



## **Scheme – 2023**

**Department of Computer Science & Engineering**

**G. Pulla Reddy Engineering College (Autonomous):  
Kurnool**

**Accredited by NBA of AICTE and NAAC of UGC**

**Affiliated to JNTUA, Anantapuramu**

**Scheme and Syllabus for II Year of FOUR YEAR  
B.Tech. Degree Course in  
Computer Science and Engineering**

**(With Effect from the Batch Admitted in 2023-24)**

**G. PULLA REDDY ENGINEERING COLLEGE (Autonomous) : KURNOOL**

**SCHEME -23**

**B. TECH – CSE**

**Applicable from the Academic Year 2023-24 onwards**

**B.Tech - III Semester: CSE**

S.No	Category	Title	L/D	T	P	Credits	CIA	End Exam	Total Marks
1	BS&H	Managerial Economics & Financial Analysis	2	0	0	2	30	70	100
2	BS&H	Discrete Mathematics & Graph Theory	3	0	0	3	30	70	100
3	ES	Digital Logic & Computer Organization	3	0	0	3	30	70	100
4	PC	Advanced Data Structures & Algorithms Analysis	3	0	0	3	30	70	100
5	PC	Object Oriented Programming Through Java	3	0	0	3	30	70	100
6	PC	Advanced Data Structures and Algorithms Analysis Lab	0	0	3	1.5	30	70	100
7	PC	Object Oriented Programming Through Java Lab	0	0	3	1.5	30	70	100
8	SC	Soft skills	0	1	2	2	30	70	100
9	AC	Environmental Science	2	0	0	-	0	0	0
<b>Total</b>		<b>16</b>	<b>1</b>	<b>8</b>	<b>19</b>				

**B.Tech - IV Semester: CSE**

S.No	Category	Title	L	T	P	Credits	CIA	End Exam	Total Marks
1	BS&H	Universal Human Values	2	1	0	3	30	70	100
2	BS&H	Probability & Statistics	3	0	0	3	30	70	100
3	PC	Operating Systems	3	0	0	3	30	70	100
4	PC	Database Management Systems	3	0	0	3	30	70	100
5	PC	Software Engineering	3	0	0	3	30	70	100
6	PC	Operating Systems Lab	0	0	3	1.5	30	70	100
7	PC	Database Management Systems Lab	0	0	3	1.5	30	70	100
8	SC	Python Programming	0	1	2	2	30	70	100
9	BS&H	Design Thinking & Innovation	1	0	2	2	30	70	100
<b>Total</b>		<b>15</b>	<b>2</b>	<b>10</b>	<b>22</b>				
Mandatory Community Service Project Internship of 08 weeks duration during summer vacation									

**Category:**

BS&H : Basic Sciences & Humanities

ES : Engineering Sciences

PC : Professional Core

SC : Skill Enhancement Course

AC : Audit Course

L/D : Lecture / Design / Drawing

T/P : Theory / Practical

CIA : Continuous Internal assessment

PE: Professional Elective

OE: Open Elective

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (MEFA)

III/IV Semester: Common to CSE,CSB,CE,ECE & EEE

Scheme:2023

Course Code	Category	Hours/Week			Credits	Maximum Marks		
HSM202	BS&H	L/D	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100

**Sessional Exam Duration: 2 Hours**

**End Exam Duration: 3 Hours**

**Course Outcomes:**

**After the completion of the course students will be able to**

**CO1**- Adopt the concepts of Managerial Economic for decision making and forwardplanning in business organizations.

**CO2**-Apply the Concepts of Production, cost and revenues for effective Business decision

**CO3**- Evaluate different types of business organizations and provide a framework for different Market Structures and the price determination.

**CO4**- Understand the significance of capital, types of capital and sources of capital and evaluate the capital budgeting techniques for choosing the optimal projects.

**CO5**- Adopt the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts and implement various techniques for assessing the financial position of the business.

**UNIT – I**

**Managerial Economics and Demand Analysis**

Introduction – Meaning, Nature & Scope and Uses of Managerial Economics, Role of Managerial Economist. Demand - Concepts, Law of Demand, Exceptions of Law of Demand, Law of Diminishing Marginal Utility, Indifference Curve. Elasticity of Demand – Types, Measurement and Significance.

**UNIT – II**

**Production and Cost Analysis**

Introduction –Production Function –Meaning, Features and types. Short run and long run Production Function, Isoquants and Isocosts, Least- cost combination– Cost = Cost concepts and Cost behaviour in Short-run and Long-run. Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems).

**UNIT – III**

**Business Organizations and Markets**

Introduction – Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies. Types of Markets - Perfect and Imperfect Markets; Features of Perfect Competition, Monopoly, Monopolistic and Oligopoly; Price-Output Determination under Perfect and Monopoly.

**UNIT – IV**

**Capital and its Significance and Capital Budgeting**

Capital and its Significance: Types of Capital, Estimation of fixed and working capital requirements, Methods and sources of raising fixed and working capital.

Capital Budgeting: Meaning, Significance and Complications involved in Capital Budgeting decisions, Methods of Capital Budgeting - Traditional Methods-Payback period and Accounting

rate of return methods, Discounted Cash flow methods- Net present value method, Internal Rate of return method and Profitability index method (Simple Problems)

### **UNIT - V**

#### **Financial Accounting and Analysis**

Introduction – Concepts and Conventions- Double-Entry System of Bookkeeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with Simple adjustments).

Introduction to Financial Analysis - Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability Ratios.

Income tax calculation and filing income tax returns(ITR).

#### **Textbooks:**

1. Varshney & Maheswari: Managerial Economics, Sultan Chand
2. A.R. Aryasri: Managerial Economics and Financial Analysis, 4/e, MGH

#### **References:**

1. Ahuja HI Managerial economics Schand
2. S.A. Siddiqui and A.S.Siddiqui:Managerial Economics and Financial Analysis,NewAge International.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.
4. Domnick Salvatore: Managerial Economics in a Global Economy, Cengage

#### **Question Paper Pattern:**

##### **Sessional Exam :**

The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 contains Five short answer questions (2 marks each) for a total of Ten marks. Remaining Three questions shall be EITHER/OR Type descriptive questions for Ten marks each. Each of these descriptive questions may contain sub-questions.

