VL5009 DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS

DETAILED SYLLBUS

OBJECTIVES:

- To discuss the algorithmic complexity parameters and the basic algorithmic design techniques.
- To discuss the graph algorithms, algorithms for NP Completeness Approximation Algorithms and NP Hard Problems.

UNIT I INTRODUCTION

Polynomial and Exponential algorithms, big "oh" and small "oh" notation, exact algorithms and heuristics, direct / indirect / deterministic algorithms, static and dynamic complexity, stepwise refinement.

UNIT II DESIGN TECHNIQUES

Sub goals method, working backwards, work tracking, branch and bound algorithms for traveling salesman problem and knapsack problem, hill climbing techniques, divide and conquer method, dynamic programming, greedy methods.

UNIT III SEARCHING AND SORTING

Sequential search, binary search, block search, Fibonacci search, bubble sort, bucket sorting, quick sort, heap sort, average case and worst case behavior

UNIT IV GRAPH ALGORITHMS

Minimum spanning, tree, shortest path algorithms, R-connected graphs, Even's and Kleitman's algorithms, max-flow min cut theorem, Steiglitz's link deficit algorithm.

UNIT V SELECTED TOPICS

NP Completeness Approximation Algorithms, NP Hard Problems, Strasseu's Matrix Multiplication Algorithms, Magic Squares, Introduction to Parallel Algorithms and Genetic Algorithms, Monte-Carlo Methods, Amortised Analysis.

REFERENCES:

1. D.E.Goldberg, "Genetic Algorithms : Search Optimization and Machine Learning", Addison Wesley, 1989.

2. E Horowitz and S.Sahni, "Fundamentals of Computer Algorithms", Galgotia Publications, 1988.

3. Sara Baase, "Computer Algorithms: Introduction to Design and Analysis", Addison Wesley, 1988.

4. T. H. Cormen, C. E. Leiserson and R. L. Rivest, "Introduction to Algorithms", Mc Graw Hill, 1994.