

ADVANCED DATA STRUCTURE AND ALGORITHM

Internal Assessment: 50

Full Marks: 100

Theory Credit: 04

MODULE-I:

Heap Structure: Min-Max heap, Leftist heaps, Binomial heaps, Fibonacci heaps, Skew heaps, Lazy binomial heaps, Deap Data structure.

MODULE-II:

Search and Multimedia Structure: Binary Search Tree, AVL Tree, 2-3 Tree, B-Tree, B+ Tree, Red-Black Tree, Segment Tree, k-d Tree, Point Quad Trees, R-Tree, TV-Tree.

MODULE-III:

Asymptotic Notations, Dynamic Programming (LCS, Floyd-Warshall Algorithm, Matrix Chain Multiplication), Greedy Algorithm (Single Source Shortest Path, Knapsack problem, Minimum Cost Spanning Trees), Geometric Algorithm (Convex hulls, Segment Intersections, Closest Pair), Internet Algorithm (Tries, Ukonnen's Algorithm, Text pattern matching), Numerical Algorithm (Integer, Matrix and Polynomial multiplication, Extended Euclid's algorithm)

MODULE-IV:

Polynomial Time, Polynomial-Time Verification, NP Completeness & reducibility, NP Completeness proofs, Cook's theorem

Reference Books:

1. T. H. Cormen, C. E. Leiserson, and R. L. Rivest, "Introduction to Algorithms", PHI.
2. E. Horowitz, S. Sahani and Dinesh Mehta, Fundamentals of Data Structures in C++, 2nd Ed, University Press.
3. Mark Allen Weiss, "Data Structures & Algorithm Analysis in C/C++", Pearson Edu. India.
4. Adam Drozdex, Data Structures and algorithms in C++, Thomason learning.