

**PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY**  
**KANURU, VIJAYAWADA**  
**II B.Tech – II Semester(CSE/IT)**  
**Design and Analysis of Algorithms (19IT3404)**

<b>Offering Branches</b>	CSE, IT		
<b>Course Category:</b>	Program Core	<b>Credits:</b>	3
<b>Course Type:</b>	THEORY	<b>Lecture-Tutorial- Practical:</b>	3-0-0
<b>Prerequisites:</b>	Discrete mathematics and probability, Data Structure	<b>Continuous Evaluation:</b>	30
		<b>Semester End Evaluation:</b>	70
		<b>Total Marks:</b>	100
<b>Course Outcomes</b>			
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.		L2
<b>CO2</b>	Apply various algorithm design techniques for solving problems		L3
<b>CO3</b>	Analyze the performance of different algorithms in divide and conquer.		L4
<b>CO4</b>	Analyze the feasible solutions to find optimal one for the given problem.		L4
<b>Course Content</b>			
<b>UNIT-1</b>	<b>Introduction:</b> Notion of Algorithm, Fundamentals of Algorithmic Problem Solving. <b>Fundamentals of the Analysis of Algorithm Efficiency:</b> Analysis framework and Asymptotic Notations and Basic Efficiency Classes. Introduction to Brute Force Technique, Exhaustive Search.		CO1, CO2
<b>UNIT-2</b>	<b>Divide and Conquer:</b> Introduction, Merge sort, Quick sort, Binary Search, Finding Maximum and Minimum, Strassen's Matrix Multiplication.		CO1, CO2, CO3
<b>UNIT-3</b>	<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.		CO1, CO2, CO4

<b>UNIT-4</b>	<b>Dynamic Programming:</b> Introduction, 0/1 Knapsack problem, All pairs shortest paths, Optimal Binary search trees, Travelling salesman problem.	CO1, CO2
<b>UNIT-5</b>	<b>Back Tracking:</b> Introduction, n-Queens problem, Sum of subsets, Hamiltonian cycle. <b>Branch and Bound:</b> Introduction, Assignment problem, Travelling Salesman problem. <b>Introduction to Complexity classes:</b> P and NP Problems, NP-Complete Problems.	CO1, CO2
<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>Reference Books</b>	<ol style="list-style-type: none"> <li>1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, 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 &amp; 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>	