays Theses Dissertations in Literary Studies*. London: Longman Publishing, 1993.
5. Gibaldi, Joseph and Walters, Achtert. *MLA Handbook for Writers of Research Papers, 2<sup>nd</sup> Edition*. New Delhi: Wiley Eastern Ltd., 1977.
6. Kumar, Anand Raju. *American British and Commonwealth*. Chennai: Affiliated East-West Press Ltd, 1990.
7. Woolf, Judith. *Writing About Literature*. London and New York: Routledge, 2005.

**PEENF20 - ELECTIVE III A: TRANSLATION STUDIES**

<b>Year : II SEM : III</b>	<b>Course Code : PEENF20</b>	<b>Title Of The Course : Translation Studies</b>	<b>Course Type :</b>	<b>Course Category : Elective III A</b>	<b>H/W 6</b>	<b>CREDITS 4</b>	<b>MARKS 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to::

1. Identify the technical terms in translation theory
2. Explain the theoretical principles in translation theory and their implications
3. Apply the knowledge of translation theories to research in translation
4. Appraise the problems of equivalence and loss and gain between the SL and TL texts, leading to comparative evaluation of available versions of translations of a text
5. Translate literary and non-literary works

CO/PSO	PSO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	M	M	M

<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	H

**Unit I: Central Issues (Theory I)                      K2-K5                      (18 hours)**

1. Language and Culture
2. Types of Translation
3. Decoding and Recoding
4. Problems of Equivalence
5. Loss and Gain
6. Untranslatability

**Unit II: History of Translation Theory (Theory II)                      K2-K5                      (18 hours)**

- 2.1. Problems of “Period Study”
- 2.2. The Romans
- 2.3. Bible Translation
- 2.4. Education and the Vernacular
- 2.5. Early Theorists
- 2.6. Archaizing

**Unit III: History of Translation Theory (Theory III)                      K2-K5                      (18 hours)**

- 3.1. The Renaissance
- 3.2. The Seventeenth Century
- 3.3. The Eighteenth Century
- 3.4. Romanticism and Post Romanticism
- 3.5. The Victorian
- 3.6. The Twentieth Century

**Unit IV: Critical Issues in Translation (Theory IV)                      K2-K5                      (18 hours)**

- |                       |   |
|-----------------------|---|
| 4.1. Albrecht Neubert | Translation as Text   |
| 4.2. Roman Jakobson   | On Linguistic Aspects of Translation                          |
| 4.3. Sherry Simon     | A.K.Ramanujan: What happened in the library                   |
| 4.4. Lawrence Venuti  | The Translator, the Name-of-the-father, and the Mother Tongue |
| 4.5 Lawrence Venuti   | The Translator’s Unconscious(pg 232-237).                     |
| 4.6. Susan Bassnett   | Literary Research and Translation                             |

## Unit V: Translation in Practice K2-K5

(18 hours)

A field work on anyone of the topics given below has to be undertaken by the students to attempt a translation of the same and to be submitted for **internal assessment**.

- 5.1. Oral stories, songs and traditions of the village  
History of the local or town temple or mosque or churches- worship places.
- 5.2. History of the monuments in the village or town, Family History, Life of the ancestors in the village or town  
The origin of the name of the village /town
- 5.3. Great personalities of the past and present who lived in the village/town  
Extraordinary Historical event.
- 5.4. The development of the village or town  
The description of special occupation of the village or town  
The Landscape, details of the source of water.  
Culture of the village or town.
- 5.5. Typical village festival, its origin and the celebrations.  
The natural treatment and cure of the diseases.
- 5.6. Biographies, literary texts, newsletters, documents from regional languages

### Books for Study

1. Bassnett, Susan - *Translation Studies*, 3<sup>rd</sup> Edition – Routledge, New Delhi, 2005.
2. Richard, Alessandra. Ed. *Translation Studies: Perspectives on an Emerging Discipline*. New Delhi: Cambridge University Press, 2002.
4. Nair, Rukmini Bhaya. *Lying on the Postcolonial Couch*. New Delhi: Oxford University press, 2002.
5. Wakabayashi, Judy and Rita Kothari, Eds. *Decentering Translation Studies, India and Beyond*, Hyderabad : Orient Blackswan, 2014
6. Corrae, Delia Da Sousa and W.R.Owens (Eds). *The Handbook to Literary Research*, 2<sup>nd</sup> Edition. London: Routledge, 2010.
7. Naikar, Basavaraj. *Glimses of Indian Literature in English Translation*. Delhi: Authors press, 2008.

### Books for Reference

1. Dharwadker, Vinay (Ed). *The Collected Essays of A.K. Ramanujan*. New Delhi: Oxford University Press, 2004.
2. Bassnett, Susan and Harish, Trivedi. *Post-Colonial Translation: Theory Practice*. London and New York: Routledge, 1999.
3. Kumar, Bijay Das. *A Handbook of Translation Studies*. New Delhi: Atlantic Publishers and Distributors, 2005.
4. Seturaman, ed. *Indian Aesthetics: An Introduction*. New Delhi: Macmillan, 2005.
5. Mukherjee Sujit. *Translation as Recovery*. Delhi: Pencraft International.

6. Naikar, Basavaraj. *Glimpses of Indian Literature in English Translation*. Delhi: Authors press, 2008.
7. Nair, Rukmini Bhaya. *Lying on the postcolonial couch*. New Delhi: Oxford University press, 2002.

**PEENG20 - ELECTIVE III B: LITERATURE FOR ACADEMIC AND PROFESSIONAL PURPOSES**

<b>Year : II SEM : III</b>	<b>Course Code : PEENG20</b>	<b>Title Of The Course : Literature For Academic And Professional Purposes</b>	<b>Course Type : Theory</b>	<b>Course Category :Elective III B</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Recognize the various literary genres and Literature written from various socio-political, cultural and historical backgrounds
2. Examine the transition and transformation of text, context, and theory in the literary scenario from period to period
3. Develop subject- specific academic writing skill, critical thinking and writing Skills
4. Demonstrate the mastery of answering the question in a competitive examination in English Literature
5. Acquaint with secondary sources in Literature and to demonstrate strategies for research

<b>CO/PSO</b>	<b>PSO</b>					
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>CO1</b>	H	H	M	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	H	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I: Characteristics of British Literary Movements – Renaissance to Postmodernism**  
**K2-K5 (18 hours)**

- 1.1 Old English ( or Anglo-Saxon) Period: Middle English Period : The Renaissance
- 1.2 Elizabethan Age: Jacobean Age: Caroline Age : Commonwealth Period ( or Puritan Interregnum)
- 1.3 The Neoclassical Period: The Restoration : The Augustan Age ( or Age of Pope ) : The Age of Sensibility ( or Age of Johnson)
- 1.4 The Romantic Period : The Victorian Period : The Pre-Raphaelites: Aestheticism and Decadence
- 1.5 The Edwardian Period: The Georgian Period:
- 1.6 The Modern Period 1945-present : Postmodern Period

**Unit II: American History of Literature** **K2-K5 (18 hours)**

- 2.1 The Colonial Period 1607- 1765
- 2.2 The Revolutionary Period 1765-1815
- 2.3 The Era of National Expansion 1815 1837
- 2.4 The Concord Writers 1837-1861
- 2.5 The Cambridge Scholars 1837-1861  
Literature in the Cities 1837 -
- 2.6 Literature Since 1861

**Unit III: History of Indian English Literature** **K2-K5 (18 hours)**

- 3.1 The Literary Landscape: The Nature and Scope of Indian English Literature
  - 3.2 From The Beginnings to 1857, Early Prose – Early Poetry
  - 3.3 The Winds of Change : 1857 to 1920
- Poetry – Prose – Biography and Autobiography - Travel Books – Essays – Literary and Art Criticism – Drama – Fiction – The Short Story

### 3.4 The Gandhian Whirlwind : 1920 – 1947

#### **Prose**

Political Prose-Mahatma Gandhi – Jawaharlal Nehru – Other associates of Gandhi Critics of Gandhism Hindu Mahasabha ideology – Muslim Political thought

### 3.5 Communist thought – Socialist thought Moderate thought – Journalism –

History – Religious and Philosophical Prose – Radhakrishnan Biography and Autobiography – Travel Books – Essays – Literary and Art Criticism Poetry –

The School of Sri Aurobindo – Religious and Philosophical verse – Romantic verse Minor verse writers Drama – Fiction – Novel – Short Story

### 3.6 Independence And After

#### **Poetry**

The Romantic School – Women Poets : Kamala Das – Other modern Poets

fiction – The Novel – Women Novelists – The Short Story – Women Writers Drama – Poetic Drama – Prose Drama

Prose – Autobiography – Biography – Politics and History – Religion and

Philosophy

Travel Books – Essays and Belles-Letters – Literary and Art Criticism

### **Unit IV: Basic Tenets of various Schools of Criticism – Classical to Contemporary**

**K2-K5 (18 hours)**

- 4.1 Moral Criticism, Dramatic Construction
- 4.2 Formalism, New Criticism, Neo-Aristotelian Criticism
- 4.3 Psychoanalytic Criticism, Marxist Criticism, Reader-Response Criticism
- 4.4 Structuralism/Semiotics, Post-Structuralism/Deconstruction
- 4.5 New Historicism/Cultural Studies, Post-Colonial Criticism
- 4.6 Feminist Criticism, Gender/Queer Studies

**Unit V: Literary Forms: K2-K5 (18 hours)**

- 5.1 Poetry, Essay, Short Story, Novel
- 5.2 Drama, Biography, Autobiography

#### **Rhetoric**

- 5.3 Figure of speech, words
- 5.4 Sentences, paragraph, composition

### **Prosody**

- 5.5 Accent – rhythm and meter
- 5.6 Scansion

### **Innovative Component**

- Review of literary texts
- Preparing a paper (Analysis, study and Research)

### **Books for Reference:**

1. Stephen, Martin. *English literature*. New York: Longman, 1986.
2. Burton S.H. *Workout English literature ‘A’ Level: Macmillan Master Series*. Macmillan Education Ltd. London .1986.
3. V.S.Seturaman,C.T.Indira, T.Sriraman. *Practical criticism*. India,Macmillan.1999
4. Klarer, Mario. *An Introduction to Literary Studies*. London: Routledge, 2004.
5. Leech, Geoffrey, Margaret Deuchar and Robert Hoogenraad. *English Grammar for Today*. New York: Palgrave Macmillan, 2011.
6. R.J. Rees ,*English Literature : An Introduction for Foreign Readers*. London : Macmillan , 1978.
7. M. H. Abrams , *A Glossary of Literary Terms* , Seventh Edition . Singapore : Thomson Heinle , 2008.
8. Gray , Martin . *A Dictionary of Literary Terms* . New Delhi : Pearson , 2008.
9. Jaytip Sarkar and Anindya Battacharya. *A Handbook of Rhetoric and Prosody* Paperback. Chennai. Orient Blackswan.2018
10. Day, Gary. *Literary Criticism: A New History*. Hyderabad : Orient Black Swan, 2008.
11. Albert, Edward. *A History of English Literature*. Oxford: Oxford University Press, 1979.Print.
12. Chowdhury, Aditi and Rita Goswami. *A History of English Literature: Traversing theCenturies*. Hyderabad: Orient Blackswan, 2014. Print.
13. Daiches, David. *A Critical History of English Literature*. London: Secker& Warburg, 1960. Print.
14. Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford, UK: Oxford University Press, 1994. Print

- A.P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
15. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
16. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
17. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
18. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
19. Yule, George. *The Study of Language*. Cambridge University Press, 1985.

### Web sources

<http://english.columbia.edu/graduate/orals-reading-list#Medieval>

### PIENE20 - INDEPENDENTELECTIVE III A: LITERARY SKILLS FOR EMPLOYABILITY- III

<b>Year : II SEM : III</b>	<b>Course Code :</b> PIENE20	<b>Title Of The Course :</b> Literary Skills For Employability- III	<b>Course Type :</b> Theory	<b>Course Category :</b> Elective III A	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:l

1. Remember and recall names of authors, literary works, dates, facts, terms and concepts
2. Demonstrate knowledge of English Language and Linguistics
3. Apply knowledge of literary criticism to analyse literary works
4. Discover interest and demonstrate knowledge in literature in English outside Britain and America

5. Demonstrate knowledge in Application-oriented areas like Research Methodology, Translation and English Language Teaching

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: The Romantic Age Poetry                      K2-K5                      (18 hours)**

- 1.1. Literary Background of the Romantic Age
- 1.2. First Generation Romantic Poets – Blake, Southey
- 1.3. Wordsworth and Coleridge
- 1.4. Second Generation Romantic Poets – Byron, Shelley, Keats
- 1.5. Age of Chaucer, Geoffrey Chaucer
- 1.6. Model Questions & Solved Question papers

**Unit II: Victorian Poetry                                      K2-K5                                      (18 hours)**

- 2.1. The Victorian Age
- 2.2. Literary Movements of the Victorian Age
- 2.3. English Chaucerians
- 2.4. Scottish Chaucerians
- 2.5. New Court Poets
- 2.6. Model Questions & Solved Question papers

**Unit III: The Modern, Contemporary Age and American Poetry**  
**K2-K5 (18 hours)**

- 3.1. Modern Poetry
- 3.2. Major Poets of the Modern Age
- 3.3. Contemporary Poetry
- 3.4. American Poetry
- 3.5. American Poets
- 3.6. Model Questions & Solved Question papers

**Unit IV: Fiction and Short Stories**                      **K2-K5**                      **(18 hours)**

- 4.1. Pre-Chaucerian to Elizabethan Age
- 4.2. Puritan, Restoration and Neo-Classical Age
- 4.3. The Romantic Age
- 4.4. The Victorian Age and Modern Age
- 4.5. Contemporary Period
- 4.6. Model Questions & Solved Question papers

**Unit V: Non-Fictional Prose**                      **K2-K5**                      **(18 hours)**

- 5.1. Non-Fiction in Anglo-Norman Period
- 5.2. Non-Fiction in Puritan Age, Non-Fiction in the Restoration Age
- 5.3. Major Non-Fiction Writers in Neo-Classical and Romantic Age
- 5.4. The Victorian and Modern Age Non-Fiction
- 5.5. Contemporary American and Non-British Fiction
- 5.6. Model Questions & Solved Question papers

**Books for Reference:**

1. Albert, Edward. A History of English Literature. Oxford: Oxford University Press, 1979. Print.
2. Chowdhury, Aditi and Rita Goswami. A History of English Literature: Traversing the Centuries. Hyderabad: Orient Blackswan, 2014. Print.
3. Daiches, David. A Critical History of English Literature. London: Secker & Warburg, 1960. Print.

4. Sanders, Andrew. *The Short Oxford History of English Literature*. Oxford, UK: Oxford University Press, 1994. Print
- A. P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
5. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
6. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
7. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
8. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
9. Yule, George. *The Study of Language*. Cambridge University Press, 1985.

### **PIENF20 - ELECTIVE III B: CONTENT WRITING**

<b>Year :</b> <b>II</b>	<b>Course Code :</b> PIENF20	<b>Title Of The Course :</b> Elective III B: Content Writing	<b>Course Type :</b> Theory	<b>Course Category :</b> Independent Elective	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> <b>100</b>
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#### **Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Cultivate technical writing Skills
2. Develop editing skills
3. Create using analytic skills
4. Display skills in publication and advertising
5. Engage in Freelance writing and entrepreneurship

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	
CO2	H	H	H	H	H	H
CO3	H	H	H	H	H	H
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**Unit I:**

**K4-K6**

**(18 hours)**

1. 1. SEO Content Writing

- 1. 2. Technical Writing
- 1. 3. Communication and Marketing Writing
- 1. 4. Publication Based and Editorial Writing, Instructional Design
- 1.5. Profile Writing (Individual, Institution, Corporate)
- 1. 6. Research and Report Writing

**Unit II:**

**K1 – K6 (18 hours)**

- 2. 1 Writing on Corporate Social Responsibility (CSR)
- 2. 2. Feature Writing and headlines
- 2.3. Business Writing
- 2.4. Press Release Writing
- 2.5. Magazine Writing
- 2.6. Copywriting

**Unit III:**

**K1-K6**

**(18 hours)**

- 3.1 ISBN – The International Standard Book Number, ISSN – The International Standard Serial Number, Foreword – Preface
- 3.2 Introduction to copy- editing- making the typescript - Copyright Permission and acknowledgement
- 3.3 Making corrections- House Style- Abbreviation - Bias and Parochialism
- 3.4 Capitalization - Cross- References - Dates and Time- Italic - Proper Names
- 3.5 Punctuation – Spelling - Miscellaneous Points
- 3.6 Preliminary Pages

Butcher, Judith, Drake Caroline, and Leach, Maurice. *Butcher's Copy-editing: The Cambridge Handbook for Editors, Copy-editors and Proof readers.*

**Unit IV:**

**K1, K4-K6**

**(18 hours)**

- 4.1 Report Writing
- 4.2 Proofreading
- 4.3 Editing
- 4.4 Review Writing
- 4.5 Book and Film Review
- 4.6 Transcribing audio talks or interviews

Mukhopadhyay, Lina *et al.* *Polyskills: A Course in Communication Skills and Life Skills.*  
Chennai and New Delhi: Foundation Books CUP, 2012

**Essential Reading**

## Writing for the Media

Introduction to Scriptwriting	<i>Mike Harris</i>
Writing for the Stage	<i>Brighde Mullins</i>
Writing for Radio	<i>Mike Harris</i>
Writing for Television	<i>Stephen V. Duncan</i>
Writing for Television	<i>John Milne</i>
Writing for Film	<i>Bonnie O'Neill</i>

Steven Earnshaw (Ed) *The Handbook of Creative Writing* Edited by Edinburgh University Press Ltd. Edinburgh 2007

## Unit V: K1, K3-K6 (18 hours)

- 5.1 User's Manual
- 5.2 Technical Letters
- 5.3 Newsletters
- 5.4 Writing Instruction
- 5.5. Brochure, Poster/flyer and Leaflets
- 5.6 Pamphlets, invitations and advertisements

Pauley, Steven E. and Daniel, G. Riordan. *Technical Report Writing*. New Delhi: A.I.T.B.S. Publishers and Distributors, 2006.

### Essential Reading in General:

### Other Writing

Writing as Experimental Practice	<i>Thalia Field</i> 305
Writing as 'Therapy'	<i>Fiona Sampson</i> 312
Writing in the Community	<i>Linda Sargent</i> 320
Writing for the Web	<i>James Sheard</i> 327
Copyright	<i>Shay Humphrey, with Lee Penhaligan</i>

Steven Earnshaw (Ed) *The Handbook of Creative Writing* Edited by Edinburgh University Press Ltd. Edinburgh 2007

### Books for Study:

1. Butcher, Judith, Drake Caroline, And Leach, Maurice. *Butcher's Copy-editing: The Cambridge Handbook for Editors, Copy-editors and Proof readers*. Fourth Edition Cambridge University Press, 2007

2. Steven Earnshaw (Ed) *The Handbook of Creative Writing* Edited by Edinburgh University Press Ltd. Edinburgh 2007

**Books for Reference:**

1. Gerson, Sharon. J. and Steven M. Gerson. *Technical Writing: Process and Product* - III edition. New Delhi: Pearson Education Inc., 2005.
2. Pauley, Steven E. and Daniel, G.Riordan. *Technical Report Writing*. New Delhi: A.I.T.B.S. Publishers and Distributors, 2006.
3. <https://content-writing-india.com/blog/different-types-of-content-writing/>

**SEMESTER IV**

**PCENM20 - LITERATURE OF THE MODERN AGE**

<b>Year :</b> II <b>SEM</b> :IV	<b>Course Code :</b> PCENM20	<b>Title Of The Course :</b> Literature of the Modern Age	<b>Course Type :</b> Theory	<b>Course Category :</b> Core	<b>H/W</b> 6	<b>Credits</b> 4	<b>Marks</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Recognize the broad spectrum of literary and artistic movements of the Twentieth century and thereby develop critical insight to comprehend the plots, characters and techniques in the literary works.
2. Explain the relationship between literature and social structures.





- 4.4 Bernard Shaw Arms and the Man(detailed Drama)
- 4.5. John Galsworthy The Silver Box (ND)
- 4.6 Joseph Conrad

## Unit V

K1 – K5

(18 Hours)

- 5.1 Stream of Consciousness, Oedipus Complex and Modernism
- 5.2 Ted Hughes Crow (Detailed Poetry)
- 5.3 C. P. Snow Two Cultures (Detailed Prose)
- 5.4 Fragmentation, Iconoclasm, Melancholy and Political Disillusionment
- 5.5 Graham Greene
- 5.6 Aldous Huxley

## Reference Books:

1. Harold Bloom Ed, *Samuel Beckett's Waiting for Godot: Viva Modern Critical Interpretations*. New Delhi: First Indian Edition, 2007.
2. Morris Beja, A. E. Dyson Ed. *James Joyce : Dubliners and A portrait of the Artist as a Young man: A selection of critical essays*, 1<sup>st</sup> ed. London: The Macmillan Press Ltd, 1973.
3. Gamini Salgado, A. E. Dyson Ed., *D.H. Lawrence Sons and Lovers: A selection of Critical Essays*. London: The Macmillan Press Ltd, 1973.
4. R.D. Draper, *Sons and Lovers by D.H. Lawrence Macmillan Master Guides*. New York: Palgrave Macmillan, 1986.
5. Harold Bloom ed., *F. Scott Fitzgerald's The Great Gatsby Viva Bloom's Notes*. New Delhi: Viva Books Pvt. Ltd, 2007.
6. Harold Bloom ed., *F. Scott Fitzgerald's The Great Gatsby Viva Bloom's Notes*. New Delhi: Viva Books Pvt. Ltd, 2001.
7. William Stephenson, *Fowler's The Lieutenant's Woman: Reader's Guide* Viva-continuum edition. London: Continuum International Publishing Group first South Asian Edition, 2008.
8. Heiney, Donald and Downs, Lenthel H., *Twentieth Century and Critical Theory*. Essentials of Contemporary Literature of the Western World - Vol.2
9. Hudson, Derek, *English Critical Essays: Twentieth Century (Second Series)*. London: OUP, 1963.
10. James, Pickering H. and Jeffrey D. Hoepfer, *Concise Companion to Literature*. New York: Macmillan Publishing Co., Inc., 1981.
11. Jones M., Phyllis, *English Critical Essays: Twentieth Century (First Series)*. London: OUP, 1964.

12. Orr, John, *The Making of the Twentieth Century Novel: Lawrence, Joyce, Faulkner and Beyond*. Hongkong: Macmillan, 1987.
13. Rama, R.P. ed. *Critical Interactions: Reading Twentieth Century Literary Texts*. Jaipur: Pointer Publishers. 1992.
14. Salgaonkar, V.D. Ed. *The Gates of Wisdom: Selections from Bertrand Russell*. Madras: The Macmillan Co. of India Ltd., 1971.
15. John Wain ed. *Anthology of Modern Poetry*. London: Hutchinson & Co Publishers Ltd.
16. A.J. Wilks, *T.S. Eliot: The Waste Land Macmillan Critical Commentaries*. London: Macmillan Education Ltd, 1971.

### PCENN20 - CONTEMPORARY WRITING

<b>Year : II</b>	<b>Course Code :</b>	<b>Title Of The Course :</b>	<b>Course Type :</b>	<b>Course Category :</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b>
<b>SEM : IV</b>	PCENN20	<b>Contemporary Writing</b>	<b>Theory</b>	<b>Main</b>	<b>6</b>	<b>5</b>	<b>100</b>

#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss the significance of Contemporary literary works
2. Appreciate contemporary writing for the form and theme
3. Evaluate Contemporary writers for their contribution to literature and society
4. Evaluate the contemporary literary schools /movements
5. Create critical essays on contemporary writing

CO/P SO	PSO					6
	1	2	3	4	5	
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/P O	PO					6
	1	2	3	4	5	
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**Unit I: Poetry      K3-K6      (18 hours)**

1.1 World War II and the horrors of the war, genocide and corruption, real-life themes and the beginning of a new period of writing.

