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
CO1	H	H	L	M	M	L
CO2	H	H	L	L	L	L
CO3	H	H	L	M	M	M
CO4	H	H	L	M	L	L
CO5	H	H	L	L	M	L

CO/PO	PO					
	PO1	PO2	PO3	PO4	PO5	PO6
CO1	H	H	H	M	H	L
CO2	H	H	H	H	M	L
CO3	H	H	H	M	M	M
CO4	H	H	H	H	M	L
CO5	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 – Lamark. (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., 8th 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, 3rd 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 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-15th edition 2014.

Reference Books:

3. Balinsky B.L - Introduction to Embryology, 5th Edition. First Indian, Reprint 2012.
4. Mohan P.Arora –Embryology- Himalaya Publishing House, 2011.
5. Veer Bala Rastogi, Jayaraj- Developmental Biology,2nd Edition, Kedar Nath Ram Nath. 1994.
6. Robert S. Mcewen- Vertebrate Embryology, 4th Edition, Oxford & IBH Publishing Co. 1949.
7. Bradley M.Patten, Bruce M. Carlson-Foundations of Embryology, 3rd 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 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 Spirullina. (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 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 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 Massachusets, 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

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 6th 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 5th 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