##### **End Examination:**

The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten short answer questions (2 marks each) for a total of Twenty marks, with Two short answer questions from each unit. Remaining Five Questions (Each question covering one unit of syllabus) carrying 10 marks each shall be EITHER/OR Type descriptive questions and may contain sub-questions.



2. Joe L.Mott, Abraham Kandel and Theodore P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd Edition, Pearson Education.

**Reference Books:**

1. Kenneth H. Rosen, Discrete Mathematics and its Applications with Combinatorics and Graph Theory, 7th Edition, McGraw Hill Education (India) Private Limited.
2. Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science.

**Web References:**

1. <http://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf>

**Question Paper Pattern:**

**Sessional Examination:**

The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 contains Five short answer questions (2 marks each) for a total of Ten marks. Remaining Three questions shall be EITHER/OR Type descriptive questions for Ten marks each. Each of these descriptive questions may contain sub-questions.

**End Examination:**

The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten short answer questions (2 marks each) for a total of Twenty marks, with Two short answer questions from each unit. Remaining Five Questions (Each question covering one unit of syllabus) carrying 10 marks each shall be EITHER/OR Type descriptive questions and may contain sub-questions.



1. Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 6th edition, McGraw Hill
2. Digital Design, 6th Edition, M. Morris Mano, Pearson Education.

**Reference Books:**

1. Computer Organization and Architecture, William Stallings, 11th Edition, Pearson.
2. Computer Systems Architecture, M. Morris Mano, 3rd Edition, Pearson.
3. Computer Organization and Design, David A. Patterson, John L. Hennessy, Elsevier.
4. Fundamentals of Logic Design, Roth, 5th Edition, Thomson

**Online Learning Resources:**

<https://nptel.ac.in/courses/106/103/106103068/>

**Question Paper Pattern:****Sessional Examination:**

The question paper for Sessional Examination shall be for 30 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 contains Five short answer questions (2 marks each) for a total of Ten marks. Remaining Three questions shall be EITHER/OR Type descriptive questions for Ten marks each. Each of these descriptive questions may contain sub-questions.

**End Examination:**

The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten short answer questions (2 marks each) for a total of Twenty marks, with Two short answer questions from each unit. Remaining Five Questions (Each question covering one unit of syllabus) carrying 10 marks each shall be EITHER/OR Type descriptive questions and may contain sub-questions.



Rajasekaran Universities Press, 2nd Edition or Galgotia

2. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Pearson, Second Edition 2005

3. Algorithms in C, Robert Sedgewick, Addison-Wesley Publishing Company, 2016

**Reference Books:**

1. Data Structures and program design in C, Robert Kruse, Pearson Education Asia.

2. Introduction to Data Structures with applications, Trembley & Sorenson, McGraw Hill

3. The Art of Computer Programming, Vol.1: Fundamental Algorithms, Donald E Knuth, Addison-Wesley, 1997.

4. Algorithms + Data Structures & Programs:, N.Wirth, PHI.

**Web References:**

1. [https://www.tutorialspoint.com/advanced\\_data\\_structures/index.asp](https://www.tutorialspoint.com/advanced_data_structures/index.asp)

2. <http://peterindia.net/Algorithms.html>

3. [https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs\\_O](https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs_O)

4. <https://www.slideshare.net/slideshow/design-and-analysis-of-algorithms-lecture-notes/267127777>

**Question Paper Pattern:**

**Sessional Examination:**

The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 contains Five short answer questions (2 marks each) for a total of Ten marks. Remaining Three questions shall be EITHER/OR Type descriptive questions for Ten marks each. Each of these descriptive questions may contain sub-questions.

**End Examination:**

The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten short answer questions (2 marks each) for a total of Twenty marks, with Two short answer questions from each unit. Remaining Five Questions (Each question covering one unit of syllabus) carrying 10 marks each shall be EITHER/OR Type descriptive questions and may contain sub-questions.

# OBJECT ORIENTED PROGRAMMING THROUGH JAVA (OOPJ)

III Semester: Common to CSE, CSE (AI&ML), CSE(DS) & CSBS					Scheme: 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS203	PC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	30	70	100
<b>Sessional Exam Duration: 2 Hours</b>					<b>End Exam Duration: 3 Hours</b>			

**Course Outcomes:** At the end of the course students will be able to

**CO1:** Understand Object Oriented Programming concepts and the fundamental constructs of Java.

**CO2:** Apply Inheritance, Packages and Interfaces to solve problems.

**CO3:** Demonstrate String handling methods and Exception handling mechanism.

**CO4:** Develop programs using Multithreading and Java Data Base Connectivity.

**CO5:** Understand Collection interfaces and Collection classes.

## UNIT – I

### **Object Oriented concepts:**

Overview of Java, Java buzzwords, Object oriented principles.

### **Programming Constructs:**

Data types- byte, short, int, long, float, double, char, boolean, Operators- Assignment Operator (=), Arithmetic Operators, Increment (++) and Decrement (--) Operators, Ternary Operator, Relational Operators, Logical Operators, Bitwise Operators, Precedence and Associativity of Operators.

Control Statements- If, Switch, Iteration Statements, Nested loops, For-Each loop, Break Statement, Continue Statement.

### **Introduction to Classes:**

Classes and Objects, Methods, Constructors, Reading Console input, Writing Console output, this keyword, Garbage collection, finalize and Wrapper classes.

## UNIT – II

### **Inheritance:**

Process of Inheritance, Object Class, Access Control, Types of Inheritance- Single level and Multilevel Inheritance, Multiple and Hierarchical Inheritance, Hybrid Inheritance, Final and Super keywords, Method Overloading, Dynamic Method Dispatch.

### **Interfaces:**

Abstract Classes, Defining an interface and Implementing interfaces, Default Methods in Interfaces, Static Methods in Interface, Functional Interfaces.

### **Packages:**

Defining Package, Importing Packages and Classes into Programs, Packages in Java SE- java.lang Package, Enumeration, Math class, Java util Classes and Interfaces, Formatter Class, Random Class, Formatting for Date/Time in Java.