1.2 Social and political viewpoints, connections to current events and socioeconomic messages

1.3 Trends that illuminate societal strengths and weaknesses



4.3 Terms: polyphonic; popular; precession; realism; repetition; short-circuit; syntagmatic and paradigmatic; True-Real

4.4 Linda Hutcheon - Theorizing the Postmodern

4.5. Terms: anthropocene, anti-anthropocentrism, anti-humanism, transhuman, alterity, science fiction, technicity

4.6 Neil Badmington - Post humanism

[From Literature and Science]

### **Unit V: Fiction**

**K4-K6**

**(10 hours)**

5.1 Thomas Pynchon, Orhan Pamuk

5.2 Jose Saramago, Isabelle Allende

5.3 Kurt Vonnegut Jr, Umberto Eco

5.4 Kazuo Ishiguro, Haruki Murakami

5.5 Gabriel Garcia Marquez, Ian McEwan

5.6 John Updike

### **Books for Reference:**

1. Jennifer Birkett. *Waiting for Godot by Samuel Beckett*. New York: Palgrave Macmillan, 1987.
2. Harold Bloom Ed, *Samuel Beckett's Waiting for Godot: Viva Modern Critical Interpretations*. New Delhi: First Indian Edition, 2007.
3. Rama, R.P. ed. *Critical Interactions: Reading Twentieth Century Literary Texts*. Jaipur: Pointer Publishers. 1992.
4. Heiney, Donald and Downs, Lenthel H., *Twentieth Century and Critical Theory*. Essentials of Contemporary Literature of the Western World - Vol.2
5. Hudson, Derek, *English Critical Essays: Twentieth Century (Second Series)*. London: OUP, 1963.
6. James, Pickering H. and Jeffrey D. Hoeper, *Concise Companion to Literature*. New York: Macmillan Publishing Co., Inc., 1981.
7. Jones M., Phyllis, *English Critical Essays: Twentieth Century (First Series)*. London: OUP, 1964.
8. Frankenstein; or, the trials of a posthuman subject An investigation of the Monster in Mary Shelley's "Frankenstein" and his attempt at acquiring human subjectivity in a posthuman state by Isa Ring

<https://sh.diva-portal.org/smash/get/diva2:1178476/FULLTEXT01.pdf>

## PCENO20 - ENGLISH LANGUAGE TEACHING

<b>Year:</b> <b>II</b>	<b>Course Code:</b> PCENO20	<b>Title of the Course:</b> English Language Teaching	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W:</b> <b>6</b>	<b>Credits:</b> <b>5</b>	<b>Marks:</b> <b>100</b>
<b>Sem - IV</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Identify approaches to enable language learning and establish the feasibility of following a bilingual approach for the teaching of English.
2. Create a resource bank of language teaching strategies, ideas and techniques to be used for English Language teaching.
3. Analyse the concepts that relate and integrate content and language instruction for language acquisition.
4. Evaluate the characteristics of the approaches to enhance performance for best outcomes in language learning.

5. Design activities that allow learners to practice academic language and to develop second language acquisition at the best of the student's ability.

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Major trends in twentieth-century**

**(15 Hours)**

**Language teaching**

1.1 A brief history of early developments in Language Teaching

K1,K2

1.2 Interlanguage

K1, K2

From Rod Ellis. *Second Language Acquisition*. OUP.New Delhi. 2017

1.3 The Oral Approach and Situational Language Teaching	K2, K3
1.4 The Audiolingual Method	K2, K3
1.5 Whole Language	K2, K3
1.6 Multiple Intelligences	K2, K3

**Unit II: Current approaches and methods (20 Hours)**

2.1 Communicative Language Teaching	K2,K4
2.2 Competency-Based Language Teaching	K2,K3
2.3 Task-Based Language Teaching	K3,K4
2.4 Cooperative Language Learning	K3, K4
2.5 Content Based Instruction	K3, K4
2.6 Neurolinguistic Programming (NLP)	K3, K4

**Unit III: Alternative twentieth-century approaches and methods (15 Hours)**

3.1 The Natural Approach	K3.K4
3.2 Total Physical Response	K3, K4
3.3 The Silent Way	K3, K4
3.4 Community Language Learning	K3, K4
3.5 The Lexical Approach	K3, K4
3.6 The post-methods era	K3, K4

**Unit IV: Four basic Skills (LSRW) (20 Hours)**

4.1 Tasks for Language teachers, Using the Tasks	K5, K6
4.2 Carrying out small scale research in the classroom	K5, K6
Devising and evaluating Tasks	
4.3 Lesson Planning, Syllabus, Tests, Assessment	K5, K6
4.4 Practical Lesson management	K5, K6
4.5 Using Websites for Language Teaching	K4, K5
4.6 Micro-Teaching and Self Observation	K5, K6

**Unit V: Teaching Literature (20 Hours)**

5.1 Theories of Teaching Literature (pg 21-41)	K3, K4
5.2 Methods of Teaching Literature (Pg42-61)	K3, K4
5.3 Teaching Poetry (Pg62-78)	K4, K5
5.4 Teaching Drama (Pg79- 87)	K4, K5
5.5 Teaching Fiction (Pg88-102)	K4, K5
5.6 Teaching Literature in Dark Times	K4, K5

Elaine Showalter. (2003) *Teaching Literature*. Blackwell Publishing: UK.

### Books for Reference

1. Gabbard, Jerry S. and Robert Oporandy (2009). *Language Teaching Awareness*. Chennai: OBS Publications
2. Parrot, Martin (1993). *Tasks for Language Teaching*. New Delhi: CUP.
3. Richards, Jack C. Theodore S. Rodgers (2015). *Approaches and Methods in Language Teaching* UK: Cambridge University Press.
4. Ur, Penny (1999). *A Course in Language Teaching: Trainee Book*. UK: First Asian Edition.
5. Elaine Showalter. (2003) *Teaching Literature*. Blackwell Publishing: UK.
6. Howatt, P. R. and H.G. Widdowson (2004). *A History of English Language Teaching*. New York: OUP.
7. Krishnaswamy, N and LalithaKrishnaswamy (2011) *Methods of Teaching English*. Chennai: Macmillan, 2011.
8. Nunan, David (1992). *Research Methods in Language Learning*. New Delhi: CUP.
9. Richards, Jack C. and Willy A. Renandya (2000) ed. *Methodology in Language Teaching: An Anthology of Current Practice*. New Delhi: CUP
10. Ur, Penny (1991). *A Course in Language Teaching: Practice and Theory*. UK: CUP.
11. Wallace, Michael. J. (1991) *Training Foreign Language Teachers*. New Delhi: CUP.

## RESEARCH PROJECT

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Demonstrate knowledge of research methods, theories and research context in Literature and Language teaching
2. Explain a research problem/question foregrounded against the relevant literary context and/or research context
3. Apply relevant and result-yielding research methods, approaches and theories to the conduct of qualitative and quantitative research
4. Organise and evaluate the relevant sources of scientific evidence to construct a well-supported, research statement and/or logical argument
5. Devise a framework of expository writing to present the trajectory, context and outcome of the research

CO/PLO	PLO					
	1	2	3	4	5	6
CO1	H	H	H	M	M	M

<b>CO2</b>	H	H	H	H	H	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

<b>CO/PO</b>	<b>PO</b>					<b>6</b>
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	H	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	H
<b>CO5</b>	H	H	H	H	H	H

### **Preliminary Requirements:**

- Knowledge of the types of Research, Deductive and Inductive Arguments, Critical Approach, Research ethics, Bibliography.
- The research work must be strictly an individual sincere work, the result of ardent study and pursuit of excellence. The work should not exceed 10,000 words and there will be viva- voce by an examiner.
- This module gives the opportunity to undertake supervised work on a dissertation in Literature or English Language Teaching up to 10,000 words, on a topic of one's choice agreed with the Guide/supervisor.
- **It is strongly recommended that the student must be motivated to begin the Preliminary reading and survey of related secondary sources for the dissertation in the first summer term and vacation holidays.**
- The students can be encouraged to present papers in the conferences and to publish in the proposed topic.

### **Essential Reading**

a) Where And How To Find Secondary Literature

b) How to Write a Scholarly Paper

From *An Introduction to Literary Studies*- Mario Klarer Pub.London,Routledge. 2004

c)The Undergraduate Dissertation

From *In Pursuit of English Studies*.Barry,Peter.New Delhi, Bloomsbury.2014

d)Gupta,Suman.ThePlace of Theory In LiteraryDisciplines

From DaSousa, Delia Correa and W.R.Owens. *The Handbook to Literary Research*, second Edition. Routledge: Taylor and Francis Group, The Open University Abingdon-Oxon. 2010.

**PEENH20 - Elective IVA: HISTORY OF IDEAS**

<b>Year: II SEM : IV</b>	<b>Course Code: PEENH20</b>	<b>Title Of The Course: History of Ideas</b>	<b>Course Type : Theory</b>	<b>Course Category : Elective IV A</b>	<b>H/W 6</b>	<b>CREDITS 4</b>	<b>MARKS 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Identify the evolution of human thought and history of ideology
2. Explain the germ and growth of different schools of philosophy, their episteme and ontological development
3. Interpret social behaviour and cultural practices of human beings according to each train of thought focussed on the course
4. Evaluate the ethical attributes of the schools of philosophy
5. Critique the attributes of other disciplines against the evolutionary changes in human thought

<b>CO/PSO</b>	<b>PSO</b>	
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	1	2	3	4	5	6
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

<b>CO/PO</b>	<b>PO</b>					
	1	2	3	4	5	6
<b>CO1</b>	H	H	H	M	M	M
<b>CO2</b>	H	H	H	H	M	M
<b>CO3</b>	H	H	H	H	M	M
<b>CO4</b>	H	H	H	H	H	M
<b>CO5</b>	H	H	H	H	H	H

**Unit I: Ancient**

**K2-K6**

**(18 hours)**

a) Bharatamuni                      On Natya and Rasa: Aesthetics of Dramatic Experience  
From the *Natyasastra*

1. Indian aesthetics
2. Scientific exposition of *Rasa* theory
3. Scientific application of reason to human nature and experience

b) Tholkappiyar                      On Diction and Syntax - From the *Tholkappiyam*

4. Dravidian Poetic Sensibility
5. Syntax of Poetry
6. Content of Poetry

**Unit II:**

**K2-K6**

**(18 hours)**

**Medieval**

a) St. Augustine                      Confessions Ch X

1. The function of memory
2. The types of memory
3. Memory and Faith



- b) Simone de Beauvoir: The Second Sex-Introduction
- 3. Woman, as the other,object
- 4.Woman, as individualized self and subject
- 5. S. Radhakrishnan:Introduction to The Principal *upaniShads*
- 5.6 The term Upanishads

### **Unit V Contemporary**

**K2-K6**

**(18 hours)**

Theodore Adorno

Aesthetics

- 1. Introduction to Aesthetics
- 2. Defensive Reactions to Modern Art (L 19; Pg. 185-187)
- 3. A Critique of the theory of Aesthetic experience (L 20; Pg. 203-205)
- 4. The ambiguity of the work of art (L 20; Pg. 203-205)
- 5. The Psychology of the Artist (L 21; Pg. 211-213)
- 6. Subjectivism and Objectivism in Aesthetic (L 17; Pg.166-167)

From Theodore W. Adorno. *Aesthetics*1958/59.Ed. Eberhard Ortland. Tr. Wieland Hoban. Polity Press. UK. 2018.

### **Books for Study and Reference**

- 1. McDermott Robert A.Ed.*The Basic writings of S. Radhakrishnan*.
- 2. Jaico Publishing House, Mumbai 2004
- 3. Lear, Jonathan. *Freud*. New York. Routledge, 2005
- 4. Annas, Julia. *Plato, A Very Short Introduction*. New Delhi: Oxford University Press, 2006.
- 5. Shields, Christopher. *Aristotle*. Oxon: Routledge, 2007.
- 6. Lewens, Tim. *Darwin*.New York.Routledge, 2007.
- 7. Darwin, Charles. *The Origin of Species*. New Delhi: Peacock Books, 2012.
- 8. Dent, Nicholas.*Rousseau*. Oxon: Routledge, 2005.
- 9. Stevensen, Leslie & David L. Haberman. *Ten Theories of Human Nature*. Fourth Edition. New Delhi: Oxford University Press, 2006.

**PEENI20 - ELECTIVE IV B: CULTURAL THEORY AND POPULAR CULTURE**

<b>Year: II SEM : IV</b>	<b>Course Code: PEENI20</b>	<b>Title Of The Course: Cultural Theory &amp; Popular Culture</b>	<b>Course Type : Theory</b>	<b>Course Category : Elective IV B</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to::

1. Recognize the role of Culture in human thought, expression and art
2. Remember the names of the thinkers who initiated the cultural turn in analyzing all the productions of the human mind and both individually and collectively, and their contribution to cultural studies
3. Analyse literary and other related art forms in cultural perspective
4. Apply Cultural Theory as a research methodology
5. Evaluate literary text for their cultural value

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	M	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H		



- 3.4. Althusserianism
- 3.5. Hegemony
- 3.6. Post-Marxism and cultural studies

**Unit IV**                      **K2 – K6**                                      **(18Hours)**

- 4.1. Feminisms
- 4.2. Women at the cinema
- 4.3. Reading women's magazines
- 4.4. Post-feminism
- 4.5. Men's studies and masculinities
- 4.6. Queer theory

**Unit V**                      **K2 – K6**                                      **(18 Hours)**

- 5.1. 'Race' and racism
- 5.2. The ideology of racism
- 5.3. Orientalism
- 5.4. Whiteness
- 5.5. Anti-racism and cultural studies
- 5.6. The ideology of mass culture

**Books for Study**

1. Storey, John. *Cultural Theory and Popular Culture*, VI Edition, New Delhi: Pearson, 2014
2. Storey, John. Ed. *What is Cultural Studies? A Reader*. London: HodderHeadline Group, 1997

**Books for Reference**

1. Stuart Hall. "The Foundation of Cultural Studies". *Cinema on the Brain*. YouTube, 2014
2. Prof. Avishk Parui, Dept. of Humanities and Social Sciences, IIT Madras. "Introduction to Cultural Studies". NPTEL – NOC IITM, YouTube, 2018
3. ---. "British Cultural Studies: Raymond Williams and Culture and Society". University Quick Course, 2018
4. John Hall, F R Leavis and Raymond Williams – "Two Very Different Positions on 'Culture'". BBC., 2017
5. Prof. Anju Narayan, Delhi University. "Culture and Class Struggle in Literature: Antonio Gramsci, Raymond Williams". Vidya-Mitra. YouTube, 2017

6. Prof.Rutger de Graff, University of Amsterdam. “Popular Culture: Reflection or Illusion”,  
*Introduction to Communication Science*. Courseera. YouTube, 2013.

**PIENG20 - INDEPENDENT ELECTIVE IV A: LITERARY SKILLS FOR  
 EMPLOYABILITY –IV**

<b>Year: II SEM : IV</b>	<b>Course Code:</b> PIENG20	<b>Title Of The Course:</b> Literary Skills For Employability – IV A	<b>Course Type :</b> Theory	<b>Course Category : Core</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks</b> 100
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**Course Outcomes (CO)**

On Completion of the Course the Learners will be able to:

1. Remember and recall names of authors, literary works, dates, facts, terms and concepts
2. Demonstrate knowledge of English Language and Linguistics
3. Apply knowledge of literary criticism to analyse literary works
4. Discover interest and demonstrate knowledge in literature in English outside Britain and America
5. Demonstrate knowledge in Application-oriented areas like Research Methodology, Translation and English Language Teaching

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PSO					
	1	2	3	4	5	6
CO1	H	H	M	M	M	M
CO2	H	H	H	M	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**Unit I: Language: Basic Concepts, Theories and Pedagogy K2 –K6**

**(18 Hours)**

- 1.1. Language: Introduction and Definitions
- 1.2. Features of Language
- 1.3. Main Components of Language, Idiolect, Dialect and Language
- 1.4. Origin and Development of Language

- 1.5. Learning and Teaching Approaches
- 1.6. Model Questions & Solved Question papers

**Unit II: English in India: History, Evolution and Futures** **K2 –K6** **(18 Hours)**

- 2.1. Historical Background
- 2.2. Evolution and Development of English in India
- 2.3. Introduction to Indian English Literature
- 2.4. Indian English Writers: From Tagore to Nissim Ezekiel
- 2.5. Indian English Writers: From Vijay Tendulkar to Contemporary Writers
- 2.6. Model Questions & Solved Question papers

**Unit III: Cultural Studies** **K2 –K6** **(18 Hours)**

- 3.1. Introduction to Cultural Studies
- 3.2. Major Thinkers of Cultural Studies
- 3.3. Feminism
- 3.4. Postcolonialism
- 3.5. Marxism and Poststructuralism
- 3.6. Model Questions & Solved Question papers

**Unit IV: Literary Criticism and Literary Theory** **K2 –K6** **(18 Hours)**

- 4.1. Criticism, Its Nature and Definition
- 4.2. Major and Minor Critics and their Works
- 4.3. Introduction to Literary Theory
- 4.4. New Criticism, Cultural Materialism, Feminist Criticism, Formalism
- 4.5. Postcolonialism, Psychoanalytic Criticism, Structuralism
- 4.6. Model Questions & Solved Question papers

**Unit V: Research Methods and Materials in English** **K2 –K6** **(18 Hours)**

- 5.1. Research: Meaning, Definitions and Types
- 5.2. Characteristics of Research
- 5.3. Objectives and Approaches
- 5.4. Research Problem, Literature Review, Research Hypothesis, Research Design Sampling, Data Collection, Data Analysis,
- 5.5. Literary Research, Qualitative and Quantitative Methods, Research Materials
- 5.6. Model Questions & Solved Question papers

**Books for Study and Reference**

1. Albert, Edward. A History of English Literature. Oxford: Oxford University Press, 1979. Print.

2. Et. Al. NTA-UGC (NET/JRF/SET) English Paper -2. Arihant Publications Limited: New Delhi,
3. Chowdhury, Aditi and Rita Goswami. A History of English Literature: Traversing the Centuries. Hyderabad: Orient Blackswan, 2014. Print.
4. Daiches, David. A Critical History of English Literature. London: Secker & Warburg, 1960. Print.
5. Sanders, Andrew. The Short Oxford History of English Literature. Oxford, UK: Oxford University Press, 1994. Print
- A. P.R. Howatt and H. G. Widdowson, *A History of English Language Teaching*. New York: OUP, 2004.
6. Jack.C.Richards, Theodore.S.Rodgers, *Approaches and Methods in Language Teaching*. UK: Cambridge University Press, 2001.
7. Bertens, Hans. *Literary Theory: the Basics*. London: Routledge, 2001.
8. Barry, Peter. *Beginning Theory*. Manchester and New York: Manchester University Press, 2002.
9. Wood, F.T. *An Outline History of the English Language*. Madras: Macmillan, 2001
10. Yule, George. *The Study of Language*. Cambridge University Press, 1985.

#### Web sources

<http://english.columbia.edu/graduate/orals-reading-list#Medieval>

<http://meet.google.com/cmd-sxfb-fyr>

### PIENH20 - INDEPENDENT ELECTIVE–IV B: LITERATURE AND ENVIRONMENT

<b>Year: II SEM : IV</b>	<b>Course Code: PIENH20</b>	<b>Title Of The Course: Literature And Environment</b>	<b>Course Type : Theory</b>	<b>Course Category : Core</b>	<b>H/W</b>	<b>Credits</b>	<b>Marks 100</b>
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Explore various eco-critical perspectives through nature studies
2. Engage with environmental issues through literary narratives
3. Understand about the ecological degradation and various natural calamities that affect the planet earth due to the reckless nature of human beings
4. Develop critical awareness about sustainability practices
5. Identify environmental issues via historical narratives

CLO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CLO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	H	H
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	H
CO5	H	H	H	H	H	H

**Unit I Detailed Poems K1, K2, K3**

**(18 Hours)**

1.1 Admiration of Nature and Deforestation

1.2 William Wordsworth

The Education of Nature

1.3 Coleridge

To the Nightingale

1.4 G.M.Hopkins

Spring

1.5 Gieve Patel

On killing a Tree



1. C.D.Narasimhaiah. ed. An Anthology of Commonwealth Poetry. Macmillan India Limited, Chennai. 1990.
2. C.N.Ramachandran. Ed. Five Centuries of Poetry. RadhaAchar Macmillan Publishers India Ltd, New Delhi, 1991.
3. De Souza, Eunice. Ed. Nine Indian Women Poets: An Anthology. Oxford University Press, New Delhi, 1997.
4. Dickinson, Emily. Selected Poems. Dover Publications. Newyork.1990.
5. Dr. S. Sen. Robert Frost: Selected Poems (A Critical Evaluation). Unique Publishers, New Delhi. 1984.
6. Dr. A. Shanmugakani. Ed. A Bouquet of Poems: An Anthology of Poems. Manimegalai Publishing House, Madurai. 2012.
7. Holloway, John. Ed. Selected Poems of Percy Bysshe Shelley. Heinemann Educational Books, London.1960.
8. M.Khatri. Great Short Stories of Sufi Saints. The Book Paradise, New Delhi, 2006.
9. M.W.Gardsen. ed. Life and Literature (Prose Selections). Macmillan Co. Ltd, Madras, 1971.
10. R.Parthasarathy. Twentieth Century Indian Poets. Oxford University Press, Delhi, 1976.
11. Satpathy, Sumanyu. Ed. Early Modern Poetry. Macmillan India Limited, Chennai, 1999.

### **End-Semester Examination 100 Marks**

#### 1. Question Paper Pattern A:

Section A – Annotations 150 words – 4 questions out of 6 (4x5 = 20)

Section B – Short Answers - 300 words - either/or pattern (4x5 = 20)

Section C – Essays - 900 words - 4 questions out of 6 (4x15 = 60)

#### 2. Question Paper Pattern B:

Section A – Short Questions 80 words – 10 questions out of 12 (10x2 = 20)

Section B – Short Answers - 300 words - either/or pattern (4x5 = 20)

Section C – Essays - 900 words - 4 questions out of 6 (4x15 = 60)

#### 3. Question Paper Pattern C:

Independent Elective I A, II A, IIIA, IV A

Section A – (1x20 = 20)

Objective Type questions on Identification:

Section B – (1x20 = 20)

Objective Type questions on History and Theory of Literary Criticism:

Section C – (1x40 = 40)

Objective Type questions on Cultural and Historical Contexts:

4. Question Paper Pattern D:

Independent Elective – Course I B, II B, III, IV B

Answer any five questions out of 8 - 5x20=100

# **Department of Commerce (UG)**

## **SYLLABUS AND REGULATIONS**

**Under**

**OUTCOME-BASED EDUCATION**

**2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**



**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**AUXILIUM COLLEGE (Autonomous)**

*(Accredited by NAAC with A+ Grade with a CGPA of 3.55 out of 4 in the 3rd Cycle)*

**Gandhi Nagar, Vellore-632 006**

**Department of Commerce (UG)**

**OUTCOME BASED EDUCATION - 2020**

**(Effective for the Batch of Students Admitted from 2020-2021)**

**A) INSTITUTION LEVEL**

**Vision:**

The vision of the college is the education of young women especially the poorest to become empowered and efficient leaders of integrity for the society.

**Mission:**

To impart higher education to the economically weak, socially backward and needy students of Vellore and neighboring districts.

**B) NAME OF THE PROGRAMME: B. Com**

**Vision**

To develop a centre for excellence providing conceptual knowledge and sharpen analytical and decision-making skills with ethical behaviour.

**ELIGIBILITY CRITERIA OF THE PROGRAMME**

A candidate who has passed the Higher Secondary Examinations (Academic [10 + 2] Stream) with Commerce, Accountancy, Economics, Computer Science/Statistics/Business Mathematics as subjects, conducted by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the Syndicate of the Thiruvalluvar University shall be eligible for admission to B. Com Degree Course in General Commerce.

