SEMESTER IV

UCCSL20 – PRACTICAL VIII: PYTHON PROGRAMMING

Year: II **Sem:** IV	**Course Code:** UCCSL20	**Title of the Course:** Practical VIII: Python Programming	**Course Type:** Practical	**Course Category:** Core	**H/W** 3	**Credits** 2	**Marks** 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, 4th 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, 3rd 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

UCCSN20 .NET PROGRAMMING IN C#

Year: III Sem: V	Course Code: UCCSN20	Title of the Course: .NET Programming in C#	Course Type: Theory	Course Category: Core	H/W 5	Credits 4	Marks 40+60

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

(Low -L, Medium -M, High-H)

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#", 4th 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", 8th Edition, PHI Publications, 2016.
3. Harsh Bhasin, "Programming in C#", 1st 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

UCCSQ20- PRACTICAL X: .NET PROGRAMMING IN C#

Year: III Sem: V	Course Code: UCCSQ20	Title of the Course: Practical X: .Net Programming in C#	Course Type: Practical	Course Category: Core	H/W 2	Credits 2	Marks 40+60

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

UECSD20 - Elective – II B: DATA SCIENCE

Year: III Sem: VI	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
	UECSD20	Elective – II B: Data Science	Theory	Elective	5	5	40+60

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

(**Low -L, Medium -M, High-H)**

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", 1st 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
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: III Sem: VI	Course Code: UECSE20	Title of the Course: Elective – III A: Artificial Intelligence	Course Type: Theory	Course Category: Elective	H/W 5	Credits 5	Marks 40+60

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" 2nd Edition Pearson Education/ Prentice Hall of India 2010.

Reference Books

1. Nils J.Nilsson," Artificial Intelligence: A new Synthesis", 1st Edition, Harcourt Asia Pvt. Ltd., 1998.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", 3rd Edition, Tata McGraw Hill, 2017.
3. George F.Luger "Artificial Intelligence Structures and Strategies for Complex Problem solving", 3rd 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

UCCSU20 - PRACTICAL XII: PROJECT WORK

Year: III Sem: VI	Course Code: UCCSU20	Title of the Course: Practical XII: Project Work	Course Type: Practical	Course Category: Core	H/W 2	Credits 2	Marks 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

Year: III/ V **Sem:** VI	**Course Code:** USCSEn20	**Title of the Course:** Data Analytics using Data Visualization Tools	**Course Type:** Practical	**Course Category:** Skill Based Elective	**H/W** 2	**Credits** 2	**Marks** 40+60

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

(Low -L, Medium -M, High-H)

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, 1st 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
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

Year: **III/** V **Sem:** VI	**Course Code:** USCSFn20	**Title of the Course:** Skill Based Elective: R Programming	**Course Type:** Practical	**Course Category:** Skill Based Elective	**H/W** 2	**Credits** 2	**Marks** 40+60

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

(Low -L, Medium -M, High-H)

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, 1st 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

Year: II Sem: III	Course Code: USCSAn20	Title of the Course: SBE: Basics of Web Design	Course Type: Practical	Course Category: Skill Based Elective	H/W 2	Credits 2	Marks 40+60

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
CO1	M	H	M	M	M	L
CO2	M	L	L	L	M	M
CO3	L	M	M	L	L	L
CO4	M	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	H	H	H	L	M
CO2	H	H	H	H	L	M
CO3	H	L	H	H	M	L
CO4	H	L	H	H	H	M
CO5	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)
2.5Introduction 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", 1st 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

Year:	Course Code:	Title of the Course:	Course Type:	Course Category:	H/W	Credits	Marks
II Sem: IV	USCSBn20	Skill Based Elective: Design and	Practical	Skill Based Elective	2	2	40+60

		Animation					

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

(Low -L, Medium -M, High-H)

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