## UNIT – III

**String Handling:**

String constructors, String methods-Character extraction, String comparison, Searching strings and Modifying strings. StringBuffer class and its methods. StringBuilder class and its methods, Comparison of String, StringBuffer and StringBuilder.

**Exception Handling:**

Introduction, Types of Exceptions, Hierarchy of Built in exceptions, Keywords -try, catch, throw, throws and finally. Multi catch blocks, Java built-in exceptions, Creating customized exceptions.

**UNIT- IV****Multithreading:**

Java thread model, Creating a thread- Extending Thread class and Implementing Runnable interface, Thread life cycle, Thread class methods, Thread priorities, Deadlocks in Threads, Thread Synchronization and Inter Thread Communication.

**Java Data Base Connectivity:**

JDBC Architecture, JDBC Drivers, JDBC steps, Driver Manager class, Connection, Statement, ResultSet and PreparedStatement.

**UNIT- V****Collections Framework:**

Collection Interfaces- List, Set, SortedSet, Queue, Deque. Collection Classes- ArrayList, LinkedList, HashSet, LinkedHashSet, TreeSet, PriorityQueue and ArrayDeque.

Accessing a Collection using an Iterator, The For-Each Alternative to Iterators.

**Text Books:**

1. JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
2. Joy with JAVA, Fundamentals of Object Oriented Programming, Debasis Samanta, Monalisa Sarma, Cambridge, 2023.
3. JAVA for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

**Reference Books:**

1. The complete Reference Java, 11th edition, Herbert Schildt, TMH
2. Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson

**Web References:**

1. <https://nptel.ac.in/courses/106/105/106105191/>
2. [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_auth\\_012880464547618816347\\_shar\\_ed/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012880464547618816347_shar_ed/overview)

**Question Paper Pattern:****Sessional Examination:**

The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 contains Five short answer questions (2 marks each) for a total of Ten marks. Remaining Three questions shall be EITHER/OR Type descriptive questions for Ten marks each. Each of these descriptive questions may contain sub-questions.

**End Examination:**

The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten short answer questions (2 marks each) for a total of Twenty marks, with Two short answer questions from each unit. Remaining Five Questions (Each question covering one unit of syllabus) carrying 10 marks each shall be EITHER/OR Type descriptive questions and may contain sub-questions.

ADVANCED DATA STRUCTURES & ALGORITHMS ANALYSIS LAB (ADSA (P))								
III Semester: Common to CSE, CSE (AI&ML) & CSBS					Scheme: 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS204	PC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		0	0	3	1.5	30	70	100
						End Exam Duration: 3 Hours		

**Course Outcomes:** At the end of the course students will be able to

**CO1:** Implement the operations on AVL tree, B-Tree, Heaps and Graphs.

## **CO2: Implement String Processing methods.**

**CO3:** Solve the problems using Divide-and-Conquer technique.

**CO4:** Develop programs using Greedy and dynamic programming methods.

**CO5:** Solve N-Queens problem using backtracking.

## List of Experiments

1. Construct an AVL tree for a given set of elements which are stored in a file and implement insert and delete operation on the constructed tree.
  2. Construct B-Tree and Implement searching, insertion and deletion operations.
  3. Implement a program to sort the elements of an array using Heap sort technique.
  4. Implement BFT and DFT for given graph, when graph is represented by
    - a) Adjacency Matrix
    - b) Adjacency Lists
  5. Implement the string processing algorithms- Brute Force & Boyer Moore methods.
  6. Implement Quick sort and Merge sort using Divide and conquer technique and observe the execution time for various input sizes (Average, Worst and Best cases).
  7. Implement Single Source Shortest Paths using Greedy method when the graph is represented by adjacency matrix and adjacency lists.
  8. Implement Fractional knapsack problem and Job sequencing with deadlines problem using Greedy strategy.
  9. Write a program to solve All pairs shortest paths problem Using Dynamic Programming.
  10. Implement N-Queens Problem Using Backtracking.

## References:

1. Fundamentals of Data Structures in C++, Horowitz Ellis, Sahni Sartaj, Mehta, Dinesh, 2nd Edition, Universities Press
  2. Computer Algorithms/C++ Ellis Horowitz, Sartaj Sahni, SanguthevarRajasekaran, 2nd Edition, University Press.
  3. Data Structures and program design in C, Robert Kruse, Pearson Education Asia.
  4. An introduction to Data Structures with applications, Trembley & Sorenson, McGraw Hill.

## **Web References:**

1. <http://cse01-iiith.vlabs.ac.in/>
  2. <http://peterindia.net/Algorithms.html>

# OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB (OOPJ(P))

III Semester: Common to CSE, CSE (AI&ML), CSE(DS) & CSBS					Scheme: 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS205	PC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		0	0	3	1.5	30	70	100
					End Exam Duration: 3 Hours			

**Course Outcomes:** At the end of the course students will be able to

**CO1:** Implement Method overloading and Constructor overloading.

**CO2:** Implement Inheritance , Packages and Interfaces concepts.

**CO3:** Implement String handling methods and Exception handling.

**CO4:** Implement multithreading and collections concepts.

## List of Experiments

1) Programs to implement class and object mechanism

a) Create a class, methods and invoke them inside main method.

b) Write a program to implement method overloading.

c) Write a program to implement constructor overloading.

2) Programs to implement Inheritance

a) Write a program to implement Single-level Inheritance.

b) Write a program to implement Multi-level and Hierarchical Inheritance.

c) Write a program creating an abstract class to find areas of different shapes.

d) Write a program to implement Multiple inheritance using interfaces.

3) Write a program to implement Dynamic Method Dispatch.

4) Write a program that imports and uses the user defined packages.

5) Write a program on String handling methods.

6) Programs to implement Exception handling mechanism

a) Write a program Illustrating Multiple catch blocks.

b) Write a program for handling Java Built-in Exceptions.

c) Write a program for handling User Defined Exception.

7) Programs to implement Multi threading concepts

a) Write a program to create threads by extending Thread class. First thread displays “Good Morning” every 1 sec, the second thread displays “Hello “every 2 seconds and the third display “Welcome” every 3 seconds, (Repeat the same by implementing Runnable).

b) Write a program illustrating isAlive() and join() methods.

c) Write a program illustrating thread synchronization.

d) Write a program to solve Producer Consumer Problem using Inter Thread Communication.

