



**BIT 355**

**DESIGN AND ANALYSIS OF ALGORITHMS**

**UNIT-I**

**Introduction:** Algorithm Specification, Performance analysis, Space Complexity, Time Complexity, Asymptotic Notation(O, Omega, Theta), Practical Complexities, Performance Measurement, Review of elementary data structures, 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 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 generation problems, Decision problem, Node covering problem.

**Suggested Reading:**

1. Horowitz E. Sahani S: Fundamentals of Computer Algorithm, Second editon, University Press, 2007.
2. Anany Levitin, Introduction to the Design & Analysis, of Algorithms, Pearson Education, 2003.
3. Aho, Hopcroft, Ullman, 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.