

DSA - Course Syllabus

Unit 1

Basic complexity analysis – Analyzing Programs – Best, Worst, and Average Cases - Asymptotic Analysis. Overview of Data Structures – Abstract Data Types and Data Structures. Linked List: Implementation - Analysis = Variations – LL ADT – LL Applications. Stack: Implementation - Recursion - Expression Evaluation and other applications. Queues - Implementation - Variations - Applications.

Unit 2

Trees: Tree Definition and Properties – Binary tree - Representation - Traversals. Priority queues: ADT – Implementing Priority Queue using List – Heaps - Heap sort. Search trees: Binary search tree - AVL tree - Implementation - Analysis. Maps and Dictionaries: Hash Tables - Collisions - Dynamic Resizing.

Unit 3

Sorting and Selection: Divide and Conquer Strategy – Merge Sort - Quick Sort - Quick Select. Graphs: ADT- Data structure for graphs - Graph traversals - Reachability, Cycles and Connectedness - Shortest Paths - Minimum spanning tree – Greedy Methods for MST.

Textbooks:

1. Michael T Goodrich and Roberto Tamassia and Michael H Goldwsasser, “Data Structures and Algorithms in Java”, John Wiley publication, 2013.
2. Clifford A. Shaffer, “Data Structures and Algorithm Analysis”, Third Edition, Dover Publications, 2012.

References:

1. Adam Drozdek, “Data Structures and Algorithms in Java”, Cengage Learning Asia, Paperback, 2013.
2. Tremblay J P and Sorenson P G, “An Introduction to Data Structures with Applications”, Second Edition, Tata McGraw-Hill, 2002.