8) Write a program to implement ArrayList, LinkedList and HashSet collections.

## References:

1. P. J. Deitel, H. M. Deitel, “Java for Programmers”, Pearson Education, PHI, 4th Edition, 2007.

2. P. Radha Krishna, “Object Oriented Programming through Java”, Universities Press, 2nd Edition

2007

3. Bruce Eckel, "Thinking in Java", Pearson Education, 4th Edition, 2006.

4. Sachin Malhotra, Saurabh Chaudhary, "Programming in Java", Oxford University Press, 5th Edition, 2010.

**Web References:**

<https://java-iitd.vlabs.ac.in/>

<http://peterindia.net/JavaFiles.html>

## SOFT SKILLS (SS(P))

IV Semester: Common for all Branches					Scheme : 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
SCCM01	SC	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		0	1	2	2	30	70	100

**End Exam Duration: 3 Hrs**

**Course Outcomes :** At the end of the course the student will be able to

- CO1:** Enhance teamwork and professional growth in engineering and related fields through foundational soft skills and practical communication proficiency
- CO2:** Develop effective presentation skills to meet industry standards, enabling clear and professional communication of ideas and information
- CO3:** Develop the ability to identify and employ a variety of problem-solving and decision-making methods that is relevant and effective in real-world situations
- CO4:** Develop and apply emotional intelligence and stress management techniques to enhance personal, professional well-being and emotional well-being
- CO5:** Understand and develop the corporate etiquette necessary to present themselves in a professional setting

### UNIT – I

<b>Soft Skills &amp; Communication Skills</b>	<b>Soft Skills -</b> Introduction, Need - Mastering Techniques of Soft Skills – Communication. Skills -Significance, process, types - Barriers of communication - Improving techniques
<b>Activities</b>	<p><b>Intrapersonal Skills-</b> Narration about self- strengths and weaknesses- clarity of thought – self-expression – articulating with felicity. (The facilitator can guide the participants before the activity citing examples from the lives of the great, anecdotes and literary sources) – Stake holders Management</p> <p><b>Interpersonal Skills-</b> Group Discussion – Debate – Team Tasks - Book and film reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic.</p> <p><b>Verbal Communication-</b> Extempore- brief addresses and speeches convincing-negotiating- agreeing and disagreeing with professional grace.</p> <p><b>Non-verbal communication</b> – Public speaking – Mock interviews – presentations with an objective to identify non- verbal clues and remedy the lapses on observation</p>

### UNIT - II

<b>Presentation Skills</b>	Types of presentations-Delivery techniques – Engaging the audience – Handling Q&A and feedback – Research Content – Visual aids and materials
<b>Activities</b>	Poster Presentation Power Point Presentation Oral Presentation

### UNIT – III

<b>Problem Solving &amp;</b>	Meaning & features of Problem Solving – Managing Conflict – Conflict
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<b>Decision Making</b>	resolution – Team building - Effective decision making in teams – Methods & Styles
<b>Activities</b>	Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision
<b>UNIT - IV</b>	
<b>Stress Management</b>	Self-awareness –Self-Regulation – Stress factors – Controlling Stress – Tips
<b>Activities</b>	Providing opportunities for the participants to narrate certain crisis and stress – ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates
<b>UNIT - V</b>	
<b>Corporate Etiquette</b>	Etiquette- Introduction, concept, significance - Corporate etiquette - meaning, modern etiquette, benefits - Global and local culture sensitivity - Gender Sensitivity - Etiquette in interaction- e-mail etiquette - Cell phone etiquette - Dining etiquette - Netiquette - Job interview etiquette -Corporate grooming tips - Overcoming challenges
<b>Activities</b>	Providing situations to take part in the Role Plays where the students will learn about bad and good manners and etiquette - Group Activities to showcase gender sensitivity, dining etiquette etc. - Conducting mock job interviews - Case Study - Business Etiquette Games
<b>Text Books</b>	
1. Mitra Barun K, Personality Development and Soft Skills, Oxford University Press, Pap/Cdr edition 2012	
2. Dr Shikha Kapoor, Personality Development and Soft Skills: Preparing for Tomorrow, I K International Publishing House, 2018.	
<b>Reference Books</b>	
1. Sharma, Prashant, Soft Skills: Personality Development for Life Success, BPB Publications 2018	
2. Alex K, Soft Skills S.Chand& Co, 2012 (Revised edition)	
3. Gajendra Singh Chauhan & Sangeetha Sharma, Soft Skills: An Integrated Approach to Maximise Personality Published by Wiley, 2013	
4. Pillai, Sabina & Fernandez Agna, Soft Skills and Employability Skills, Cambridge University Press, 2018	
5. Soft Skills for a Big Impact (English, Paperback, Renu Shorey) Publisher: Notion Press	
6. Dr. Rajiv Kumar Jain, Dr. Usha Jain, Life Skills (Paperback English) Publisher : Vayu Education of India, 2014	
<b>Web References:</b>	
1. <a href="https://youtu.be/DUIsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q">https://youtu.be/DUIsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q</a>	
2. <a href="https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KIJ">https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KIJ</a>	

## ENVIRONMENTAL SCIENCE (ES)

III/IV Semester : Common to all Branches						Scheme: 2023		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
AC201	BS&H	L/D	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	0	100	--	100

**Course Outcomes:** After the completion of the course students will be able to

**CO1:** Apply the knowledge of environmental issues in area of work. Interpret the need for the conservation of Natural resources for sustainable development.

**CO2:** Pursue the importance of Ecosystem and conservation of biodiversity

**CO3:** Assess the problems due to environmental pollution with remedial measures and issues related to environment.

**CO4:** Evaluate sustainable development and address environmental issues.

**CO5:** Interpret the use of IT & related technology to conserve environment & human health.

### UNIT – I

**Multidisciplinary Nature of Environmental Studies:** Definition, Scope and Importance – Need for Public Awareness.

**Natural Resources:** Renewable and non-renewable resources – Natural resources and associated problems. Forest resources – Use and over-exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people. Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems. Food resources – World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer, pesticide problems, water logging, salinity, case studies. Energy resources – solar, wind and nuclear energy resources.

