SEMESTER – VI			
Course Name	**: Technical Proficiency Enhancement Course 4 For ECE, EEE, ME and Civil Branch**	**Course Code :**	
Number of Lecture Hours / Week	**: 02**	**CIE Marks :**	**50**
Number of Tutorial / Practical Hours / Week	**:**	**SEE Marks :**	**50**
Total Number of Lecture + Tutorial/Practical Hours	**: 30**	**SEE Duration :**	**03 Hours**
L:T:P	**:**	**CREDITS :**	**03**

COURSE PREREQUISITES: Working knowledge of C and C++ Programming

COURSE OVERVIEW: This course is designed to enhance an individual's problem-solving, analytical, and critical thinking skills. It is often a crucial component of career development, competitive exams, and job recruitment processes.

COURSE LEARNING OBJECTIVES (CLO) :

1. Develop Problem Solving Skills.
2. Enhance Technical Skills.
3. Prepare students for job recruitment process and competitive exams.

MODULES	TEACHING HOURS
MODULE 1: Advanced Data Structures 1 **Priority Queues:** Introduction to Priority Queues, Ways to implement priority queues, Introduction to heaps, Introduction to Complete Binary Trees and its implementation, Insert and Delete operations in heaps, Implementing priority queues, Heap sort, Inbuilt Priority Queue.	**6**
MODULE 2: Advanced Data Structures 2	**6**

Hashmaps: Introduction to Hashmaps, Inbuilt Hashmap, Hash functions, Collision handling, Insert and Delete operation implementation in hashmap, Load factor, Rehashing.	
MODULE 3: Advanced Data Structures 3 **Tries:** Introduction to Tries, Making a Trie Node class, Insert, Search and Remove operation implementation in Tries, Types of Tries, Huffman coding. **Graphs:** Introduction to Graphs, Graph Terminology, Graph implementation, Graph Traversals (DFS and BFS), Weighted and Directed Graphs, Minimum Spanning Trees, Cycle Detection in Graphs, Kruskal's algorithm, Prim's Algorithm, Dijkstra's algorithm.	**6**
MODULE 4: Dynamic Programming 1 **Introduction to Dynamic Programming:** Introduction to Memoization, Introduction to Dynamic Programming, Fibonacci numbers using recursion, memoization and dynamic programming.	**6**
MODULE 5: Dynamic Programming 2 **Applications of Dynamic Programming:** Longest Common Subsequence (LCS) using recursion, memoization and dynamic programming, Edit distance using recursion, memoization and dynamic programming, Knapsack problem using recursion, memoization and dynamic programming.	**6**

Textbooks:

1.

Reference Books:

1. Data Structures and Algorithms Made Easy by Narasimha Karumanchi
2. Data Structures through C in Depth by by S K Srivastava and Deepali Srivastava

COURSE OUTCOMES (COs):
Upon completion of the course, students will be able to

CO1	Students will be able to analyze and solve complex problems efficiently using logical and structured approaches.
CO2	Students will develop critical thinking skills, enabling them to evaluate information and make sound decisions.

CO3	Students will be well-prepared to handle technical related questions during job interviews and assessment tests.

CO – PO – PSO Matrix

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2															
CO3															
CO4															
CO															