SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(AUTONOMOUS)

Dr. Visweswaraiah Road, (Bangalore-Tirupathi Bye-pass Road),Murukambattu, Chittoor – 517127, Andhra Pradesh, India.

B.Tech
Course Structures and Syllabi
Under R23 Regulations

(Applicable for 2023-2024 Regular Students & 2024-2025 Lateral Students)

Department of
Computer Science and Engineering

B.Tech- R23 - COURSE STRUCTURE AND SYLLABI

Semester III (Second Year)

S.No	Course Code	Course Title	Course Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23MBA24xa/ 23MBA24xb/ 23MBA24xc	Managerial Economics and Financial Analysis / Business Environment / Organizational Behavior	MBA	2	0	0	2	30	70	100
2	23BSC23x	Discrete Mathematics & Graph Theory	BSC	3	0	0	3	30	70	100
3	23ECE23x	Digital Logic &Computer Organization	ECE	3	0	0	3	30	70	100
4	23CSE231	Advanced Data Structures & Algorithm Analysis	PCC	3	0	0	3	30	70	100
5	23CSE232	Object Oriented Programming Through Java	PCC	3	0	0	3	30	70	100
6	23CSE233	Advanced Data Structures and Algorithm Analysis Lab	PCC	0	0	3	1.5	30	70	100
7	23CSE234	Object Oriented Programming Through Java Lab	PCC	0	0	3	1.5	30	70	100
8	23CSE235	Python Programming	SEC	0	1	2	2	30	70	100
9	23MAC23x	Environmental Science	MAC	2	0	0	-	P	-	-
	Contact Hours per week			16	1	8	19	-	-	-
	Total Hours per week			25			-	-	-	-
	Total credits						19	-	-	-
	Total Marks							240	560	800

Semester IV (Second Year)

S.No	Course Code	Course Title	Course Category	Scheme of Instructions Hours per Week				Scheme of Examination Maximum Marks		
				L	T	P	C	I	E	Total
1	23BSC24x	Probability & Statistics	BSC	3	0	0	3	30	70	100
2	23HSM24X	Universal Human Values– Understanding Harmony & Human Ethical Conduct	HSMC	2	1	0	3	30	70	100
3	23CSE241	Operating Systems	PCC	3	0	0	3	30	70	100
4	23CSE242	Database Management Systems	PCC	3	0	0	3	30	70	100
5	23CSE243	Software Engineering	PCC	3	0	0	3	30	70	100
6	23CSE244	Operating Systems Lab	PCC	0	0	3	1.5	30	70	100
7	23CSE245	Database Management Systems Lab	PCC	0	0	3	1.5	30	70	100
8	23CSE246	Full Stack Development –I	SEC	0	1	2	2	30	70	100
9	23MECxxx	Design Thinking & Innovation	BSH	1	0	2	2	30	70	100
	Contact Hours per week			15	2	10	22	-	-	-
	Total Hours per week			27			-	-	-	-
	Total credits						22	-	-	-
	Total Marks							270	630	900
	Mandatory community service project internship of 08 weeks duration during summer vacation									

23MBA24xa	MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS	L	T	P	C
	(Common to All branches of Engineering)	2			2

PRE - REQUSITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To make students understand the basic perspectives of managerial economics
2. To inculcate knowledge of analyzing production operations and cost structure.
3. To provide knowledge on forms of business and market structure.
4. To give an overview on investment appraisal methods to promote the students tolearn how to plan long-term investment decisions.
5. To provide fundamental skills on accounting and to explain the process of preparingfinancial statements

UNIT – I: MANAGERIAL ECONOMICS: (9)

Introduction – Nature, meaning, significance, functions, and advantages of Managerial Economics. **Demand-Concept**, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting- Factors governing Forecasting, Methods.

UNIT – II: PRODUCTION AND COST ANALYSIS: (9)

Production Analysis: Introduction – Functions and significance of Production. Production Function– Least cost combination– Short run and Long run Production Function- Isoquants and Isocosts

Cost & Break-Even Analysis: Cost concepts and cost behaviour - Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)

UNIT – III: BUSINESS ORGANIZATIONS AND MARKETS: (9)

Introduction Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises. **Types of Markets** - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly-Monopolistic Competition– Oligopoly-Price-Output Determination - Pricing Methods and Strategies

UNIT – IV: CAPITAL BUDGETING: (9)

Introduction – Nature, meaning, significance. Types of Working Capital, Components, Sources of Short-term and Long-term Capital, Estimating Working capital requirements.Capital Budgeting– Features, Proposals, Methods and Evaluation.

Projects – Pay Back Method, Accounting Rate of Return (ARR) Net Present Value (NPV) Internal Rate Return (IRR) Method (simple problems)

UNIT – V: FINANCIAL ACCOUNTING AND ANALYSIS: (9)

Introduction – Concepts and Conventions- Double-Entry 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.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course , student will be able to		Pos
CO1	Demonstrate the basic knowledge of Managerial Economics and demand analysis.	**PO1,PO11**
CO2	Apply the Concept of Production and cost analysis in business decision making	**PO1,PO2,PO4,PO10 ,PO11**
CO3	Classify the forms of business organization and forms of market.	**PO1,PO2,PO11,**
CO4	Analyze the investment alternatives using capital budgeting techniques.	**PO1,PO2,PO4,PO10, PO11**
CO5	Prepare the accounting statements and analyze the financial performance of business entity	**PO1,PO2,PO4,PO10, PO11**

Text Books:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2016.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019.

Reference Books:

1. Ahuja Hl Managerial economics Schand,3/e,2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, NewAge International, 2013.
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, 2013.

Refference website :

1. https://www.nutshell.com/blog/sales-forecasting-methods
2. https://corporatefinanceinstitute.com/resources/accounting/break-even-analysis/
3. https://archive.nptel.ac.in/courses/110/101/110101149/
4. https://archive.nptel.ac.in/courses/110/107/110107144/
5. https://www.copperberg.com/how-to-price-your-digital-products-and-services/

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	-	-	-	3	-
CO.2	3	2	-	3	-	-	-	-	-	3	3	-
CO.3	3	2	-	-	-	-	-	-	-	-	3	-
CO.4	3	3	-	3	-	-	-	-	-	3	3	-
CO.5	3	3	-	3	-	-	-	-	-	3	3	-
CO*	3	2.5	-	3	-	-	-	-	-	3	3	-

II B.Tech –III semester

23MBA24xb	BUSINESS ENVIRONMENT	L	T	P	C
	(Common to All branches of Engineering)	2			2

PRE - REQUSITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To make students understand about Business Environment
2. To enable student's in knowing the importance of fiscal and monitory policy
3. To facilitate the students in understanding the export policy of the country
4. To Impart knowledge on the functioning and role of WTO
5. To encourage the student in knowing the structure of stock markets

UNIT – I: OVERVIEW OF BUSINESS ENVIRONMENT: (9)

Introduction – meaning Nature, Scope, significance, functions and advantages.
Types- Internal & External, Micro and Macro. Competitive structure of industries -
EnvironmentalAnalysis- advantages & limitations of environmental analysis

UNIT – II: FISCAL & MONETARY POLICY: (9)

Introduction – Nature, meaning, significance, functions and advantages. **Public Revenues** - Public Expenditure - Evaluation of recent fiscal policy of GOI. **Highlights of Budge**t- Monetary Policy - Demand and Supply of Money –**RBI** - Objectives of monetary and credit policy - Recent trends- Role of Finance Commission

UNIT – III: INDIA'S TRADE POLICY: (9)

Introduction – Nature, meaning, significance, functions and advantages. Magnitude and direction of Indian International Trade - Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank -**Balance of Payments**– Structure & Major components -Causes for Disequilibrium in Balance of Payments - Correction measures

UNIT – IV: WORLD TRADE ORGANIZATION: (9)

Introduction – Nature, significance, functions and advantages. **Organization and Structure** - Role and functions of WTO in promoting world trade - **GATT** -Agreements in theUruguay Round –TRIPS, TRIMS - Disputes Settlement Mechanism - Dumping and Anti- dumping

UNIT – V: MONEY MARKETS AND CAPITAL MARKETS: (9)

Introduction – Nature, meaning, significance, functions and advantages. Features and components of Indian financial systems - Objectives, features and structure of money markets and capital markets - Reforms and recent development – **SEBI** – Stock Exchanges -Investor protection and role of SEBI, Introduction to international finance

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course , student will be able to		Pos
CO1	Understand types of Business Environments and its Importance	PO1,PO6,
CO2	Evaluate fiscal and monitory policy	PO1,PO11
CO3	Understand India's Trade Policy	PO1, PO11
CO4	Develop a personal synthesis and approach for identifying business opportunities	PO1,PO9,PO10
CO5	Apply the knowledge of Money markets in future investment	PO1, PO11

Text Books:

1. Francis Cherunilam, International Business: Text and Cases, Prentice Hall of India.
2. K. Aswathappa, Essentials of Business Environment: Texts and Cases & Exercises13th Revised Edition.HPH

Reference Books:

1. K. V. Sivayya V. B. M Das, Indian Industrial Economy, Sultan Chand Publishers,New Delhi, India.
2. Sundaram Black, International Business Environment Text and Cases, Prentice Hallof India, New Delhi, India.
3. Chari. S. N, International Business, Wiley India.
4. E. Bhattacharya, International Business, Excel Publications, New Delhi.

