23CS201 DATA STRUCTURES USING C L T P C
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COURSE OBJECTIVES:

- To understand the concepts of ADTs.
- To Learn linear data structures – lists, stacks, and queues.
- To understand non-linear data structures – trees and graphs.
- To understand sorting, searching and hashing algorithms.
- To apply Tree and Graph structures.

UNIT-I LISTS 9

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists – Applications of lists – Polynomial ADT.

UNIT-II STACKS AND QUEUES 9

Stack ADT – Operations – Applications – Balancing Symbols – Evaluating arithmetic expressions- Infix to Postfix conversion –Queue ADT – Operations – Circular Queue – DeQueue – Applications of Queues.

UNIT-III TREE STRUCTURES 9

Tree ADT – Tree Traversals - Binary Tree ADT – Expression trees – Binary Search Tree ADT – Priority Queue (Heaps) – Binary Heap-Multiway Search Trees - B-Tree – B+ Tree.

UNIT-IV SORTING AND SEARCHING 9

Sorting – Bubble sort – Selection sort – Insertion sort –Merge Sort – Quick Sort –Shell sort — Radix sort. Searching – Linear Search – Binary Search.

UNIT-V GRAPH STRUCTURES 9

Graph Definition – Representation of Graphs – Types of Graph - Breadth-first traversal – Depth-first traversal –– Bi-connectivity –Topological Sort – Dijkstra's algorithm – Minimum Spanning Tree – Prim's algorithm – Kruskal's algorithm.

COURSE OUTCOMES:

- **CO1**: Define linear and non-linear data structures.
- **CO2**: Implement linear and non–linear data structure operations.
- **CO3**: Use appropriate linear/non–linear data structure operations for solving a given problem.
- **CO4**: Apply appropriate graph algorithms for graph applications.
- **CO5**: Analyze the various searching and sorting algorithms.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2nd Edition, Pearson Education, 2005.
2. Kamthane, Introduction to Data Structures in C, 1st Edition, Pearson Education, 2007

REFERENCES:

1. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2022.

3. Alfred V. Aho, Jeffrey D. Ullman,John E. Hopcroft ,Data Structures and Algorithms, 1st edition, Pearson, 2002.
4. Kruse, Data Structures and Program Design in C, 2nd Edition, Pearson Education, 2006.