PVP SIDDHARTHA INSTITUTE OF TECHNOLOGY, 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								2	2		3	3	3
CO3		3							1	1		3	3	3
CO4		3							1	1		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/