NARSIMHA REDDY ENGINEERING COLLEGE
UGC AUTONOMOUS INSTITUTION
Maisammaguda (V), Kompally - 500100, Secunderabad, Telangana State, India

UGC - Autonomous Institute
Accredited by **NBA & NAAC** with **'A'** Grade
Approved by **AICTE**
Permanently affiliated to **JNTUH**

School of Computer Science and Engineering

SYLLABUS

DS3102PC: DESIGN AND ANALYSIS OF ALGORITHMS

III-I:CSE(DS)								
Course Code	Category	Hours/Week			Credits	Max Marks		
		L	T	P	C	CIE	SEE	Total
DS3102PC	Core	3	0	0	3	30	70	100
Contact Classes:45	Tutorial classes:15	Practical classes: Nill				Total Classes:60		
Prerequisites								

Course Objectives:
- Introduces the notations for analysis of the performance of algorithms.
- Introduces the data structure disjoint sets.
- Describes major algorithmic techniques (divide-and-conquer, backtracking, dynamic programming, greedy, branch and bound methods) and mention problems for which each technique is appropriate;
- Describes how to evaluate and compare different algorithms using worst-, average-, and best- case analysis.
- Explains the difference between tractable and intractable problems, and introduces the problems that are P, NP and NP complete.

Course Outcomes:
- Ability to analyze the performance of algorithms
- Ability to choose appropriate data structures and algorithm design methods for aspecified application
- Ability to understand how the choice of data structures and the algorithm designmethods impact the performance of programs

UNIT - I

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, Asymptotic Notations- Big oh notation, Omega notation, Theta notation and Little oh notation.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen'smatrix multiplication.

UNIT - II
Disjoint Sets: Disjoint set operations, union and find algorithms
Backtracking: General method, applications, n-queen's problem, sum of subsets problem,graphcoloring

UNIT - III
Dynamic Programming: General method, applications- Optimal binary search trees, 0/1 knapsackproblem, All pairs shortest path problem, Traveling sales person problem, Reliability design.

UNIT - IV
Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT - V
Branch and Bound: General method, applications - Travelling sales person problem, 0/1
Knap sack problem - LC Branch and Bound solution, FIFO Branch and Bound solution. **NP-Hardand NP-Complete problems**: Basic concepts, non deterministic algorithms, NP -Hard and NP- Complete classes, Cook's theorem.

TEXT   BOOK:
1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press.

REFERENCE   BOOKS:
Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
Introduction to Algorithms, second edition, T. H. Cormen, C.E. Leiserson, R. L. Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education.
Algorithm Design: Foundations, Analysis and Internet Examples,M.T.Goodrich and R.Tamassia, John Wiley and sons.