Refference website :

1. https://www.slideshare.net/ShompaDhali/business-environment-53111245
2. https://www.slideshare.net/rbalsells/fiscal-policy-ppt
3. https://www.slideshare.net/aguness/monetary-policy-presentationppt

4. https://www.slideshare.net/DaudRizwan/monetary-policy-of-india-69561982
5. https://www.slideshare.net/ShikhaGupta31/indias-trade-policyppt
6. https://www.slideshare.net/viking2690/wto-ppt-60260883
7. https://www.slideshare.net/prateeknepal3/ppt-mo

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	2	-	-	-	-	-	-
CO.2	3	-	-	-	-	-	-	-	-	-	3	-
CO.3	3	-	-	-	-	-	-	-	-	-	3	-
CO.4	3	-	-	-	-	-	-	-	2	2	-	-
CO.5	3	-	-	-	-	-	-	-	-	-	3	-
CO*	3	-	-	-	-	2	-	-	2	2	3	-

23MBA24xc	ORGANISATIONAL BEHAVIOUR	L	T	P	C
	(Common to All branches of Engineering)	2			2

PRE - REQUSITES: Nil

COURSE EDUCATIONAL OBJECTIVES:

1. To enable student's comprehension of organizational behavior
2. To offer knowledge to students on self-motivation and management
3. To facilitate the students to become powerful leaders
4. To impart knowledge about group dynamics
5. To make them understand the importance of change and development

UNIT – I: INTRODUCTION TO ORGANIZATIONAL BEHAVIOR: (8)

Meaning, definition, nature, scope and functions - Organizing Process – Making organizing effective - **Understanding Individual Behaviour** –Attitude -Perception - Learning – Personality

UNIT – II: MOTIVATION: (9)

Theories of Motivation- Maslow's Hierarchy of Needs - Hertzberg's Two Factor Theory -Vroom's theory of expectancy – Mc Cleland's theory of needs–Mc Gregor's theory X andtheory Y– Adam's equity theory.

UNIT – III: ORGANIZATIONAL CLIMATE AND LEADERSHIP: (9)

Introduction – Meaning, scope, definition, Nature - **Organizational Climate** - **Leadership**
- Traits Theory–Managerial Grid - Transactional Vs Transformational Leadership – Qualities ofgood Leader - Conflict Management -Evaluating Leader.

UNIT – IV: GROUP DYNAMICS: (10)

Introduction – Meaning, scope, definition, Nature- Types of groups - **Determinants of group behaviour** - Group process – Group Development - Group norms - Group cohesiveness - Small Groups - Group decision making - **Team building** - Conflict in the organization– Conflict resolution.

UNIT – V: ORGANIZATIONAL CHANGE AND DEVELOPMENT: (9)

Introduction –Nature, Meaning, scope, definition and functions- **Organizational Culture** - Changing the Culture – Change Management – Work Stress Management – Organizational management – Managerial implications of organization's change and development.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course , student will be able to		Pos
CO1	Understand the nature and concept of Organizational behaviour	**PO1,PO8,PO9, PO10,PO11,PO12**
CO2	Apply theories of motivation to analyse the performance problems	**PO1, PO8,PO9, PO10**
CO3	Analyse the different theories of leadership	**PO1,PO9,PO11,**
CO4	Evaluate group dynamics	**PO1,PO9,PO10, PO11**
CO5	Analyse organizational dynamics and readiness	**PO1,PO9, PO12**

Text Books:

1. Essentials of Management, 10/e., 2008, Koontz, H and,Weihrich, H, McGraw-Hill,New York.
2. Organizational Behavior, 15/e, 2013, Stephen P. Robbins, Pearson Education, SanDiego

Reference Books:

1. Organizational Behaviour, 12 /e, 2010, Fred Luthans, Tata McGrawHill, NewDelhi.
2. Organizational Behaviour, 15/e, 2012, Robbins, SP, Prentice Hall of India, New Delhi.
3. Management and Organisational Behaviour, 4/e, 2010, Subbarao P, HimalayaPublishing House, New Delhi.

Refference website :

1. https://www.geeksforgeeks.org/introduction-to-business-management/
2. http://www.mim.ac.mw/books/Management%20&%20Organizational%20Behaviour,%207th%20edition.pdf
3. https://ccsuniversity.ac.in/bridge-library/pdf/Main-principles%20of%20Management %20and%20Organisational%20Behaviour.pdf

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	-	-	-	-	-	3	2	3	3	3
CO.2	3	-	-	-	-	-	-	2	3	3	-	-
CO.3	3	-	-	-	-	-	-	-	3	3	-	-
CO.4	3	-	-	-	-	-	-	-	3	3	3	-
CO.5	3	-	-	-	-	-	-	-	2	-	-	3
CO*	3	-	-	-	-	-	-	2.5	2.6	3	3	3

II B Tech- III Semester

23BSC232	DISCRETE MATHEMATICS & GRAPH THEORY	L	T	P	C
	Common to CSE/CSD/CSM/CAI	3	1	-	4

PRE-REQUISITES: **Set Theory, Permutations and Combinations, Calculus, Linear Algebra**

COURSE EDUCATIONAL OBJECTIVES:

1. To gain the knowledge on connectives and relate the laws of logic to find the disjunctive normal form and conjunctive normal form of compound proposition and various concepts related to predicate logic.
2. To perform the operations associated with sets, functions, and relations and study the basic Properties of lattices and the concept of groups, Abelian groups and group homomorphism and isomorphism.
3. To develop skill to analyze the concepts of Permutations , Combinations ,Binomial and Multinomial Theorems
4. To develop skill to apply the concept of Recurrence relations and Generating Functions in various computer programming languages.
5. To study the fundamentals of graphs, sub graphs, planar graphs, Hamiltonian graphs, Euler graphs, Spanning trees and graph traversals.

UNIT I:Mathematical Logic   09

Introduction, Statements and Notation, Connectives, Well-formed formulas, Tautology, Duality law, Equivalence, Implication, Normal Forms, Functionally complete set of connectives, Inference Theory of Statement Calculus, Predicate Calculus, Inference theory of Predicate Calculus.

UNIT II:Set theory   09

The Principle of Inclusion- Exclusion, Pigeon hole principle and its application, Functions-composition of functions, Inverse Functions, Recursive Functions, Lattices and its properties. Algebraic structures: Algebraic systems-Examples and General Properties, Semi groups and Monoids, groups, sub groups, homomorphism, Isomorphism.

UNIT III:Elementary Combinatorics   09

Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems.

UNIT IV:Recurrence Relations   09

Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence relations, Solving Recurrence Relations by Substitution and Generating functions, The Method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT V:Graphs   09

Basic Concepts, Isomorphism and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs.

COURSE OUTCOMES:

Onsuccessfulcompletionofthecourse,studentswillbeableto		Pos
CO1	Apply mathematical logic to solve problems.	**PO1, PO2, PO3**
CO2	Understand the concepts and perform the operations related to sets, relations and functions. Gain the conceptual background needed and identify structures of algebraic nature.	**PO1, PO2, PO3**
CO3	Apply basic counting techniques to solve combinatorial problems.	**PO1, PO2,PO3**
CO4	Formulate problems and solve recurrence relations.	**PO1, PO2, PO3**
CO5	Apply Graph Theory in solving computer science problems	**PO1, PO2, PO3**

TEXT BOOKS:
1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 2002.
2. Kenneth H. Rosen, Discrete Mathematics and its Applications with Combinatorics and Graph Theory, 7th Edition, McGraw Hill Education (India) Private Limited.

REFERENCE BOOKS:
1. Joe L. Mott, Abraham Kandel and Theodore P. Baker, Discrete Mathematics for Computer Scientists & Mathematicians, 2nd Edition, Pearson Education.
2. NarsinghDeo, Graph Theory with Applications to Engineering and Computer Science.

