CS/DSC/T/ 201: Data Structure

Total Credits : 02 **Total Contact Hours : 30 Hrs.**

Maximum Marks : 50

Learning Objectives of the Course:

i) To introduce fundamental data structures and their implementation in C.
ii) To develop efficient problem-solving skills using various data structures.
iii) To analyze the efficiency of algorithms

Course Outcomes (COs) :

After completion of the course, students will be able to

i) Understand the Fundamentals of Data Structures
ii) Implement sorting using array & String.
iii) Develop and Apply Linked Lists, Stacks and Queues

Module No.	Topics / Actual Contents of the Syllabus	Contact Hours
I	**Introduction,** Definition, need, and classification of data structures, Abstract Data Types (ADT), Time and Space Complexity (Big O Notation) **Arrays and Strings:** One-dimensional and Multi-dimensional arrays, Array operations (insertion, deletion, searching, sorting)	**10 Hrs.**
II	**Linked Lists:** Concept and comparison with arrays, Singly Linked List (creation, insertion, deletion, traversal), Introduction to Doubly and Circular Linked Lists **Stacks and Queues:** Stack: Definition, operations, applications (expression evaluation, recursion), Queue: Definition, types (linear, circular), operations, Implementation using arrays and linked lists.	**10 Hrs.**
III	**Trees:** Definition, binary trees, binary search trees (BST), Tree traversal techniques (Inorder, Preorder, Postorder). **Searching and Sorting Techniques:** Searching: Linear search, Binary search, Sorting: Bubble sort, Selection sort, Insertion sort.	**10 Hrs.**

References:

1. "Data Structures Using C" – Yashavant Kanetkar, BPB Publication.
2. "Data Structures and Program Design in C" – Robert L. Kruse, Bruce P. Leung, Pearson Education.
3. "Data Structures Through C in Depth" – S.K. Srivastava, Deepali Srivastava, BPB Publication.
4. "C and Data Structures" – Reema Thareja, Oxford University Press.
5. "Let Us C" – Yashavant Kanetkar, BPB Publication.