**LIST OF COURSES:**
**Structure of the course and scheme of Examination**

Sem	Part	Paper Code	Title of Paper	Hours/week	Exam		credits	Marks	
					Th	Pr			
I	I	ULTAA20	Tamil paper –I	6	3	-	3	40+60	
	II	UENGA20	English paper – I	6	3	-	3	40+60	
	III	UCCOA20	Principles of Accounting – I	5	3	-	4	40+60	
	III	UCCOB20	Business Economics – I	5	3	-	4	40+60	
	III	UABMA20	Allied I: Business Mathematics and Statistics	5	3	-	5	40+60	
	IV	USCOA120/ USCOA220	Skill Based Elective – I Consumer Awareness	2	2	-	2	40+60	
	IV	-	Value Education	1	-	-	-	-	
			<b>Total</b>	<b>30</b>	-	-	<b>21</b>	<b>600</b>	
II	I	ULTAB20	Tamil paper – II	6	3	-	3	40+60	
	II	UENGB20	English paper – II	6	3	-	3	40+60	
	III	UCCOC20	Principles of Accounting – II	5	3	-	4	40+60	
	III	UCCOD20	Business Economics – II	5	3	-	4	40+60	
	III	UASOR20	Allied II: Statistics and Operations Research	5	3	-	5	40+60	
	IV	USCOA120/ USCOA220	Skill based elective – II Consumer Awareness	2	2	-	2	40+60	
	IV	-	Value Education	1	-	-	-	-	
			<b>Total</b>	<b>30</b>	-	-	<b>21</b>	<b>600</b>	
III	III	UCCOE20	Financial Accounting – I	6	3	-	4	40+60	
	III	UCCOF20	Principles of Cost Accounting	6	3	-	4	40+60	
	III	UCCOG20	Law of Contract – I	5	3	-	4	40+60	
	III	UAIED20	Allied III: Indian Economic Development Policy	5	3	-	5	40+60	
	III	UECOA20	Elective I A: Principles of Management	5	3	-	5	40+60	
	III	UECOB20	Elective I B: Essentials of Business Communication						
	IV	USCOB320	Skill based Elective – III Advertising & Sales Promotion Management	2	3	-	2	40+60	
	IV	-	Value Education	1	-	-	-	-	
				<b>Total</b>	<b>30</b>	-	-	<b>24</b>	<b>600</b>
	IV	III	UCCOH20	Financial Accounting –II	5	3	-	4	40+60
III		UCCOI20	Methods of Cost Accounting	5	3	-	4	40+60	
III		UCCOJ20	Law of Contract – II	5	3	-	4	40+60	
III		UCCOK20	Marketing	5	3	-	4	40+60	
III		UAITA20	Allied IV: International Trade	5	3	-	5	40+60	
IV		UNEVS20	Environmental Studies	2	2	-	2	40+60	
IV		USCOC420	Skill based elective – IV Entrepreneurship Development	2	2	-	2	40+60	

	IV	-	Value Education	1	-	-	-	-
			Total	30	-	-	<b>25</b>	<b>700</b>
V	III	UCCOL20	Corporate Accounting – I	6	3	-	4	40+60
	III	UCCOM20	Management Accounting- II	6	3	-	4	40+60
	III	UCCON20	Income Tax – Law and Practice – I	6	3	-	5	40+60
	III	UECOC520	Elective II: Banking: Law and Practice	6	3	-	5	40+60
	III	UECOD520	Elective III: E-Commerce and Tally	4	3	-	3	40+60
	III	UECOE520	Elective Practicals: Tally	2	-	3	2	40+60
	IV	UGCOA520	Non Major Elective Book –keeping and accounting	3	2	-	2	40+60
	IV	USCOD520	Skill based Elective – V Consumer Guide and Empowerment	2	2	-	2	40+60
		USCOE520	Skill based Elective-VI Practical Auditing					
			Value Education	1	-	-	-	-
			Total	30	-	-	<b>22</b>	<b>600/700</b>
vi	III	UCCOO20	Corporate Accounting – II	6	3	-	5	40+60
	III	UCCOP20	Management Accounting – II	6	3	-	5	40+60
	III	UCCOQ20	Income Tax – Law and Practice –II	6	3	-	5	40+60
	III	UECOC620	Elective II: Banking: Law and Practice	6	3	-	5	40+60
	III	UECOD620	Elective III: E-Commerce and Tally	4	3	-	3	40+60
	III	UECOE620	Elective Practical: Tally	2	-	3	2	40+60
	IV	UGCOA620	Non-Major Elective Book –keeping and accounting	3	2	-	2	40+60
		USCOD620	Skill based Elective – V Consumer Guide and Empowerment					
	IV	USCOE620	Skill based Elective-VI SBE-Practical Auditing	2	2	-	2	40+60
	IV	UVEDA15	Value Education	1	2	-	2	40+60
			Total	30	-	-	<b>26</b>	<b>800/700</b>
	V		Extension Activities		-	-	1	-
			Grand Total				140	3900

**PROGRAMME OUTCOME:**

On completion of the UG Programme, students will be able to:

**PO 1: SOCIAL CONTRIBUTION:**

excel as a socially committed individual having empathy for the needs of the society through value-based education.

**PO 2: ENVIRONMENT AND SUSTAINABILITY:**

enhance the theoretical and practical knowledge gained in the field of auditing, tax filing, and share market.

**PO 3: PROFESSIONAL ETHICS:**

apply ethical principles in promoting values and attitudes and become responsible towards the practice of accounting norms.

**PO 4: INDIVIDUAL AND TEAM WORK:**

function effectively as an individual and as a member or leader in teams strengthening group dynamics to achieve the common goals of the organisations.

**PO 05: LIFE-LONG LEARNING:**

recognize the need for and have the ability to engage in life-long learning process to cope up with the emerging trends in social, cultural, economic and technological changes.

**PO6: HIGHER KNOWLEDGE :**

Pursue higher knowledge, qualify professionally, enhance entrepreneurial skills and contribute towards the needs of the society.

**PROGRAMME SPECIFIC OBJECTIVE:**

Within few years of obtaining UG Degree in commerce, the students will be able to

**PSO 1. SUBJECT PROFICIENCY:**

succeed in obtaining employment appropriate to their interest in related fields and make a positive contribution in public practice, government, commerce and industry.

**PSO 2. PRACTICAL APPLICATION:**

Apply the practical knowledge gained over the years in the field of auditing, tax filing, share market and other finance related services

**PSO 3. PROFESSIONAL GROWTH:**

develop in their professional career through lifelong learning and excel as the fellow associates in the field of company secretaryship, chartered accountancy and business administration.

**PSO 4. MANAGEMENT SKILLS:**

Exercise leadership qualities and moral values through ethical ways with the concern for the society and the environment with team spirit to adapt to change throughout their professional career.

**PSO 5. ADDRESSING THE NEEDS OF THE NATION:**

Cater to the needs of the industry/society so as to contribute for the development of the nation.

**PSO6. ENTREPRENEURIAL SKILL:**

Enhance the Entrepreneurial skill, critical & creative thinking to thrive to be self-motivated and successful.

**MAPPING OF PROGRAMME SPECIFIC OBJECTIVE WITH PROGRAMME  
OUTCOME**

<b>PSO</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PSO 6</b>
<b>PO 1</b>	H	M	H	H	H	H
<b>PO 2</b>	H	H	H	M	H	M
<b>PO 3</b>	M	M	H	H	M	H
<b>PO 4</b>	H	H	M	H	H	H
<b>PO 5</b>	H	H	M	H	M	H

**(Low – L, Medium – M, High – H)**

## SEMESTER I

### UCC0A20 - PRINCIPLES OF ACCOUNTING- I

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
I/I	UCCOA20	Principles of Accounting- I	Theory	Core	5	4	40+60

#### Course Objective:

1. To impart the basic knowledge about accounting principles concepts and convention.
2. To ascertain day book, preparation of ledger and verification of trial balance.
3. To enable the students to differentiate the types of cash book.
4. To examine the difference between cash book and pass book.
5. To imbibe the learners about the need of rectification of errors. And recording of accounts for non-profit organization.

#### Course Outcome (CO):

On the successful completion of the course, students will be able to

1. Gain knowledge about the basic accounting principles, concepts and conventions.
2. Write day books, prepare Ledger Accounts and verify the Trial Balance.
3. Prepare different types of subsidiary books and prepare relevant ledger accounts.
4. Analyze difference between cash book and bank pass book by preparing Bank Reconciliation Statement.
5. Identify the various errors and rectify them in the books of accounts.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	M	M	H	H
2	H	H	M	H	H	H
3	H	H	M	H	H	H
4	H	H	H	H	H	H
5	H	H	H	M	M	H

(Low – L, Medium – M, High – H)

#### COs consistency with PSOs

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	L	L	M	H
2	H	H	M	H	H	H
3	H	M	M	M	M	H
4	H	M	M	M	H	H
5	M	M	M	H	H	H

(Low – L, Medium – M, High – H)

## Course Syllabus

### Unit I: Introduction to Accounting

(15 Hours)

- 1.1 Introduction, Meaning and Definition of Accounting (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.2 Principles of Double entry (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.3 Basic Accounting Principles (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Methods of Accounting concepts and conventions (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Accounting Equation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Journal Entries, ledgers and Trial Balance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Unit II: Subsidiary Books

(15 Hours)

- 2.1 Introduction to Subsidiary Books (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.2 Journal Proper and methods of subsidiary Books (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Methods of Purchases and purchases return Book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Sales and its return Book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Types of cash book Single, Double, Triple and analytical petty cash book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Bills Receivable and Bills Payable Books (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Unit III: Bank Reconciliation Statement and Rectification of Errors

(15 Hours)

- 3.1 Need, Meaning causes for differences between cash book and pass book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.2 Method of preparation of Bank reconciliation statement (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Bank balance to be shown in balance sheet. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4 Classifications of errors (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.5 Suspense Account (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6 Effect of Rectification (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Unit IV: Final Accounts

(15 Hours)

- 4.1 Introduction to Final Accounts (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Features and terms of manufacturing Account  
(Included stock of finished goods, raw material consumed etc) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Manufacturing Account (K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Trading Profit and Loss Account (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Final accounts without adjustments (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.6 Final accounts with adjustments (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Unit V: Accounts of Non-Profit Organizations

(15 Hours)

- 5.1 Introduction to final Accounts of Non-Profit Organizations (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Preparation of Receipts and Payments Account (K<sub>1</sub>, K<sub>2</sub>)
- 5.3 Preparation of Income and Expenditure Account. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Preparation of Receipts and Payments Account from Income and Expenditure Account  
And Balance sheet (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Preparation of opening and closing balance sheets from a given expenditure account and receipts and payment. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Final Accounts of Non-Profit Organisations (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Text Books:

Reddy T.S and Murthy – Advanced Accountancy – Margham Publications, Chennai, Reprint 2018

### Reference Books

- 1). Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts (Volume I) – S.Chand & Company Limited, New Delhi, Reprint 2019.

- 2). Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.
- 3). Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khasa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.
- 4).Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint - 2017.
- 5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors – Guwahati, Edition 2018.

**Web Resources:**

- 1.The national society for Accountants
- 2.Accounting coach
- 3.MIT Sloan school of management
- 4.The Blunt bean counter
5. Online Accounting schools
6. Online Master's in forensic accounting
- 7.American institute of certified public Accountants.

## SEMESTER I / II

### USCOA120/USCOA220 - CONSUMER AWARENESS

Year/ Semester I/II	Course Code USCOA120/ USCOA220	Title of the course Consumer Awareness	Course type Theory	Course category Skill Based	No. of. Hours 2	Credits 2	Marks 40+60
				<b>Elective</b>			

#### Course Objectives

1. To create awareness among the students with regard to consumer movement.
2. To enable the students learn the rights of consumer.
3. To analyse the methods of handling grievances and its redressal measures.
4. To impart them the procedure for filing complaint.
5. To learn ways and means in safeguarding the rights of consumers.

#### Course Outcomes (CO)

1. Students gain an insight knowledge on consumer awareness movement and FSSAI 2006.
2. Students were familiarised with the rights of consumers.
3. Students gained thorough knowledge in handling grievances and its redressal measures.
4. Students were well versed in filing the complaints and appeals.
5. Students gained conceptual knowledge on the social responsibilities of the consumers.

#### COs consistency with POs

CO	PO1	PO2	PO3	PO4	PO5	PO6
<b>1</b>	H	M	H	M	H	H
<b>2</b>	H	M	H	H	H	H
<b>3</b>	H	M	H	H	M	H
<b>4</b>	H	H	H	H	M	H
<b>5</b>	H	H	H	H	H	H

Low – L, Medium – M, High - H COs

#### consistency with PSOs

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
<b>1</b>	M	H	L	M	M	M
<b>2</b>	H	H	M	L	H	H
<b>3</b>	H	M	M	M	M	H
<b>4</b>	H	M	M	M	H	H
<b>5</b>	M	M	M	H	H	M

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Consumer protection Act**

**(6 Hours)**

- 1.1 Gandhi's Quote - Brief History (K<sub>1</sub>,K<sub>2</sub>)
- 1.2 Consumer Protection Act, 1986 (K<sub>1</sub>,K<sub>2</sub>)
- 1.3 Rights of Consumer (K<sub>1</sub>,K<sub>2</sub>)
- 1.4 United Nations Guidelines (K<sub>1</sub>,K<sub>2</sub>)
- 1.5 Responsibility of consumers (K<sub>1</sub>,K<sub>2</sub>)
- 1.6 Standard Certification Marks (K<sub>1</sub>,K<sub>2</sub>)

### **Unit II: Right to Information Act**

**(6 Hours)**

- 2.1 Meaning of Brand name, label, Package & Trade Mark (K<sub>1</sub>,K<sub>2</sub>)
- 2.2 Advertisements, print and Electronic Media (K<sub>1</sub>,K<sub>2</sub>)
- 2.3 Official records and citizen charter (K<sub>1</sub>,K<sub>2</sub>)
- 2.4 Meaning of right to Choose (K<sub>1</sub>,K<sub>2</sub>)
- 2.5 Platforms for consumer representation (K<sub>1</sub>,K<sub>2</sub>)
- 2.6 Consumer Protection Councils (K<sub>1</sub>,K<sub>2</sub>)

### **Unit III: Right to Redressal – 1**

**(6 Hours)**

- 3.1 Types of Grievances (K<sub>1</sub>,K<sub>2</sub>)
- 3.2 Remedies available under the Consumer Protection (K<sub>1</sub>,K<sub>2</sub>)
- 3.3 Restrictive Trade Practice Act, 1986 (K<sub>1</sub>,K<sub>2</sub>)
- 3.4 Unfair Trade Practice (K<sub>1</sub>,K<sub>2</sub>)
- 3.5 Pre-packed goods and unfair trade practices (K<sub>1</sub>,K<sub>2</sub>)
- 3.6 Advertising Standards Council of India (K<sub>1</sub>,K<sub>2</sub>)

### **Unit IV: Right to Redressal – II**

**(6 Hours)**

- 4.1 Definitions; goods, services, Consumer of Goods, consumer of Services, Complaint, complainant, consumer dispute, defect, deficiency, Appropriate laboratory, manufacturer (K<sub>1</sub>,K<sub>2</sub>)
- 4.2 Filing a complaint (K<sub>1</sub>,K<sub>2</sub>)
- 4.3 Procedure on receipt of complaint (K<sub>1</sub>,K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Appeals (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 4.5 District Forum, State Commission and National Commission (K<sub>1</sub>,K<sub>2</sub>)
- 4.6 Composition, Appointment, Term of office (K<sub>1</sub>,K<sub>2</sub>)

### **Unit V: Consumer Responsibilities and Case laws and other tips**

**(6 Hours)**

- 5.1 Responsibilities (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Critical Awareness – Social Responsibility (K<sub>1</sub>, K<sub>2</sub>)
- 5.3 Environmental Awareness (K<sub>1</sub>, K<sub>2</sub>)
- 5.4 Solidarity (K<sub>1</sub>, K<sub>2</sub>)
- 5.5 Responsibilities in association with all the Rights (K<sub>1</sub>, K<sub>2</sub>)
- 5.6 Leading Case Laws (K<sub>1</sub>, K<sub>2</sub>)

### **Reference Book:**

1. E-books available in the FSSAI website like Dart, Pink, Yellow and Orange books
2. Newsletters (quarterly publications) of State Consumer Knowledge Helpline Knowledge Resource

Management Portal (SCHKRMP)

3. "Nugarvor Kavasam" a publication by the Department of Civil Supplies and Consumer

**Web Resources:**

[www.consumer.tn.gov.in](http://www.consumer.tn.gov.in)

[www.consumeradvice.in](http://www.consumeradvice.in)

**SEMESTER II**

**UCCOC20 - Principles of Accounting-II**

<b>Year/ Semester</b>	<b>Course Code</b>	<b>Title of the course</b>	<b>Course type</b>	<b>Course category</b>	<b>No. of Hours</b>	<b>Credits</b>	<b>Marks</b>
I/II	UCCOC20	Principles of Accounting- II	Theory	Core	5	4	40+60

**Course Objective:**

1. To impart knowledge about single entry and double entry.
2. To analyze the average due date and account current.
3. To ascertain the value of depreciation.
4. To enable and prepare joint venture and consignment accounts.
5. To imbibe the different types of bills of exchange.

**Course Outcome (CO):**

On the successful completion of the course, students will be able to

1. Prepare Accounts based on Single Entry System and understand the difference between single entry and double entry system.
2. Calculate average due dates and prepare account current through different methods.
3. Calculate depreciations of assets through different methods and ascertain the value of assets.
4. Understand the Meaning of Joint Venture and prepare related accounts in the books of related parties.
5. Understand the meaning of Consignment of goods, prepare the necessary accounts and ascertain the Profit or loss.

**COs consistency with POs**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	M	M	H	M	H
2	H	H	M	H	H	H
3	H	M	H	M	M	H
4	H	M	H	M	H	H
5	M	H	M	H	H	H

**Low – L, Medium – M, High - H**

**COs consistency with PSOs**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO 6
1	H	M	H	H	M	M
2	H	H	M	H	H	H
3	H	H	M	H	M	H
4	H	M	H	M	H	H
5	H	M	M	H	H	M

**Low – L, Medium – M, High - H**

**Course Syllabus**

**Unit I: Single entry System**

**(15 Hours)**

- 1.1 Meaning, definition salient features, limitations and difference between double entry and single entry. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.2 Distinction between balance sheet and statement of affairs (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.3 Ascertainment of Profit & Net worth method (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Computation of Conversion Method (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Calculation of missing items and appropriate accounts (K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Calculation of missing figures and Balance sheet (K<sub>3</sub>, K<sub>4</sub>)

**Unit II: Average due Date and Account Current**

**(15 Hours)**

- 2.1 Meaning of average due date & Meaning & Definition of Account current (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Computation of where amount is lent in different installments/ Preparation of Account Current (K<sub>3</sub>, K<sub>4</sub>)
- 2.3 Determination of due date/ Calculation of Product Method and Red ink interest method (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.4 Average due date as basis for calculation of interest/ Calculation of interest table method and Daily Balance Method (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Interest on drawing of interest (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Where the amount is lent in a single installments/ Calculation of Époque method and varying interest method (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Unit III: Depreciation**

**(15 Hours)**

- 3.1 Concepts, Meaning, characteristics, causes and objectives of Depreciation. Basic factors affecting the amount of depreciation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Methods of recording depreciation and exchange of used asset (K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Methods of providing depreciation straight line method, diminishing balance method (K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Change in Method of depreciation, Annuity Method, Depreciation fund or sinking fund method. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

- 3.5 Computation of Insurance policy method Revaluation methods. (K<sub>2</sub>,K<sub>3</sub>, K<sub>4</sub>)  
3.6 Computation of Depletion method, machine hour rate method(K<sub>2</sub>,K<sub>3</sub>, K<sub>4</sub>)

**Unit IV: Accounting for Special Transactions I –**

**Joint Venture and Consignment**

**(15 Hours)**

- 4.1 Meaning and features of Joint venture and Consignment Distinction between Joint venture and Partnership and sale and consignment (K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>, K<sub>4</sub>)  
4.2 Calculation of Accounting for joint Ventures when a separate book is kept Accounting treatment of consignment transaction(K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>, K<sub>4</sub>)  
4.3 Computation when separate set of book is not kept in joint venture & Journal entries in consignor's and consignee book (K<sub>3</sub>, K<sub>4</sub>)  
4.4 Computation of when each co-venture maintains a complete record of all the joint venture maintains a record of his own transactions (K<sub>3</sub>, K<sub>4</sub>)  
4.5 Computation of partial record method or memorandum joint venture method.  
4.6 Conversion of consignment into joint venture (K<sub>3</sub>, K<sub>4</sub>)

**Unit V: Accounting for special Transaction II -Bills of exchange(15 Hours)**

- 5.1 Bills of Exchange Introduction definition of bills of exchange features parties to bill of exchange. (K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>, K<sub>4</sub>)  
5.2 Advantages and Disadvantages of bills of exchange types of Bills of exchange-accounting for Bills of exchange(K<sub>2</sub>,K<sub>3</sub>)  
5.3 Recording transactions in journal and ledger (K<sub>3</sub>, K<sub>4</sub>)  
5.4 Computation of Retiring bill under rebate (K<sub>3</sub>, K<sub>4</sub>)  
5.5 Dishonour of Bill and renewal of Bill. (K<sub>3</sub>, K<sub>4</sub>)  
5.6 Computation of Accommodation Bills and Trade Bills(K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

Reddy T.S and Murthy – Advanced Accountancy – Margham Publications, Chennai, Reprint 2018

**Reference Books**

- 1). Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(Volume I) – S.Chand & Company Limited, New Delhi, Reprint 2019.
- 2). Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.
- 3). Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khosa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.
- 4). Tulsian P.C. – Financial Accounting – Pearson Education, New Delhi, Edition Reprint-2017.
- 5). Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors – Guwahati, Edition 2018.

**Web Resources:**

1. The national society for Accountants
2. Accounting coach
3. MIT Sloan school of management
4. The Blunt bean counter
5. Online Accounting schools
6. Online Master's in forensic accounting
7. American institute of certified public Accountants.

**SEMESTER III**  
**UCCOE20 - FINANCIAL ACCOUNTING I**

<b>Year/ Semester</b> II/III	<b>Course Code</b> UCCOE20	<b>Title of the course</b> Financial Accounting I	<b>Course type</b> Theory	<b>Course category</b> Core	<b>No. of Hours</b> 6	<b>Credits</b> 4	<b>Marks</b> 40+60
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**Course Objectives:**

1. To ascertain the different types of branches and its accounting systems.
2. To impart the learners the need for preparation of Departmental Accounts.
3. To enable the students to differentiate Hire Purchase and Instalment System of accounting.
4. To examine the various accounting treatments in the preparation of Royalty Accounts.
5. To analyse the different methods of recording Investment Accounts.

**Course Outcomes (CO):**

1. Students acquired conceptual knowledge on Branch accounts and its systems.
2. Students were familiarised with the scope and dimensions of Departmental Accounting.
3. Students gain an insight knowledge on the preparation of Hire Purchase and Instalment Systems.
4. Students gained thorough knowledge in the accounting treatments to be applied in the preparation of Royalty Accounts.
5. Students were well versed in the methods of recording the Investment Accounts.

