

Course Syllabus – Data Structures and Algorithms

Day 1 – Recursion

- For Divide-and-Conquer Algorithms
- For Inductive Mathematical Definitions

Day 2 – The List ADT

- Array Implementation
- Linked List Implementation

The Stack ADT

- Array Implementation
- Linked List Implementation

The Queue ADT

- Array Implementation
- Linked List Implementation

Day 3 – Algorithm Efficiency

- Asymptotic Notations
- List Traversal Algorithms
- Link Inversion
- Doubly Linked Lists

Day 4 – Trees

- Definitions
- Traversals
- Implementations

Day 5 – Special Tree Implementations

- Array Representation of Complete Binary Tree
- Threaded Trees

Day 6 – The Dictionary ADT

- Various Tree Implementations
 - Binary Search Tree
 - Splay Tree

Day 7 – 2-3 Tree Implementation of Dictionary

- Hash Table Implementations of Dictionary

Day 8 – The Priority Queue ADT

- Heap Implementation
- Heap Sort

Day 9 – Sorting Algorithms

- Selection Sort
- Insertion Sort
- Bubble Sort
- Merge Sort
- Quick Sort
- Bucket Sort

Day 10 – Graph Definitions

- Undirected graph
- Directed graph
- Edge-weighted graph

Day 11 – Graph Algorithms

- DFS
- BFS
- Topological Sort

Day 12 – Other Graph Problems

- MST
- Shortest Path Problems

Day 13 – Dynamic Programming

- Intractability (P vs. NP)

Day 14 & 15 – Other Algorithm Techniques

- Approximation Algorithms
- Hill Climbing
- Simulated Annealing
- Genetic Algorithms
- Evolutionary Programming