

# **Design Analysis of Algorithm Syllabus**

## **UNIT I (7 Hours)**

Basics of Algorithms and Mathematics: - Introduction to an algorithm. The efficient algorithm, Average, Best and worst-case analysis of Time Complexity and Space Complexity. Asymptotic Notations.

Divide and Conquer Algorithm: Binary Search, Merge Sort, Max-Min problem, Multiplying Large Integers Problem, Strassen's Matrix Multiplication.

## **UNIT II (8 Hours)**

Greedy Algorithm: - General Characteristics, Activity selection problem, Job Scheduling Problem,

Fractional Knapsack Problem, Minimum Cost Spanning trees (Kruskal's algorithm, Prim's algorithm), Huffman Coding, Dijkstra Shortest Path Algorithm.

## **UNIT III (8 Hours)**

Dynamic Programming: - Introduction, The Principle of Optimality, All Pair Shortest path(Floyd-Warshall), Matrix chain multiplication 0/1 Knapsack, Optimal Binary Search Tree, Travelling Salesman Problem.

## **UNIT IV (8 Hours)**

Backtracking: - Introduction, N-Queen's problem, Graph Coloring, Hamiltonian Cycle, sum of subsets.

String Matching: - Introduction, The naive string-matching algorithm, The Rabin Karp algorithm, The Knuth Morris-Pratt algorithm.

## UNIT V(5 Hours)

Approximation algorithms: Vertex Cover Approximation, Travelling Salesman problem,

Set Cover Problem.

Introduction to NP-Completeness: - The class P and NP, Polynomial reduction, NP Completeness Problem, NP-Hard Problem.