

**CA9112 DATA STRUCTURES AND ALGORITHM DESIGN**

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**UNIT I FUNDAMENTALS**

Mathematical Induction - Asymptotic Notations – Properties of Big-oh Notation – Conditional Asymptotic Notation – Algorithm Analysis – Amortized Analysis – NP-Completeness – NP-Hard – Recurrence Equations – Solving Recurrence Equations – Memory Representation of Multi-dimensional Arrays – Time-Space Tradeoff.

**UNIT II DATA STRUCTURES 9**

Min/Max heaps – Leftist Heaps – Skew Heaps – AVL Trees – Red-Black Trees – B-Trees – Splay Trees – Tries.

**UNIT III ALGORITHM DESIGN: I 9**

Divide and Conquer strategy – Selection of kth Smallest Elements – Convex Hull – Strassen’s Matrix Multiplication – Greedy Approach – Container Loading – Tree Vertex Splitting – Optimal Merge Patterns.

**UNIT IV ALGORITHM DESIGN: II 9**

Dynamic Programming Approach – Principle of Optimality – String Editing – Flow Shop Scheduling – Connected Components – Bi-Connected Components Graph Coloring using Backtracking Technique – Branch and Bound Methodology.

**UNIT V APPROXIMATION ALGORITHMS 9**

Planar Graph Coloring – Maximum Program Stored Problem – Bin Packing – Scheduling Independent Tasks – 0/1 Knapsack – Rounding – Interval Partitioning.

**TOTAL = 45**

**REFERENCES**

1. E. Horowitz, S.Sahni and Dinesh Mehta, Fundamentals of Data structures in C++, University Press, 2007.
2. E. Horowitz, S. Sahni and S. Rajasekaran, Computer Algorithms/C++, Second Edition, University Press, 2007.
3. G. Brassard and P. Bratley, Algorithmics: Theory and Practice, Printice –Hall, 1988.