ONLINE LEARNING RESOURCES:
1. http://www.cs.yale.edu/homes/aspnes/classes/202/notes.pdf

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	3	3	-	-	-	-	-	-	-	-	-
CO.2	3	3	3	-	-	-	-	-	-	-	-	-
CO.3	3	3	3	-	-	-	-	-	-	-	-	-
CO.4	3	3	3	-	-	-	-	-	-	-	-	-
CO.5	3	3	3	-	-	-	-	-	-	-	-	-
CO*	3	3	3	-	-	-	-	-	-	-	-	-

II B.TECH - III SEMESTER

23ESC232	DIGITAL LOGIC AND COMPUTER ORGANIZATION	L	T	P	C
		3	-	-	3

COURSE OBJECTIVES:
1. Provide students with a comprehensive understanding of digital logic design principles andcomputer organization fundamentals.
2. Describe basic structure of computer.
3. To understand the computer arithmetic and processor organization.
4. To classify the memory, and peripheral devices.
5. To gain the knowledge on input/output (I/O) systems and their interaction with the CPU

UNIT – I: **9**

DATA REPRESENTATION: Binary Numbers, Fixed Point Representation. Floating Point Representation. Number base conversions, Octal and Hexadecimal Numbers, components, Signed binary numbers, Binary codes

DIGITAL LOGIC CIRCUITS-I: Basic Logic Functions, Logic gates, universal logic gates, Minimization of Logic expressions. K-Map Simplification, Combinational Circuits, Decoders, Multiplexers

UNIT – II: **9**

DIGITAL LOGIC CIRCUITS-II: Sequential Circuits, Flip-Flops, Binary counters, Registers, Shift Registers, Ripple counters

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Computer Generations, Von- Neumann Architecture

UNIT – III: **9**

COMPUTER ARITHMETIC: Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations

PROCESSOR ORGANIZATION: Fundamental Concepts, Execution of a Complete Instruction,Multiple-Bus Organization, Hardwired Control and Multi programmed Control

UNIT – IV: **9**

THE MEMORY ORGANIZATION: Basic concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage, Solid state drives- Flash, PCI Express flash, Hybrid DRAM-flash storage.
.

UNIT – V: **9**

INPUT/OUTPUT ORGANIZATION: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces, PCI Express, types of USB.

Total Hours: 45

COURSE OUTCOMES:

	On successful completion of the course, students will be able to	Pos
CO1	Differentiate between combinational and sequential circuits based on their characteristics and functionalities	**PO1, PO2**
CO2	Demonstrate an understanding of computer functional units.	**PO1, PO2**
CO3	Analyze the design and operation of processors, including instruction execution, pipelining, and control unit mechanisms, to comprehend their role in computer systems.	**PO1, PO2, P03**
CO4	Describe memory hierarchy concepts, including cache memory, virtual memory, and secondary storage, and evaluate their impact on system performance and scalability.	**PO1, PO2**
CO5	Explain input/output (I/O) systems and their interaction with the CPU, memory, and peripheral devices, including interrupts, DMA, and I/O mapping techniques.	**PO1, PO2**

TEXTBOOKS:
1. Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 6th edition,McGraw Hill, 2023.
2. Digital Design, 6th Edition, M. Morris Mano, Pearson Education, 2018.

REFERENCE BOOKS:
1. Computer Organization and Architecture, William Stallings, 11thEdition, Pearson, 2022.
2. Computer Systems Architecture, M.Mroris Mano, 3rd Edition, Pearson, 2017.
3. Computer Organization and Design, David A. Paterson, John L. Hennessy, Elsevier, 4thEdition, 2008.
4. Fundamentals of Logic Design, Roth, 5th Edition, Thomson, 2003.

ONLINE LEARNING RESOURCES:
1. https://nptel.ac.in/courses/106/103/106103068/

CO-POMAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	2	-	-	-	-	-	-	-	-	-	-
CO.2	3	2	-	-	-	-	-	-	-	-	-	-
CO.3	3	3	2	-	-	-	-	-	-	-	-	-
CO.4	3	2	-	-	-	-	-	-	-	-	-	-
CO.5	3	2	-	-	-	-	-	-	-	-	-	-
CO*	**3**	**2.2**	**2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

II B.TECH - III SEMESTER

23CSE231   ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS   **LT P C**
(Common to CSE, CSM, CAI and CSD)   **3 0 0 3**

PRE-REQUISITES: A course on Data Structures

COURSE EDUCATIONAL OBJECTIVES:
1. Provide knowledge about algorithm analysis using time complexity and spacecomplexity, and to introduce the concept of AVL trees and B trees.
2. To understand the concepts of Heap trees, Basics of Graphs and Divide and Conqueralgorithm design strategy.
3. To gain knowledge of Greedy and Dynamic programming approach to problem solving.
4. To Understand back tracking and branch and bound strategies for solving the complexproblems
5. To Develop skills of deciding a problem is solvable or not using NP hard and NP complete classproblem.

UNIT 1:   (9)

Introduction to Algorithm Analysis, Space and Time Complexity analysis, Asymptotic Notations. AVL Trees – Creation, Insertion, Deletion operations and Applications B-Trees – Creation, Insertion, Deletion operations and Applications

UNIT 2:   (9)

Heap Trees (Priority Queues) – Min and Max Heaps, Operations and Applications Graphs – Terminology, Representations, Basic Search and Traversals, Connected Components and Biconnected Components, applications. Divide and Conquer: The General Method, Quick Sort, Merge Sort, Strassen's matrix multiplication, Convex Hull

UNIT 3:   (9)

Greedy Method: General Method, Job Sequencing with deadlines, Knapsack Problem, Minimum cost spanning trees, Single Source Shortest Paths. Dynamic Programming: General Method, All pairs shortest paths, Single Source Shortest Paths– General Weights (Bellman Ford Algorithm), Optimal Binary Search Trees, 0/1 Knapsack, String Editing, Travelling Salesperson problem

UNIT 4:   (9)

Backtracking: General Method, 8-Queens Problem, Sum of Subsets problem, Graph Coloring,0/1 Knapsack Problem
Branch and Bound: The General Method, 0/1 Knapsack Problem, Travelling Salesperson problem

UNIT 5:   (9)

NP Hard and NP Complete Problems: Basic Concepts, Cook's theorem NP Hard Graph Problems: Clique Decision Problem (CDP), Chromatic Number Decision Problem (CNDP), Traveling Salesperson Decision Problem (TSP)NP Hard Scheduling Problems: Scheduling Identical Processors, Job Shop Scheduling
.

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	To gain knowledge of time complexity, space complexity and introduce the concept of AVL trees and B trees.	PO1, PO2, PO3
CO2	To design searching and sorting algorithms along with divide and conquer method and to understand the concepts of Heap trees, Basics of Graphs.	PO1, PO2, PO3, PO4
CO3	To apply Greedy method and Dynamic Programming design technique for problem solving.	PO1, PO2, PO3, PO4
CO4	To apply back tracing and branch & bound design technique for problem solving	PO1, PO2, PO3, PO4
CO5	To understand and analyze the NP hard and NP complete class problem.	PO1, PO2, PO3, PO4

TEXT BOOKS:

1. Fundamentals of Data Structures in C++, Horowitz, Ellis; Sahni, Sartaj; Mehta, Dinesh, 2ndEdition Universities Press
2. Computer Algorithms in C++, Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, 2nd Edition University Press

REFERENCES:

1. Data Structures and program design in C, Robert Kruse, Pearson Education Asia
2. An 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. Data Structures using C & C++: Langsam, Augenstein&Tanenbaum, Pearson, 1995
5. Algorithms + Data Structures & Programs:, N.Wirth, PHI
6. Fundamentals of Data Structures in C++: Horowitz Sahni& Mehta, Galgottia Pub.
7. Data structures in Java:, Thomas Standish, Pearson Education Asia

REFERENCE WEBSITE:

1. https://www.tutorialspoint.com/advanced_data_structures/index.asp
2. http://peterindia.net/Algorithms.html
3. https://www.youtube.com/playlist?list=PLDN4rrl48XKpZkf03iYFl-O29szjTrs_0

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	--	-	-	-	-	-	-	-	-
CO2	3	3	3	3	-	-	-	-	-	-	-	-
CO3	3	3	3	3	-	-	-	-	-	-	-	-
CO4	3	3	3	3	-	-	-	-	-	-	-	-
CO5	3	3	3	3	-	-	-	-	-	-	-	-
CO*	3	3	3	3	-	-	-	-	-	-	-	-

II B.TECH - III SEMESTER

23CSE232   OBJECT ORIENTED PROGRAMMING THROUGH JAVA   L T P C
(Common to CSE, CSM, CAI, CSD)   3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:
1. Identify Java language components and how they work together in applications
2. Learnthe fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
3. learn how to extend Java classes with inheritance and dynamic binding and how to use exception handling in Java applications
4. understand how to design applications with threads in Java
5. understand how to use Java APIs for program development

UNIT 1:   (9)

Object Oriented Programming: Basic concepts, Principles,

Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style.

Data Types, Variables, and Operators :Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with printf() Method, Static Variables and Methods, Attribute Final,

Introduction to Operators, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (- -) Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, Bitwise Logical Operators.

Control Statements: Introduction, if Expression, Nested if Expressions, if–else Expressions, Ternary Operator (?:), Switch Statement, Iteration Statements, while Expression, do–while Loop, for Loop, Nested for Loop, For–Each for Loop, Break Statement, Continue Statement.

UNIT 2:   (9)

Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this.

Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods, Nesting of Methods, Overriding Methods, Attributes Final and Static.

UNIT 3:   (9)

Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two-dimensional Arrays, Arrays of Varying Lengths, Three-dimensional Arrays, Arrays as Vectors.

Inheritance: Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class-Object Class, Inhibiting Inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Interfaces and Inheritance.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, Functional Interfaces, Annotations.

