

DESIGN AND ANALYSIS OF ALGORITHMS

Instruction 4 Periods per week

Duration of University Examination 3 Hours

University Examination 75 Marks

Sessional 25 Marks

UNIT-I

Introduction, Algorithm Specification, Performance analysis, Space Complexity, Time Complexity, Asymptotic Notation(O , Ω , Θ), Practical Complexities, Performance Measurement, Review of elementary data structure- Heap and Heap Sort, Hashing, Set representation. UNION, FIND.

UNIT-II

Divide-and Conquer: The general method, finding maximum minimum. Merge sort quick sort and selection.

Greedy Method: Knapsack problem, Optimal Storage on tapes, Job sequencing with deadlines, Optimal merge patterns, Minimum Spanning Trees.

UNIT-III

Dynamic Programming And Traversal Technique: Multistage graph, All Pair Shortest Path, Optimal Binary Search trees, 0/1 Knapsack, Reliability Design, Traveling Salesman Problem, Bi connected Components and Depth First Search.

UNIT-IV

Backtracking and Branch and Bounds: 8-Queens Problem, Graph Coloring Hamilton cycle, Knapsack Problem, 0/1 Knapsack Problem, Traveling salesperson problem, Lower-Bound Theory.

UNIT-V

NP-Hard and NP-Completeness: Basic concepts, cook's theorem, NP-hard graph problems and scheduling problem, NP-hard code generation

13 14

problems, Clique Decision problem, Node covering decision, Scheduling problem, NP hard code generation problem.

Suggested Reading:

1. Horowitz E. Sahani S: "*Fundamentals of Computer Algorithm*", Galgotia Publications.
2. Anany Levitin, "*Introduction to the Design & Analysis, of Algorithms*", Pearson Education, 2000.
3. Aho, Hopcroft, Ulman, "*The Design and Analysis of Computer Algorithm*", Pearson Education, 2000.
4. Parag H. Dave, Himanshu B. Dave "*Design and Analysis of Algorithms*" Pearson Education, 2008.