PCS4I102 DESIGN AND ANALYSIS OF ALGORITHM

Module- I (10 Hours)

Introduction, Definition, Chrematistics of algorithm, Growth of Functions, Asymptotic analysis, Amortized analysis, standard notations and common functions, Recurrences, solution of recurrences by substitution, recursion tree, induction method, and Master methods, Algorithm design techniques, worst case analysis of Merge sort, Quick sort and Binary search, Design & Analysis of Divide and conquer algorithms.

Module – II (10 Hours)

Heapsort mechanism, Heaps, Building a heap, The heapsort algorithm, Priority Queue, Lower bounds for sorting. Dynamic programming methodology, Elements of dynamic programming, Matrix-chain multiplication, Longest common subsequence, Greedy Algorithms, Elements of Greedy strategy, Assembly-line scheduling, Activity selection Problem, Fractional knapsack problem, Huffman codes).

Module – III (10 Hours)

Data structure for disjoint sets, Disjoint set operations, Linked list representation, path compression, Disjoint set forests. Graph Algorithms and their characteristics, Breadth first search and depth-first search, Minimum Spanning Trees, Kruskal algorithm and Prim's algorithms, single- source shortest paths (Bellman-ford algorithm and Dijkstra's algorithms), All-pairs shortest paths (Floyd – Warshall Algorithm).

Module – IV (10 Hours)

Back tracking, Branch and Bound, Eight Queen problem, string matching algorithms, naïve string matching algorithm, Rabin-Karp algorithm, Knuth–Morris–Pratt algorithm, NP - Completeness (Polynomial time, Polynomial time verification, NP - Completeness and reducibility, NP-Complete problems (without Proofs), Approximation algorithms characteristics, Traveling Salesman Problem.

Text Book:

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest, C.Stein : **Introduction to Algorithms**, 2nd Edition, PHI Learning Pvt. Ltd.
2. H. Bhasin: **Algorithms, Design and Analysis**, First Edition, Oxford Higher Education.

Reference Books:

1. Sanjay Dasgupta, Umesh Vazirani: **Algorithms**, McGraw-Hill Education.
2. Horowitz & Sahani: **Fundamentals of Algorithm**, 2nd Edition, Universities Press.
3. Goodrich, Tamassia: **Algorithm Design**, Wiley India.