UNIT 4:   (9)

Packages and Java Library: Introduction, Defining Package, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE, Java.lang Package and its Classes, Class Object, Enumeration, class Math, Wrapper Classes, Auto-boxing and Auto- unboxing, Java util Classes and Interfaces, Formatter Class, Random Class, Time Package, Class Instant (java.time.Instant), Formatting for Date/Time in Java, Temporal Adjusters Class, Temporal Adjusters Class.

Exception Handling: Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Class Throwable, Unchecked Exceptions, Checked Exceptions.

Java I/O and File: Java I/O API, standard I/O streams, types, Byte streams, Character streams, Scanner class, Files in Java(Text Book 2)

UNIT 5:   (9)

String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Comparison, Modifying, Searching; Class String Buffer.

Multithreaded Programming: Introduction, Need for Multiple Threads Multithreaded Programming for Multi-core Processor, Thread Class, Main Thread-Creation of New Threads, Thread States, Thread Priority-Synchronization, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads.

Java Database Connectivity: Introduction, JDBC Architecture, Installing MySQL and MySQL Connector/J, JDBC Environment Setup, Establishing JDBC Database Connections, ResultSet Interface

Java FX GUI: Java FX Scene Builder, Java FX App Window Structure, displaying text and image, event handling, laying out nodes in scene graph, mouse events (Text Book 3)

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to Cos
CO1	Analyse problems, design solutions using OOP principles, and implement them efficiently in Java. (L4)	PO1, PO2, PO5
CO2	Design and implement classes to model real-world entities, with a focus on attributes, behaviours, and relationships between objects (L4)	PO1, PO4,PO5
CO3	Demonstrate an understanding of inheritance hierarchies and polymorphic behaviour, including method overriding and dynamic method dispatch. (L3)	PO1,PO3,PO4, PO5

CO4	Apply Competence in handling exceptions and errors to write robust and fault-tolerant code. (L3)	PO1,PO4, PO5
CO5	Perform file input/output operations, including reading from and writing to files using Java I/O classes, graphical user interface (GUI) programming using JavaFX.(L3)	PO1, PO2, PO4, PO5

TEXT BOOKS:

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

REFERENCES:

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

REFERENCE WEBSITE:
1) https://nptel.ac.in/courses/106/105/106105191/
2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012880 464547618816347_shared/overview

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	2	-	-	-	-	-	-	-
CO2	2	-	-	3	3	-	-	-	-	-	-	-
CO3	3	-	3	3	3	-	-	-	-	-	-	-
CO4	3	-	-	3	3	-	-	-	-	-	-	-
CO5	2	3	-	3	3	-	-	-	-	-	-	-
CO*	**2.6**	**3**	**3**	**3**	**2.8**	**-**	**-**	**-**	**-**	**-**	**-**	-

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II B.TECH - III SEMESTER

23CSE233	ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS LAB	L T P C
	(Common to CSE, CSM and CAI)	0 0 0 1.5

PRE-REQUISITES: A course on Data Structures

COURSE EDUCATIONAL OBJECTIVES:
- Acquire practical skills in constructing and managing Data structures
- Apply the popular algorithm design methods in problem-solving scenarios

List of Demo/ Experiments (Only for Skill Enhancement, Not for Exams)   (15)

Experiments covering the Topics:
- Operations on AVL trees, B-Trees, Heap Trees
- Graph Traversals
- Sorting techniques
- Finding Biconnected components in a graph
- Shortest path algorithms using greedy Method
- 0/1 Knapsack Problem using Dynamic Programming and Backtracking
- Travelling Salesperson problem using Branch and Bound
- N-Queens Problem using Backtracking
- Job Sequencing using Branch and Bound

Sample Programs:
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. Write contents of tree into a new file using in-order.
2. Construct B-Tree an order of 5 with a set of 100 random elements stored in array. Implement searching, insertion and deletion operations.
3. Construct Min and Max Heap using arrays, delete any element and display the content of the Heap.
4. Implement BFT and DFT for given graph, when graph is represented by
     a) Adjacency Matrix   b) Adjacency Lists
5. Write a program for finding the biconnected components in a given graph.
6. Implement Quick sort and Merge sort and observe the execution time for various input sizes (Average, Worst and Best cases).
7. Compare the performance of Single Source Shortest Paths using Greedy method when the graph is represented by adjacency matrix and adjacency lists.
8. Implement Job Sequencing with deadlines using Greedy strategy.
9. Write a program to solve 0/1 Knapsack problem Using Dynamic Programming.
10. Implement N-Queens Problem Using Backtracking.
11. Use Backtracking strategy to solve 0/1 Knapsack problem.
12. Implement Travelling Sales Person problem using Branch and Bound approach.

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Acquire the Knowledge on structure and model of the sorting techniques.	PO1
CO2	Analyze the Time and space complexity.	PO2
CO3	Design solutions for user requirements using software functionality.	PO3
CO4	Investigate on different dynamic programming in developing TSP	PO4
CO5	Develop the the N-queens problem using backtracking algorithm	PO5, PO6
CO6	Follow the ethical principles in implementing the programs	PO8
C07	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to object oriented concepts and implementing programs in future.	PO12

REFERENCE BOOKS:
1. Fundamentals of Data Structures in C++, Horowitz Ellis, SahniSartaj, Mehta, Dinesh, 2nd Edition, Universities Press
2. Computer Algorithms/C++ Ellis Horowitz, SartajSahni, 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

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

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	1	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	**3**	**3**	**3**	**3**	**3**	**1**	**-**	**3**	**3**	**3**	**-**	**3**

II B.TECH - III SEMESTER

23CE234   OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB   L T P C
(Common to CSE, CSM, CAI, CSD)   0 0 3 1.5

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:
1. Practice object-oriented programming in the Java programming language
2. Implement Classes, Objects, Methods, Inheritance, Exception, Runtime Polymorphism,User defined Exception handling mechanism
3. Illustrate inheritance, Exception handling mechanism, JDBC connectivity
4. Construct Threads, Event Handling, implement packages, Java FX GUI

EXPERIMENTS COVERING THE TOPICS:
- Object Oriented Programming fundamentals- data types, control structures
- Classes, methods, objects, Inheritance, polymorphism,
- Exception handling, Threads, Packages, Interfaces
- Files, I/O streams, JavaFX GUI

LIST OF EXPERIMENTS:
EXERCISE – 1:
a) Write a JAVA program to display default value of all primitive data type of JAVA
b) Write a java program that display the roots of a quadratic equation $ax^2+bx=0$. Calculate the discriminate D and basing on value of D, describe the nature of root.

EXERCISE - 2
a) Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
b) Write a JAVA program to sort for an element in a given list of elements using bubble sort
c) Write a JAVA program using String Buffer to delete, remove character.

EXERCISE - 3
a) Write a JAVA program to implement class mechanism. Create a class, methods and invoke them inside main method.
b) Write a JAVA program implement method overloading.
c) Write a JAVA program to implement constructor.
d)Write a JAVA program to implement constructor overloading.

EXERCISE - 4
a) Write a JAVA program to implement Single Inheritance
b) Write a JAVA program to implement multilevel Inheritance
c) Write a JAVA program for abstract class to find areas of different shapes

EXERCISE - 5
a) Write a JAVA program give example for "super" keyword.
b) Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?
c) Write a JAVA program that implements Runtime polymorphism

EXERCISE - 6
a) Write a JAVA program that describes exception handling mechanism
b) Write a JAVA program Illustrating Multiple catch clauses
c) Write a JAVA program for creation of Java Built-in Exceptions
d) Write a JAVA program for creation of User Defined Exception

EXERCISE - 7

a) Write a JAVA program that creates threads by extending Thread class. First thread display"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 **is Alive** and **join ()**
c) Write a Program illustrating Daemon Threads.
d) Write a JAVA program Producer Consumer Problem

EXERCISE – 8
a) Write a JAVA program that import and use the user defined packages
b) Without writing any code, build a GUI that display text in label and image in an ImageView (use JavaFX)
c) Build a Tip Calculator app using several JavaFX components and learn how to respond to user interactions with the GUI

COURSE OUTCOMES:

	On successful completion of the course the student will be	POs related to COs
CO1	Acquire the Knowledge on structure and model of the Java programming language.	PO1
CO2	Analyze the complex examples using java programming language.	PO2
CO3	Design solutions for user requirements using software functionality.	PO3
CO4	Investigate on event handling concepts in developing the object oriented programming	PO4
CO5	Develop the data base connectivity to the Java application	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to object oriented concepts and implementing programs in future.	PO12

REFERENCE BOOKS:
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.

REFERENCE WEBSITE:
https://java-iitd.vlabs.ac.in/
http://peterindia.net/JavaFiles.html

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	3	-	-	3	3	3	-	3

II B.TECH - III SEMESTER

23CSE235   **PYTHON PROGRAMMING**   **L T P C**
                                (SKILL ENHANCEMENT COURSE)
                                (Common to ALL)   **0 1 2 2**

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:
1. Introduce core programming concepts of Python programming language.
2. Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
3. Implement Functions, Modules and Regular Expressions in Python Programming and to create practical and contemporary applications using these

UNTI-I:
History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter Notebook.
Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.
Control Flow Statements: if statement, if-else statement, if...elif…else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

SAMPLE EXPERIMENTS:
1. Write a program to find the largest element among three Numbers.
2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.
   i) Arithmetic Operators ii) Relational Operators iii) Assignment Operators iv) Logical Operators v) Bit wise Operators vi) Ternary Operator vii) Membership Operatorsv iii) Identity Operators
5. Write a program to add and multiply complex numbers
6. Write a program to print multiplication table of a given number.

