

**PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY**  
(Autonomous)

KANURU, VIJAYAWADA-520007

II B.Tech -II SEM CSE(AI&ML)

**Design and Analysis of Algorithms**

<b>Course Code</b>	20AM3403	<b>Year</b>	II	<b>Semester</b>	II
<b>Course Category</b>	PCC	<b>Branch</b>	CSE(AI&ML)	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Discrete Mathematical Structures and Data Structures
<b>Continuous Internal Evaluation :</b>	30	<b>Semester End Examination:</b>	70	<b>Total Marks:</b>	100

**Course Outcomes**

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Understand the fundamental concepts of algorithm analysis and design techniques.	<b>L2</b>
<b>CO2</b>	Apply Divide and Conquer, Greedy techniques for solving problems.	<b>L3</b>
<b>CO3</b>	Apply Dynamic Programming, Back Tracking and Branch and Bound techniques for solving problems.	<b>L3</b>
<b>CO4</b>	Analyze the given problem using suitable design techniques and provide the feasible solution.	<b>L4</b>

**Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	2													
<b>CO2</b>	3											1		
<b>CO3</b>		3										1		
<b>CO4</b>		3										1		

<b>Syllabus</b>		
<b>Unit No</b>	<b>Contents</b>	<b>Mapped CO</b>
<b>I</b>	<p><b>Introduction:</b> Notion of Algorithm, Fundamentals of Algorithmic Problem Solving.</p> <p>Fundamentals of the Analysis of Algorithm Efficiency: Analysis framework and Asymptotic Notations and Basic Efficiency Classes, Amortized Analysis.</p> <p>Introduction to Brute Force Technique, Exhaustive Search.</p>	<b>CO1,CO2</b>
<b>II</b>	<p><b>Divide and Conquer:</b> Introduction, Merge sort, Quick sort, Binary Search, Finding Maximum and Minimum, Strassen's Matrix Multiplication.</p>	<b>CO1,CO2,CO4</b>
<b>III</b>	<p><b>The Greedy Method:</b> Introduction, Huffman Trees and codes, Minimum Coin Change problem, Knapsack problem, Job sequencing with deadlines, Minimum Cost Spanning Trees, Single Source Shortest paths.</p>	<b>CO1,CO2,CO4</b>
<b>IV</b>	<p><b>Dynamic Programming:</b> Introduction, 0/1 Knapsack problem, All pairs shortest paths, Optimal Binary search trees, Travelling salesman problem.</p>	<b>CO1,CO3,CO4</b>
<b>V</b>	<p><b>Back Tracking:</b> Introduction, n-Queens problem, Sum of subsets, Hamiltonian cycle.</p> <p><b>Branch and Bound:</b> Introduction, Assignment problem, Travelling Salesman problem.</p> <p><b>Introduction to Complexity classes:</b> P and NP Problems, NP-Complete Problems.</p>	<b>CO1,CO3,CO4</b>
<b>Learning Resources</b>		
<b>Text Books</b>		
<ol style="list-style-type: none"> <li>1. Introduction to the Design &amp; Analysis of Algorithms, Anany Levitin, Third Edition, 2011, Pearson Education.</li> <li>2. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, 2002, Pearson.</li> <li>3. Algorithm Design Techniques, Narasimha Karumanchi, CareerMonk Publications, 2018.</li> </ol>		
<b>References</b>		
<ol style="list-style-type: none"> <li>1. Introduction to Algorithms, <a href="#">Thomas H. Cormen</a>, <a href="#">Charles E. Leiserson</a>, <a href="#">Ronald L. Rivest</a>, <a href="#">Clifford Stein</a>, Third Edition, 2012, MIT Press.</li> <li>2. Fundamentals of computer algorithms, Ellis Horowitz, Sartaj Sahni, S. Rajasekharan, Second Edition, 2008, Universities Press.</li> </ol>		
<b>e-Resources and other Digital Material</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/106/106/106106131/">https://nptel.ac.in/courses/106/106/106106131/</a></li> <li>2. <a href="https://www.cmi.ac.in/~madhavan/">https://www.cmi.ac.in/~madhavan/</a></li> <li>3. <a href="https://www.coursera.org/lecture/analysis-of-algorithms/resources-jMWPY">https://www.coursera.org/lecture/analysis-of-algorithms/resources-jMWPY</a></li> <li>4. <a href="https://www.geeksforgeeks.org/fundamentals-of-algorithms/">https://www.geeksforgeeks.org/fundamentals-of-algorithms/</a></li> </ol>		