

Code No.: ETCS 204
Paper: Algorithm Analysis & Design

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3	1	4

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT – I

Preliminaries: Review of growth of functions, Recurrences: The substitution method, The iteration method, The master method, Data Structures for Disjoint Sets.

Divide and Conquer Approach: Merge Sort, Quick sort, Medians and Order statistics, Strassen's algorithm for Matrix Multiplications. **[No. of Hrs.: 11]**

UNIT – II

Dynamic Programming: Elements of Dynamic Programming, Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems.

Greedy Algorithms: Elements of Greedy strategy, An activity selection problem, Huffman Codes, A task scheduling problem. **[No. of Hrs.: 11]**

UNIT – III

Graph Algorithms: Representation of Graphs, Breadth First Search, Depth First Search, Topological Sort, Strongly Connected Components, Algorithm for Kruskal's and Prim's for finding Minimum cost Spanning Trees, Dijkstra's and Bellman Fort Algorithm for finding Single source shortest paths. All pair shortest paths and matrix multiplication, Floyd – Warshall algorithm for all pair shortest paths. **[No. of Hrs.: 11]**

UNIT – IV

String matching: The naïve String Matching algorithm, The Rabin-Karp Algorithm, String Matching with finite automata, The Knuth-Morris Pratt algorithm.

NP-Complete Problem: Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP-Complete problems. **[No. of Hrs.: 11]**

TEXT BOOKS:

1. T. H. Cormen, C. E. Leiserson, R. L. Rivest, Clifford Stein, "Introduction to Algorithms", 2nd Ed., PHI, 2004.

REFERENCES BOOKS:

1. A. V. Aho, J. E. Hopcroft, J. D. Ullman, "The Design and Analysis of Computer Algorithms", Addison Wesley, 1998.
2. Ellis Horowitz and Sartaz Sahani, "Computer Algorithms", Galgotia Publications, 1999.
3. D. E. Knuth, "The Art of Computer Programming", 2nd Ed., Addison Wesley, 1998