

# Vidyalankar

S.E. Sem. IV [CMPN]  
Analysis of Algorithm & Design

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## SYLLABUS

Time : 3 Hrs.

Theory : 100 Marks  
Term Work : 25 Marks  
Practical & Oral : 25 Marks

### 1. Introduction to analysis of algorithm :

Design and analysis fundamentals; Performance analysis space and time complexity; Growth of function – Big–Oh, Omega, theta notation; Mathematical background for algorithm analysis; Randomized and recursive algorithm.

### 2. Divide and Conquer :

General method, Binary search, finding the min and max; Merge sort analysis; Quick sort, performance measurement; Randomized version of quick sort and analysis; Partitioned algorithm selection sort, radix sort, efficiency considerations; Strassen's matrix multiplication.

### 3. Greedy Method :

General method; Knapsack problem; Minimum cost spanning tree-kruskal and primal algo, performance analysis; Single source shortest path; Job sequencing with deadlines; Optimal storage on tapes.

### 4. Dynamic Programming :

The general method; Multistage graphs, all pair shortest paths, single source shortest paths; Optimal BST 0/1 knapsack; TSP, flow shop scheduling.

### 5. Backtracking :

The general method; 8 queen problem sum of subsets; Graph coloring hamiltonian cycles; Knapsack problem.

### 6. Branch and Bound :

The method, LC search; 15 puzzle : An example; Bounding and FIFO branch and bound; LC branch and bound; 0/1 knapsack problem; TP efficiency considerations.

### 7. Internet algorithm :

Strings and patterns matching algorithm; Tries; Text compression; Text similarity testing.

### References :

1. "Fundamentals of Computer Algorithms" (*Ellis horowitz, Sarataj Sahani, S. Rajsekar*) University press.
2. "Introduction to the Design and Analysis of Algorithms" (*Annay V. Levitin*) Pearson Education publication, Second Edition.
3. "Introduction to Algorithms" (*T. H. Cormen, C. E. Leiserson, R. L. Rivest and C. Stein*) 2<sup>nd</sup> Edition, MIT Press/McGraw Hill, 2001.
4. "Algorithm design foundation, analysis and internet examples" (*Michael Goodrich & Roberto Tamassia*) Second Edition, Wiley student Edition.
5. "Computer Algorithms " Introduction to Design and Analysis" (*S. Baase, S and A. Van Gelder*) 3<sup>rd</sup> edition. Addison Wesley, 2000.
6. "Algorithm : sequential, parallel and distributed" (*Kenneth berman, Jerome Paul*) Cengage Learning.
7. "Data Structure & Algorithm Analysis in C++" (*Mark Allen Weiss*) Third Edition, Pearson Education.