### UNIT – II

**Ecosystems:** Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers. Energy flow in the ecosystem – Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and functions of the forest and aquatic (pond and ocean) ecosystems.

**Biodiversity and its Conservation:** Introduction, Definition: genetic, species and ecosystem diversity. Values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

### UNIT – III

**Environmental Pollution:** Definition, cause, effects and control measures of :

- a. Air Pollution.

- b. Water pollution
- c. Noise pollution
- d. Nuclear hazards

**Solid Waste Management:** Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution – Pollution case studies. Disaster management: floods, earthquake and cyclone.

#### **UNIT – IV**

**Social Issues and the Environment:** From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting – Environmental ethics. Global issues and possible solutions – Climate change, global warming, acid rain and ozone layer depletion – Case Studies. Consumerism and waste products. Environment Protection Acts – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act. Issues involved in enforcement of environmental legislation – Public awareness.

#### **UNIT – V**

**Human Population and the Environment:** Population growth, Population explosion – Family Welfare Programmes. – Environment and human health. Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health.

**Field Work:** Visit to a local area to document environmental assets River/forest/grassland/ hill/mountain – Visit to a local polluted site – Urban/Rural/Industrial/Agricultural study of common plants, insects, and birds – river, hill slopes, etc.

#### **Textbooks:**

1. C. P. Kaushik and Anubha Kaushik, "Environmental Studies" New Age International (P) Ltd., New Delhi.
2. Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses" University Grants Commission, Universities Press.
3. Y. Anjaneyulu "Introduction to Environmental Sciences", BS Publications, Hyderabad.
4. R. Rajagopalan, "Environmental Studies", Oxford University Press, Chennai.
5. S.Azeem Unnisa, "Environmental Studies" Academic Publishing Company.

#### **References:**

1. Benny Joseph, "Environmental Studies", Tata McGraw Hill, New Delhi.
2. Decksha Dave and E.Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications.
3. M. Anji Reddy, "Text book of Environmental Sciences and Technology", BS Publication.
4. Palaniswamy, "Environmental Studies", Pearson Education.
5. J. P. Sharma, "Comprehensive Environmental Studies", Laxmi Publications.
6. Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science", Prentice Hall of India Private limited.

### UNIVERSAL HUMAN VALUES (UHV)

III/IV Semester: Common to all branches					Scheme : 2023			
Course Code	Category	Hours/Week		Credits	Maximum Marks			
HSM 201	BS&H	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		2	1	0	3	30	70	100
<b>Sessional Exam Duration : 2 Hrs</b>					<b>End Exam Duration :3 Hr</b>			

**Course Outcomes :** At the end of the course, students will be able to

- CO1:** Define the terms like Natural Acceptance, Happiness and Prosperity
- CO2:** Identify one's self, and one's surroundings(family, society nature)
- CO3:** Apply what they have learnt to their own self in different day-to-day settings in real life
- CO4:** Relate human values with human relationship and human society.
- CO5:** Justify the need for universal human values and harmonious existence
- CO6:** Develop as socially and eco logically responsible engineers

#### **UNIT – I**

##### **Introduction to Value Education (6 lectures and 3 tutorials for practice session)**

- Lecture 1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
- Lecture 2: Understanding Value Education
- Tutorial 1: Practice Session PS1 Sharing about Oneself
- Lecture 3: self-exploration as the Process for Value Education
- Lecture 4: Continuous Happiness and Prosperity—the Basic Human Aspirations
- Tutorial 2: Practice Session PS2 Exploring Human Consciousness
- Lecture 5: Happiness and Prosperity – Current Scenario
- Lecture 6: Method to Fulfill the Basic Human Aspirations Tutorial3: Practice Session PS3 Exploring Natural Acceptance

#### **UNIT – II**

##### **Harmony in the Human Being (6 lectures and 3 tutorials for practice session)**

- Lecture 7: Understanding Human being as the Co-existence of the self and the body. Lecture 8: Distinguishing between the Needs of the self and the body
- Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self and body.
- Lecture 9: The body as an Instrument of the self
- Lecture 10: Understanding Harmony in the self
- Tutorial 5: Practice Session PS5 Exploring Sources of Imagination in the self
- Lecture 11: Harmony of the self with the body
- Lecture 12: Programme to ensure self-regulation and Health
- Tutorial 6: Practice Session PS6 Exploring Harmony of self with the body

#### **UNIT – III**

##### **Harmony in the Family and Society (6 lectures and 3 tutorials for practice session)**

- Lecture 13: Harmony in the Family—the Basic Unit of Human Interaction
- Lecture 14: 'Trust' – the Foundational Value in Relationship
- Tutorial 7: Practice Session PS7 Exploring the Feeling of Trust

Lecture 15: 'Respect' – as the Right Evaluation

Tutorial 8: Practice Session PS8 Exploring the Feeling of Respect

Lecture 16: Other Feelings, Justice in Human-to-Human Relationship

Lecture 17: Understanding Harmony in the Society

Lecture 18: Vision for the Universal Human Order

Tutorial 9: Practice Session PS9 Exploring Systems to fulfill Human Goal

#### **UNIT - IV**

#### **Harmony in the Nature/Existence (4lectures and 2 tutorials for practice session)**

Lecture 19: Understanding Harmony in the Nature

Lecture 20: Inter connectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature

Tutorial 10: Practice Session PS10 Exploring the Four Orders of Nature

Lecture 21: Realizing Existence as Co-existence at All Levels

Lecture 22: The Holistic Perception of Harmony in Existence

Tutorial 11: Practice Session PS11 Exploring Co-existence in Existence

#### **UNIT - V**

#### **Implications of the Holistic Understanding – a Look at Professional Ethics (6 lectures and 3 tutorials for practice session)**

Lecture 23: Natural Acceptance of Human Values

Lecture 24: Definitiveness of (Ethical) Human Conduct

Tutorial 12: Practice Session PS12 Exploring Ethical Human Conduct

Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order

Lecture 26: Competence in Professional Ethics

Tutorial 13: Practice Session PS13 Exploring Humanistic Models in Education

Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies

Lecture 28: Strategies for Transition towards Value-based Life and Profession

Tutorial 14: Practice Session PS14 Exploring Steps of Transition towards Universal Human Order

