EE-609: Data Structure

Credit	L	T	P
3	**2**	**1**	**-**

UNIT-I
Introduction, Types and characteristics of Data structures, Abstract Data Type (ADT), Algorithm Concepts, Definition of Algorithm, Objectives of algorithms, Space complexity and Time complexity of algorithm, Arrays: Characteristics of an array, Implementation of 1-D arrays, Row and Column Major Implementations of 2-D, 3-D and n-D arrays.

UNIT II
Stacks: Basic concepts, operations on stack, Stack implementation using array, Applications of Stack: Polish and reverse Polish notations, Evaluating a Postfix expression, conversion of an expression from Infix to Postfix, Recursion, Queue: Introduction, Operations on queue, and types of queues: Linear Queue, Circular Queue, Priority Queue, and Double Ended Queue, Queue implementation.

UNIT III
Linked Lists: Concept of a Linked List, Inserting and removing nodes from the list, Linked implementation of stack and queues. Array implementation of lists, Linear, Single and Double lists, Circular Single and Double List, Generalized Linked List, Header Linked list.

UNIT IV
Trees: Concepts of a Tree, Binary trees, Strictly Binary Tree, Complete Binary Tree, Almost Complete Binary Tree, Weight of a tree, Level of a node, Height/Depth of a Tree. Operations on tree, Tree Search Algorithms, Binary Search Tree, Tree traversal Algorithms, AVL Trees - Balance of a node, Weight Balanced Trees. Tree implementation.

UNIT V
Graphs: vertex and edge, Types of graphs – directed/undirected, connected/disconnected, cyclic/acyclic, Representation of graphs: Adjacency matrix, linked list implementation. Searching and sorting techniques: Linear Search, Binary Search. Bubble Sort, Sequential Sort, Shell Sort, Selection Sort, Insertion Sort, Merge Sort, Quick Sort, Heap Sort techniques.

Note: Implementation can be done using C/C++.

TEXT/REFFERENCE BOOKS

1. Yedidyah Langsam, Moshe J. Augenstein, Aaron M. Tenenbaum, “Data Structures Using C & C++”, PHI, Second Edition.
2. D. Samanta, “Classic Data Structures”, PHI.
3. S. Lipshutz, “ Data Structures” , Schaum outline series, Tata Mc-graw Hill.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Cliff Stein “Introduction to Algorithms”, McGraw Hill, Second Edition.