PVP SIDDHARTHA INSTITUTE OF TEHNOLOGY, KANURU, VIJAYAWADA
(AUTONOMOUS)
INFORMATION TECHNOLOGY
Design and Analysis of Algorithms

(Common to CSE & IT)

Course Code	20IT3403	**Year**	II	**Semester**	II
Course Category	PC	**Branch**	IT	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Discrete Mathematical Structures and Data Structures
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Understand the fundamental concepts of algorithm analysis and design techniques.	**L2**
CO2	Apply various algorithm design techniques for solving problems	**L3**
CO3	Analyze the performance of given problem using different algorithm techniques.	**L4**
CO4	Analyze the given problem and provide the feasible solution.	**L4**

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**
CO1	3												3	3
CO2	3								3	3		3	3	3
CO3		3							3	3		3	3	3
CO4		3							3	3		3	3	3

Syllabus		
Unit No	**Contents**	**Mapped CO**
I	**Introduction:** Notion of Algorithm, Fundamentals of Algorithmic Problem Solving. Fundamentals of the Analysis of Algorithm Efficiency: Analysis framework and Asymptotic Notations and Basic Efficiency Classes, Amortized Analysis. Introduction to Brute Force Technique, Exhaustive Search.	**CO1,CO2, CO3**
II	**Divide and Conquer:** Introduction, Merge sort, Quick sort, Binary Search, Finding Maximum andMinimum, Strassen's Matrix Multiplication.	**CO1,CO2, CO3,CO4**
III	**The Greedy Method:** Introduction, Huffman Trees and codes, Minimum Coin Change problem, Knapsack problem, Job sequencing with deadlines, Minimum CostSpanning Trees, Single Source Shortest paths.	**CO1,CO2, CO3,CO4**
IV	**Dynamic Programming:** Introduction, 0/1 Knapsack problem, All pairs shortest paths, OptimalBinary search trees, Travelling salesman problem.	**CO1,CO2, CO3,CO4**
V	**Back Tracking:** Introduction, n-Queens problem, Sum of subsets, Hamiltonian cycle. **Branch and Bound:** Introduction, Assignment problem, Travelling Salesman problem. **Introduction to Complexity classes:** P and NP Problems, NP-Complete Problems.	**CO1,CO2, CO3,CO4**

Learning Resources
Text Books
1. *Introduction to the Design & Analysis of Algorithms*, Anany Levitin, Third Edition, 2011, Pearson Education. 2. *Data Structures and Algorithm Analysis in C*, Mark Allen Weiss, 2002, Pearson. 3. *Algorithm Design Techniques*, Narasimha Karumanchi, CareerMonk Publications, 2018.
References
1. *Introduction to Algorithms*, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Third Edition, 2012, MIT Press. 2. *Fundamentals of computer algorithms*,Ellis Horowitz, Sartaj Sahni, S. Rajasekharan, Second Edition, 2008, Universities Press.
e-Resources and other Digital Material
1. https://nptel.ac.in/courses/106/106/106106131/ 2. https://www.cmi.ac.in/~madhavan/ 3. https://www.coursera.org/lecture/analysis-of-algorithms/resources-jMWPy 4. https://www.geeksforgeeks.org/fundamentals-of-algorithms/