#### **Text Books:**

1. R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

2. R R Gaur, R Asthana, G P Bagaria, Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

#### **Reference Books:**

1. Jeevan Vidya: Ek Parichaya, ANagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.

2. Human Values, A.N.Tripathi, New Age Intl. Publishers, NewDelhi,2004.

3. The Story of Stuff (Book).

4. The Story of My Experiments with Truth-by Mohandas Karamchand Gandhi

#### **Online Resources:**

1. <https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf>

2. <https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202->

Harmony%20in%20the%20Human%20Being.pdf

3. <https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf>
4. <https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%202023.pdf>
5. <https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf>

**Question Paper Pattern:**

**Sessional Exam:**

The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 shall contain Five compulsory short answer questions for a total of Ten marks. Question No.2 to 4 shall be EITHER/OR Type for Ten marks each. Student shall Answer any one of them. Each of these questions may contain sub-questions.

**End Examination:**

The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten compulsory short answer questions for a total of Twenty marks (with Two short answer questions from each unit). Question No.2 to 6 shall be EITHER/OR Type for Ten marks each and shall cover one Unit of the Syllabus for each question. Student shall Answer any one of them. Each of these questions may contain sub-questions.



<b>Reference Books:</b>
1. S. Ross, a First Course in Probability, Pearson Education India, 2002.
2. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.
3. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
<b>Web References:</b>
1. <a href="https://onlinecourses.nptel.ac.in/noc21_ma74/preview">https://onlinecourses.nptel.ac.in/noc21_ma74/preview</a>
2. <a href="https://onlinecourses.nptel.ac.in/noc22_mg31/preview">https://onlinecourses.nptel.ac.in/noc22_mg31/preview</a>
<b>Question Paper Pattern:</b>
<b>Sessional Examination:</b> The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 contains Five short answer questions (2 marks each) for a total of Ten marks. Remaining Three questions shall be EITHER/OR Type descriptive questions for Ten marks each. Each of these descriptive questions may contain sub-questions.
<b>End Examination:</b> The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten short answer questions (2 marks each) for a total of Twenty marks, with Two short answer questions from each unit. Remaining Five Questions (Each question covering one unit of syllabus) carrying 10 marks each shall be EITHER/OR Type descriptive questions and may contain sub-questions.

OPERATING SYSTEMS(OS)							
IV Semester: Common to CSE & CSBS				Scheme: 2023			
Course Code	Category	Hours/Week		Credits	Maximum Marks		
CS206	PC	L	T	P	C	Continuous Internal Assessment	End Exam
		3	0	0	3	30	70
Sessional Exam Duration:2 Hours					End Exam Duration: 3 Hours		

**Course Outcomes:** At the end of the course students will be able to

**CO1:** Acquaint with the basics of the Operating System and their different structures.

**CO2:** Comprehend the process management policies, CPU Scheduling

## **CO3:Understand Process synchronization techniques, Deadlocks and their Handling mechanisms**

**CO4:** Analyze memory management schemes and allocation policies.

## **CO5:** Demonstrate file management system and its implementation.

UNIT- I

## **Operating Systems Overview:** Introduction, Operating system functions, Operating systems operations, Computing environments, Free and Open-Source Operating Systems

**System Structures:** Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, Operating system Design and Implementation, Operating system structure.

UNIT- II

**Processes:** Process Concept, Process scheduling, Operations on processes, Inter-process communication.

**Threads and Concurrency:** Multithreading models, Thread libraries, Threading issues.

**CPU Scheduling:** Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling.

## **UNIT- III**

**Synchronization Tools:** The Critical Section Problem, Peterson's Solution, Mutex Locks, Semaphores, Monitors, Classic problems of Synchronization.

**Deadlocks:** system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock

UNIT- IV

**Memory-Management Strategies:** Introduction, Contiguous memory allocation, Paging, Structure of the Page Table, Swapping.

**Virtual Memory Management:** Introduction, Demand paging, Copy-on-write, Page replacement, Allocation of frames, Thrashing.

UNIT - V

**File System:** File System Interface: File concept, Access methods, Directory Structure; File system

**Implementation:** File-system structure, File-system Operations, Directory implementation, Allocation method, Free space management; **File-System Internals:** File-System Mounting, Partitions and Mounting, File Sharing

## **Text Books:**

1. Operating System Concepts Operating System Concepts, Silberschatz A, Galvin P B, Gagne

G, 10 <sup>th</sup> Edition, Wiley, 2018.
2. Modern Operating Systems, Tanenbaum A S, 4 <sup>th</sup> Edition, Pearson , 2016
<b>Reference Books:</b>
1. Operating Systems -Internals and Design Principles, Stallings W, 9 <sup>th</sup> edition, Pearson, 2018.
2. Operating Systems: A Concept Based Approach, D.M Dhamdhere, 3 <sup>rd</sup> Edition, McGraw- Hill, 2013
<b>Web References:</b>
1. <a href="https://nptel.ac.in/courses/106/106/106106144/">https://nptel.ac.in/courses/106/106/106106144/</a> .
2. <a href="http://peterindia.net/OperatingSystems.html">http://peterindia.net/OperatingSystems.html</a> .
<b>Question Paper Pattern:</b>
<b>Sessional Examination</b>
The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 contains Five short answer questions (2 marks each) for a total of Ten marks. Remaining Three questions shall be EITHER/OR Type descriptive questions for Ten marks each. Each of these descriptive questions may contain sub-questions.
<b>End Examination</b>
The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten short answer questions (2 marks each) for a total of Twenty marks, with Two short answer questions from each unit. Remaining Five Questions (Each question covering one unit of syllabus) carrying 10 marks each shall be EITHER/OR Type descriptive questions and may contain sub-questions.