**COs consistency with POs**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>1</b>	H	M	M	M	M	H
<b>2</b>	H	H	M	H	H	H
<b>3</b>	H	M	M	M	H	H
<b>4</b>	H	M	M	M	M	H
<b>5</b>	M	M	M	H	H	H

(Low – L, Medium – M, High – H)

**COs Consistency with PSOs**

<b>CO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO 6</b>
<b>1</b>	H	H	H	H	H	M
<b>2</b>	H	M	M	M	H	H
<b>3</b>	H	H	M	H	H	H
<b>4</b>	H	H	M	H	H	H
<b>5</b>	H	H	M	H	H	M

**(Low – L, Medium – M, High – H)**

**Course Syllabus**

**Unit I: Branch Accounts:**

**(15 Hours)**

- 1.1 Meaning and objectives of Branch Accounts(K<sub>1</sub>,K<sub>2</sub>)
- 1.2 Types of branches – Dependent and independent Branch (Excluding Foreign Branches) (K<sub>1</sub>,K<sub>2</sub>)
- 1.3 Debtors system under Dependent Branch System. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.4 Stock and Debtors System. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 1.5 Wholesale Branch System(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.6 Final Accounts System(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)

**Unit II: Departmental Accounting:**

**(15 Hours)**

- 2.1 Meaning, need and advantages of Departmental Accounting(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 2.2 Distinction between departments and branches (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 2.3 Methods and techniques of Departmental Accounting(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 2.4 Allocation of expenses (K<sub>1</sub>,K<sub>2</sub>)
- 2.5 Inter departmental transfers at cost price (K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 2.6 Inter departmental transfers at selling price(K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit III: Hire Purchase and Instalment Systems:**

**(15 Hours)**

- 3.1 Meaning of Hire Purchase System, Distinction between Hire Purchase and Instalment System. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 3.2 Accounting Treatment for Hire purchase system. (K<sub>1</sub>,K<sub>2</sub>)
- 3.3 Calculation of interest(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 3.4 Default and complete repossession (K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 3.5 Default and partial repossession (K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 3.6 Meaning and Accounting treatment of Instalment System (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit IV: Royalty Accounts:**

**(15 Hours)**

- 4.1 Meaning and its treatment in Final Accounts(K<sub>1</sub>,K<sub>2</sub>)
- 4.2 Technical terms used in Royalty Accounts(K<sub>1</sub>,K<sub>2</sub>)
- 4.3 Accounting treatment of entries in Royalty Accounts(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 4.4 Methods of recoupment of shortworkings and its Treatment (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 4.5 Meaning of sub-lease and its Accounting Treatment (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 4.6 Methods of recoupment of shortworkings and its treatment in sublease(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)

**Unit V: Investment Accounts:**

**(15 Hours)**

- 5.1 Meaning of Investment Accounts and its nature. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2 Purchase and sale of investments and types of Securities(K<sub>1</sub>, K<sub>2</sub>)
- 5.3 Cum-interest and Ex-interest quotations and its Accounting treatment. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Fixed bearing securities and its interest Calculation with journal entries. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Columnar investment accounts for fixed income bearing securities. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Columnar investment accounts for equity shares(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

Reddy T.S and Murthy – Advanced Accountancy – Margham Publications, Chennai, Reprint 2018

### **Reference Books**

- 1). Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(VolumeI) – S.Chand& Company Limited, New Delhi, Reprint 2019.
- 2). Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.
- 3). Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khasa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.
- 4).Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint - 2017.
- 5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors – Guwahati, Edition 2018

### **Web Resources:**

- 1).MIT Open CourseWar (<http://ocw.mit.edu/courses/sloan>)
- 2). Khan Academy
- 3). Accounting Student Network
- 4). MissCPA
- 5)Accounting.com
- 6)Accounting Coach
- 7)AQA(aqa.org.uk.)
- 8)Accounting-World
- 9)AccountingInfo
- 10)Course Hero

## SEMESTER III

### UCCOF20– PRINCIPLES OF COST ACCOUNTING

Year/ Semester II/III	Course Code UCCOF20	Title of the course Principles of Cost Accounting	Course type Theory	Course category Core	No. of Hours 6	Credits 4	Marks 40+60

#### Course Objectives:

1. To introduce to the students the cost accounting system its applications in business.
2. Ascertainment of cost and selling price, cost & cost control.
3. To assist management in decision making.
4. Develop the skills needed to analyze the Cost statements effectively.
5. To apply effectively various indirect expenses for effective cost control.

#### Course Outcomes (CO):

1. Understand the ideas of costing, retrieving the concept to prepare tenders & Quotations.
2. Executing the essence of material control, maintaining stock ledgers and various pricing methods.
3. Exemplifying the concept of calculating labour cost, wages and incentives.
4. Understand the concept of indirect expenses(Over heads) and its impact in production.
5. Applying the procedure to allocate and apportion various Overheads

#### COs consistency with POs

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO6
1	H	H	M	M	M	H
2	H	H	M	H	H	H
3	H	M	M	M	H	H
4	H	M	M	M	M	H
5	M	H	M	H	H	H

(Low – L, Medium – M, High – H)

#### COs Consistency with PSOs

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO 6
1	H	H	H	H	H	M
2	H	M	M	M	H	H
3	H	H	M	H	H	H
4	H	H	M	H	H	H
5	H	H	M	H	H	M

(Low – L, Medium – M, High – H)

## Course Syllabus

### Unit I: Introduction: (15 Hours)

- 1.1 Definition of Cost, Costing, Cost Accountancy and Cost Accounting, Need, Scope and Objectives of Cost Accounting. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.2 Difference between Cost and Financial Accounting, Advantages and Limitations of Cost Accounting. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Classification of cost, Cost centre, Cost Units, Methods and Types of costing. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4 Elements of Cost, Preparation of simple cost sheet without inventories. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Cost sheet with inventories and closing stock valuation. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Preparation of Tenders and Quotations. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Unit II: Material Control: (15 Hours)

- 2.1 Meaning, Need, Essentials, Advantages and Organisation of Material control (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Classification, codification of materials, inventory control and its techniques. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Economic Ordering Quantity – Problems. (K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Computation of Stock Levels. (K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Pricing of Materials (without returns and losses). (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Pricing of Materials (with Returns and Losses). (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Unit III: Labour: (15 Hours)

- 3.1 Introduction, Types of labours, objectives and techniques. (K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Labour turnover methods, Causes, Measurements, Calculation of labour Turnover. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Time Keeping, Objectives, Essentials, Methods of Time keeping. (K<sub>1</sub>, K<sub>2</sub>)
- 3.4 Calculation of wages (Normal & Overtime). (K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Calculation of remuneration and incentives based on time (Time rate system). (K<sub>3</sub>, K<sub>4</sub>)
- 3.6 Calculation of Wages, Remuneration and Incentives based on Outputs. (Piece Rate system). (K<sub>2</sub>, K<sub>4</sub>)

### Unit IV: Overheads - I: (15 Hours)

- 4.1 Meaning -Definition and Importance of overheads-classification of overheads based on function. (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Classification of overheads based on behavior - classification based on elements. (K<sub>1</sub>, K<sub>2</sub>)
- 4.3 Codification of overheads - Departmentation of overheads. (K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Allocation of Overheads- Apportionment of Overheads-difference between Allocation and apportionment. (K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Primary distribution of overheads, Principles of apportionment, bases of apportionment. (K<sub>3</sub>, K<sub>4</sub>)
- 4.6 Primary distribution –Problems. (K<sub>3</sub>, K<sub>4</sub>)

### Unit V: Overheads – II: (15 Hours)

- 5.1 Secondary distribution - direct reapportionment method - Step ladder method (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Secondary distribution - Reciprocal services method (K<sub>1</sub>, K<sub>2</sub>)
- 5.3 Secondary distribution - Repeated distribution method - Trial and Error method (K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Absorption of overheads, Overheads rates, Types and Methods. (K<sub>2</sub>, K<sub>3</sub>)

5.5 Problems on Absorption (All Methods).( K<sub>3</sub>, K<sub>4</sub>)

5.6 Machine Hour rate.( K<sub>3</sub>, K<sub>3</sub>)

**Text Books:**

Reddy T.S and Hari Prasad Reddy Y. – Cost Accounting – Margham Publications, Chennai, Reprint 2018.

**Reference Books:**

- 1.Jain S. P & Narang K.L. \_ Cost Accounting – Kalyani Publishers, New Delhi, Reprint2017
- 2.Khanna, Ahuja and Pandey – Cost Accounting – S. Chand & Co., New Delhi, Reprint2016
- 3.Lall Nigam B.M. and Bagavathi V. – Cost Accounting: An Introduction – Prentice Hall of India, New Delhi, Reprint2018.
- 4.Pillai R.S.N. and Bagavathi V. – Cost Accounting – S. Chand & Co., Ltd., NewDelhi,2014
- 5.Arora M. N. – A Textbook of Cost and Management Accounting – Vikas Publishing House, Chennai,10<sup>th</sup> Edition, 2012

**Web Resources:**

- 1).MIT Open CourseWare  
(<http://ocw.mit.edu/courses/sloan>)
2. Costmgmt.org
3. [www.edx.org](http://www.edx.org)
4. study.com
5. [www.accountingcoach.com](http://www.accountingcoach.com)
6. fasab.gov
7. [www.freebookcentre.net](http://www.freebookcentre.net)
8. open.umn.edu
9. libguides.uwf.edu
10. books.google.co.in

## SEMESTER III

### UCCOG20 - LAW OF CONTRACT I

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
II/III	UCCOG20	Law of Contract I	Theory	Core	5	4	40+60

#### Course Objectives:

1. To gain knowledge on the essential elements of valid contract.
2. To learn about the law relating to capacity to contract.
3. To acquire theoretical knowledge on legality of contract.
4. To familiarize with the law relating to performance of contract.
5. To apprehend knowledge on principal-agent relationship.

#### Course Outcomes (CO):

1. Students acquired conceptual knowledge on essential elements of the contract.
2. Students were familiarised with the competence of parties to enter into a valid contract.
3. Students gained an insight knowledge on the legality of the contract.
4. Students gained thorough knowledge in the performance of a contract.
5. Students were well versed in the principal-agent relationship.

#### COs consistency with POs

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO6
1	H	H	M	H	M	H
2	H	H	M	H	M	H
3	H	H	M	H	M	H
4	H	H	M	H	M	H
5	H	H	M	H	M	H

(Low – L, Medium – M, High – H)

#### COs Consistency with PSOs

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO 6
1	H	M	M	H	M	M
2	H	M	H	M	H	H
3	H	H	H	H	M	H
4	M	M	M	H	M	H
5	H	H	M	H	H	M

(Low – L, Medium – M, High – H)

## Course Syllabus

### **Unit I: Introduction: Nature, Offer and Acceptance, Consideration (15 Hours)**

- 1.1 Definition, essential elements of a valid contract, Classification of contracts (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Offer, legal rules as to Offer (K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>)
- 1.3 Acceptance, Legal rules as to Acceptance(K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>)
- 1.4 Communication of offer, acceptance and revocation(K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>)
- 1.5 Consideration, legal rules as to consideration(K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>)
- 1.6 Stranger to contract and exceptions (K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>)

### **Unit II: Capacity to Contract and Free Consent (15 Hours)**

- 2.1 Minor and minor's position as regard to agreement(K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>)
- 2.2 Persons of unsound mind and persons disqualified under law(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Coercion and undue influence(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Misrepresentation(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Fraud (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Mistake(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Legality of Object, Void agreements, Contingent contracts and Quasi-contracts (15 Hours)**

- 3.1 Unlawful objects and consideration, unlawful and illegal agreements (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Agreements opposed to public policy (K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>)
- 3.3 Void agreements, void contracts, and restitution (K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>)
- 3.4 Wagering agreements (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Contingent contracts (K<sub>1</sub>, K<sub>2</sub>,K<sub>3</sub>)
- 3.6 Quasi-contracts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Performance, Discharge and Remedies to breach of contract (15 Hours)**

- 4.1 Performance of contract (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Reciprocal promises, Appropriation of payments and assignment of contracts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Discharge of contract by performance, agreement or consent, lapse of time (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Discharge by impossibility of performance, operation of Law, breach of contract (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Rescission and suit for damages (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Suit upon quantum meruit, specific performance, and injunction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Contract of Agency (15 Hours)**

- 5.1 Definition, essentials and rules of Agency (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2 Creation of Agency (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Classification of agents, delegation of authority (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Relations of Principal and Agents (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Relation of Principal with Third Parties (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Termination of Agency (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

## **Text Books:**

Kapoor N. D. – Business Law – Sultan Chand & Sons, New Delhi, Revised Ed. 2015

### Reference Books

1. Kapoor N. D. – Elements of Company Law – Sultan Chand & Sons New Delhi, Revised Ed.2015  
Kapoor N. D. – Business Law – Sultan Chand & Sons, New Delhi, Revised Ed. 2015
2. Gulshan S.S. – Mercantile Law – Excel Books, New Delhi, 2012
3. Pillai R.S.N. and Bagavathi V. – Business Law – Sultan Chand& Sons, New Delhi, Revised Edition 2017.
4. Kuchhal M.C. and VivekKuchhal – Business Laws – Vikas Publishing House, Chennai, 2015
5. Dr.Jain V.K. and CA Shashank S.Sharma – Business Laws, Business Correspondence and Reporting – Taxmann Publication, New Delhi, 2017

### Web Resources:

- 1). [www.himpub.com](http://www.himpub.com)
- 2). [www.rccmindore.com](http://www.rccmindore.com)
- 3). [www.dphu.org](http://www.dphu.org)
- 4). [www.geektonight.com](http://www.geektonight.com)
- 5). [www.epdf.pub](http://www.epdf.pub)
- 6). [www.academia.edu](http://www.academia.edu)

## SEMESTER III

### UECOA20 - PRINCIPLES OF MANAGEMENT

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
II/III	UECOA20	Principles of Management	Theory	Elective	5	5	40+60

### Course Objectives:

1. To help the students to develop cognizance of the importance of management principles.
2. To outline the major functions of management.
3. To develop and achieve organisational goal and objectives.
4. To gain valuable insight into the workings of business and other organisations.
5. To understand the role of communication in the management function.

### Course Outcomes (CO):

The learners will able to:

1. Learn the concept and understand the principles and managerial skills.
2. Impart knowledge in planning, diagnosing and solving organizational problems and developing optimum managerial solutions.
3. Gain knowledge in organizing and delegating authority under various structures.
4. To identify and analyse attributes that motivate to work under different leadership styles.
5. To become versatile in co-ordinating and developing the skill of effective communication.

**COs consistency with POs**

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO6
1	H	H	H	H	H	H
2	H	H	H	H	H	H
3	H	H	H	H	H	H
4	H	H	H	H	H	H
5	H	H	H	H	H	H

(Low – L, Medium – M, High – H)

**COs Consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	H	H	H	H	M
2	H	M	H	H	H	H
3	H	H	H	H	H	H
4	H	H	M	H	H	H
5	H	H	H	H	H	M

Low – L, Medium – M, High - H

**Course Syllabus****UnitI: Introduction****(15 Hours)**

- 1.1 Management, Meaning, Definition, Concepts, Nature and Characteristics (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.2 Levels, Importance and Scope (K<sub>1</sub>,K<sub>2</sub>)
- 1.3 Skills of manager, Process of Management, Functions (K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 1.4 Principles, Contributions by F.W. Taylor (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 1.5 Henri Fayol & Peter F. Drucker (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 1.6 Conceptual idea of Corporate Social Responsibility. (K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**UnitII:Planning and Decision Making****(15 Hours)**

- 2.1 Planning, Meaning, Definition, Nature, Importance (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 2.2 Advantages and Limitations (K<sub>1</sub>,K<sub>2</sub>)
- 2.3 Steps in the Process of Planning, Types of Plans (K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 2.4 Concept of M.B.O. (K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 2.5 Forecasting, meaning, steps and problems (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 2.6 Decision Making, Meaning, steps and problems (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit III: Organising (15 Hours)**

- 3.1 Organising, Meaning, Nature, Importance (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 3.2 Principles, Steps of organizing (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 3.3 Types of Organisation structure (Line, Functional, Line and Staff, Committee – Excluding Advantages and Disadvantages) (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 3.4 Delegation, Meaning, Types (K<sub>1</sub>,K<sub>2</sub>)
- 3.5 Process and Principles of delegation (K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 3.6 Decentralisation of Authority, Differences between Delegation andDecentralisation (K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**UnitIV: Staffing and Motivation****(15 Hours)**

- 4.1 Staffing, Meaning, Elements or Functions, Importance (K<sub>1</sub>,K<sub>2</sub>)
- 4.2 Recruitment and Selection process (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 4.3 Meaning of Directing, Nature and Characteristics of Directing, Significance (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 4.4 Leadership, Meaning, Nature, Functions, Importance, Types or Styles of leadership. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 4.5 Motivation, Meaning, Monetary and Non-Monetary Incentives (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 4.6 Theories of Motivation, Maslow, McGregor, Herzberg. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**UnitV: Control and Coordination****(15 Hours)**

- 5.1 Control, Definition, Meaning, Nature and Purpose, Elements (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 5.2 Need and Significance, Control Process, Problems in the Control (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 5.3 Management by Exception, Co-ordination, Meaning, Nature, problems, Importance, types (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 5.4 Co-operation, Importance, Types, Problems (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 5.5 Communication, Meaning, Nature, Elements of good Communication, Importance and Essentials (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 5.6 Barriers to Communication, measures to improve Communication Barriers, Feedback. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Text Book**

1. Dr. Gupta C.B. – Business Management - Sultan Chand & sons, New Delhi, Revised Edition 2018

**Reference Books:**

1. Prasad L.M. – Management: principles and practices – Sultan Chand & Sons, New Delhi, Revised Edition 2012.
2. Harold Koontz & Cyril O' Donnell – Principles of Management: An Analysis of Managerial Functions – McGraw Hill Publishing Co. Ltd., New Delhi, Reprint 2012
3. Sharm Ltd., New Delhi, Reprint 2012
4. Sharma B.D., Bhalka N.S. and Gupta R.S. – Principles of Management – Kalyani Publishers, New Delhi, Reprint 2013
5. Kumkum Mukherjee – Principles of Management – McGraw Hill Education, New Delhi Reprint 2013
6. Bhushan Y.K. – Fundamentals of Business Organization and Management – Sultan Chand & Sons, New Delhi, Revised Edition 2013

**Web Resources:**

1. <https://www.cliffsnotes.com>
2. <https://www.open.umn.edu>
3. <https://study.com>
4. <https://www.inc.com>
5. <https://www.pearson.com>

## SEMESTER III

### UECOB20 - ESSENTIALS OF BUSINESS COMMUNICATION

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
II/III	UECOB20	Elective – II A: Essentials of Business Communication	Theory	Elective	5	5	40+60

#### Course Objectives:

1. To know the importance of business communication in the organisations.
2. To impart the strategies of effectiveness of business writing.
3. This course enable the students to draft bank correspondence letters.
4. To gain the knowledge of report writing and its importance.
5. To induce the skills in resume writing and train the students to face interviews.

#### Course Outcomes (CO):

The learners will able to:

1. Become versatile in business communication.
2. Acquire knowledge on drafting business letters.
3. Compose bank correspondence letters.
4. Understand the importance of report writing in organisations.
5. Apply skills in writing resume, job applications and to face interviews.

#### COs consistency with POs

CO	PO1	PO 2	PO 3	PO 4	PO 5	PO6
1	M	M	H	H	M	H
2	H	M	M	M	H	H
3	H	M	H	H	H	H
4	M	M	M	M	H	H
5	H	M	M	M	H	H

(Low – L, Medium – M, High – H)

#### COs consistency with PSOs

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	L	L	M	M
2	H	H	M	H	H	H
3	H	M	M	M	M	H
4	H	M	M	M	H	H
5	M	M	M	H	H	M

Low – L, Medium – M, High - H

## Course Syllabus

### Unit I: Introduction

(15 Hours)

- 1.1 Business Communication, Meaning, Definition ((K<sub>1</sub>,K<sub>2</sub>)
- 1.2 Objectives, Process of Communication (K<sub>2</sub>,K<sub>3</sub>)
- 1.3 Importance of Communication (K<sub>2</sub>,K<sub>3</sub>)
- 1.4 Types of Communication (K<sub>2</sub>,K<sub>3</sub>)
- 1.5 Directions of Communications (K<sub>2</sub>,K<sub>3</sub>)
- 1.6 Barriers to Effective Communication (K<sub>2</sub>,K<sub>4</sub>)

### Unit II: Business Communication

(15 Hours)

- 2.1 Features of Business Communication (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Guidelines (The 7Cs) for Effective Business Communication (K<sub>1</sub>,K<sub>2</sub>, K<sub>3</sub>,K<sub>4</sub>)
- 2.3 Model Letters, Layout of Business Letter (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Features in Layout of a Business Letter, Need for Business Letter (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Functions of a Business Letter (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Classification of Business Letter. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Unit III: Bank Correspondence

(15 Hours)

- 3.1 Guidelines for writing a complaint letter (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Drafting Complaint Letters regarding various issues to the authorities (K<sub>1</sub>, K<sub>3</sub>)
- 3.3 Essentials of Bank Correspondence (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4 Letters from Customers to Bank, Opening of a Current Account (K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Requesting to Stop Payment, Extension of time for the repayment of a Loan (K<sub>1</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6 Transfer of SB Account to another Branch, Wrong Debit in the Account (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Unit IV: Report Writing

(15 Hours)

- 4.1 Reports, Importance (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Kinds, Effective Report (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Guidelines of Report writing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Short Reports, Long Reports (K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Meetings (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.6 Agenda and Minutes (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### Unit V: Job Application

(15 Hours)

- 5.1 Job Application, Meaning, Important aspects, Advantages (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Drafting Job Application (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Resumes, Meaning (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Types, Drafting (K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Model of Letters and Resumes (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Interviews, Guidelines (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Book:**

1. Raghunathan N. S and Santhanam B – Business Communication – Margham Publications, Chennai - Reprint 2017.

**Reference Books:**

1. Sundar K and Kumara Raj A – Essentials of Business Communication – Vijay Nicole Imprints Private Limited, Chennai – Reprint 2017.
2. Krishnamacharyulu C. S. G – Business Communication – Himalaya Publishing House, Mumbai – First Edition – 2016.

**Web Resources:**

1. <https://en.wikibooks.org>
2. <https://blog.in.co>
3. <https://www.iabc.com>
4. <https://myperfectresume.com>
5. [www.mybusinessletter.com](http://www.mybusinessletter.com)

**SEMESTER III****USCOB320– ADVERTISING & SALES PROMOTION MANAGEMENT**

Year/ Semester II/III	Course Code USCOB320	Title of the course Advertising & Sales Promotion management	Course type Theory	Course category Skill- Based	No. of Hours <sup>2</sup>	Credits 2	Marks 40+60

**Course Objectives:**

1. To know about the basic concepts of advertising and its role in marketing.
2. To learn about different advertising budgets and various advertising media.
3. To enable the students to visualize an advertisement and learn the procedure of copywriting.
4. To understand the effectiveness of advertising.
5. To understand sales promotion through advertising.

**Course Outcomes (CO):**

1. Students acquired conceptual knowledge on advertising.
2. Students were able to identify different advertising media.
3. Students gained an insight knowledge on the visualization of advertisement and procedure of copywriting.
4. Students gained thorough knowledge in measuring advertising effectiveness.
5. Students were well versed in managing sales through advertising.

