

CSE206C DESIGN AND ANALYSIS OF ALGORITHMS
B. Tech. Semester – IV (Computer Science and Engg.)
w.e.f. 2019-2020

L	T	P	Credits	Class Work	: 25 Marks
3	0	0	3	Examination	: 75 Marks
				Total	: 100Marks
				Duration of Examination	: 3 Hours

Course Objectives:

1. To analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
2. To apply the algorithms and design techniques to solve problems.
3. To explain the major graph algorithms and their analyses and to employ graphs to model engineering problems.
4. To understand the concepts of tractable and intractable problems and the classes P, NP and NP-complete problems.

UNIT-I

Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

UNIT-II

Fundamental Algorithmic Strategies: Brute-Force, Greedy, Dynamic Programming, Branch-and-Bound and Backtracking methodologies for the design of algorithms; Illustrations of these techniques for Problem-Solving, Bin Packing, Knapsack TSP. Heuristics-characteristics and their application domains.

UNIT-III

Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms, Transitive closure, Minimum Spanning Tree, Topological sorting, Network Flow Algorithm.

UNIT-IV

Tractable and Intractable Problems: Computability of Algorithms, Computability classes – P, NP, NP-complete and NP-hard. Cook's theorem, Standard NP-complete problems and Reduction techniques.

Advanced Topics: Approximation algorithms, Randomized algorithms, Class of problems beyond NP – PSPACE