# DATABASE MANAGEMENT SYSTEMS (DBMS)

IV Semester: Common to CSE, CSE (AI&ML), CSE(DS) & CSBS					Scheme: 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
CS207	PC	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		3	0	0	3	30	70	100
<b>Sessional Exam Duration:</b> 2 Hours					<b>End Exam Duration:</b> 3 Hours			

**Course Outcomes:** At the end of the course students will be able to

**CO1:** Understand the basic concepts of database management systems.

**CO2:** Analyze a given database application scenario to use ER model for conceptual design of the database.

**CO3:** Utilize SQL proficiently to address diverse query challenges.

**CO4:** Employ normalization methods to enhance database structure.

**CO5:** Understand transaction processing concepts in databases.

## UNIT - I

**Introduction:** Database system, Characteristics (Database Vs File System), Database Users, Advantages of Database systems, Database applications. Brief introduction of different Data Models; Database system structure, environment.

**Entity Relationship Model:** Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, specialization, generalization using ER Diagrams.

## UNIT - II

**Relational Model:** Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance. **BASIC SQL:** Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update).

## UNIT - III

**SQL:** Basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions(Date and Time, Numeric, String conversion).Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, relational set operations.

## UNIT - IV

**Schema Refinement (Normalization):** Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency, (1NF, 2NF and 3 NF), Boyce-Codd normal form(BCNF), Fourth normal form(4NF), Fifth Normal Form (5NF).

## UNIT - V

**Transaction Concept:** Transaction State, ACID properties, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, lock based, time stamp based, Deadlocks, Failure Classification, Storage, Recovery and Atomicity.

**Text Books:**

- 1) Database Management Systems, 3<sup>rd</sup> edition, Raghurama Krishnan, Johannes Gehrke, TMH (For

Chapters 2, 3, 4)
2) Database System Concepts, 5 <sup>th</sup> edition, Silberschatz, Korth, Sudarsan, TMH (For Chapter 1 and Chapter 5)
<b>Reference Books:</b>
1) Introduction to Database Systems, 8 <sup>th</sup> edition, C J Date, Pearson.
2) Database Management System, 6 <sup>th</sup> edition, Ramez Elmasri, Shamkant B. Navathe, Pearson
3) Database Principles Fundamentals of Design Implementation and Management, 10 <sup>th</sup> edition, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning, 2022.
<b>Web References:</b>
1). <a href="https://nptel.ac.in/courses/106/105/106105175/">https://nptel.ac.in/courses/106/105/106105175/</a>
2) <a href="https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01275806667282022456_share_d/overview">https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01275806667282022456_share_d/overview</a>
<b>Question Paper Pattern:</b>
<b>Sessional Examination</b>
The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 contains Five short answer questions (2 marks each) for a total of Ten marks. Remaining Three questions shall be EITHER/OR Type descriptive questions for Ten marks each. Each of these descriptive questions may contain sub-questions.
<b>End Examination</b>
The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten short answer questions (2 marks each) for a total of Twenty marks, with Two short answer questions from each unit. Remaining Five Questions (Each question covering one unit of syllabus) carrying 10 marks each shall be EITHER/OR Type descriptive questions and may contain sub-questions.

UNIT - I

**Introduction:** Evolution, Software development projects, Exploratory style of software developments, Emergence of software engineering, Notable changes in software development practices, Computer system engineering.

**Software Life Cycle Models:** Basic concepts, Waterfall model and its extensions, Rapid application development, Agile development model, Spiral model.

## **UNIT-II**

**Software Project Management:** Software project management complexities, Responsibilities of a software project manager, Metrics for project size estimation, Project estimation techniques, Empirical Estimation techniques, COCOMO, risk management.

**Requirements Analysis And Specification:** Requirements gathering and analysis, Software Requirements Specification (SRS), Formal system specification.

UNIT- III

**Software Design:** Overview of the design process, How to characterize a good software design? Layered arrangement of modules, Cohesion and Coupling, approaches to software design.

**Agility:** Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models, Tool Set for the Agile Process (Text Book 2).

**Function-Oriented Software Design:** Overview of SA/SD methodology, Structured analysis, Developing the DFD model of a system, Structured design, Detailed design, and Design Review.

**User Interface Design:** Characteristics of a good user interface, Basic concepts, Types of user interfaces, Fundamentals of component-based GUI development, and user interface design methodology.

UNIT- IV

**Coding And Testing:** Coding, Code review, Testing, Black-box testing, White-Box testing, Debugging, Program analysis tools, Integration testing, Smoke testing, and Some general issues associated with testing.

**Software Reliability And Quality Management:** Statistical testing, Software quality, Software quality management system, ISO 9000. SEI Capability maturity model. Few other important quality standards, and Six Sigma.

## UNIT- V

**Computer-Aided Software Engineering (Case):** CASE and its scope, CASE environment, CASE support in the software life cycle, other characteristics of CASE tools, Towards second generation CASE Tool, and Architecture of a CASE Environment.

**Software Maintenance:** Characteristics of software maintenance, Software reverse engineering, Software maintenance process models and Estimation of maintenance cost.

**Software Reuse:** reuse- definition, introduction, reason behind no reuse so far, Basic issues in any reuse program, A reuse approach, and Reuse at organization level.

**Text Books:**

1. Fundamentals of Software Engineering, Rajib Mall, 5<sup>th</sup> Edition, PHI.
2. Software Engineering A practitioner's Approach, Roger S. Pressman, 9<sup>th</sup> Edition, Mc-Graw Hill International Edition.

**Reference Books:**

1. Software Engineering, Ian Sommerville, 10<sup>th</sup> Edition, Pearson.
2. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

**e-Resources:**

- 1) <https://nptel.ac.in/courses/106/105/106105182/>
- 2) [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_auth\\_01260589506387148827\\_shared/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01260589506387148827_shared/overview)
- 3) [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_auth\\_013382690411003904735\\_shared/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013382690411003904735_shared/overview)

**Question Paper Pattern:**

**Sessional Examination:**

The question paper for Sessional Examination shall be for 40 marks. The question paper shall consist of Four questions and all questions are compulsory. Question No.1 contains Five short answer questions (2 marks each) for a total of Ten marks. Remaining Three questions shall be EITHER/OR Type descriptive questions for Ten marks each. Each of these descriptive questions may contain sub-questions.

