



**BONAM VENKATA CHALAMAYYA INSTITUTE OF
TECHNOLOGY AND SCIENCE (A) :: BATLAPALEM, Andhra
Pradesh, India**

**MCA Course Structure & Syllabus
(Applicable for batches admitted from 2025-2026)**

**MCAII Semester
Course code : 25MC2E01**

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DESIGN AND ANALYSIS OF ALGORITHMS

Course Objectives:

To analyze the asymptotic performance of algorithms

- To understand and write rigorous correctness proofs for algorithms.
- To familiarity with major algorithms and data structures
- Apply important algorithmic design paradigms and methods of analysis
- Synthesize efficient algorithms in common engineering design situations

UNIT-I:

Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis. Disjoint Sets- disjoint set operations, union and find algorithms, spanning trees, connected components and bi- connected components.

UNIT-II:

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Stassen's matrix multiplication. Greedy method: General method, applications-Job sequencing with deadlines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem

UNIT-III:

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling salesperson problem, Reliability design.

UNIT-IV:

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT-V:

Branch and Bound: General method, applications - Travelling salesperson problem, 0/1 knapsack problem-LC Branch and Bound solution, FIFO Branch and Bound solution. NPHard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes, Cook's theorem

University Nominee Dr.Suneetha Eluri		Alumni Member Mr.HariSuresh Polisetti	
SubjectExpert:1 Dr. B Kezia Rani		Chairman Mr. AVS M Ganesh	
SubjectExpert:2 Dr.SuneelKumarDuvvuri		Member Mr. G L N V S Kumar	
Representative From Industry Mr.SaiKrishna Narima		Member	



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Text Books: 1.

Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekaran, Universities Press 2. The Algorithm Design Manual, 2nd edition, Steven S. Skiena, Springer 3. Introduction to Algorithms, second edition, T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, PHI Pvt. Ltd

Reference Books:

1. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA
2. Design and Analysis of Algorithms, Pearson Education, Parag Himanshu Dave, Himansu Balachandra Dave
3. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, McGraw Hill
4. Design and Analysis of algorithms, Pearson education, Aho, Ullman and Hopcroft

Web Resources:

1. <https://nptel.ac.in/courses/106106131>
2. <http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=IntroToAlgorithms>
3. <https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithms-spring-2015/resources/lecture-notes/>
4. <https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithms-spring-2015/resources/lecture-notes/>
5. <https://aofa.cs.princeton.edu/home>

University Nominee Dr. Suneetha Eluri		Alumni Member Mr. Hari Suresh Polisetti	
Subject Expert: 1 Dr. B Kezia Rani		Chairman Mr. AVS M Ganesh	
Subject Expert: 2 Dr. Suneel Kumar Duvvuri		Member Mr. G L N V S Kumar	
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