

**CORE COURSE V - DATA STRUCTURES AND ALGORITHMS**

**UNIT I:**

Elementary Data Organization, Data structures, data Structure Operations, Algorithm: Complexity, Time Space Trade off. Mathematical Notation and Functions, Algorithm Notation, control Structures, Complexity of algorithms, Sub algorithm, Variables, Word Processing, Pattern Matching Algorithms.

**UNIT II:**

Linear arrays, Representation of Linear Arrays in Memory, Traversing Linear Arrays, Inserting and Deleting, Sparse Matrices, Linked List, Representation of Linked Lists in Memory, Traversing a Linked List, Memory Allocation: Garbage collection, Insertion into a Linked List, Deletion from a Linked List, Header Linked List, Two-way Lists.

**UNIT III**

Stacks, Arrays Representation of Stacks, Arithmetic Expressions; Polish Notation Quick sort, on Application of Stacks, Recursion, Tower of Hanoi, Implementation of Recursive procedure by Stacks, Queues, Deques, Priority Queues, Binary Trees, Traversing Algorithms Using Stacks, Header Notes: Threads, Binary Search Trees, Searching and inserting in Binary Search Tree.

**UNIT IV**

Graph Theory Terminology, Sequential Representation of Graphics ; Adjacency Matrix; Path matrix, Warshall's Algorithm: Shortest Paths, Linked Representation of a graph, Operations on Graph, Posets; Topological Sorting.

**UNIT V**

Greedy method – General Method -Knapsack problem, Dynamic programming-General Method - Multistage Graphs-Backtracking – General Method – 8 Queens Problem.

**Text Books:**

1. Seymour Lipschutz “Theory and problem of data Structure”, Tata McGraw Hill International Edition, 3<sup>rd</sup> Reprint , 2003.
2. E. Howrowitz and Sahni, “Fundamentals fo Computer Algorithms”, Galgotia Publications, 1998.