**End Examination:**

The question paper for End Examination shall be for 70 marks. The Question paper shall contain Six Questions and all questions are compulsory. Question No.1 shall contain Ten short answer questions (2 marks each) for a total of Twenty marks, with Two short answer questions from each unit. Remaining Five Questions (Each question covering one unit of syllabus) carrying 10 marks each shall be EITHER/OR Type descriptive questions and may contain sub-questions.





CURRENT of clause and CURSOR variables.
11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.
<b>References</b>
1. Oracle: The Complete Reference by Oracle Press
2. Nilesh Shah, "Database Systems Using Oracle", PHI, 2007
3. Rick F Vander Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 2007
4. RamezElmasri, Shamkant, B. Navathe, "Database Systems", Pearson Education, 6th Edition, 2013.
5. Database Principles Fundamentals of Design Implementation and Management, 10 <sup>th</sup> edition, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning, 2022.
<b>Web References:</b>
1. <a href="http://www.scoopworld.in">http://www.scoopworld.in</a>
2. <a href="http://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php">http://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php</a>



**Lists:**

Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statements.

**Sample Experiments:**

7. Write a program to define a function with multiple return values.
8. Write a program to define a function using default arguments.
9. Write a program to find the length of the string without using any library functions.
10. Write a program to check if the substring is present in a given string or not.
11. Write a program to perform the given operations on a list: a) Addition b). Insertion c). Slicing
12. Write a program to perform any 5 built-in functions by taking any list.

**UNIT- III****Dictionaries:**

Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.

**Tuples and Sets:**

Creating Tuples, Basic Tuple Operations, tuple () Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Using zip() Function, Sets, Set Methods, Frozen set

**Sample Experiments:**

13. Write a program to create tuples (name, age, address, college) for at least two members concatenate the tuples, and print the concatenated tuples.
14. Write a program to count the number of vowels in a string (No control flow allowed).
15. Write a program to check if a given key exists in a dictionary or not.
16. Write a program to add a new key-value pair to an existing dictionary.
17. Write a program to sum all the items in a given dictionary.

**UNIT- IV****Files:**

Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python OS and os.path Modules.

**Object-Oriented Programming:** Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance, Polymorphism.

**Sample Experiments:**

18. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
19. Python program to print each line of a file in reverse order.
20. Python program to compute the number of characters, words and lines in a file.
21. Write a program to create, display, append, insert and reverse the order of the items in the array.
22. Write a program to add, transpose and multiply two matrices. Write a Python program to create a class that represents a shape. Include methods to calculate its area and perimeter. Implement subclasses for different shapes like circle, triangle, and square.

**UNIT- V****Introduction to Data Science:**

Functional Programming, JSON and XML in Python, NumPy with Python, Pandas.

**Sample Experiments:**

23. Python program to check whether a JSON string contains complex object or not.
24. Python Program to demonstrate NumPy arrays creation using array () function.

25. Python program to demonstrate use of ndim, shape, size, dtype.
26. Python program to demonstrate basic slicing, integer and Boolean indexing.
27. Python program to find min, max, sum, cumulative sum of array
28. Create a dictionary with at least five keys and each key represent value as a list where this list contains at least ten values and convert this dictionary as a pandas data frame and explore the data through the data frame as follows:
  - a) Apply head () function to the pandas data frame
  - b) Perform various data selection operations on Data Frame
29. Select any two columns from the above data frame, and observe the change in one attribute with respect to other attribute with scatter and plot operations in matplotlib

**Text Books:**

1. Gowri Shankar S, Veena A., Introduction to Python Programming, CRC Press
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2<sup>nd</sup> Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

**Reference Books:**

1. Python 3 for Absolute Beginners, Tim Hall and J-P Stacey, Apress.
2. Python -The Ultimate Beginner's Guide! , Andrew Johansen.

**Web References:**

- 1.<https://www.coursera.org/learn/python-for-applied-data-science-ai>
- 2.<https://www.coursera.org/learn/python?specialization=python#syllabus>

## DESIGN THINKING & INNOVATION (DTI)

III/IV Semester:Common for all Branches					Scheme: 2023			
Course Code	Category	Hours/Week			Credits	Maximum Marks		
ESCMO1	ES	L	T	P	C	Continuous Internal Assessment	End Exam	TOTAL
		1	0	2	2	30	70	100

**End Exam Duration: 3 Hrs**

**Course Outcomes:** At the end of the course, students will be able to

**CO1:** Define the concepts related to Design thinking

**CO2:** Explain the fundamentals of Design Thinking and innovation

**CO3:** Apply the design thinking techniques for solving problems in various sectors

**CO4:** Analyse to work in a multidisciplinary environment

**CO5:** Formulate specific problem statements of real time issues

### **UNIT - I**

**Introduction to Design Thinking:** Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

### **UNIT - II**

**Design Thinking Process:** Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brainstorming, product development

**Activity:** Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

### **UNIT - III**

**Innovation:** Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations- Creativity to Innovation- Teams for innovation- Measuring the impact and value of creativity.

**Activity:** Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

### **UNIT - IV**

**Product Design:** Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications- Innovation towards product design- Case studies

**Activity:** Importance of modelling, how to set specifications, Explaining their own product design.

### **UNIT - V**

**Design Thinking in Business Processes:** Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs- Design thinking for Startups- Defining and testing Business Models and Business Cases- Developing & testing prototypes.

**Activity:** How to market our own product, About maintenance, Reliability and plan for startup.

#### **Text Books:**

1. Tim Brown, Change by design, Harper Bollins (2009)

2. Idris Mootee, Design Thinking for Strategic Innovation, 2013, John Wiley & Sons

**Reference Books:**

1. David Lee, Design Thinking in the Classroom, Ulysses press
2. Shruti N Shetty, Design the Future, Norton Press
3. William Lidwell, Universal Principles of Design- Kritinaholden, Jill Butter.
4. Chesbrough.H, The Era of Open Innovation – 2013

**Online Resources:**

- 1.<https://nptel.ac.in/courses/110/106/110106124/>
- 2.<https://nptel.ac.in/courses/109/104/109104109/>
- 3.[https://swayam.gov.in/nd1\\_noc19\\_mg60/preview](https://swayam.gov.in/nd1_noc19_mg60/preview)