CS9201 **DESIGN AND ANALYSIS OF ALGORITHMS** **L T P C**
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AIM:

The aim is to introduce the basics of algorithm design paradigms and analysis to enable designing of efficient algorithms.

OBJECTIVES:

- To introduce the basic concepts of algorithm analysis
- To introduce the design paradigms for algorithm design
- To introduce the basic complexity theory.

UNIT I PRELIMINARIES **9**

The Role of Algorithms in Computing-Getting Started-Growth of Functions – Recurrences-The Substitution Method- The Recurrence Tree Method-The Master Method -Probabilistic Analysis and Randomized Algorithms-The Hiring Problem-Random Variables-Randomized Algorithms.

UNIT II DESIGN TECHNIQUE-I **9**

Quicksort-Description-Performance-Randomized version-Analysis.Sorting in linear time-Lower bounds for sorting-Counting sort-Medians and order statistics-Minimum and maximum-Selection in expected linear time- Selection in worst-case linear time-Dynamic Programming – Matrix chain multiplication –Elements of Dynamic programming- Longest common sequences.

UNIT III DESIGN TECHNIQUE-II **9**

Greedy Algorithms-Activity selection problem-Elements of Greedy Strategy-Huffman code.Matrix Operations-Properties of matrices-Strassen's algorithm-Solving systems of linear equations-Inverting matrices.

UNIT IV APPLICATIONS **9**

Linear Programming-Standard and slack forms-Formulating problems-Simplex algorithm-Duality-Initial basic feasible solution - String Matching-Naive string matching algorithm-Knuth-Morris-Pratt algorithm.

UNIT V NP PROBLEMS **9**

NP-completeness-Polynomial time-Polynomial-time verification-NP-completeness and reducibility-NP-completeness proofs - NP-completeness problems. Approximation Algorithms-The vertex-cover problem-The traveling-salesman problem.

TOTAL= 45 PERIODS

TEXT BOOK:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, Cliford Stein, "Introduction to Algorithms", Second Edition, Prentice Hall of India, 2007.

REFERENCES:

1. Jon Kleinberg, Eva Tardos, "Algorithm Design", Pearson Education, 2006.
2. Michael T. Goodrich, Toberto Tamassisa, " Algorithm Design: Foundations, Analysis and Internet Examples", Wiley Student Edition, 2007.
3. Anany Levitin, "Introduction to Design and Analysis of Algorithms", Pearson Education, 2003.