**COs consistency with POs**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	M	M	M	M	M	H
2	M	M	M	M	M	H
3	L	H	H	H	H	H
4	H	H	H	H	H	H
5	H	H	H	H	H	H

(Low – L, Medium – M, High – H)

**COs consistency with PSOs**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	H	M	H	M	M
2	H	H	M	H	M	H
3	H	H	M	H	M	H
4	H	H	M	H	M	H
5	H	H	M	H	M	M

(Low – L, Medium – M, High –H)

**Course Syllabus:**

**Unit I: Advertising – an introduction**

**(6 Hours)**

- 1.1 Nature and evolution of Advertising(K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Functions and role of advertising(K<sub>1</sub>, K<sub>2</sub>)
- 1.3 Advertising as a communication model(K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Advertising in marketing mix(K<sub>1</sub>, K<sub>2</sub>)
- 1.5 IMC and its elements(K<sub>1</sub>, K<sub>2</sub>)
- 1.6 Organisations involved in advertising(K<sub>1</sub>, K<sub>2</sub>)

**Unit II: Advertising budget and media**

**(6 Hours)**

- 2.1 Budgeting and its approach and its methods(K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Media planning(K<sub>1</sub>, K<sub>2</sub>)
- 2.3 Factors influencing media plan (K<sub>1</sub>, K<sub>2</sub>)
- 2.4 Media selection (indoor)(K<sub>1</sub>, K<sub>2</sub>)
- 2.5 Outdoor and miscellaneous media (K<sub>1</sub>, K<sub>2</sub>)
- 2.6 Media scheduling(K<sub>1</sub>, K<sub>2</sub>)

**Unit III: Advertising design and Creative thinking**

**(6 Hours)**

- 3.1 Meaning, characters, elements (K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Types of Advertising copy (K<sub>1</sub>, K<sub>2</sub>)
- 3.3 Designing advertisement copy (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Working of advertisement (K<sub>1</sub>, K<sub>2</sub>)
- 3.5 Creativity in advertising (K<sub>1</sub>, K<sub>2</sub>)
- 3.6 Theories of creativity, execution (K<sub>1</sub>, K<sub>2</sub>)

**Unit IV: Measuring advertising effectiveness****(6 Hours)**

- 4.1 Objectives and need for measuring advertising effectiveness (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Time of measuring (K<sub>1</sub>, K<sub>2</sub>)
- 4.3 Testing the advertising copy (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Subject matter of measurement (K<sub>1</sub>, K<sub>2</sub>)
- 4.5 Methods and techniques (K<sub>1</sub>, K<sub>2</sub>)
- 4.6 Causes of waste in advertising (K<sub>1</sub>, K<sub>2</sub>)

**Unit V: Sales Promotion Management****(6 Hours)**

- 5.1 Introduction (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Types and techniques (K<sub>1</sub>, K<sub>2</sub>)
- 5.3 Personal selling (K<sub>1</sub>, K<sub>2</sub>)
- 5.4 Sales promotion through selling skills (K<sub>1</sub>, K<sub>2</sub>)
- 5.5 Promotion of services (K<sub>1</sub>, K<sub>2</sub>)
- 5.6 Relationship marketing during Pandemic period (K<sub>1</sub>, K<sub>2</sub>)

**Text Books:**

1. Advertising and sales Promotion Management, S.L.Gupta and V.V. Ratna, SultanChand & Sons, New Delhi, Reprint (Latest Edition)

**Reference Books:**

1. Advertising and Personal Selling, C.B. Gupta, Sultan Chand & Sons, New Delhi, Reprint 2017.

**Web Resources:**

1. [www.Books.Google.in](http://www.Books.Google.in)
2. [www.slideshare.net](http://www.slideshare.net)
3. [www.studynama.com](http://www.studynama.com)

**SEMESTER IV**  
**UCCOH20 - FINANCIAL ACCOUNTING II**

<b>Year/ Semester</b>	<b>Course Code</b>	<b>Title of the course</b>	<b>Course type</b>	<b>Course category</b>	<b>No. of. Hours</b>	<b>Credits</b>	<b>Marks</b>
II/IV	UCCOH20	Financial Accounting II	Theory	Core	5	4	40+60

**Course Objective:**

1. To impart the students with knowledge on the procedure for preparation of fire insurance Claims.
2. To enable the students prepare statement of affairs and deficiency account under insolvency Accounts.
3. To acquaint students with the partnership principles and concepts.
4. To assist the students in understanding the application of Partnership principles in different situations and conditions.
5. To enable the students differentiate the different methods of preparation under Piecemeal Distribution System.

**Course Outcome (CO):**

1. Students gained knowledge in computing the loss of stock or loss of profits under fire insurance claims.
2. Students were able to prepare the Statement of Affairs and Deficiency accounts under Insolvency system.
3. Students gained knowledge on applying the various concepts relating to partnership accounts.
4. Students were familiarised to choose different modes of Dissolution of Partnership firms.
5. Students were able to differentiate the different methods of preparation under Piecemeal Distribution System.

**COs consistency with POs**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	H	H	H	H
2	H	M	M	M	H	M
3	H	H	M	H	H	M
4	H	H	M	H	H	M
5	H	H	M	H	H	M

**(Low – L, Medium – M, High – H)**

**COs consistency with PSOs**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	H	H	H	H	H
2	H	M	M	M	H	H
3	H	H	M	H	H	H
4	H	H	M	H	H	H
5	H	H	M	H	H	H

**(Low – L, Medium – M, High –H)**

**Course Syllabus**

**Unit I: Fire Insurance Claims**

**(15 Hours)**

- 1.1 Meaning and need for fire insurance. (K<sub>1</sub>,K<sub>2</sub>)
- 1.2 Types of fire insurance policies(K<sub>1</sub>,K<sub>2</sub>)
- 1.3 Claim for loss of normal stock(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.4 Claim for loss of abnormal stock. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)
- 1.5 Technical terms related to loss of profit policy (K<sub>1</sub>,K<sub>2</sub>)
- 1.6 Claim for loss of profits(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit II: Insolvency**

**(15 Hours)**

- 2.1 Meaning and nature of Insolvency (K<sub>1</sub>, K<sub>2</sub>)
- 2.1 Relevant acts – Presidency Town and Provincial Insolvency Act (K<sub>1</sub>, K<sub>2</sub>)
- 2.3 Difference between Statement of Affairs and Balance Sheet(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 2.4 Preparation of Statement of Affairs(K<sub>2</sub>,K<sub>3</sub>)
- 2.5 Preparation of Deficiency Accounts. (K<sub>1</sub>,K<sub>2</sub>)
- 2.6 Consolidated Preparation of Statement of Affairs and Deficiency Accounts (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit III: Partnership**

**(15 Hours)**

- 3.1 Meaning and features of Partnership Act and Contents of Partnership Deed(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 3.2 Difference between Sacrificing and Gaining Ratios and methods of Goodwill(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 3.3 Partnership Fundamentals(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 3.4 Admission of a Partner(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

3.5 Retirement of a Partner(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit IV: Death and Dissolution of a partners (15 Hours)**

4.1 Death of a partner (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)

4.2 Dissolution of firm – Meaning and Modes of Dissolution (K<sub>1</sub>,K<sub>2</sub>)

4.3 Normal Dissolution – Settlement of Accounts – Accounting Treatment of unrecovered assets and liabilities (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)

4.4 Insolvency of a Partner(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)

4.5 Insolvency of two Partners – Garner Vs Murray Rule(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

4.6 Insolvency of All Partners. (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit V: Piecemeal Distribution (15 Hours)**

5.1 Meaning of Piecemeal Distribution. (K<sub>1</sub>, K<sub>2</sub>)

5.2 Methods of Piecemeal Distribution. (K<sub>1</sub>, K<sub>2</sub>)

5.3 Order of settlement of claims. (K<sub>1</sub>, K<sub>2</sub>)

5.4 Statement showing Absolute Surplus(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

5.5 Proportionate Capital Method. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

5.6 Maximum loss method. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

1.Reddy T.S and Murthy Advanced Accountancy – Margham Publications, Chennai, Reprint 2018.

**Reference Books**

1). Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(Volume I) – S.Chand& Company Limited, New Delhi, Reprint 2019.

2). Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.

3). Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khansa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.

4).Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint – 2017.

5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors – Guwahati, Edition 2018.

**Web Resources:**

1).MIT Open CourseWar (<http://ocw.mit.edu/courses/sloan>)

2). Khan Academy

3). Accounting Student Network

4). MissCPA

5)Accounting.com

6)Accounting Coach

7)AQA(aqa.org.uk.)

8)Accounting-World

9)AccountingInfo

10)Course Hero

## SEMESTER IV

### UCCOI20– Methods of Cost Accounting

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
II/IV	UCCOI20	Methods of Cost Accounting	Theory	Core	5	4	40+60

#### Course Objectives:

1. To introduce to the students the methods of process costing.
2. To teach various methods of apportionment of expenses.
3. To enable the students to ascertain cost for Joint products and by products.
4. To illustrate the students to calculate cost of complete and incomplete contracts.
5. Students are able to differentiate, analyze and prepare reconciliation statement.

#### Course Outcomes (CO):

Upon the successful completion of this course the students will be able to:

1. Acquire conceptual knowledge of process costing and its treatment.
2. Identify the methods of apportionment according to the impact of business.
3. Identify and analyze the costs incurred in contract costing and job costing.
4. Understand and apply the methods of calculating transport cost.
5. Differentiate and compare the cost and financial books to reconcile the accounts.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	M	M	M	H
2	H	H	M	H	H	M
3	H	M	M	M	H	M
4	H	M	M	M	M	M
5	H	H	M	H	H	M

(Low – L, Medium – M, High – H)

#### COs Consistency with PSOs

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	H	H	H	H	H
2	H	M	M	M	H	H
3	H	H	M	H	H	H
4	H	H	M	H	H	H
5	H	H	M	H	H	H

(Low – L, Medium – M, High –H)

## **Course Syllabus**

### **Unit I: Process Costing**

**(15 Hours)**

- 1.1. Introduction Features, costing procedures. (K<sub>1</sub>, K<sub>2</sub>)
- 1.2. Special points in Process costing – Normal loss and scrap.( K<sub>1</sub>, K<sub>2</sub>)
- 1.3. Abnormal Loss, Abnormal Gain. (K<sub>1</sub>, K<sub>2</sub>)
- 1.4. Problems on Normal Process account. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5. Process Cost with Normal Loss and Normal Gain with Units. (K<sub>3</sub>, K<sub>4</sub>)
- 1.6. Process Cost with Abnormal Loss and Abnormal Gain with Units. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Costing Methods**

**(15 Hours)**

- 2.1. Joint products – Meaning, Accounting for joint products, methods used in apportioning Joint cost. (K<sub>1</sub>, K<sub>2</sub>)
- 2.2. Problems on Joint products- Average Unit method, Physical Unit method, Survey method, Market value method. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.3. By-products – Meaning, Accounting for by-products, Methods used in apportioning By-products, Problems on By-products. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4. Job costing – Meaning, Features, Advantages, Limitations and procedures. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5. Batch costing – Elements of cost relating to batch, Economic Batch Quantity (EBQ). (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6. Problems on Job costing and batch costing. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Contract Costing**

**(15 Hours)**

- 3.1. Meaning, features, Difference between contract costing and job costing. (K<sub>1</sub>, K<sub>2</sub>)
- 3.2. Contract Costing, Problems on completed contract. (K<sub>3</sub>, K<sub>4</sub>)
- 3.3. Contract Costing – Treatment of plant. (K<sub>2</sub>, K<sub>3</sub>)
- 3.4. Incomplete Contracts. (K<sub>3</sub>, K<sub>4</sub>)
- 3.5. Incomplete contracts with laws. (K<sub>3</sub>, K<sub>4</sub>)
- 3.6. Multiple Contracts. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Transport Costing**

**(15 Hours)**

- 4.1. Meaning, Classification of cost, Selection of appropriate cost Unit. (K<sub>1</sub>, K<sub>2</sub>)
- 4.2. Computation of cost Unit. (K<sub>2</sub>, K<sub>3</sub>)
- 4.3. Calculation of cost for running distance. (K<sub>2</sub>, K<sub>3</sub>)
- 4.4. Passenger transport cost. (K<sub>2</sub>, K<sub>3</sub>)
- 4.5. Goods transport Cost.( K<sub>2</sub>, K<sub>3</sub>)
- 4.6. Comprehensive Problems. (K<sub>3</sub>, K<sub>4</sub> )

### **Unit V: Reconciliation Statement**

**(15 Hours)**

- 5.1. Introduction, Meaning and need for reconciliation. (K<sub>1</sub>, K<sub>2</sub>)
- 5.2. Reasons for difference in profit. (K<sub>1</sub>, K<sub>2</sub>)
- 5.3. Procedure of Reconciliation with format. (K<sub>2</sub>, K<sub>3</sub>)
- 5.4. Reconciliation statement – profit as per cost account and laws as per financial account. (K<sub>3</sub>, K<sub>4</sub>)
- 5.5. Reconciliation statement – profit as per financial account and laws as per cost account . (K<sub>3</sub>, K<sub>4</sub>)
- 5.6. Memorandum reconciliation statement. (K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

1. Reddy T.S and Hari Prasad Reddy Y. – Cost Accounting – Margham Publications, Chennai, Reprint 2018

**Reference Books:**

1. Jain S. P & Narang K.L. \_ Cost Accounting – Kalyani Publishers, New Delhi, Reprint 2017
2. Khanna, Ahuja and Pandey – Cost Accounting – S. Chand & Co., New Delhi, Reprint 2016
3. Lall Nigam B.M. and Bagavathi V. – Cost Accounting: An Introduction – Prentice Hall of India, New Delhi, Reprint 2018.
4. Pillai R.S.N. and Bagavathi V. – Cost Accounting – S. Chand & Co., Ltd., New Delhi, 2014
5. Arora M. N. – A Textbook of Cost and Management Accounting – Vikas Publishing House, Chennai, 10<sup>th</sup> Edition, 2012.

**Web Resources:**

- 1). MIT Open CourseWare (<http://ocw.mit.edu/courses/sloan>)
2. Costmgmt.org
3. [www.edx.org](http://www.edx.org)
4. study.com
5. [www.accountingcoach.com](http://www.accountingcoach.com)
6. fasab.gov
7. [www.freebookcentre.net](http://www.freebookcentre.net)
8. open.umn.edu
9. libguides.uwf.edu

## SEMESTER IV

### UCCOJ20 - LAW OF CONTRACTS II

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
II/IV	UCCOJ20	Law of Contracts II	Theory	Core	5	4	40+60

#### Course Objectives:

1. To gain knowledge on sales and consumer protection act.
2. To apprehend knowledge on pricing, performance of contract.
3. To acquire theoretical knowledge on special contracts.
4. To know about the incorporation of companies.
5. To have in-depth knowledge on the internal affairs of the companies

#### Course Outcomes (CO):

1. Students acquired conceptual knowledge on sales and consumer protection act.
2. Students were familiarised with the performance of valid contract.
3. Students gained an insight knowledge on special contracts.
4. Students gained thorough knowledge incorporation of companies.
5. Students were well versed in the internal affairs of the companies.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	M	H	M	H
2	H	H	M	H	M	M
3	H	H	M	H	M	M
4	H	H	M	H	M	M
5	H	H	M	H	M	M

(Low – L, Medium – M, High – H)

#### COs consistency with PSOs

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	H	M	H	M	H
2	H	H	M	H	M	H
3	H	H	M	H	M	H
4	H	H	M	H	M	H
5	H	H	M	H	M	H

(Low– L, Medium– M, High– H)

## **Course Syllabus**

### **Unit I: Sale of Goods Act – I**

**(15 Hours)**

- 1.1 Formation of contract of sale (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.2 Subject matter of contract of sale (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Conditions and Warranties (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Passing of property (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Contracts involving sea routes, Sale by non-owners (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.6 Consumer Protection Act-Unfair sale practices (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit II: Sale of Goods Act – II**

**(15 Hours)**

- 2.1 Delivery of goods (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Rights of buyer (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Rights of seller (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Rights of unpaid seller against goods (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Rights of unpaid seller against buyer personally (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Auction sales (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Other Special Contracts**

**(15 Hours)**

- 3.1 Contract of Indemnity and contract of Guarantee, Kinds of Guarantee (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Extent of Surety's liability (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Bailment, Duties and rights of Bailor and Bailee (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Law relating to Lien and finder of goods (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Pledge (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Hypothecation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Introduction to Companies Act –I**

**(15 Hours)**

- 4.1 Company law in India, Characteristics of a company,  
Lifting or piercing of corporate veil (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Kinds of companies (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Formation of a Company (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Memorandum of Association (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Articles of Association (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Doctrine of Ultra vires, Doctrine of indoor management (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Introduction to Companies Act –II**

**(15 Hours)**

- 5.1 Prospectus and contents of prospectus (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2 Meeting, Types (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Quorum (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Voting and poll (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Proxy (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Resolutions (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

**Text Books:**

Kapoor N. D. – Business Law – Sultan Chand & Sons, New Delhi, Revised Ed. 2015

**Reference Books**

1. Kapoor N. D. – Elements of Company Law – Sultan Chand & Sons New Delhi, Revised Ed.2015  
Kapoor N. D. – Business Law – Sultan Chand & Sons, New Delhi, Revised Ed. 2015
2. Gulshan S.S. – Mercantile Law – Excel Books, New Delhi, 2012
3. Pillai R.S.N. and Bagavathi V. – Business Law – Sultan Chand& Sons, New Delhi, Revised Edition 2017.
4. Kuchhal M.C. and VivekKuchhal – Business Laws – Vikas Publishing House, Chennai, 2015
5. Dr.Jain V.K. and CA Shashank S.Sharma – Business Laws, Business Correspondence and Reporting – Taxmann Publication, New Delhi, 2017

Study material will be provided by the department.

**Web Resources:**

- 1). [www.himpub.com](http://www.himpub.com)
- 2). [www.rccmindore.com](http://www.rccmindore.com)
- 3). [www.dphu.org](http://www.dphu.org)
- 4). [www.geektonight.com](http://www.geektonight.com)
- 5). [www.epdf.pub](http://www.epdf.pub)
- 6). [www.academia.edu](http://www.academia.edu)

## SEMESTER IV

### UCCOK20 - MARKETING

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
II/IV	UCCOK20	Marketing	Theory	Core	5	5	40+60

#### Course Outcomes:

1. To identify, understand and satisfy the needs of customers and markets.
2. To provide knowledge on various marketing functions.
3. To analyse consumer behaviour and decision-making process.
4. This course enables the students to understand marketing mix elements.
5. To understand the dynamics of marketing and to know about latest trends in marketing.

#### Course Outcomes(CO):

The learners will able to:

1. Classify the various marketing activities and to summarize consumer behavior and decision making process.
2. Evaluate the strategies used by the marketers to sustain a product for longer period.
3. Familiarize the factors influencing pricing decisions.
4. Acquire knowledge on various promotional mix used by marketers to promote goods and services.
5. Understand the various methods of channels of distribution and familiarize with latest Technologies.

#### COs consistency with POs

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	H	H	H	H	H	H
2	H	H	H	H	H	M
3	H	H	H	H	H	M
4	H	H	H	H	H	M
5	H	H	H	H	H	M

(Low – L, Medium – M, High – H)

#### COs consistency with PSOs

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO6
1	H	M	L	L	M	H
2	H	H	M	H	H	H
3	H	M	M	M	M	H
4	H	M	M	M	H	H
5	M	M	M	H	H	H

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Introduction**

**(15 Hours)**

- 1.1 Market, Meaning, Types, Marketing, Meaning, Definition (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Functions of Marketing, Role and Importance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.3 Marketing Mix, Classification of Goods (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Market Segmentation (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Consumer Behaviour, Meaning and Importance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Services Marketing, Difference between Product and Service, 7Ps of Service Marketing (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Product Mix**

**(15 Hours)**

- 2.1 Product, Meaning, Importance and Features (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 New Product Planning and Development, Types (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.3 Product Mix, Product Life Cycle (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.4 Branding, Brand Loyalty and Equity (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Copyrights, Trademarks and Patents (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Packing. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Price Mix**

**(15 Hours)**

- 3.1 Pricing, Meaning, Definitions, Objectives (K<sub>1</sub>, K<sub>2</sub>, K<sub>4</sub>)
- 3.2 Types of Pricing (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.3 Methods of Pricing (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4 Pricing Strategies (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.5 Factors affecting pricing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6 Pricing in Product Life Cycle. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Promotion Mix**

**(15 Hours)**

- 4.1 Promotion, Meaning, Need (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Promotion Mix, Meaning (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.3 Types of promotional mixes (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.4 Promotional mixes, strategies, Forms (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5 Advantages, Limitations (K<sub>1</sub>, K<sub>2</sub>)
- 4.6 Promotions in Product Life Cycle. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Channels of distribution and Electronic Marketing**

**(15 Hours)**

- 5.1 Channels of Distribution I, Meaning, Definition, Types (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Market consideration, Logistic Management. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Channels of Distribution II, Middlemen in Distribution, Agent Middlemen and Merchant Middlemen (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Wholesalers and Retailers, Recent Trends in Marketing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Tele-Marketing, Relationship Marketing, Word of Mouth Marketing, Test Marketing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 E-Marketing, Meaning, Types, Participants in E-Marketing, Crisis Marketing Techniques during the Pandemic period (K<sub>1</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Text Books:**

1. Pillai R.S.N. and Bagavathi V. – Modern Marketing – S. Chand and Co. Ltd., New Delhi, 2015
2. Natatrajan L. – Marketing – Margham Publications, Chennai. (latest Edition)

**Reference Books:**

1. Philip Kotler and Gary Armstrong –Principles of Marketing – Pearson Education India, New Delhi,2015
2. Gupta C.B. and Rajan Nair N. – Marketing Management Text and Cases – Sultan Chand and Sons, New Delhi,2018
3. Kavitha Sharma and Dr. Swathi Agarwal, Principles of Marketing, Taxmann Publication, New Delhi,2018
4. Govindarajan M. Marketing Management, Concepts, Cases, Challenges and Trends, Prentice Hall India Learning Private Ltd., New Delhi, Reprint2012
5. Jayachandran S. – Marketing Management – SAI Book House, Hyderabad, Edition2018

**Web Resources:**

1. Content Marketing Institute
2. Marketing Profs
3. American Marketing Association
4. eMarketer
5. Direct Marketing News
6. <https://www.sitepoint.com>
7. <http://www.ethinos.com>

**SEMESTER IV**  
**USCOC420 - Skill Based Elective -ENTREPRENEURIAL DEVELOPMENT**

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of. Hours	Credits	Marks
II/IV	USCOC420	Entrepreneurial Development	Theory	Skill Based Elective	2	2	40+60

**Course Objectives:**

1. To understand about entrepreneurship and its functioning.
2. To know the financial institutions funding entrepreneurs.
3. To generate business ideas and its scope of implementation.
4. To understand the role of Government in developing entrepreneurship.
5. To realize the impact of entrepreneurs in economic growth.

**Course Outcomes (CO):**

1. Students understand the basic concepts of entrepreneurship and its functioning.
2. Students were able to select the best financial institutions for business as per the needs.
3. Students generated best innovative business ideas.
4. Students bridged the gap between Government and entrepreneurs.
5. Students made an impact on the development of economy.