UNIT-II:
Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.
Strings: Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.
Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In Functions Used on Lists, List Methods, del Statement.

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:
                    i. additionii. insertioniii. 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, Frozenset.

Sample Experiments:
13. Write a program to create tuples (name, age, address, college) for at least two members and 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.
23. 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:
24. Python program to check whether a JSON string contains complex object or not.
25. Python Program to demonstrate NumPy arrays creation using array () function.
26. Python program to demonstrate use of ndim, shape, size, dtype.
27. Python program to demonstrate basic slicing, integer and Boolean indexing.
28. Python program to find min, max, sum, cumulative sum of array
29. 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
30. 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

COURSE OUTCOMES:

On successful completion of this course the students should be able to:		POs related to COs
CO1	Learn various problem solving approaches and ability to identify an appropriate approach to solve the problem	PO1, PO2, PO3, PO5
CO2	Implement conditionals and loops to design the python programming	PO1, PO2, PO3, PO5
CO3	Implement lists, set, tuples and dictionaries to develop python program.	PO1, PO2, PO3, PO5
CO4	Able to modulate the given problem using structural approach of programming	PO1, PO2, PO3, PO5
CO5	Build Python Programs using packages to solve real-time problems.	PO1, PO2, PO3, PO4,PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to lists, tuples and dictionaries implementing programs in future.	PO12

REFERENCE BOOKS:
1. Gowrishankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

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

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	-	2	-	-	-	-	-	-	-
CO2	3	3	3	-	2	-	-	-	-	-	-	-
CO3	3	3	3	-	2	-	-	-	-	-	-	-
CO4	3	3	3	-	2	-	-	-	-	-	-	-
CO5	3	3	3	3	2	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	2	-	-	3	3	3		3

23MAC231	Environmental Studies	L	T	P	C
	Common to all Branches	2	-	-	-

PRE-REQUISITES: NIL

COURSE EDUCATIONAL OBJECTIVES:
1. To recognize nature of environment, atmosphere and natural resources includingrenewable and nonrenewable resources.
2. To understand flow and bio-geo-chemical cycles, ecological pyramids and bio-diversity with its conservation.
3. To identify various causes of pollution and solid waste management and relatedpreventive measures.
4. To evaluate and interpret the rainwater harvesting, watershed management andenvironmental issues such as ozone layer depletion, greenhouse effect etc.
5. To understand the causes of population explosion, value education and welfareprograms.

UNIT - I: INTRODUCTION TO ENVIRONMENTALSTUDIES AND NATURALRESOURCES (6)

Multidisciplinary nature of environmental studies:(a) Definition, scope and importance. Need for public awareness
Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and nonrenewable energy resources.

UNIT – II: CONCEPT OF ECOSYSTEM AND BIODIVERSITY   (6)

Structure and function of an ecosystem: Producers, consumers and decomposers-Energy flow in the ecosystem- Ecological succession- Food chains, food webs and ecological pyramids- Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
Biodiversity and its conservation: Introduction – Definition: genetic, species and ecosystem diversity-Biogeographical classification of India-Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels- India as a mega-diversity nation-Hot-sports 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.
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UNIT – III: ENVIRONMENTAL POLLUTION AND WASTE MANAGEMENT (6)

Environmental Pollution: Definition - Cause, effects and control measures of: - a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermalpollution g. 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, cyclone and landslides.

UNIT – IV: SOCIAL ISSUES AND THE ENVIRONMENT   (6)
From Unsustainable to Sustainable development: Urban problems related to energy- Water conservation, rain water harvesting, watershed management-Resettlement and rehabilitation of people; its problems and concerns

UNIT – V: HUMAN POPULATION AND THE ENVIRONMENT   (6)
Population growth: variation among nations-Population explosion – Family Welfare Programmes-Environment and human health-Human Rights-Value Education-HIV/AIDS. - Women and Child Welfare-Role of Information Technology in Environment and human health - Case Studies.

COURSE OUTCOMES:

On successful completion of the course, students will be able to		POs
CO1	Grasp multidisciplinary nature of environmental studies, atmosphere and various renewable and nonrenewable resources.	PO1, PO7, PO8
CO2	Understand flow and bio-geo- chemical cycles, ecological pyramids and biodiversity and with its conservation.	PO1, PO7, PO8
CO3	Understand various causes of pollution and solid waste management and related preventive measures.	PO1, PO7, PO8
CO4	Gain knowledge on rainwater harvesting, watershed management, environmental issues and waste land reclamation.	PO1, PO7, PO8
CO5	Understand population explosion, value education and welfare programmes.	PO1, PO7, PO8

TEXT BOOKS:
1. Ferdinand P. Beer, E. Russell Johnston, "Vector Mechanics for Engineers", TataMcGraw-HillEducationPvt., Ltd, 12/e, 2019.
2. ErachBharucha, "Textbook of Environmental Studies for Undergraduate Courses",University Grants Commission, 2/e,2013, University Press.
3. Palaniswamy, "Environmental Studies", Pearson Educations.
4. S. AzeemUnisa, "Environmental Studies", Academic Publishing Company.
5. K. RaghavanNambiar, "Text book of Environmental Studies for UndergraduateCourses as per UGC model syllabus", SciTech Publications (India) Pvt. Ltd.

REFERENCE BOOKS:
1. DeekshaDave, and E. Sai Baba Reddy, "Textbook of Environmental Science" CengagePublications.
2. C.P.Kaushik and AnubhaKaushik "Text book of EnvironmentalStudies", New AgeInternational publishers, 4/e,2006.

3. M. Anji Reddy, "Text Book of Environmental Sciences and Technology", BSPublications.
4. J.P. Sharma, "Comprehensive Environmental Studies", Laxmi Publications.
5. J. Glynne Henry and Gary W. Heinke, "Environmental Sciences and Engineering",Printice Hall of India Pvt Ltd.
6. G.R. Chatwal, "A Text book of Environmental Studies", Himalaya Publishing House
7. Gilbert M. Masters, and Wendell P. Ela, "Introduction to EnvironmentalEngineeringand Science", Printice Hall of India Pvt Ltd.

REFERENCE WEBSITE:

https://nptel.ac.in/courses/127/105/127105018/

https://nptel.ac.in/courses/113/104/113104061/

https://nptel.ac.in/courses/120/108/120108005/

https://nptel.ac.in/courses/120/108/120108002/

II B.Tech. - IV Semester

23HSM234	UNIVERSAL HUMAN VALUES –UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT	L	T	P	C
	(Common to All Branches)	2	1		3

Course Objectives:

1. To help the students appreciate the essential complementary between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.

2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.

3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutuallyenriching interaction with Nature.

Course Topics

The course has 28 lectures and 14 tutorials in 5 modules. The lectures and tutorials are of 1- hour duration. Tutorial sessions are to be used to explore and practice what has been proposed during the lecture sessions.

The Teacher's Manual provides the outline for lectures as well as practice sessions. The teacher is expected to present the issues to be discussed as propositions and encourage the students to have a dialogue.

UNIT I   Introduction to Value Education (6 lectures and 3 tutorials for practicesession)
Lecture 1: Right Understanding, Relationship and Physical Facility (HolisticDevelopment 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
Lecture4: Continuous Happiness and Prosperity – the Basic HumanAspirations
Tutorial 2: Practice Session PS2 Exploring Human ConsciousnessLecture 5: Happiness and Prosperity – Current Scenario.

Lecture 6: Method to Fulfill the Basic Human Aspirations

Tutorial 3: 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 thebody.
Lecture 8: Distinguishing between the Needs of the self and the body
Tutorial 4: Practice Session PS4 Exploring the difference of Needs of self andbody.

