

**Objective(s)**

The student of this course will get acquainted with different types of data structure and various ways of collecting and organizing data in such a way that operations on these data can be performed effectively and efficiently.

**UNIT I Concepts of Data Structure & Algorithm Analysis**

Need and importance of data structure, types of Data structure, operations on data structure, complexity analysis of algorithms, recursion.

**UNIT II Linear Data structures**

Arrays– row and columnar representation of Array–Dynamic memory allocation–Stack and its applications, PUSH POP, PEEK 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 – Concepts, programming and applications of pattern matching.

**UNIT V Sorting**

Analysis of simple sorting techniques such as linear sort, shell sort, bubble sort, insertion sort, selection sort, quick sort, heap sort and merge sort.

**UNIT VI Trees and Graphs**

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, Binary Trees - Representation – operations: insert, delete – Traversal – preorder, inorder, postorder. N-ary trees: Balanced tree, B-tree, insertion, deletion and search algorithm of B-trees; B-tree based keyed access to records in a file.

**Reference Book(s)**

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.

**Practical(s)**

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