**COs consistency with POs**

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6
1	M	M	M	M	M	H
2	M	H	M	H	H	M
3	M	M	H	M	H	M
4	H	M	M	M	M	M
5	M	M	M	M	H	M

(Low – L, Medium – M, High – H)

**COs Consistency with PSOs**

CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
1	H	M	M	H	M	H
2	M	H	M	H	H	H
3	M	M	H	M	H	H
4	H	M	M	H	M	H
5	M	H	H	M	H	H

Low – L, Medium – M, High - H

## **Course Syllabus**

### **Unit I: Concepts of Entrepreneurship (6 Hours)**

- 1.1 Meaning and definition of entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.2 Types of entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.3 Qualities of entrepreneurs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Classifications of entrepreneurs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Factors influencing entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Functions of entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Industrial Finance to Entrepreneurs (6 Hours)**

- 2.1 Introduction to SFC's (State Finance Corporation) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Explanation about SIDC'S (Small industries development corporation Limited) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.3 Introduction and brief achievements in SIPCOT (State Industries promotion corporation of Tamil Nadu) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.4 Introduction to DIC'S (District Industries centre) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Explanation to Commercial Banks measures and achievement (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Introduction to Small Industrial Development Banks of India (SIDBI) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Project Management (6 Hours)**

- 3.1 Introduction to Business Ideas (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Business Generation techniques (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.3 Identification of Business opportunities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4 Checking feasibility for the study (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.5 Analysis of the project Report (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6 Project life cycle and classification (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Entrepreneurial Development Programme (6 Hours)**

- 4.1 Introduction to EDP (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Role Relevance of EDP (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.3 Achievements in the sector (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.4 Role of the government (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5 Organising programmes towards the development (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.6 Benefits to Rural Entrepreneur (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Entrepreneurial Growth (6 Hours)**

- 5.1 Introduction to economic development and Growth (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.2 Role of Entrepreneur and their growth (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Small scale entrepreneurs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Women and Entrepreneurship (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Challenges faced by women entrepreneurs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Innovation process and Development of entrepreneurial skills during Pandemic period (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

#### **Text Books:**

Entrepreneurial Development Dr.Radha , Prasana & Co Triplicane Chennai

#### **Reference Books:**

1. Entrepreneurial Development Renu Arora S .K Sood.

2. Entrepreneurial Development S.S.Khanka S chand&company Ltd New Delhi
3. Entrepreneurship CA (Dr.) Abha Matuhr University of Delhi
4. Innovation and Entrepreneurship Peter F. Drucker
5. Entrepreneurship Development and Management in extension M. Priyadharshini S. Janani  
T.N.Sujatha et.al.,

**Web Resources:**

1. <https://balancesmb.go>
2. <https://www.freebookcentre.net>
3. The secrets of successful entrepreneurship (audio book) – Stephen Hawley [www.audible.in](http://www.audible.in)
4. <https://www.inc.com>
5. <https://www.pdfdrive.com>entrepreneur>

## SEMESTER V

### UCCOL20 - CORPORATE ACCOUNTING I

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
III/V	UCCOL20	Corporate Accounting I	Theory	Core	6	5	40+60

#### Course Objective

- 1.To teach the basic Accounting Concepts and Practices of Companies
- 2.It Provide the Knowledge of Issue of Share and Issued of Debentures etc
- 3.This Subject Describes the Pattern of final accounts of the company
4. This subject also provides the knowledge of amalgamation, absorption and external reconstruction
- 5.It also helps students to give practical knowledge of accounts

#### Course Outcomes (CO)

The learners will be able to:

- 1.Gain knowledge on the procedure of issue of shares and redemption of shares.
- 2.Understand the meaning and formalities of issues of debentures and underwriting of shares and debentures
- 3.Become proficient in preparing company final account as per the rules of Company Act
- 4.Know about the importance of Profit Prior to incorporation and their allocation.
- 5.Calculate Purchase consideration during the event of amalgamation, absorption and external reconstruction

#### CO's consistency with PO'S

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

#### CO's consistency with PSO'S

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I : Issue and Redemption of Shares (15 Hours)**

- 1.1 Meaning and definition of Share (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Meaning of Joint Stock Company (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Difference between a Private limited Company and Public Limited Company (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4 Issue of shares and Redemption of Preference Shares (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Forfeiture and Reissue of Shares (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.6 Alternative method of Recording Share Premium (K<sub>1</sub>, K<sub>2</sub>)

### **Unit II: Issue and Redemption of Debentures (15 Hours)**

- 2.1 Meaning, issue of Debentures and Redemption of Debentures (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Difference between Debentures and Shares (K<sub>1</sub>, K<sub>2</sub>)
- 2.3 Consideration for Issue of Debentures (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Terms relating to Issue Price and Conditions of Redemption of Debentures (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Payment of the Underwriting Commission (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Marked and Unmarked firm - Under writing Application (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Final Accounts of Companies (15 Hours)**

- 3.1 Meaning of Final Accounts of Company (K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Form of Statement of Profit and loss Account (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Advance tax, income tax, and tax deducted at sources (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Contents of Balance Sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Reserves and Surplus (K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Profits Prior to Incorporation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Amalgamation, Absorption and External Reconstruction (15 Hours)**

- 4.1 Meaning of Amalgamation, Absorption and External Reconstruction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Accounting problems relating to Amalgamation and Absorption (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Calculation of purchase Consideration (K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Inter Company Holding (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Accounting Treatment for Amalgamation and Absorption (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Preparation of entries for Amalgamation cum Absorption (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Internal Reconstruction (15 Hours)**

- 5.1 Meaning of Alteration of Share Capital (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Schemes of Reconstruction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Steps for Reconstruction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Different kinds of Alteration of Share Capital and the necessary Accounting entries (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Internal Reconstruction or Capital Reduction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Procedure for Reduction of Share Capital (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Text Books:**

1. Reddy T.S. & Murthy A. – Corporate Accounting – Margham Publications, Chennai, 2016.

### **Reference Books:**

1. Jain S.P. and Narang K. L. – Advanced Accounts – Vol II – Kalyani Publishers, New Delhi, 2018
2. Gupta R.L. and Radhasamy M. – Advanced Accounts – Vol II – S. Chand & Sons., New

Delhi, 2017

3. Dr.Maheswari S.N. – Corporate Accounting – Vikas Publishing House, New Delhi, 2017
4. Shukla M.C. and Grewal T. S. – Advanced Accounts – Vol II - S. Chand & Sons., New Delhi, 2019
5. Dr.Arulanandam M.A. & Raman K.S – Advanced Accountancy – Himalaya Publishing House, Revised Edition 2015

**Web Resources:**

1. MIT open course ware (<https://ocw.mit.edu/courses/sloan>)
2. Khan academy
3. Accounting student network
4. Miss CPA
5. Accounting.com
6. Account coach
7. Accounting world

**SEMESTER V**  
**UCCOM20 - MANAGEMENT ACCOUNTING I**

<b>Year/ Semester</b> III/V	<b>Course Code</b> UCCOM20	<b>Title of the course</b> Management  Accounting I	<b>Course type</b> Theory	<b>Course category</b> Core	<b>No. of Hours</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
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**Course Objectives**

- 1.To enhance the abilities of learners to develop the concept of management accounting and its significance in the business.
- 2.To improve the abilities of learners to analyze the financial statement.
- 3.To impart knowledge on management accounting system to the students and to teach the analytical tools applied in companies.
- 4.To provide adequate knowledge on cash flow analysis.
- 5.To Prepare a budget and budgetary control an understanding of the relationship.

**Course Outcomes (CO)**

The learners will be able to

- 1.Understand the importance of management accounting and the installation of management accounting system
- 2.Analyze various financial statements and application of various ratio's
- 3.Interpret inflow and outflow of funds in computation of fund flow statement
- 4.Report on cash flow analysis.
- 5.Prepare different budgets.

**CO's consistency with PO'S**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	M
<b>3</b>	H	H	M	H	M	M
<b>4</b>	M	H	H	M	H	M
<b>5</b>	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

<b>CO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	H
<b>3</b>	H	H	M	H	M	H
<b>4</b>	M	H	H	M	H	H
<b>5</b>	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus:**

### **Unit 1: Introduction (15 Hours)**

- 1.1 Meaning and definition of Management Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Nature and scope of Management Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.3 Objectives and Function of Management Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Relationship between financial, Cost and Management Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.5 Installation of Management Accounting system (K<sub>1</sub>, K<sub>2</sub>)
- 1.6 Duties of Management Accounting (K<sub>1</sub>, K<sub>2</sub>)

### **Unit II: Analysis of Financial Statements (15 Hours)**

- 2.1 Meaning and Analysis of Financial Statements (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Comparative and Common Size Financial Statement (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Procedure for Financial Interpretation (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.4 Analysis of Techniques or Tools of Financial Statement Analysis (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Calculation of Trend Percentages and Ratio Analysis (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.6 Calculation of Profitability, Solvency and Turnover Ratio (including reconstruction of Profit and Loss Account and Balance Sheet) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Fund Flow Statement (15 Hours)**

- 3.1 Meaning and definition of Fund Flow Statement (K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Meaning of Working Capital (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Preparation of Statement showing changes in Working Capital (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Calculation of Funds From Operation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Calculation of Fund Flow Statement (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 External sources and Applications of Funds (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit VI: Cash Flow Analysis (15 Hours)**

- 4.1 Meaning and importance of Cash Flow Statements (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Difference between Fund Flow Analysis and Cash Flow Analysis (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.3 Preparation of Cash Flow Statement (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.4 Calculation of Cash From Operations (K<sub>2</sub>, K<sub>3</sub>)
- 4.5 External sources and Application of Cash (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Statement of Cash from Operation and Cash Flow Statements (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Budgets – Budgetary Control (15 Hours)**

- 5.1 Meaning and Definition of Budgeting and Budgetary Control (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Advantages and limitation of Budgetary Control (K<sub>1</sub>, K<sub>2</sub>)
- 5.3 Essentials of a successful Budgetary Control system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Organization for installation of Budgetary Control system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Classification of Budget and Functional Budgets, Sales Budgets, Production Budget , Material Budget, Overheads, Budget, Cash Budget, Master Budget (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Fixed and Flexible Budget and performance budgeting (theory) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

## **Text Books:**

Reddy T.S. and Hari Prasad Reddy Y. – Management Accounting – Margham Publications, Chennai

## **Reference Books:**

1. Khan M.Y. and Jain S.P. – Management Accounting – Tata McGraw Hill, New

Delhi, 6<sup>th</sup> Edition, 2017

2. Pillai R.S. N. and Bhagavathi V. – Management Accounting – S. Chand, New Delhi, 4<sup>th</sup> Edition, 2017
3. Dr. Murthy A. and Dr. Guruswamy S. – Management Accounting – Margham Publications, Chennai, Edition 2009.
4. Manmohan S.P. and Goyal P. S. – Principles of Management Accounting – S. Chand & Co., Delhi, Revised Edition 2019.
5. Sekhar R.C. and Rajagopalan A.V. – Management Accounting – Oxford University Press Chennai, Edition 2019

**Web Resources:**

1. Journal of Accountancy
2. Khan Academy
3. Accounting Student Network
4. The Blunt Counter
5. Insightful Accountant
6. Account Coach
7. Accounting Today
8. 360 Degrees of Financial Literacy
9. Accounting & Business Magazines

**SEMESTER V**  
**UCCON20 - INCOME TAX LAW AND PRACTICE I**

Year/ Semester III/V	Course Code UCCON20	Title of the course Income Tax Law and Practice I	Course type Theory	Course category Core	No. of Hours 6	Credits 5	Marks 40+60

**Course Objectives:**

1. To enable the students learn the basic concepts of Income Tax.
2. To analyse the provisions relating to Income from Salaries.
3. To impart the learners the need for Computation of Income from House Property.
4. To examine the provisions relating to Income from Business or Profession.
5. To familiarize with the powers and duties of Income Tax Authorities and the Assessment Procedure.

**Course Outcomes(CO):**

1. Students gained knowledge on the basic concepts of Income Tax.
2. Students became familiar with the provisions relating to Income from Salaries.
3. Students learnt to compute taxable Income from House Property.
4. Students became competent in computing Income from Business or Profession.
5. Students were familiarized with the powers and duties of different income tax authorities and their assessment procedure.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Introduction**

**(15 Hours)**

- 1.1 Brief history of Income Tax in India(K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Important Definitions(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Residential Status of different persons (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4 Incidence and Scope of Tax Liability (only theory) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Incomes exempt from tax(Theory) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Incomes exempt from tax and its practical applications(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit II: Income from Salaries**

**(15 Hours)**

- 2.1 Meaning and Definition of Salary(K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Allowances and its types (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Perquisites and its treatment (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Profits in lieu of salary, superannuation fund Types of Provident fund (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Deductions from Gross Salary (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Computation of Taxable Salary (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Income from House Property**

**(15 Hours)**

- 3.1 Meaning and Definition of Annual Value(K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Exemptions regarding Income from House Property(K<sub>1</sub>, K<sub>2</sub>)
- 3.3 Determination of Actual Rent(K<sub>1</sub>, K<sub>2</sub>)
- 3.4 Computation of Annual Value of a house under situations(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Deductions from Annual Value and Interest on loan(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Computation of Income from House Property (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Profits and Gains of Business or Profession**

**(15 Hours)**

- 4.1 Meaning and conditions for allowance for Depreciation (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Additional Depreciation, Written Down Value Rates of Depreciation, Investment Allowance and unabsorbed depreciation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Computation of Depreciation Allowance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Meaning of Business and Profession, Expenses expressly allowed and Disallowed (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Computation of Business (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.6 Computation of Profession (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Income Tax authorities and Assessment Procedure**

**(15 Hours)**

- 5.1 Income Tax authorities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2 Powers of Income Tax authorities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Procedure for Assessment (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Types of Assessment (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Permanent Account Number (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Provisions relating to Quoting of Aadhar (K<sub>1</sub>, K<sub>2</sub>)

### **Text Books:**

Dr. Mehrotra H.C. – Income Tax Law & Practice - Sahitya Bhawan Publications, Agra, (Relevant Edition)

### **Reference Books**

1. Vinod. K. Singhanian – Students Guide to Income Tax – Tax man Publications Pvt. Ltd., New Delhi (Relevant Edition)
2. Gaur V.P. and Narang D.B. – Income Tax – Kalyani Publishers, New Delhi (Relevant Edition)

Edition)

3. Reddy T.S. and Hari Prasad Reddy Y. – Income Tax – Margham Publications, Chennai (Relevant Edition)
4. Hariharan N. – Income Tax Law and Practice – McGrawHill, New Delhi, Reprint (Relevant Edition)

**Web Resources:**

1. IRS.gov
2. E-file Colorado taxes with Revenue Online
3. DABC Free Tax Supersites
4. AARP Tax-Aide
5. Federal: [www.irs.gov](http://www.irs.gov)
6. Missouri:  
[www.dor.mo.gov/forms/Other](http://www.dor.mo.gov/forms/Other) States:
7. [www.taxadmin.org/state-tax-forms](http://www.taxadmin.org/state-tax-forms)
8. Affordable Care Act (ACA)  
Tax Provisions – IRS
9. <https://books.google.co.in>
10. <https://www.incometaxindia.gov.in>
11. <https://www.incometaxindiaefiling.gov.in>
12. <https://www.denverlibrary.org>

**SEMESTER V / VI**  
**UECOC520 / UECOC620– Banking: Law and Practice**

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
III/V/VI	UECOC520/ UECOC620	Banking : Law and Practice	Theory	Elective II A	6	5	40+60

**Course Objectives:**

- 1.To make the students understand the current law and practice in banking.
- 2.To update the regulations and technological implementation in modern scenario.
- 3.To upgrade the students regarding the service provided by the banks in view of customer relations.
- 4.To teach the learners new emerging dimensions in banking system including e – banking.
- 5.To make them understand the core concept of banking as a financial intermediation service provider.

**Course Outcomes(CO):**

Upon the successful completion of this course the students will be able to:

1. Gain versatile knowledge on features, functions of banking. Operate various accounts as Per KYC norms.
2. Discern knowledge on the relationships between banker and customer. Analyze the concept of money laundering.
- 3.Gain in-depth knowledge on negotiable instruments and rights and duties of paying and Collecting banker
4. Impart knowledge on various types of loans & advances. Modes of charging securities. analyze the mechanism of customer grievance
5. Execute and apply the modern technologies for making payments and other technological services.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **UnitI: Opening and Operating of Account (15 Hours)**

- 1.1. Definition, (Banking, Business of banking, Customers), other business permitted. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.2. Types of deposit accounts, Features, Joint Account, Operation Style. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.3. Procedure for opening a bank account, letter of Introduction, Risk in opening Account without proper introduction. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4. Pay-in-slip, Printed Cheque book, advantages, Pass book, Wrong entry and legal effects, Insurance of Bank deposits, Inoperative accounts, Closing of Accounts and Nominations & its legal status. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5. Special types of Customers including Senior citizens Account. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6. KYC, RBI Guidelines, Unique Customer Identification Code. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **UnitII:Banker and Customer Relationship (15 Hours)**

- 2.1. Banker customer relationship – Meaning, Types of Relationship. ( K<sub>1</sub>, K<sub>2</sub>)
- 2.2. General relationship – Principle and agent, Trustee and beneficiary, Bailor and Bailee. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3. Debtor – Creditor relationship, Banker as a Privileged Debtor. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4. Special relationship – Rights of a Banker. (K<sub>2</sub>, K<sub>3</sub>)
- 2.5. Obligations of a banker. (K<sub>2</sub>,K<sub>3</sub>)
- 2.6. Money Laundering, RBI Guidelines for Anti money Laundering. (K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Negotiable Instruments, Paying & Collecting Banker (15 Hours)**

- 3.1. Meaning, Difference between Negotiability and Transferability, definition of Negotiable instruments. ( K<sub>1</sub>, K<sub>2</sub>)
- 3.2. Types of Negotiable instruments, Definitions and Characteristic features. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3. Crossing of cheque, features, Types of crossing. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4. Endorsement of a cheque, Features, Types, Regularity of endorsement. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.5 Paying banker- Duties and Liabilities, Payment in due course, suitable replies for dishonour. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6. Collecting banker – Duties and Liabilities, Material and non material alteration, Forgery and consequences. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Loans and Advances (15 Hours)**

- 4.1. Meaning of loans and advances, importance. ( K<sub>1</sub>, K<sub>2</sub>)
- 4.2. Principles of sound Lending, Sources (infra structure bonds). ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3. Types and Styles of securities. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4. Different modes of creating charges.( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5. Factors affecting the level of advances. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6. Customer Grievance, Redressal and Ombudsman. ( K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Electronic Banking (15 Hours)**

- 5.1. Meaning, Core banking solutions, Traditional banking Vs Internet banking, drawbacks and issues. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2. Mobile banking, Meaning, Features, Telephone banking, features, ATM, features. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3. Electronic Fund transfer, NEFT, RTGS, features, Difference between NEFT & RTGS. ( K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

- 5.4. Electronic Clearing System – Debit, Credit, Operations and benefits. ( K<sub>2</sub>, K<sub>3</sub>)
- 5.5. Electronic Payment System – meaning, features and process. ( K<sub>2</sub>, K<sub>3</sub>)
- 5.6. Electronic Payment methods, (Digital cheques, e-cash, e- cards, SWIFT, Plastic cards, UPL payments, etc. ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

1. Kandasami K.P. Natarajan S., Parameswaran R. – Banking – S. Chand &Co.Ltd., New Delhi. (LatestEdition)
2. Dr. Guruswamy S. –Banking Theory, Law and practice – Vijay Nicole Imprints Pvt. Ltd., (LatestEdition).
3. Natarajan S. and Parameswaran R. – Indian Banking – S. Chand & Co. Ltd., New Delhi (latest Edition)
4. Vasudevan S.V – Theory of Banking - S. Chand &Co.Ltd., New Delhi. (LatestEdition)
5. Sundharam and Varshney – Banking Law & practice - S. Chand &Co.Ltd., New Delhi. (Latest Edition)
6. Gopinath M.N. - Banking Principles & Operations – Snow White Publishers (Latest Edition)
7. Indian Institute of Banking and Finance - Anti money Laundering & KYC – Macmillan Publishers, (Latest Edition)

**Web Resources:**

1. Books.google.co.in
2. iiblp.org – institute of international banking law& Practice. Khan Academy.
3. En.m.wikipedia.org
4. [www.freebookcentre.net](http://www.freebookcentre.net)
5. Bookauthority.org
6. Ebooks.ipude.in
7. [www.alphainvesco.com](http://www.alphainvesco.com)
8. rbidocs.rbi.org.in
9. [www.ibef.org](http://www.ibef.org)
10. M.economicstimes.com

**SEMESTER VI**  
**UCCOO20 - CORPORATE ACCOUNTING II**

<b>Year/ Semester</b> III/VI	<b>Course Code</b> UCCOP20	<b>Title of the course</b> Corporate Accounting II	<b>Course type</b> Theory	<b>Course category</b> Core	<b>No. of. Hours</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
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**Course Objectives**

- 1.To provide in depth knowledge on various Accounting valuation of goodwill and shares
- 2.It also describes the process of liquidation which in included in the company accounts
- 3.It include account of holding company and consolidation of balance sheet
- 4.It also helps students to give practical knowledge of general insurance company
5. This subject also differentiate accounts of banking company

**Course Outcomes(CO)**

The learners will be able to:

1. Value Goodwill and shares of Company through different methods.
- 2.Prepare the statement of affairs and Liquidators final statement of Accounts
- 3.Get a comprehensive knowledge about the latest provisions of companies Act relating to consolidation of Holding and Subsidiary Company
- 4.Gain expertise knowledge in the preparation of final accounts of General Insurance Companies as per the revised AS of IRDA.
- 5.Prepare Profit & Loss and final Accounts of Banking Companies as per the Guidelines of RBI

**CO's consistency with PO'S**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	M
<b>3</b>	H	H	M	H	M	M
<b>4</b>	M	H	H	M	H	M
<b>5</b>	H	M	H	H	H	M

**(Low – L, Medium – M, High – H)**

**CO's consistency with PSO'S**

<b>CO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	H
<b>3</b>	H	H	M	H	M	H
<b>4</b>	M	H	H	M	H	H
<b>5</b>	H	M	H	H	H	H

**(Low– L, Medium – M, High– H)**

## **Course Syllabus**

### **Unit I: Valuation of Goodwill and Shares (15 Hours)**

- 1.1 Meaning of Valuation of Goodwill (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Factors determining the Valuation of Goodwill (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Methods of Valuation of Shares (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Factors Affecting of Goodwill(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Profitability Normal Rate of Return (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Average capital Employed and Methods of Valuation of Goodwill (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit II: Liquidation of Companies (15 Hours)**

- 2.1 Liquidation of Companies (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Contributory Statement Preparation (K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Preferential Payments (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Statement of Affairs and Deficiency of Accounts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Liquidator's Final Statement of Accounts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Fully paid Equity Shareholders (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Accounts of Holding Company (15 Hours)**

- 3.1 Accounts of Holding Companies (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Consolidation of Balance Sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.3 Minority Interest (K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Pre-acquisition or Capital Profits (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.5 Cost of Control or Goodwill (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.6 Requirement relating to Presentation of Accounts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Accounts of General Insurance Company (15 Hours)**

- 4.1 Accounts of General Insurance Company (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Definition of General Insurance Business (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Commission and Reinsurance Premium (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Commission on Reinsurance Accepted (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Commission on Reinsurance ceded Reserve for Unexpired Risks (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Preparation of financial statements as per IRDA Regulations (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Accounts of General Insurance Company (15 Hours)**

- 5.1 Accounts of Banking Companies (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Regulation of Banking Companies (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Management Capital and Reserve (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Final Accounts (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Business of Banking Companies and its legal Requirement (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Preparation of Profit and loss Account and Balance Sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Text Books:**

1. Reddy T.S. & Murthy A. – Corporate Accounting – Margham Publications, Chennai, 2016.

### **Reference Books:**

1. Jain S.P. and Narang K. L. – Advanced Accounts – Vol II – Kalyani Publishers, New Delhi, 2018

2. Gupta R.L. and Radhasamy M. – Advanced Accounts – Vol II – S. Chand & Sons., New Delhi, 2017
3. Dr.Maheswari S.N. – Corporate Accounting – Vikas Publishing House, New Delhi, 2017
4. Shukla M.C. and Grewal T. S. – Advanced Accounts – Vol II - S. Chand & Sons., New Delhi, 2019
5. Dr.Arulanandam M.A. & Raman K.S – Advanced Accountancy – Himalaya Publishing House, Revised Edition 2015

**Web Resources:**

1. MIT open course ware (<https://ocw.mit.edu/courses/sloan>)
2. Khan academy
3. accounting student network
4. miss CPA
5. accounting.com
6. account coach
7. accounting world

**SEMESTER VI**  
**UCCOP20 - MANAGEMENT ACCOUNTING II**

<b>Year/ Semester</b> III/VI	<b>Course Code</b> UCCOP20	<b>Title of the course</b> Management  Accounting II	<b>Course type</b> Theory	<b>Course category</b> Core	<b>No. of Hours</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
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**Course Objectives**

1. To acquire the basic concepts and processes used to determine the marginal costing
2. To impart practical applications of marginal costing
3. To help the students understand the standard costing and variance analysis
4. To enable the students to learn various methods of capital budgeting
5. To analyse the simple theories, cases of responsibility accounting and zero based budgeting

**Course Outcomes(CO)**

The learners will be able to:

