SE-501

ADVANCED ALGORITHMS

UNIT-I

Algorithm Analysis: Asymptotic Notation ,Amortization.
Basic Data Structures: Stacks and Queues, Vectors, Lists and Sequences, Trees, Priority Queues, Heaps, Dictionaries and Hash Tables.

Search Trees : Ordered Dictionaries and Binary Search Trees, AVL Trees, Bounded-Depth Search Trees, Splay Trees.

UNIT-II

Fundamental Techniques: The Greedy Methods, Divide-and-conquer, Dynamic Programming.

Graphs: The Graph Abstract Data Type, Data Structures for Graphs, Graph Traversal, Directed Graphs.

UNIT-III

Weighted Graphs: Single-Source Shortest Paths, All-Pairs Shortest Paths, Minimum Spanning Trees.
Network Flow and Matching: Flows and Cuts, Maximum Bipartite Matching, Minimum-Cost Flow.

UNIT-IV

Text Processing: Strings and Pattern Matching Algorithms, Tries, Text Compression, Text Similarity Testing.

Number Theory and Cryptography: Fundamental Algorithms involving numbers, Cryptographic Computations, Information Security Algorithms and Protocols.

UNIT-V

Computational Geometry: Range Trees, Priority Search Trees, Quad trees and k-D Trees, Convex Hulls.

Suggested Reading:

1. M T Goodrich, R Tomassia. "*Algorithm Design – Foundations, Analysis, and Internet Algorithms*", John Wiley,2002.
2. E Horowitz S Salmi, S Rajasekaran, "*Fundamentals of Computer Algorithms*", Second Edition,university Press,2007.
3. Aho, A V Hopcraft, Ullman J D, "*The design and analysis of Computer Algorithms*", Pearson Education, 2007.
4. Hari Mohan Pandy, "*Design Analysis and Algorithms*", University Science Press, 2009.
5. Cormen., Lieserson, Rivest "*Introduction to Algorithm*", 2nd Edition, PHI,2003.