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 selfLecture 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 practicesession)
Lecture 13: Harmony in the Family – the Basic Unit of Human InteractionLecture 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 RelationshipLecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session PS9 Exploring Systems to fulfil Human Goal

UNIT IV   Harmony in the Nature/Existence (4 lectures and 2 tutorials for practicesession)
Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, self-regulation and Mutual Fulfilment amongthe Four Orders of Nature
Tutorial 10: Practice Session PS10 Exploring the Four Orders of NatureLecture 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 (6lectures 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 andUniversal 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 towardsUniversal Human Order

Practice Sessions for UNIT I – Introduction to Value
EducationPS1 Sharing about Oneself
PS2 Exploring Human
ConsciousnessPS3 Exploring
Natural Acceptance

Practice Sessions for UNIT II – Harmony in the
Human BeingPS4 Exploring the difference of Needs
of self and body
PS5 Exploring Sources of Imagination in
the selfPS6 Exploring Harmony of self with
the body

Practice Sessions for UNIT III – Harmony in the Family
and SocietyPS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal

Practice Sessions for UNIT IV – Harmony in the Nature
(Existence)PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at
ProfessionalEthics
PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

READINGS:
Textbook and Teachers Manual
a. The Textbook
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
b. The Teacher's Manual
R R Gaur, R Asthana, G P Bagaria,Teachers' Manual for A Foundation Course in Human
Values andProfessional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN
978-93-87034-53-2

Reference Books
1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Define the terms like natural acceptance ,Happiness and Prosperity. (L1,L2)	PO7
CO2	Identify One's self and one's surroundings family society nature. (L1, L2)	PO7
CO3	Apply what they have learnt to their own self in different day to day settings in real life. (L3)	PO8
CO4	Relate human values with human relationship and human society. (L4)	PO8
CO5	Justify the need for universal human values and harmonious existence. (L5) Develop as socially and ecologically responsible engineers. (L3,L6)	PO8

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	-	-	-	-	-	-	3	-	-	-	-	-
CO.2	-	-	-	-	-	-	3	-	-	-	-	-
CO.3	-	-	-	-	-	-	-	3	-	-	-	-
CO.4	-	-	-	-	-	-	-	3	-	-	-	-
CO.5	-	-	-	-	-	-	-	3	-	-	-	-
CO*	-	-	-	-	-	-	3	3	-	-	-	-

Mode of Conduct:

Lecture hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them.

Tutorial hours are to be used for practice sessions.

While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements.

In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self-observation, self-reflection and self-exploration.

Scenarios may be used to initiate discussion. The student is encouraged to take up "ordinary" situations rather than" extra-ordinary" situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting.

Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values.

It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, not exclusively by any one department.

Teacher preparation with a minimum exposure to at least one 8-day Faculty Development Program onUniversal Human Values is deemed essential.

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

6. https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3-S2A%20Und%20Nature-Existence.pdf

7. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%202023-25%20Ethics%20v1.pdf

8. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human-values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385

9. https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

B.TECH. - IV SEMESTER

23CSE241	OPERATING SYSTEMS	L T P C
		3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Understand the basic concepts and principles of operating systems, includingprocess management, memory management, file systems, and Protection.
2. Make use of process scheduling algorithms and synchronization techniques to achievebetter performance of a computer system.
3. Illustrate different conditions for deadlock and their possible solutions.

UNIT –1: OPERATING SYSTEMS OVERVIEW & SYSTEM STRUCTURES

(9)

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, Building and Booting an Operating System, Operating system debugging.

UNIT –2: PROCESSES, THREADS AND CONCURRENCY & CPU SCHEDULING   (9)

Processes: Process Concept, Process scheduling, Operations on processes, Inter-processcommunication.
Threads and Concurrency: Multithreading models, Thread libraries, Threading issues.
CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processorscheduling.

UNIT III: SYNCHRONIZATION TOOLS & DEADLOCKS   (9)

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 & STORAGE MANAGEMENT   (9)

Memory-Management Strategies: Introduction, Contiguous memory allocation, Paging,Structure of the Page Table, Swapping.
Virtual Memory Management: Introduction, Demand paging, Copy-on-write, Pagereplacement, Allocation of frames, Thrashing.
Storage Management: Overview of Mass Storage Structure, HDD Scheduling.

UNIT V: FILE SYSTEM& PROTECTION   (9)

File System: File System Interface, File concept, Access methods, Directory Structure, File system Implementation, File-system structure, File-system Operations, Directory implementation, Allocationmethod, Free space management, File-System Internals: File System Mounting, Partitions and Mounting, File Sharing.
Protection: Goals of protection, Principles of protection, Protection Rings, Domain of protection, Access matrix.

Total Hours: 45

COURSE OUTCOMES:

	On successful completion of the course the student will be	POs related to COs
CO1	Describe the basics of the operating systems, mechanisms of OS to handle processes, threads, and their communication. (L1)	PO1, PO2
CO2	Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection. (L2)	PO1, PO3, PO4
CO3	Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system. (L3)	PO1,PO2, PO3,PO4,PO5
CO4	Illustrate different conditions for deadlock and their possible solutions. (L2)	PO1, PO2, PO4
CO5	Analyze the memory management and its allocation policies. (L4)	PO1, PO4

TEXT BOOKS:
1. Operating System Concepts, Silberschatz A, Galvin P B, Gagne G, 10th Edition, Wiley, 2018.
2. Modern Operating Systems, Tanenbaum A S, 4th Edition, Pearson , 2016

REFERENCE BOOKS:
1. Operating Systems -Internals and Design Principles, Stallings W, 9th edition, Pearson, 2018
2. Operating Systems: A Concept Based Approach, D.M Dhamdhere, 3rd Edition, McGraw- Hill, 2013

REFERENCE WEBSITE:
1.https://nptel.ac.in/courses/106/106/106106144/
2. http://peterindia.net/OperatingSystems.html

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	-	3	3	-	-	-	-	-	-	-	-
CO3	2	2	3	2	3	-	-	-	-	-	-	-
CO4	2	2	-	3	-	-	-	-	-	-	-	-
CO5	3	-	-	2	-	-	-	-	-	-	-	-
CO*	**2.4**	**2**	**3**	**2.5**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

II B.Tech. - IV Semester

23CSE242	DATABASE MANGEMENT SYSTEM	L T P C
	(Common to CSE, CSM, CAI and CSD)	3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. Discuss the basic Database concepts and the applications, data models and ER Model.
2. Understand the Relational database design principles
3. Master the basics of SQL and construct queries using SQL.
4. Understand   the Normalization process in Database Management System.
5. Familiar with the basic issues of transaction processing and concurrency control.

UNIT –1: INTRODUCTION TO DATABASE MANAGEMENT SYSTEM AND ENTITY RELATIONSHIP MODEL   (9)

Database system - Characteristics (Database Vs File System) - Database Users - Advantages of Database systems - Database applications - Brief introduction of different Data Models - Concepts of Schema - Instance and data independence -Three tier schema architecture for data independence

- Database system structure environment - Centralized and Client Server architecture for the database - Introduction to Entity Relationship Model - Representation of entities - Attributes - Entity set – Relationship - Relationship set – Constraints - Sub classes - super class - Inheritance- Specialization -Generalization using ER Diagrams.

UNIT –2: RELATIONAL MODEL   (9)

Introduction to Relational model - Concepts of domain – Attribute – Tuple - Relation importance of null values - Constraints (Domain, Key constraints, integrity constraints) and their importance - Relational Algebra, Relational Calculus - BASIC SQL: Simple Database schema - Data Base Language - types- Table definitions (create, alter), different DML operations (insert, delete, update).

UNIT –3: INTRODUCTION TO STRUCTURED QUERY LANGUAGE   (9)

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, view (updatable and non-updatable) - Relational set operations.

UNIT –4: NORMALIZATION   (9)

Purpose of Normalization and schema refinement - Concept of functional dependency - normal forms based on functional dependency - Lossless join and dependency preserving decomposition (1NF, 2NF and 3 NF), concept of surrogate key - Boyce-Codd normal form(BCNF) - MVD - Fourth normal form(4NF) - Fifth Normal Form (5NF).

UNIT –5: TRANSACTION CONCEPT AND INDEXING CONCEPTS   (9)

Transaction State - ACID properties - Concurrent Executions – Serializability - Recoverability, Implementation of Isolation - Testing for Serializability - Lock based - Time stamp based optimistic
- Concurrency protocols – Deadlocks - Failure Classification - Storage, Recovery and

Atomicity - Recovery algorithm - Introduction to Indexing Techniques **-** B+ Trees, operations onB+Trees - Hash Based Indexing

Total Hours: 45

COURSE OUTCOMES:

On successful completion of the course, students will be able to		Pos
CO1	Demonstrate knowledge on Data models and Database Languages and Design Entity Relationship model for a database	PO1, PO3
CO2	Analyze the relational database theory, and be able to write relational algebra and relational calculus expressions for queries	PO1, PO2
CO3	Analyze and evaluate the database using SQL DML/DDL	PO1, PO2, PO3, PO5
CO4	Analyze databases using normal forms to provide solutions for real time applications	PO1, PO2
CO5	Understand the properties of transactions in a database system, analyze serializability and indexing techniques.	PO1, PO3,PO4

TEXT BOOKS:
1. Database Management Systems, 3rd edition, Raghurama Krishnan, Johannes Gehrke,TMH (For Chapters 2, 3, 4)
2. Database System Concepts,5th edition, Silberschatz, Korth, Sudarsan,TMH (ForChapter 1 and Chapter 5)

REFERENCE BOOKS:
1. Introduction to Database Systems, 8thedition, C J Date, Pearson.
2. Database Management System, 6th edition, RamezElmasri, Shamkant B. Navathe,Pearson
3. Database Principles Fundamentals of Design Implementation and Management,Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

REFERENCE WEBSITE:

1. https://www.w3schools.in/sql/database-concepts
2. https://www.javatpoint.com/dbms-tutorial
3. https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system- set-1/
4. https://nptel.ac.in/courses/106/105/106105175/
5. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_0127580666728 202 2456_shared/overview

CO-PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO.1	3	-	3	-	-	-	-	-	-	-	-	-
CO.2	3	3	-	-	-	-	-	-	-	-	-	-
CO.3	3	3	3	-	3	-	-	-	-	-	-	-
CO.4	3	3	-	-	-	-	-	-	-	-	-	-
CO.5	3	-	2	3	-	-	-	-	-	-	-	-
CO*	**3**	**3**	**2.6**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

23CSE243	SOFTWARE ENGINEERING	L T P C
		3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

1. To provide knowledge of basic software engineering methods, practices and their appropriate application.
2. To understand software requirements and the SRS documents.
3. To design components based on different software architectural styles and to Study the notations of Unified Modeling Language to identify, analyze, and model structural and behavioral concepts of the system.
4. To understanding of approaches to verification and validation including static analysis, and Reviews.
5. To describe software measurement and software risks.