1. Understand Various Elements of Marginal Costing and Break Even Analysis.
2. Get Familiar with different Managerial Decision Making Techniques and its Practical Applicability
3. Apply norms of Variances Relating to Cost
4. Compute Capital Budgeting under different Methods
5. Know the importance of Responsibility Accounting and Zero Based Budgeting

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Marginal Costing**

**(15 Hours)**

- 1.1 Meaning and definition of Marginal Costing (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Marginal costing and Absorption Costing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Cost Volume Profit Analysis (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.4 Fixed cost and Variable cost (Important terms) ( K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Contribution to Sales (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.6 Calculation of Break - Even Analysis (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Practical Applications of Marginal Costing**

**(15 Hours)**

- 2.1 Practical Applications of Marginal Costing for Managerial Decision Making (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Key Factors in Make or Buy Decision (K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Idle facilities and Plant Mergers (K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Product Mix or Sales Mix (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Export decision - Product Elimination Decision (K<sub>1</sub>, K<sub>2</sub>)
- 2.6 Plant or Equipment Purchase Decision (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Standard costing and Variance Analysis**

**(15 Hours)**

- 3.1 Meaning of Standard Costing and Variance Analysis (K<sub>1</sub>, K<sub>2</sub>, K<sub>4</sub>)
- 3.2 Advantages and Limitations of Standard Costing and Variance Analysis (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.3 Computation of Variances Relating to Materials (K<sub>1</sub>, K<sub>2</sub>)
- 3.4 Labour, Overheads and Sales based on Sales Value (Simple problems) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Standard Costs and Estimated Costs (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Applicability of Standard Cost (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Capital Budgeting**

**(15 Hours)**

- 4.1 Meaning and definition of Capital Budgeting (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Difference between Traditional Methods and Non Traditional Methods (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Pay back accounting Rate of Return (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Profitability Index and Internal Rate of Return (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 Discounted Cash Flow Method (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 N.P.V and I.R.R Method (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Responsibility Accounting and Zero Base Budgeting**

**(15 Hours)**

- 5.1 Meaning of Responsibility accounting and Zero Base Budgeting (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2 Essentials of Responsibility accounting (K<sub>1</sub>, K<sub>2</sub>)
- 5.3 Responsibility Centres (K<sub>1</sub>, K<sub>2</sub>)
- 5.4 Advantages and Limitations of Responsibility Accounting (K<sub>1</sub>, K<sub>2</sub>)
- 5.5 Cost centre and Profit centre (K<sub>1</sub>, K<sub>2</sub>)
- 5.6 Zero Base budgeting and process (K<sub>1</sub>, K<sub>2</sub>)

**Text Books:**

Reddy T.S. and Hari Prasad Reddy Y. – Management Accounting – Margham Publications, Chennai

**Reference Books:**

1. Khan M.Y. and Jain S.P. – Management Accounting – Tata McGraw Hill, New Delhi, 6<sup>th</sup> Edition, 2017
2. Pillai R.S. N. and Bhagavathi V. – Management Accounting – S. Chand, New Delhi, 4<sup>th</sup> Edition, 2017
3. Dr. Murthy A. and Dr. Guruswamy S. – Management Accounting – Margham Publications, Chennai, Edition 2009.
4. Manmohan S.P. and Goyal P. S. – Principles of Management Accounting – S. Chand & Co., Delhi, Revised Edition 2019.
5. Sekhar R.C. and Rajagopalan A.V. – Management Accounting – Oxford University Press Chennai, Edition 2019

**Web Resources:**

1. journal of Accountancy
2. Khan Academy
3. Accounting Student Network
4. The Blunt Counter
5. Insightful Accountant
6. Account Coach
7. Accounting Today
8. 360 Degrees of Financial Literacy
9. Accounting & Business Magazines

**SEMESTER VI**  
**UCCOQ20 - INCOME TAX LAW AND PRACTICE II**

<b>Year/ Semester</b> III/VI	<b>Course Code</b> UCCOQ20	<b>Title of the course</b> Income Tax Law and Practice II	<b>Course type</b> Theory	<b>Course category</b> Core	<b>No. of Hours</b> 6	<b>Credits</b> 5	<b>Marks</b> 40+60
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**Course Objectives:**

1. To enable the students determine the Provisions relating to Computation of Income from Capital Gains.
2. To impart the learners the skill of calculating the Income from Other Sources.
3. To familiarize with the different provisions relating to Set-off and carry forward of losses.
4. To make the students learn the importance of Computation of Total Income and Tax Liability of Individuals.
5. To gain practical knowledge on Filing of Returns of Income.

**Course Outcomes(CO):**

1. Students learnt to determine the Income from Capital Gains.
2. Students acquired the skill in calculating the Income from Other Sources.
3. Students were well versed in ascertaining the provisions relating to Clubbing of Incomes and set off and carry forward of losses.
4. Students were able to assess the total income and tax liability of individual assesseees.
5. Students gained practical knowledge on filing of returns of income.

**CO's consistency with PO'S**

<b>CO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	M
<b>3</b>	H	H	M	H	M	M
<b>4</b>	M	H	H	M	H	M
<b>5</b>	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

<b>CO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>	<b>PSO6</b>
<b>1</b>	H	M	H	H	H	H
<b>2</b>	H	M	H	H	H	H
<b>3</b>	H	H	M	H	M	H
<b>4</b>	M	H	H	M	H	H
<b>5</b>	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Income from Capital Gains**

**(15 Hours)**

- 1.1 Meaning of Capital assets, its exceptions and Self generated assets(K<sub>1</sub>,K<sub>2</sub>)
- 1.2 Kinds of capital assets – Short term and Long term assets(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.3 Cost of acquisition and cost of improvement under different circumstances(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.4 Computation of short term and long term gains(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.5 Capital Gains exempt from tax(K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>)
- 1.6 Computation of capital gains including exemptions (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

### **Unit II: Income from Other Sources**

**(15 Hours)**

- 2.1 Incomes chargeable under from Other Sources (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Meaning of dividend and taxation of dividend (K<sub>1</sub>, K<sub>2</sub>)
- 2.3 Taxation of casual incomes (K<sub>1</sub>, K<sub>2</sub>)
- 2.4 Interest on securities and kinds of securities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Deductions allowable from Income from other Sources. (K<sub>1</sub>, K<sub>2</sub>)
- 2.6 Computation of Income from Other Source (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Set off and Carry forward of losses**

**(15 Hours)**

- 3.1 Meaning of clubbing of incomes and deemed incomes(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>).
- 3.2 Income of Other Persons included in the Assessee's Total Income(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>).
- 3.3 Aggregation of incomes(K<sub>1</sub>, K<sub>2</sub>).
- 3.4 Provisions governing the set-off of losses(K<sub>1</sub>, K<sub>2</sub>).
- 3.5 Provisions regarding the carry forward and set off of losses(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>).
- 3.6 Computation of Gross Total Income(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Assessment of Individuals**

**(15 Hours)**

- 4.1 Deductions in respect of certain payments (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Deductions in respect of certain incomes. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Computation of Deductions eligible under Sec 80C to 80U (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Computation of Total Income (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5 Rates of Income Tax in case of Individuals (K<sub>1</sub>, K<sub>2</sub>)
- 4.6 Computation of Tax Liability of Individuals(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Preparation of Filing of Returns and Payment of Tax**

**(15 Hours)**

- 5.1 Preparation and Filing of Returns – E- Filing (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.2 Deduction and Collection of Tax at Source (TDS) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Advance Payment of Tax (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Recovery of Tax (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Refund of Tax (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Appeals and Revision (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

Dr. Mehrotra H.C. and Goyal S.P – Income Tax Law & Practice - Sahitya Bhawan Publications, Agra, (Relevant Edition)

**Reference Books**

1. Vinod. K. Singhanian – Students Guide to Income Tax – Tax man Publications Pvt. Ltd., New Delhi (Relevant Edition)
2. Gaur V.P. and Narang D.B. – Income Tax – Kalyani Publishers, New Delhi (Relevant Edition)
3. Reddy T.S. and Hari Prasad Reddy Y. – Income Tax – Margham Publications, Chennai (Relevant Edition)
4. Hariharan N. – Income Tax Law and Practice – McGrawHill, New Delhi, Reprint(Relevant Edition)

**Web Resources:**

1. IRS.gov
2. E-file Colorado taxes with Revenue Online
3. DABC Free Tax Supersites
4. AARP Tax-Aide
5. Federal: [www.irs.gov](http://www.irs.gov)
6. Missouri:  
[www.dor.mo.gov/forms/Other](http://www.dor.mo.gov/forms/Other) States:
7. [www.taxadmin.org/state-tax-forms](http://www.taxadmin.org/state-tax-forms)
8. Affordable Care Act(ACA)  
Tax Provisions – IRS
9. <https://books.google.co.in>
10. <https://www.incometaxindia.gov.in>
11. <https://www.incometaxindiaefiling.gov.in>
12. <https://www.denverlibrary.org>

**SEMESTER V / VI**  
**UECOD520/UECOD620 - ELECTIVE: ELECTRONIC COMMERCE AND TALLY**

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
III/V/VI	UECOD520/ UECOD620	Electronic Commerce and Tally	Theory	Elective III:A	4	3	40+60

**Course Objectives:**

1. To impart the knowledge about various concepts of e-commerce.
2. To enable the awareness through the usage of internet technologies.
3. To execute the different models of OSI
4. To evaluate the various knowledge about payment methods.
5. To criticize the features of tally & practical consideration of it.

**Course Outcomes (CO):**

The Learners will be able to:

1. To know the various concepts of e-commerce.
2. Awareness gained on the aspects of e-commerce, the usage of internet technologies
3. Executing different security, OSI models
4. Imbibe knowledge on various payment models and its application
5. In depth knowledge on Tally hands on training to create a company and preparation of final accounts.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Introduction to E-Commerce (12 Hours)**

- 1.1 E-Commerce Meaning and Definition (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.2 Concept of Electronic Commerce (K<sub>2</sub>, K<sub>3</sub>)
- 1.3 Nature, Scope ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4 Impact, challenges and limitations of E-Commerce (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5 Advantages of E-Commerce& Disadvantages (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6 Encryption and Decryption (K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Aspects of E-Commerce (12 Hours)**

- 2.1 Evolution of E-Commerce (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2 Major categories of E-Commerce ( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Advertising and Marketing through internet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.4 Internet Advertising and models (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 2.5 Banner Advertisements (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Sponsoring content and push based advertising (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Security in E-Commerce (12 Hours)**

- 3.1 Firewall and Securities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.2 OSI Models (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Network security and Firewalls (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 3.4 Firewall & Protocols Types of Protocols (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Data and Message Security (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Security tools (Digital Signature and Digital Certificate) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: E-Commerce payment modes (12 Hours)**

- 4.1 E-Payment Systems Introduction (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Online payment& Prepaid and Post paid payment system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Types of Electronic Payment System (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.4 Security issues on Electronic payment system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.5 Net Banking & Mobile Commerce. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 4.6 Requirements metrics of a payment system (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Tally (Theory) (12 Hours)**

- 5.1 Introduction of Tally Accounting and Inventory an outline (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Fundamentals of accounting, accounting terms, (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Definitions Ledger and ledger accounts Trial balance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Trading and profit and loss account Balance SheetFundamentals of Inventory (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Account creation, Account Information, Groups (create,display, delete) (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6Multiple groups ledger (create, display, alter) Multiple ledger Inventory master creation stock groups and stock items Entering Vouchers and Invoices Different types of Accounting vouchers and Inventory Vouchers,Reports in tally Balance sheet, Profit and Loss Account, Trial Balance, Day Book Ratio Analysis, Reconciliation of Bank account,

Interest Calculation (Simple Mode) (K<sub>1</sub>,K<sub>2</sub>,K<sub>3</sub>,K<sub>4</sub>)

**Unit VI: Practical (12 Hours)**

1. Profit & Loss Account and Balance sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
2. Trial balance and Balance sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
3. Bank reconciliation (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
4. Stock summary and Profit and loss Account (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
5. Interest receivables and payables (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

1. Dr. P. Rizwan Ahmed – E – Business & E-Commerce – Margham Publications, Chennai,  
2<sup>nd</sup> Edition 2016.

**Reference Books:**

1. Srinivasa Vallaban – E-Commerce – Srinivasa Vallaban S.V. – E-Commerce – Vijay Nicole Imprints Pvt. Ltd., Chennai, 2015
2. Abirami Devi K. and Alagammai M. – E-Commerce – Margham Publications, Chennai, Edition 2016
3. Bhasin T.M. – E-Commerce and E-Banking - Tarun Offset, New Delhi, Edition 2013
4. Palanivel S. – Tally Accounting Software – Margham Publications, Chennai, Reprint 2016
5. Nandhini A.K. and Nandhini K.K. – Tally ERP 9 – BPB Publications, New Delhi, Edition 2011

**Extra Reading** (if applicable) (can also be suggested unit wise) [Meant for self study/  
internal assessment (assignment/seminar/presentation/discussion) only]

## SEMESTER V / VI

### USCOD520/USCOD620 - CONSUMER GUIDE AND EMPOWERMENT

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of. Hours	Credits	Marks
III/V/VI	USCOD520/ USCOD620	Consumer Guide and Empowerment	Theory	Skill Based Elective	2 2	2	40+60

#### Course Objectives

- 1.To understand the advantages and limitation of the consumer movement and the right of consumer
- 2.To understand the role of the consumer guidance society of India
- 3.It get information about demerits or defects of products from consumer and suggests remedial measures
- 4.Students learn food safety and standards authority of India
5. Students will be able to appreciate the emerging questions and policy issues in consumer law for future research

#### Course Outcomes(CO)

- 1.Gain knowledge on Consumer Movement
2. Apprehend Knowledge on Right to Information act
- 3.Acquire Theoretical Knowledge Consumer Protection act
- 4.Know About FSSAI 2006 Act
- 5.Have In-Depth Knowledge on Certification Marks

#### CO's consistency with PO'S

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

#### CO's consistency with PSO'S

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Consumer Awareness Movement (6 Hours)**

- 1.1 Consumer Awareness Movement (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Gandhiji's quote - Brief History (K<sub>1</sub>, K<sub>2</sub>)
- 1.3 Main features and Provision for Consumer Rights (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Responsibilities towards each Right (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.5 Critical Awareness (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.6 Environmental concern and United Nations Guidelines (K<sub>1</sub>, K<sub>2</sub>)

### **Unit II: Right to Information (6 Hours)**

- 2.1 Right to Information Act (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Public information Officer and Assistant (K<sub>1</sub>, K<sub>2</sub>)
- 2.3 Supply of Information to Associations (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Time period for supply of Information (K<sub>1</sub>, K<sub>2</sub>)
- 2.5 Appeals and Complaints (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.6 Third party Information and Disclosure (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Consumer Protection Act 1986 (6 Hours)**

- 3.1 Consumer Protection Act 1986 (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Preliminary (Introduction, commencement and application) (K<sub>1</sub>, K<sub>2</sub>)
- 3.3 Consumer Protection Council (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Establishment, Composition, Jurisdiction, Complaint, Manner, Procedure on Receipt of Complaint finding, Appeal (K<sub>1</sub>, K<sub>2</sub>)
- 3.5 Finality of order - limitation Period (K<sub>1</sub>, K<sub>2</sub>)
- 3.6 Administrative control and Enforcement of Orders by the Redressal Agencies (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: FSSAI ACT 2006 (Food Safety and Standards) (6 Hours)**

- 4.1 FSSAI Act 2006 (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2 Food safety and standards Authority of India (K<sub>1</sub>, K<sub>2</sub>)
- 4.3 General provisions as to Articles of Food (K<sub>1</sub>, K<sub>2</sub>)
- 4.4 Compliance steps of FBO (K<sub>1</sub>, K<sub>2</sub>)
- 4.5 Liability of the Manufacturers, Packers, Wholesalers, Distributors and Sellers Food Recall Procedures (K<sub>1</sub>, K<sub>2</sub>)
- 4.6 Offences and penalties, General Provisions relating to Penalty (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Certification Agencies - Certification Mark (6 Hours)**

- 5.1 Certification Agencies (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Certification Marks, BIS Hall Mark, AGMARK, ISI Mark, FPO Mark (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Vegetarian and Non Vegetarian Mark, Geographical Indication Mark (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4 Significance of Certification Mark (K<sub>1</sub>, K<sub>2</sub>)
- 5.5 Bureau of Indian Standards (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.6 Objectives and Activities (K<sub>1</sub>, K<sub>2</sub>)

**Text Books:**

- 1.E-books available in the FSSAI website like
- 2.Dart, Pink, Yellow and Orange books
3. Newsletters (quarterly publications) of State Consumer Knowledge Helpline Resource Management Portal (SCHKRMP)
- 4.“Nugarvor Kavasam” a publication by the Department of Civil Supplies and Consumer

**Web Resources:**

1. [www.consumer.tn.gov.in](http://www.consumer.tn.gov.in) – publications
2. [www.consumeradvice.in](http://www.consumeradvice.in) – publications

## SEMESTER V / VI

### USCOE520/USCOE620 - PRACTICAL AUDITING

Year/ Semester	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
III/V/VI	USCOE520/ USCOE620	Practical Auditing	Theory	Skill Based Elective	2	2	40+60

#### Course Objectives:

1. To understand basic principles governing audit.
2. To prepare audit programme.
3. To identify different audit evidence.
4. To apply practical knowledge in internal control, internal check and internal audit.
5. To know about vouching and verification.

#### Course Outcomes (CO):

1. Students acquired conceptual knowledge on basic audit principles.
2. Students were familiarized with the preparation of audit programmes for various situations.
3. Students gained an insight knowledge on different audit evidence.
4. Students were well versed in methodology of internal audit.
5. Students were able to differentiate between vouching and verification.

#### CO's consistency with PO'S

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

#### CO's consistency with PSO'S

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Nature of Auditing**

**(6 Hours)**

- 1.1 Definitions, features, Principles (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Qualifications and qualities of Auditor, Advantages and Disadvantages (K<sub>1</sub>, K<sub>2</sub>)
- 1.3 Primary object (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Secondary object (K<sub>1</sub>, K<sub>2</sub>)
- 1.5 Audit based on nature (K<sub>1</sub>, K<sub>2</sub>)
- 1.6 Audit based on period (K<sub>1</sub>, K<sub>2</sub>)

### **Unit II: Audit Programme**

**(6 Hours)**

- 2.1 Audit plan (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Audit program, Types (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Merits and demerits of Audit program (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4 Working papers (K<sub>1</sub>, K<sub>2</sub>)
- 2.5 Audit files (K<sub>1</sub>, K<sub>2</sub>)
- 2.6 Audit note book (K<sub>1</sub>, K<sub>2</sub>)

### **Unit III: Audit Evidence**

**(6 Hours)**

- 3.1 Compliance and substantive audit procedures (K<sub>1</sub>, K<sub>2</sub>)
- 3.2 Types of audit evidence (K<sub>1</sub>, K<sub>2</sub>)
- 3.3 Stages in judging audit evidence (K<sub>1</sub>, K<sub>2</sub>)
- 3.4 Audit sampling (K<sub>1</sub>, K<sub>2</sub>)
- 3.5 Determinants of Audit sample (K<sub>1</sub>, K<sub>2</sub>)
- 3.6 Risks of audit sample (K<sub>1</sub>, K<sub>2</sub>)

### **Unit IV: Internal Control, Internal Check, Internal Audit**

**(6 Hours)**

- 4.1 Audit risk, Types (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Concept of Internal control (K<sub>1</sub>, K<sub>2</sub>)
- 4.3 Characteristics of effective Internal control system (K<sub>1</sub>, K<sub>2</sub>)
- 4.4 objects, principles and advantages of internal check (K<sub>1</sub>, K<sub>2</sub>)
- 4.5 Internal check as regards to various transactions (K<sub>1</sub>, K<sub>2</sub>)
- 4.6 Difference between external and internal audit (K<sub>1</sub>, K<sub>2</sub>)

### **Unit V: Vouching and Verification**

**(6 Hours)**

- 5.1 Audit of cash transactions (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.2 Audit of trading transactions (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.3 Vouching of Impersonal Ledger (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4 Verification of Assets (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.5 Verification of Liabilities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6 Valuation of Assets and Liabilities (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

DingarPagare – Principles and Practice of Auditing – Sultan chand& sons, New Delhi, Reprint 2017.

Study material will be provided by the department.

**Web Resources:**

1. [www.auditnet.org](http://www.auditnet.org)
2. [www.fasab.org](http://www.fasab.org)

**SEMESTER I**  
**UAAFA20– Accounting Fundamentals-1**

Year/ Semester I/I	Course Code UAAFA20	Title of the course Accounting Fundamentals – I	Course type Theory	Course category Allied	No. of Hours 5	Credits 5	Marks 40+60
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**Course Objectives:**

1. To introduce the basic concepts and conventions of accounting.
2. To teach them accounting techniques used in a business.
3. Teach them practically to prepare accounting reports.
4. Develop the skills needed to analyze the financial statement effectively.
5. To teach the learners to sort the financial records of various companies and reveal their financial positions to interested parties of business.

**Course Outcomes (CO):**

Upon the successful completion of this course the students will have the ability to

1. Adopt the rules of Double entry system in sorting and preparing Accounts.
2. Understand the Accounting Cycle and prepare various accounts and to check Accounting errors.
3. Calculate and explain financial Accounts to reveal the profits/losses of an organization and also to evaluate the values of Assets and Liabilities.
4. Charge Depreciation on assets under straight line and written down value methods.
5. Differentiate Single entry & Double entry and ascertain the net worth of a business.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Introduction to Accounting, Concepts & Conventions & Accounting Cycle (15 Hours)**

- 1.1. Meaning of Accounting, Definition of Accounting, Need and Steps in Accounting. (K<sub>1</sub>, K<sub>2</sub>)
- 1.2. Advantage and limitations of Accounting, Groups interested in Accounting and Branches of Accounting. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3. Concepts and Conventions of Accounting, Classification of Various concepts and Conventions. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4. Double Entry System- (Accounting Equations, Rules pertaining to Accounting equations), and Accounting Cycle. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.5. Journal: Recording of transactions. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6. Ledger- Classification of transactions. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Trial Balance, Subsidiary Books & Bank Reconciliation Statements (15 Hours)**

- 2.1. Meaning of Trial balance, Definition, Objectives, Methods of Trial balance, Schedule of Debtors and Creditors and Errors not disclosed in Trial Balance. (K<sub>1</sub>, K<sub>2</sub>)
- 2.2. Problems (Trial Balance). (K<sub>3</sub>, K<sub>4</sub>)
- 2.3. Meaning of Subsidiary books, Types of Subsidiary books, Benefits, Methods of Recording and Posting. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.4. Accounting treatment of Subsidiary books. (K<sub>3</sub>, K<sub>4</sub>)
- 2.5: Meaning of Reconciliation, Need, Causes for difference and Methods of preparing Bank Reconciliation Statements. (K<sub>1</sub>, K<sub>2</sub>)
- 2.6: Preparation of Bank Reconciliation Statement. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Final Accounts with Simple adjustments (15 Hours)**

- 3.1. Introduction to Final Accounts, Meaning of Manufacturing Account and features of Manufacturing Accounts. (K<sub>1</sub>, K<sub>2</sub>)
- 3.2. Trading Account Meaning and its Accounting treatment. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3. Profit & Loss Account Meaning and its accounting treatment. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4. Balance sheet meaning, Classification of Assets and Liabilities and Adjustments. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5. Problems (Final Accounts without Adjustments). (K<sub>3</sub>, K<sub>4</sub>)
- 3.6. Problems (Final Accounts with Simple Adjustments). (K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Depreciation Accounting (15 Hours)**

- 4.1. Meaning and Definition of Depreciation, Characteristic features of Depreciation. (K<sub>1</sub>, K<sub>2</sub>)
- 4.2. Objectives of Depreciation, Factors affecting the amount of Depreciation. (K<sub>1</sub>, K<sub>2</sub>)
- 4.3. Methods of providing depreciation – Introduction. (K<sub>1</sub>, K<sub>2</sub>)
- 4.4. Straight Line method Meaning, Merits and Demerits, Calculations for finding the Rate of Depreciation ( & More than one Asset). (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5. Diminishing Balance method Meaning, Merits and Demerits, Simple problems. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6. Problems related to Depreciation. (K<sub>3</sub>, K<sub>4</sub>)

## **Unit 5: Single Entry System**

**(15 Hours)**

- 5.1.** Meaning, Definition, Characteristic Features and Limitations of Single Entry System.  
( K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.2.** Difference between Double Entry System and Single Entry System. (K<sub>3</sub>, K<sub>4</sub>)
- 5.3.** Ascertainment of Profit: Net worth method, Steps in calculating Profit or Loss.  
(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.4.** Conversion Method: Meaning, Need, Steps for conversion of incomplete records.  
(K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5.** Net worth Method: Preparation of Statement of Affairs and Statement of Profit.  
(K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.6.** Conversion Method: Debtors Account, Creditors Account, Bills Payable Account, Bills receivable Account and preparation of Final Account. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)

### **Text Books:**

Reddy T.S and Murthy – Advanced Accountancy – MarghamPublications,Chennai, Reprint 2018

### **Reference Books**

1. Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(Volume I) – S.Chand& Company Limited, New Delhi, Reprint 2019.
2. Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.
3. Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khasa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.
4. Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint – 2017.
- 5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors – Guwahati, Edition 2018.

