AIT 121   DATA STRUCTURE THROUGH C   3(2+1)

UNIT I
Concepts of Data Structure & Algorithms Analysis
Need and importance of data structure, types of Data structure, operations on data structure, complexity analysis of algorithms, recursion. Dynamic Memory Allocation.

UNIT II
Linear Data structures
Arrays– row and columnar representation of Array– Sparse Array–Dynamic memory allocation–Stack and its applications, PUSH POP, PEEP and CHANGE operations–Queues and its applications– Types of Queue– creation, insertion, deletion and search operations in queue.

UNIT III
Linked lists
Introduction to linked lists- Singly, doubly and circularly linked lists–sorted linked list, algorithms for creation, insertion, deletion and search

UNIT IV
Searching
Concepts, programming and operations of simple search & binary search– Concepts, programming and applications of hashing technique.
Sorting
Analysis of simple sorting techniques such as linear sort, bubble sort, insertion sort, selection sort, quick sort, heap sort and merge sort.

UNIT V
Trees and graphs (Non-Linear Data structures)
Introduction to graphs representation – Traversal-Depth first search, Breadth first search - Adjacency matrix and list representation – Tree-Shortest path, minimum spanning tree –Tree- all pairs Shortest Path, Transitive Closer, Splay Trees – Binary Trees - Representation – operations: insert, delete – Traversal – preorder, inorder, postorder. N-ary trees: Definitions, balanced tree, definitions of B-tree.

Practical
1. Explain & Practice of Recursive Functions.
2. Explain & Practice of Array, row and columnar representation of Array.
3. Explain & Practice of Sparse Array.
4. Explain & Practice of pointers and Dynamic memory allocation.
5. Explain & Practice of Stack and its operations.
6. Explain & Practice of Queue and its operations.
7. Explain & Practice of Linked list and its operations.
8. Explain & Practice of Doubly Linked list and its operations.
9. Explain & Practice of Linear search and Binary Search.
10. Explain & Practice of Linear, bubble, Selection, Insertion, Quick, Shell, Merge and Heap sort.
11. Explain & Practice of Trees and traversal methods.

Reference Books
1. Data Structure – By Tanenbaum, Tata McGraw Hill.
2. Data structure Using C –By Yashwant Karnetkar.
3. DATA STRUCTURES AND ALGORITHMS: CONCEPTS, TECHNIQUES AND APPLICATIONS - G. A. V. PAI.