UNIT –1: INTRODUCTION (9)
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 applicationdevelopment, Agile development model, Spiral model.

UNIT –2: SOFTWARE PROJECT MANAGEMENT & REQUIREMENTS ANALYSIS AND SPECIFICATION (9)
Software Project Management: Software project management complexities, Responsibilities ofa software project manager, Metrics for project size estimation, Project estimation techniques, Empirical Estimation techniques, COCOMO, Halstead's software science, risk management.

Requirements Analysis And Specification: Requirements gathering and analysis, Software Requirements Specification (SRS), Formal system specification, Axiomatic specification, Algebraic specification, Executable specification and 4GL.

UNIT III: SOFTWARE DESIGN & AGILITY & FUNCTION-ORIENTED SOFTWARE DESIGN & USER INTERFACE DESIGN (9)
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 & SOFTWARE RELIABILITY AND QUALITY MANAGEMENT (9)
Coding And Testing: Coding, Code review, Software documentation, Testing, Black-box testing, White-Box testing, Debugging, Program analysis tools, Integration testing**,** Testing object- orientedprograms, Smoke testing, and Some general issues associated with testing.
Software Reliability And Quality Management: Software reliability. 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 & SOFTWARE MAINTENANCE & SOFTWARE REUSE   (9)
Computer-Aided Software Engineering (Case): CASE and its scope, CASE environment,
CASE support in the software life cycle, other characteristics of CASE tools, Towards secondgeneration 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 inany reuse program, A reuse approach, and Reuse at organization level.

                                        Total Hours: 45
COURSE OUTCOMES:

On successful completion of the course the student will be	POs related to COs
CO1 Identify the key activities in managing a software project and can compare different process models.	PO1, PO2
CO2 Identify software requirements and design SRS document by analyzing the data flows.	PO1, PO3, PO4
CO3 Design class based components and conduct component level design based on architectural styles and patterns. Represent classes, responsibilities and states using UML notation and model structural concepts of the system. Model behavioral concepts of the system and analyze and document the requirements through use case driven approach	PO1,PO2, PO3,PO4,PO5
CO4 Identify various types of testing and development metrics for various phases of software development.	PO1, PO2, PO4
CO5 Identify the software risks and analyze the quality assurance activities, Represent classes,responsibilities and states using UML notation and model structural concepts of the system	PO1, PO4

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

REFERENCE BOOKS:
1. Software Engineering, Ian Sommerville,10th 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_012605895063871 48827_shared/overview
3) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_013382690411003 904735_shared/overview

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	2	-	3	3	-	-	-	-	-	-	-	-
CO3	2	2	3	2	3	-	-	-	-	-	-	-
CO4	2	2	-	3	-	-	-	-	-	-	-	-
CO5	3	-	-	2	-	-	-	-	-	-	-	-
CO*	2.4	2	3	2.5	3	-	-	-	-	-	-	-

II B.TECH - IV SEMESTER

23CSE244   **OPERATING SYSTEMS LAB**   **L T P C**
                                                        3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:
1. Provide insights into system calls, file systems, semaphores,
2. Develop and debug CPU Scheduling algorithms, page replacement algorithms, thread implementation
3. Implement Bankers Algorithms to Avoid the Dead Lock

EXPERIMENTS COVERING THE TOPICS:
- UNIX fundamentals, commands & system calls
- CPU Scheduling algorithms, thread processing
- IPC, semaphores, monitors, deadlocks
- Page replacement algorithms, file allocation strategies
- Memory allocation strategies

SAMPLE EXPERIMENTS:

1. Practicing of Basic UNIX Commands.
2. Write programs using the following UNIX operating system calls
   fork, exec, getpid, exit, wait, close, stat, opendir and readdir
3. Simulate UNIX commands like cp, ls, grep, etc.,
4. Simulate the following CPU scheduling algorithms
   - a) FCFS
   - b) SJF
   - c) Priority
   - d) Round Robin
5. Control the number of ports opened by the operating system with
   - a) Semaphore
   - b) Monitors.
6. Write a program to illustrate concurrent execution of threads using pthreads library.
7. Write a program to solve producer-consumer problem using Semaphores.
8. Implement the following memory allocation methods for fixed partition
   - a) First fit
   - b) Worst fit
   - c) Best fit
9. Simulate the following page replacement algorithms
   - a) FIFO
   - b) LRU
   - c) LFU
10. Simulate Paging Technique of memory management.
11. Implement Bankers Algorithm for Dead Lock avoidance and prevention
12. Simulate the following file allocation strategies
    - a) Sequential
    - b) Indexed
    - c) Linked

COURSE OUTCOMES:

On successful completion of the course the student will be		POs related to COs
CO1	Trace different CPU Scheduling algorithms (L2).	PO1, PO2
CO2	Implement Bankers Algorithms to Avoid the Dead Lock (L3).	PO1, PO3, PO4
CO3	Evaluate Page replacement algorithms (L5).	PO1,PO2, PO3,PO4,PO5
CO4	Illustrate the file organization techniques (L4).	PO1, PO2, PO4
CO5	Illustrate Inter process Communication and concurrent execution of threads (L4)	PO1, PO4

REFERENCES:
1. Operating System Concepts, Silberschatz A, Galvin P B, Gagne G, 10th Edition, Wiley, 2018.
2. Modern Operating Systems, Tanenbaum A S, 4th Edition, Pearson, 2016
3. Operating Systems -Internals and Design Principles, Stallings W, 9th edition, Pearson, 2018
4. Operating Systems: A Concept Based Approach, D.M Dhamdhere, 3rd Edition, McGraw-Hill, 2013

REFERENCE WEBSITE:
1. https://www.cse.iitb.ac.in/~mythili/os/
2. http://peterindia.net/OperatingSystems.html

CO-PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	3	-	-	3	3	3	-	3

II B.Tech. - IV Semester

23CSE245	DATABASE MANAGEMENT SYSTEMS LAB	L T P C
	(Common to CSE, CSM, CAI, CSD)	3 0 0 3

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

This Course will enable students to
1. Populate and query a database using SQL DDL/DML Commands
2. Declare and enforce integrity constraints on a database
3. Writing Queries using advanced concepts of SQL
4. Programming PL/SQL including procedures, functions, cursors and triggers

EXPERIMENTS COVERING THE TOPICS:
1. DDL, DML, DCL commands
2. Queries, nested queries, built-in functions,
3. PL/SQL programming- control structures
4. Procedures, Functions, Cursors, Triggers,
5. Database connectivity- ODBC/JDBC

EXPERIMENTS :

1. Creation, altering and droping of tables and inserting rows into a table (use constraintswhile creating tables) examples using SELECT command.

2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.

3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVINGand Creation and dropping of Views.

4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc,round, to_char, to_date)

5. i. Create a simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
ii. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

6. Develop a program that includes the features NESTED IF, CASE and CASE expression. Theprogram can be extended using the NULLIF and COALESCE functions.

7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE1APPLICATION ERROR.

8. Programs development using creation of procedures, passing parameters IN and OUT ofPROCEDURES.

9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.

10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.

11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

12. Create a table and perform the search operation on table using indexing and non1indexing techniques.

13. Write a Java program that connects to a database using JDBC

14. Write a Java program to connect to a database using JDBC and insert values into it

15. Write a Java program to connect to a database using JDBC and delete values from it

REFERENCE BOOKS:
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. Ramez Elmasri, Shamkant, B. Navathe," Database Systems,", Pearson Education, 6th Edition,2013.