### **Web Resources:**

- 1).MIT Open CourseWare  
(<http://ocw.mit.edu/courses/sloan>)
2. [www.accountingschoolguide.com](http://www.accountingschoolguide.com)
3. [www.edx.org](http://www.edx.org)
4. study.com
5. [www.accountingcoach.com](http://www.accountingcoach.com)
6. fasab.gov
7. [www.freebookcentre.net](http://www.freebookcentre.net)

**SEMESTER II**  
**UAAFB20– ACCOUNTING FUNDAMENTALS-II**

Year/ Semester I/II	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
	UAAFB20	Accounting Fundamentals – II	Theory	Allied	5	5	40+60

**Course Outcomes:**

Upon the successful completion of this course the students will have the ability to:

1. Illustrate and build Knowledge of Partnership fundamentals and admission of a partner.
2. To solve problems relating to retirement and death of a partner.
3. Do the accounting related to various Branch offices under stock & Debtors and final accounts method.
4. Calculate and reveal the profits/ losses of a Department through Departmental Accounting Techniques.
5. Understand and adopt the rules of Hire purchase and installment system accounting.

**Course Objectives (CO):**

1. To introduce the students with different forms of business and its Accounting Concepts.
2. To teach them to prepare accounts for partnership fundamentals, admission, retirement and death.
3. To practice them with the accounting techniques to prepare accounts for Various Branches, Departments to analyze the profits /Losses.
4. To make students aware about Hire purchase and installments system and make them to prepare accounts.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Partnership Account –I (Fundamentals & Admission) (15 Hours)**

- 1.1. Definition, Meaning, Partnership deed. (K<sub>1</sub>, K<sub>2</sub>)
- 1.2. Accounts of partnership firm. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.3. Partners Capital account (Fixed & Fluctuating). (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 1.4. Admission of a partner- Introduction, Goodwill –meaning, need & Factors affecting the value of Goodwill. (K<sub>1</sub>, K<sub>2</sub>)
- 1.5. Calculation of Sacrificing Ratio and Valuation of Goodwill. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 1.6. Problems of Admission of a partner (Capital account and Balance sheet). (K<sub>3</sub>, K<sub>4</sub>)

### **Unit II: Partnership Account – II (Retirement & Death) (15 Hours)**

- 2.1. Introduction to Retirement of Partner – Profit Sharing Ratio, Gaining Ratio, Difference between Sacrificing Ratio and Gaining Ratio and Treatment of Goodwill. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.2. Problems (Treatment of Goodwill). (K<sub>3</sub>, K<sub>4</sub>)
- 2.3. Comprehensive problems on Retirement of a Partner. (K<sub>2</sub>, K<sub>3</sub>)
- 2.4. Introduction to Death of a partner, Mode of payment. (K<sub>1</sub>, K<sub>2</sub>)
- 2.5: Calculation of Gaining ratio and share of Goodwill. (K<sub>2</sub>, K<sub>3</sub>)
- 2.6: Comprehensive problems on Death of a Partner. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit III: Branch Accounts (15 Hours)**

- 3.1. Meaning and objectives of Branch Account. (K<sub>1</sub>, K<sub>2</sub>)
- 3.2. Types of Branch Account. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3. Features of Dependent Branch. (K<sub>1</sub>, K<sub>2</sub>)
- 3.4. Debtors System (Dependent Branch System). (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5. Stock and Debtors System. (K<sub>3</sub>, K<sub>4</sub>)
- 3.6. Final Accounts System. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit IV: Departmental Accounting (15 Hours)**

- 4.1. Meaning, Need, Advantages of Departmental Accounting. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.2. Difference between Departmental accounts and Branch Accounts, Apportionment of expenses. (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3. Apportionment of Indirect expenses. Problems (K<sub>2</sub>, K<sub>3</sub>)
- 4.4. Departmental Trading Account (K<sub>2</sub>, K<sub>3</sub>)
- 4.5. Departmental Profit and Loss Account with indirect expenses (K<sub>2</sub>, K<sub>3</sub>)
- 4.6. Inter Departmental transfer at cost price. (K<sub>3</sub>, K<sub>4</sub>)

### **Unit V: Hire Purchase System (15 Hours)**

- 5.1. Meaning, Definition and characteristic features of Hire purchase. (K<sub>1</sub>, K<sub>2</sub>)
- 5.2. Difference between Hire purchase system and Instalment System. (K<sub>3</sub>, K<sub>4</sub>)
- 5.3. Calculation of Interest. (K<sub>2</sub>, K<sub>3</sub>, K<sub>4</sub>)
- 5.4. Journal in the books of buyer and seller. (K<sub>3</sub>, K<sub>4</sub>)
- 5.5. Ledger in the books of both buyer and seller. (K<sub>3</sub>, K<sub>4</sub>)
- 5.6. Default and repossession – Complete repossession. (K<sub>3</sub>, K<sub>4</sub>)

**Text Books:**

Reddy T.S and Murthy – Advanced Accountancy – MarghamPublications,Chennai, Reprint 2018

**Reference Books**

1. Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(Volume I) – S.Chand& Company Limited, New Delhi, Reprint 2019.
2. Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.
3. Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khasa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.
4. Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint – 2017.
- 5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors – Guwahati, Edition 2018.

**Web Resources:**

- 1).MIT Open CourseWare  
(<http://ocw.mit.edu/courses/sloan>)
2. [www.accountingschoolguide.com](http://www.accountingschoolguide.com)
3. [www.edx.org](http://www.edx.org)
4. study.com
5. [www.accountingcoach.com](http://www.accountingcoach.com)
6. fasab.gov
7. [www.freebookcentre.net](http://www.freebookcentre.net)
8. open.umn.edu
9. libguides.uwf.edu
- 10.books.google.co.in

**SEMESTER V / VI**  
**NON-MAJOR ELECTIVE:**  
**UGCOA520/UGCOA620 - BOOK KEEPING AND ACCOUNTING**

Year/ Semester I/V/VI	Course Code	Title of the course	Course type	Course category	No. of Hours	Credits	Marks
	UGCOA520/ UGCOA620	Book Keepingand Accounting	Theory	Non  Major  Elective	3	2	40+60

**Course Objectives:**

1. To ascertain the different types of accounts rules and its concepts.
2. To impart the learners the need for journal, ledger and preparation of trial balance.
3. To enable students to prepare various subsidiary books.
4. To analyse errors in rectification.
5. To examine the various adjustments in preparation of final accounts.

**Course Outcomes (CO):**

1. Students acquired conceptual knowledge on accounting rules and its concepts.
2. Students were familiarised with the preparation of basic accounts.
3. Students gained an insight knowledge on preparation of various subsidiary books.
4. Students were well versed in analysing different types of errors
5. Students were able to prepare final accounts with different adjustments.

**CO's consistency with PO'S**

CO	PO1	PO2	PO3	PO4	PO5	PO6
1	H	M	H	H	H	H
2	H	M	H	H	H	M
3	H	H	M	H	M	M
4	M	H	H	M	H	M
5	H	M	H	H	H	M

(Low – L, Medium – M, High – H)

**CO's consistency with PSO'S**

CO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
1	H	M	H	H	H	H
2	H	M	H	H	H	H
3	H	H	M	H	M	H
4	M	H	H	M	H	H
5	H	M	H	H	H	H

(Low– L, Medium – M, High– H)

## **Course Syllabus**

### **Unit I: Basic concepts of Accounting** (9 Hours)

- 1.1 Definition, Objectives (K<sub>1</sub>, K<sub>2</sub>)
- 1.2 Groups interested in accounting information (K<sub>1</sub>, K<sub>2</sub>)
- 1.3 Branches, methods, Types, Bases of accounting (K<sub>1</sub>, K<sub>2</sub>)
- 1.4 Accounting Terminology (K<sub>1</sub>, K<sub>2</sub>)
- 1.5 Accounting concepts (K<sub>1</sub>, K<sub>2</sub>)
- 1.6 Conventions and Equations (K<sub>1</sub>, K<sub>2</sub>)

### **UnitII: Journal & Ledger** (9 Hours)

- 2.1 Journal, meaning and objectives (K<sub>1</sub>, K<sub>2</sub>)
- 2.2 Recording of transactions in journal (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.3 Ledger, meaning and its features and difference between Journal and ledger (K<sub>1</sub>, K<sub>2</sub>)
- 2.4 Posting of journal into ledger (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 2.5 Trial balance, meaning, objectives (K<sub>1</sub>, K<sub>2</sub>)
- 2.6 Preparation of Trial balance (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit III: Subsidiary Books** (9 Hours)

- 3.1 Purchase and Purchase returns Book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.2 Sales and Sales returns Book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.3 Simple cash book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.4 Two column cash book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.5 Three columnar cash book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 3.6 Petty cash book (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit IV: Rectification of errors** (9 Hours)

- 4.1 Meaning, classification of errors (K<sub>1</sub>, K<sub>2</sub>)
- 4.2 Errors of casting (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.3 Errors of carry forward (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.4 Errors of posting (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.5 One sided errors (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 4.6 Double sided errors (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

### **Unit V: Final Accounts** (9 Hours)

- 5.1 Trading account, meaning, items appearing in Trading account (K<sub>1</sub>, K<sub>2</sub>)
- 5.2 Preparation of Trading account (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.3 Profit and Loss account, meaning, contents of P&L A/c (K<sub>1</sub>, K<sub>2</sub>)
- 5.4Preparation of P&L A/c (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)
- 5.5 Balance sheet, classification of assets and liabilities (K<sub>1</sub>, K<sub>2</sub>)
- 5.6 Preparation of Balance sheet (K<sub>1</sub>, K<sub>2</sub>, K<sub>3</sub>)

**Text Books:**

Study material will be provided by the department.

- 1). Shukla M.C., Gupta M.P., Agarwal B.M. and Grewal T.S. – Advanced Accounts(Volume I) – S.Chand& Company Limited, New Delhi, Reprint 2019.
- 2). Nagarajan K.L., Vinayagam N. And Mani P.L. – Principles of Accountancy – Eurasia Publishing House, New Delhi, Revised Edition 2017.
- 3). Jain S.P., Narang K.L., Mukesh Kumar Sharma, Romila Jain and Satish Khasa – Financial Accounting – Kalyani Publishing House, New Delhi, Reprint 2018.
- 4). Tulsian P.C. – Financial Accounting – Pearson Education ,New Delhi, Edition Reprint – 2017.
- 5).Raman B.S. – Financial Accounting (Vol-I) - United Publishers and Distributors, Guwahati Edition

**Web Resources:**

- 1).MIT Open CourseWare  
(<http://ocw.mit.edu/courses/sloan>)
- 2). Khan Academy
- 3). Accounting Student Network
- 4). MissCPA
- 5) Accounting.com
- 6) Accounting Coach
- 7) AQA(aqa.org.uk.)
- 8) Accounting-World
- 9) AccountingInfo
- 10)Course Hero

**Semester Examination (100 Marks)**

**Time: 3 Hours**

**Section A – 10 x 2 = 20 marks**

Answer **all** questions

10 questions (2 questions from each Unit)

**Section B – 5 x 7 = 35 marks**

Answer **all** questions

5 questions with internal choice (1 question from each Unit)

**Section C – 3 x 15 = 45 marks**

Answer **any three** questions

5 questions (1 question from each Unit)

**CA Examination (50 Marks)**

**Time: 1 Hour 30 Minutes**

**Section A – 7 x 2 = 14 marks**

Answer **all** questions

7 questions

**Section B – 3 x 7 = 21 marks**

Answer **any three** questions

3 out of 5 questions

**Section C – 1 x 15 = 15 marks**

Answer **any one** question

2 questions (1 question from each Unit)

## SEMESTER II

### PCENE20 - AMERICAN LITERATURE

<b>Year :2020 SEM :II</b>	<b>Course Code :PCENE18</b>	<b>Title Of The Course : American Literature</b>	<b>Course Type :Theory</b>	<b>Course Category :Core</b>	<b>H/ W 6</b>	<b>CREDIT S 5</b>	<b>MARKS 100</b>
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#### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Interpret American life and Culture against the background of History and Literary development
2. Discuss American Literary artists, who were innovative in their outlook and literary temper.
3. Identify key ideas, representative authors and works, significant historical or cultural events, and characteristic perspectives or attitudes expressed in the literature of different periods or regions
4. Analyze literary works as expressions of individual or communal values within the social, political, cultural, or religious contexts of different literary periods
5. Write research-based critical papers about the assigned readings in clear and grammatically correct prose, using various critical approaches to literature

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit I: Transcendentalism And Romanticism (K2,K3,K4) (15 Hours)**

**Poetry**

1.1. Edgar Allan Poe Raven (Detailed)

**Prose**

1.2. Emerson Nature

1.3. Transcendentalism

1.4. Romanticism

1.5. Henry David Thoreau Where I lived and What I lived for (Detailed)

**Short Fiction**

1.6. Nathaniel Hawthorne Young Goodman Brown

**Unit II: The Humanitarian Sensibility And Inevitable Conflict (K3,K4,K5) (15 Hours)**

**Poetry**

2.1. H. W. Longfellow Seaweed (Detailed)

2.2. Russell Lowell A Fable for Critics (846-847)

**Prose**

2.3. Fredrick Douglass Narrative of the Life of Fredrick Douglass –Ch I & II

2.4. Harriet A. Jacobs  
I. Childhood  
II. The New Master And Mistress  
III. The Slaves' New Year's Day  
From *Incidents in the Life of A Slave Girl*

**Age Of Expansion: Realists And Regionalists**

**Poetry**

2.5. Walt Whitman Beat! Beat! Drums (Detailed)

2.6. Emily Dickinson There came a Day at Summer's Fall (Detailed)

**Unit III -Poets Of Idea And Order (K3,K4,K5) (20 Hours)**

3.1. Wallace Steven Anecdote of the Jar (Detailed)

William Carlos Williams Portrait of a Lady

3.2. Hart Crane To Brooklyn Bridge

Robert Frost Home Burial (Detailed)

3.3. Carl Sandburg Chicago

Ezra Pound The Seafarer

3.4. Amy Lowell Meeting House Hill

**Prose**

Frank Norris A Plea for Romantic Fiction

**Short Fiction**

3.5. Edith Wharton Roman Fever

3.6. Jack London To Build a Fire



5. Hoffmann, Daniel. ed. *Harvard Guide to Contemporary American Writing*. London: Oxford University Press, 2004.
6. Massa, Ann. *American Literature in Context*. London and New York: Methuen & Co. Ltd., 1982.

## PEENA20 - ESSENTIAL ENGLISH GRAMMAR

<b>Year:</b> <b>I</b>	<b>Course Code:</b> PEENA20	<b>Title of the Course:</b> Essential English Grammar	<b>Course Type:</b> Theory	<b>Course Category:</b> Elective	<b>H/W:</b> <b>6</b>	<b>Credits:</b> <b>4</b>	<b>Marks:</b> <b>100</b>
<b>Sem - I</b>							

### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss grammatical structures common to British English
2. Interpret how the various systems of English grammar function in relation to one another
3. Apply both traditional and contemporary methods in written and oral presentations
4. Practice all covered material through classroom activities and presentations and achieve linguistic competence in using language effectively, efficiently and appropriately
5. Edit written and spoken performance and present original research and analysis in standard written academic language

CO/PSO	PSO					6
	1	2	3	4	5	
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					6
	1	2	3	4	5	
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	H	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	H

**Unit: I Words and Phrases  
Hours)**

**(15**

1. 1 Nouns, Pronouns, Determiners, Verbs, Adverbs

K2. K3

1.2 Prepositions, Conjunctions, Interjections	K2, K3
1.3 Phrases: Noun, Verb, Adjective, Adverb, Preposition	K2, K3
1.4 Word formation: Acronyms, Analogy, Back formation, Blending	K3, K4
1.5 Borrowing, Clipping, Coining	K3, K4
1.6 Compounding, Reduplication, Prefixes, Suffixes	K3, K4

## **Unit II: Sentences And Clauses**

**(15**

### **Hours)**

2.1 Major and Minor, Simple and Multiple, Clauses	K3, K4
2.2 Sentence types- Positive and Negative - Active and Passive	K4, K5
2.3 Clause elements: Subject- Predicate -Verb- Object- Complement- Adverbial	K3, K4
2.4. Compound and Complex, Independent and Dependent, Coordination- Subordination, Subordinate clauses	K4, K5
2.5 Nominal or Noun clause- Adverbial, Relative, Comparative, Finite and Non Finite clauses	K4, K5
2.6 Restrictive and Non Restrictive clauses- Dangling Modifiers- Readability	K3, K4

## **Unit III: Punctuation (15Hours)**

3.1 Apostrophe, Brackets,	K4, K5
3.2 Capital Letters, Colon,	K4, K5
3.3 Comma, Dash, Ellipsis, Exclamation mark	K4, K5
3.4 Full stop, Hyphen	K4, K5
3.5 Paragraph, Question mark	K4, K5
3.6 Quotation marks- Semicolon- Slash K4,K5	

## **Unit IV: Figures of Speech And Literary Devices**

**(20 Hours)**

4.1 Allegory, Alliteration, Anacoluthon, Analogy, Anticlimax, Antithesis	K3, K5
4.2 Apostrophe, Assonance, Bathos, Catch phrases, Clerihew, Cliché, Colloquialism	K3, K5
4.3 Dead Metaphor, Doubles, Epigram, Euphemism, Haiku, Hyperbole, Idiom,	K4, K5
4.4 Innuendo, Irony, Limerick, Litotes, Malapropism, Meiosis, Metaphor, Metonymy	K4, K5
4.5 Metre, Onomatopoeia, Oxymoron, Palindrome, Paradox, Personification, Proverb	K4, K5
4.6 Pun, Rhetorical question, Simile, Spoonerism, Syllepsis, Synecdoche, Zeugma.	K4, K5

**Unit V:** K2, K6 (20  
**Hours )**

- 5.1. Elementary Rules of Usage
- 5.2. Elementary Principles of Composition
- 5.3. A Few Matters of Form
- 5.4. Words and Expressions Commonly Misused\_
- 5.5. An Approach to Style (70-75)
- 5.6. An Approach to Style (76-81)

Strunk, Oliver. Strunk and White. *The Elements of Style*, ALLYN & BACON, 'A Pearson Education Company' & 'The New Yorker Magazine', 2000,

**Books for Study:**

1. Jarvie, Gordon. *Bloomsbury Grammar Guide*, second Edition, New Delhi. Bloomsbury. 2007
2. Strunk, Oliver. Strunk and White. *The Elements of Style*, ALLYN & BACON, 'A Pearson Education Company' & 'The New Yorker Magazine', 2000,

**Books for Reference:**

1. Eastwood, John. *Oxford Guide to English Grammar*. India: OPU, 2003.
2. Fitikides. T. J. *Common Mistakes in English*. Mumbai: Orient Longman, 1997

3. Leech, Geoffrey, DeucherMargeret, Robert Hoogenrad. *English Grammar for Today*. New York: Palgrave Macmillan, 2011
4. Palmer, Frank. *Grammar - Great Britain*: Viney Ltd, 1978
5. Palmer, Richard. *The Good Grammar Guide*. London: Routledge, 2005.

## PCENH20 - WOMEN'S WRITING

<b>Year: I  Sem – II</b>	<b>Course Code:</b> PCENH20	<b>Title of the Course:</b> Women's Writing	<b>Course Type:</b> Theory	<b>Course Category:</b> Main	<b>H/W:</b> 5	<b>Credits:</b> 4	<b>Marks:</b> 100
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### Course Outcomes (CO)

On Completion of the Course the Learners will be able to:

1. Discuss aspects of women's writing
2. Explain diversity of women's experiences and their varied cultural moorings
3. Interpret different forms of literature: poetry, fiction, short fiction and critical writings
4. Analyse women's literary history and feminist criticism
5. Evaluate literary works by women

CO/PSO	PSO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

**H - High – (3), M - Moderate (3), L - Low (1)**

CO/PO	PO					
	1	2	3	4	5	6
CO1	H	H	H	H	M	M
CO2	H	H	H	H	M	M
CO3	H	H	H	H	M	M
CO4	H	H	H	H	H	M
CO5	H	H	H	H	H	M

### Course Syllabus

**Unit I: Poetry**

**(10 Hours)**

1.1	Maya Angelou	Still I Rise	K2,K4
1.2	Wendy Cope	Difference of Opinion	K2,K4
1.3	E.B. Browning	From Aurora Leigh	K2,K4
1.4	Sylvia Plath	Mad Girls Love Song	K2,K4
1.5	Carole Ann Duffy	Little Red Cap	K2,K4
1.6	MeenaKandasamy	Apologies of Living on	K2,K4

**Unit II: Prose** **(20 Hours)**

2.1	Literary Background - Victorian Age-	Angel in the House	K2,K4
2.2	Virginia Woolf	Profession for Women	K5,K6
2.3	Marx's Critique – Commodity in Capitalism		K1,K2
2.4	Luce Irigaray	Women on the Market	K5,K6
2.5	The Stereotypical Idea of Feminism And The Word Feminist		K1,K2
2.6	Chimamanda Ngozi Adichie	We all should be Feminist	K5,K6

**Unit III: Drama** **(25 Hours)**

3.1	Oppression of women on the basis of caste, class and gender. K3,K6		
3.2	Susan Glaspell	Trifles	K4.K6
3.3	Subaltern Literature		K1, K2
3.4	Mahasweta Devi	Rudali	K6
3.5	Poile Sengupta	Mangalam	K1, K2
3.6	Poile Sengupta and the Theatre of Protest		K6

**Unit IV** **(25 Hours)**

**Feminism**

4.1	Historical Background	K6
4.2	Different waves of feminism	K2, K4
<b>4.3</b>	<b>Terms:</b>	K1, K4



2. Hansberry Lorraine. *A Raisin in the Sun*. ed, Robert Nermiroff. New York: Vintage Books, 1958
3. Devi, Mahasweta and UshaGanguli, Rudali. Seagull Books, 1997.
4. Wandor, Michelene. *Post-War British Drama: Looking Back in Gender*. London : Routledge, 2001
5. Showalter, Elaine. *Inventing Herself*. New York : Scribner, 2001
6. Eagleton, Mary Ed. *Feminist Literary Theory: A Reader*. 2<sup>nd</sup> edition. Blackwell Publishers: UK, 1994.
7. Jaidka, Manju. *From Slant to Straight: Recent Trends in Women's Poetry*. New Delhi: Prestige Books, 2000.
  
8. *Body Blows Women, Violence and Survival - Three Plays* , Ed.by Poile Sengupta Manjula Padmanabhan, Dina Mehta (Author)Seagull Books; 2000th Edition (January 1, 2000)