DATA STRUCTURE

Introduction:

- ✓ Basic Terminology
- ✓ Elementary Data Organization
- ✓ Built in Data Types in C
- ✓ Algorithm
- ✓ Efficiency of an Algorithm
- ✓ Time and Space Complexity
- ✓ Asymptotic notations
- ✓ Big Oh, Big Theta and Big Omega
- ✓ Time-Space trade-off
- ✓ Abstract Data Types (ADT)

Arrays:

- ✓ Definition,
- ✓ Single and Multidimensional Arrays,
- ✓ Representation of Arrays:
  - Row Major
  - Order
  - Column Major Order
  - Derivation of Index Formulae for 1-D,2-D,3-D and n-D Array
  - Application of arrays
  - Sparse Matrices and their representations

Linked lists:

- ✓ Array Implementation and Pointer Implementation of Singly Linked Lists
- ✓ Doubly Linked List
- ✓ Circularly Linked List
- ✓ Operations on a Linked List
    - Insertion
    - Deletion
    - Traversal

- ✓ Polynomial Representation
    - Addition Subtraction & Multiplications of Single variable & Two variables Polynomial.

Searching:

- ✓ Concept of Searching
    - Sequential search
    - Index Sequential Search
    - Binary Search
- ✓ Concept of Hashing & Collision resolution Techniques used in Hashing
- ✓ Sorting
    - Insertion Sort
    - Selection
    - Bubble Sort
    - Quick Sort
    - Merge Sort
    - Heap Sort
    - Radix Sort

Graphs:

- ✓ Terminology used with Graph
- ✓ Data Structure for Graph Representations:
  - Adjacency Matrices
  - Adjacency List
  - Adjacency
- ✓ Graph Traversal:
  - Depth First Search
  - Breadth First Search
- ✓ Connected Component
- ✓ Spanning Trees
- ✓ Minimum Cost Spanning Trees:
  - Prims
  - Kruskal algorithm
- ✓ Transitive Closure and Shortest Path algorithm:
  - Warshal Algorithm
  - Dijikstra Algorithm

Stacks:

- ✓ Abstract Data Type,
- ✓ Primitive Stack operations:
  - Push
  - Pop
- ✓ Array and Linked Implementation of Stack in C
- ✓ Application of stack:
  - Prefix and Postfix Expressions
  - Evaluation of postfix expression
  - Iteration and Recursion- Principles of recursion
  - Tail recursion, Removal of recursion Problem solving using iteration and recursion with examples such as binary search
  - Fibonacci numbers, and Hanoi towers
  - Tradeoffs between iteration and recursion

Queues:

- ✓ Operations on Queue:
  - Create
  - Add
  - Delete
  - Full and Empty
  - Circular queues
  - Array and linked implementation of queues in C
  - Dequeue and Priority Queue