5. Database Principles Fundamentals of Design Implementation and Management,10 th edition, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning,2022

REFERENCE WEBSITE:

1. https://www.scoopworld.in

2. https://vlabs.iitb.ac.in/vlabs-dev/labs/dblab/index.php

COURSE OUTCOMES:

	On successful completion of the course the student will be	POs
CO1	Demonstrate practical knowledge on creation and alteration of tables, insertion and Querying of data.	PO1
CO2	Analyze the database schemas for the different types of database	PO2
CO3	Design the databases using SQL DML/DDL Commands	PO3
CO4	Design the complex PL/SQL programs for different problems	PO4
CO5	Use the procedure, function, trigger and cursor concepts in PL/SQL	PO5
CO6	Follow the ethical principles in implementing the programs	PO8
CO7	Do experiments effectively as an individual and as a team member in a group.	PO9
CO8	Communicate verbally and in written form, the understanding about the experiments.	PO10
CO9	Continue updating their skill related to SQL Commands and Queries and implementing programs in future.	PO12

CO PO MAPPING:

CO-PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO*	3	3	3	3	3	-	-	3	3	3	-	3

II B.Tech. - IV Semester

		L	T	P	C
23CSE246	**FULL STACK DEVELOPMENT – 1**	**0**	**1**	**2**	**2**
	(Skill Enhancement Course)				
	(Common to CSE, CSM and CAI)				

PRE-REQUISITES: A course on Introduction to Programming

COURSE EDUCATIONAL OBJECTIVES:

- CO1: Design Websites.
- CO2: Apply Styling to web pages.
- CO3: Make Web pages interactive.
- CO4: Design Forms for applications.
- CO5: Choose Control Structure based on the logic to be implemented.
- CO6: Understand HTML tags, Attributes and CSS properties

TRADE FOR EXERCISES:

1. LISTS, LINKS AND IMAGES

a. Write a HTML program, to explain the working of lists.
   Note: It should have an ordered list, unordered list, nested lists and ordered list in an unorderedlist and definition lists.

b. Write a HTML program, to explain the working of hyperlinks using <a> tag and href, target Attributes.

c. Create a HTML document that has your image and your friend's image with a specific height andwidth. Also when clicked on the images it should navigate to their respective profiles.

d. Write a HTML program, in such a way that, rather than placing large images on a page, the preferred technique is to use thumbnails by setting the height and width parameters to somethinglike to 100*100 pixels. Each thumbnail image is also a link to a full sized version of the image. Create an image gallery using this technique

2. HTML TABLES, FORMS AND FRAMES

- Write a HTML program, to explain the working of tables. (use tags: <table>, <tr>, <th>,<td> and attributes: border, rowspan, colspan)

- Write a HTML program, to explain the working of tables by preparing a timetable. (Note: Use <caption> tag to set the caption to the table & also use cell spacing, cell padding, border, rowspan, colspan etc.).

- Write a HTML program, to explain the working of forms by designing Registration form. (Note: Include text field, password field, number field, date of birth field, checkboxes, radio buttons, list boxes using <select>&<option> tags, <text area> and two buttons ie: submit and reset. Use tables to provide a better view).

- Write a HTML program, to explain the working of frames, such that page is to be divided into 3 parts on either direction. (Note: first frame image, second frame paragraph, third frame □ hyperlink. And also make sure of using "no frame" attribute such that frames tobe fixed).

3. HTML 5 AND CASCADING STYLE SHEETS, TYPES OF CSS

a. Write a HTML program, that makes use of <article>, <aside>, <figure>, <figcaption>, <footer>, <header>, <main>, <nav>, <section>, <div>, <span> tags.

b. Write a HTML program, to embed audio and video into HTML web page.

c. Write a program to apply different types (or levels of styles or style specification formats) - inline, internal, external styles to HTML elements. (identify selector, property andvalue).

4. SELECTOR FORMS

a. Write a program to apply different types of selector forms
- Simple selector (element, id, class, group, universal)
- Combinator selector (descendant, child, adjacent sibling, general sibling)
- Pseudo-class selector
- Pseudo-element selector
- Attribute selector

5. CSS WITH COLOR, BACKGROUND, FONT, TEXT AND CSS BOX MODEL

a. Write a program to demonstrate the various ways you can reference a color in CSS.
b. Write a CSS rule that places a background image halfway down the page, tilting it horizontally. The image should remain in place when the user scrolls up or down.
c. Write a program using the following terms related to CSS font and text:

   i. font-size　　　ii. font-weight　　　iii. font-style

   iv. text-decoration　v. text-transformation　vi. text-alignment
d. Write a program, to explain the importance of CSS Box model using

   i. Content　　ii. Border　　iii. Margin　　iv. Padding

6. APPLYING JAVASCRIPT - INTERNAL AND EXTERNAL, I/O, TYPE CONVERSION

a. Write a program to embed internal and external JavaScript in a web page.
b. Write a program to explain the different ways for displaying output.
c. Write a program to explain the different ways for taking input.
d. Create a webpage which uses prompt dialogue box to ask a voter for his name and age.Displaythe information in table format along with either the voter can vote or not

7. JAVASCRIPT PRE-DEFINED AND USER-DEFINED OBJECTS

a. Write a program using document object properties and methods.
b. Write a program using window object properties and methods.
c. Write a program using array object properties and methods.
d. Write a program using math object properties and methods.
e. Write a program using string object properties and methods.
f. Write a program using regex object properties and methods.
g. Write a program using date object properties and methods.
h. Write a program to explain user-defined object by using properties, methods, accessors, constructors and display.

8. JAVASCRIPT CONDITIONAL STATEMENTS AND LOOPS

a. Write a program which asks the user to enter three integers, obtains the numbers from the userand outputs HTML text that displays the larger number followed by the words "LARGER NUMBER"in an information message dialog. If the numbers are equal, output HTML text as "EQUAL NUMBERS".
b. Write a program to display week days using switch case.
c. Write a program to print 1 to 10 numbers using for, while and do-while loops.
d. Write aprogram to print data in object using for-in, for-each and for-of loops
e. Develop a program to determine whether a given number is an 'ARMSTRONG NUMBER' or not. [Eg: 153 is an Armstrong number, since sum of the cube of the digits is equal to the number i.e.,13 + 53+ 33 = 153]

f. Write a program to display the denomination of the amount deposited in the bank in terms of 100's, 50's, 20's, 10's, 5's, 2's & 1's. (Eg: If deposited amount is Rs.163, the output should be 1-100's, 1-50's, 1- 10's, 1-2's & 1-1's)

9. JAVASCRIPT FUNCTIONS AND EVENTS

a. Design a appropriate function should be called to display
   ● Factorial of that number
   ● Fibonacci series up to that number
   ● Prime numbers up to that number
   ● Is it palindrome or not
b. Design a HTML having a text box and four buttons named Factorial, Fibonacci, Prime, and Palindrome. When a button is pressed an appropriate function should be called to display
   11. Factorial of that number
   12. Fibonacci series up to that number
   13. Prime numbers up to that number
   14. Is it palindrome or not
c. Write a program to validate the following fields in a registration page
   i. Name (start with alphabet and followed by alphanumeric and the length should not beless than 6 characters)
   ii. Mobile (only numbers and length 10 digits)
   iii. E-mail (should contain format like xxxxxxx@xxxxxx.xxx)

TEXT BOOKS:

1. Programming the World Wide Web, 7th Edition, Robet W Sebesta, Pearson, 2013.
2. Web Programming with HTML5, CSS and JavaScript, John Dean, Jones & Bartlett Learning, 2019 (Chapters 1-11).
3. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, andNode, Vasan Subramanian, 2nd edition, APress, O'Reilly.

REFERENCE BOOKS:

-Nil-

REFERENCE WEBSITE:

1. https://www.w3schools.com/html
2. https://www.w3schools.com/css
3. https://www.w3schools.com/js/
4. https://www.w3schools.com/nodejs
5. https://www.w3schools.com/typescript

COURSE OUTCOMES:

	On successful completion of the course the student will be	POs related to COs
CO1	Demonstrate knowledge on web page design elements	PO1
CO2	Analyze user requirements to develop web applications.	PO2
CO3	Design client-server applications using web technologies.	PO3
CO4	Manually Test the functionality of the web application	PO4
CO5	select appropriate design tools and procedure to implement web applications	PO5
CO6	Follow ethical principles in designing, and implementing various Technologies.	PO8
CO7	Do experiments effectively as an individual and as a member in a group.	PO9
CO8	Communicate verbally and in written form, the understandings about the experiments	PO10
CO9	Continue updating their skill related to various web technologies for implementation of various web applications during their life time	PO12

CO PO MAPPING:

CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	-
CO3	-	-	3	-	-	-	-	-	-	-	-	-
CO4	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	3	-	-	-	-
CO7	-	-	-	-	-	-	-	-	3	-	-	-
CO8	-	-	-	-	-	-	-	-	-	3	-	-
CO9	-	-	-	-	-	-	-	-	-	-	-	3
CO	3	3	3	3	3	-	-	3	3	3	-	3

II B.Tech. - II Semester

23ESC241	DESIGN THINKING AND INNOVATION	L	T	P	C
	(Common to All Branches)	2	-	2	3

PRE-REQUISITES: DESIGN THINKING OF INNOVATION

COURSE OBJECTIVES:

The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcomes:
1. Define the concepts related to design thinking. (L1, L2)
2. Explain the fundamentals of Design Thinking and innovation (L1, L2)
3. Apply the design thinking techniques for solving problems in various sectors. (L3)
4. Analyse to work in a multidisciplinary environment (L4)
5. Evaluate the value of creativity (L5)
6. Formulate specific problem statements of real time issues (L3, L6)

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 productdesign.

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.

Textbooks:
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. Shrutin 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 Learning Resources:
https://nptel.ac.in/courses/110/106/110106124/
https://nptel.ac.in/courses/109/104/109104109/
https://swayam.gov.in/nd1_noc19_mg60/preview