

Semester	5
Course	MAJOR
Paper Code	C3CS230512T / C3CS230512P
Paper Title	DESIGN AND ANALYSIS OF ALGORITHMS
No. of Credits	4
Theory / Practical / Composite	COMPOSITE
Minimum No. of preparatory hours per week a student has to devote	5
Number of Modules	ONE
Syllabus	Introduction: Basic Design and Analysis techniques, Space and Time complexity, Asymptotic notations, Summations, Recurrences. Algorithm Design Techniques: Divide and conquer - Strassen's Method; Greedy concepts - Make change problem; Dynamic programming – Bellman-Ford algorithm; Back tracking – 8 Queens problem. Sorting Algorithms: Merge Sort, Quick sort, Average and Worst case behaviour, Selection problem, Median and order statistics. Generalized Tree Algorithms- Binary Tree, Threaded Binary Tree, Binary Search Tree, AVL Tree and B and B+ tree representation, 2-3 Tree, Heap, Binomial Heap. String Processing - String Matching, Brute Force Technique, KMP Technique. Introduction to Notion of NP-completeness P class, NP-hard class, NP complete class, Circuit Satisfiability problem.
Learning Outcomes	1. Analyze the asymptotic performance of algorithms. 2. Write rigorous correctness proofs for algorithms. 3. Demonstrate a familiarity with major algorithms and data structures. 4. Apply important algorithmic design paradigms and methods of analysis. 5. Synthesize efficient algorithms in common scientific design situations. 6. Implement the algorithms using suitable programming language.
Reading/Reference Lists	1. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to Algorithms, PHI. 2. E. Horowitz , S. Sahani, R Sanguthevar, Fundamentals of Computer Algorithms, Galgotia. 3. Sarabasse & A.V. Gelder Computer Algorithm – Introduction to Design and Analysis, Pearson

Evaluation	Theory CIA: 12 Attendance: 3 Semester Exam: 45	Practical CA: 38 Attendance: 2
Paper Structure	Answer 3 out of 5 of 15 marks each	