

Design & Analysis of Algorithm
IT 803C
Credit: 3

Models of computation : Random Access Machine, Relationship between Turing Machine and RAM, Time and Space Complexity.

Complexity analysis : Asymptotic notations, Recurrence for divide and conquer and its solution, Merge sort, Heap sort, Quick sort and their complexity.

Dynamic Programming : Basic method, Matrix-chain multiplication, All pair shortest paths, Singlesource shortest path, Travelling Salesman problem.

Greedy Method : Basic method, Knapsack problem, Job sequencing with deadlines, Minimum spanning tree by Prim's and Kruskal's algorithms.

Disjoint Set Manipulation : Set manipulation algorithm like UNION-FIND, Union by rank, Path compression.

Graph Traversal Algorithms : BFS and DFS, Backtracking and its use in solving Knapsack and Eight queens problem.

Matrix Manipulation Algorithms : Strassen's Matrix-multiplication algorithm and its applications in Solution of simultaneous linear equations using LUP decomposition, Inversion of Matrix and Boolean Matrix multiplication.

Notion of NP-completeness : P class, NP-hard class, NP-complete class, Circuit Satisfiability problem.

Approximation Algorithms : Vertex cover problem, Travelling salesman problem, Set covering problem.