**GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**DESIGN AND ANALYSIS OF ALGORITHMS**

CourseCode: GR18A2076 L/T/ P/C:3/0/0/3

II Year IISemester

**Unit-I**

Introduction: Definition of algorithm, properties of an Algorithm, performance analysis - space complexity & time complexity, asymptotic notations: big oh notation, omega notation, theta notation, little oh notation & little omega notation.

Disjoint sets: Disjoint set Representation, Operations, union and find algorithms.

**Unit II**

Divide and conquer: General method, applications, binary search, quick sort, merge sort, strassen’s matrix multiplication. Time complexities of divide and conquer algorithms.

Dynamic programming - I: General method, applications, matrix chain multiplication, optimal binary search trees, 0/1 knapsack problem

**Unit III**

Dynamic programming - II: All pairs shortest path problem, travelling sales person problem, reliability design.

Greedy method: General method, applications-- job sequencing with deadlines, knapsack problem, minimum cost spanning trees, single source shortest path problem.

**Unit IV**

Backtracking: General method, applications, n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

**Unit V**

Branch and Bound: General method, applications, travelling sales person problem, 0/1

knapsack problem: LC branch and bound solution, FIFO branch and bound solution.

NP-hard and NP-complete problems: Basic concepts, non-deterministic algorithms, deterministic algorithms, Introduction to P class problems, NP class problems.

**TEXT BOOKS**

1. Ellis Horowitz, Satraj Sahni and S Rajasekharam, Fundamentals of Computer Algorithms, Galgotiapublishers

2. T H Cormen, C E Leiserson, and R L Rivest, Introduction to Algorithms, 3rdEdn, Pearson

Education

**REFERENCES**

1. R C T Lee, Hang and TT Sai, Introduction to Design and Analysis of Algorithms, A strategic approach, TMH