DESIGN AND ANALYSIS OF ALGORITHMS   Credit : 3

1. Introduction : Algorithm, performance evaluation of algorithms, space & time complexity, notion of optimality. Lecture: 5

2. Divide and Conquer : Finding the maximum and minimum- Quick Sort – Selection- Strassen's matrix multiplication etc. Lecture : 4

3. Greedy Algorithm : Knapsack Problem, (Knapsack, Fractional Knapsack), Activity selection problem, Huffman's

Codes, Minimum Spanning Tree, Kruskal's Algorithm, prim's Algorithm, dijkstra's Algorithm, etc. Lecture : 6

4. Dynamic Programming : Knapsack problem DP solution, Activity selection problem DP solution. All pairs shortest paths, Travelling salesman problem. Lecture : 4

5. Randomized Algorithms and Amortized Analysis : Basics ideas of randomized Algorithms (Las Vegas and Monte Carlo

types), Simple examples (Randomized Quick sort and its analysis, Min-cut algorithm and its analysis), Amortized analysis and its significance (Illustration through examples). Lecture : 6

6. Graph Algorithms : Breadth First Search (BFS), Depth First Search (DFS), Strongly Connected Components. Euler

Tour, Minimum Spanning Tree, Kruskal's Algorithm. Prim's algorithm. Single Source Shortest Path. Lecture : 14

7. Introduction to NP-Completeness : Basic concepts. Lecture : 3

Text Books:

1. Introduction to Algorithm, 2e, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, PHI.

2. Beginning Algorithms by Simen Harris, James Ross, Wiley India.

3. Fundamentals of Computer Algorithms by E. Horowitz and S. Sahni, Galgotia.

4. Algorithms by Richard Johansonbaugh and Marcus Schaefer, Pearson Algorithm.

Reference Books :

1. The design and analysis of computer algorithms by A.V. Aho, J.E. Hopcroft and J.D Ullman, Pearson Education.

2. Algorithms – Introduction to Design & Analysis by S.Basse, Pearson Education

3. Algorithms and Complexity by H.S.Wilf, PHI.