

Department : Computer Science and Engineering	
Course Title : Data Structures	Course Code : CS340
Credits(L:T:P) : 4:0:0	Core/Elective : Core
Type of Course : Lecture	Total Contact Hours : 52
CIE Marks : 50	SEE Marks : 100

Pre-requisite: Knowledge of C programming concepts and C programming skill

Course Outcomes: After completing this course, students should be able to:

CO1	Understand the fundamentals of data structures and their applications essential for problem solving.
CO2	Apply Linear and Non-linear data structures to organize data for different types of problems.
CO3	Analyze and implement various operations on Linear and Non-linear data structures.
CO4	Evaluate the most appropriate data structure for efficient data storage for a give problem.

Unit No.	Course Content	No. of Hours
1	Introduction to Data structures:Pointers Revisited: Pointers to variables, arrays, structures and functions.. Array Operations: Traversing, inserting, deleting, Searching, and sorting. Dynamically allocated arrays.	08
2	Linear List: Array vs Linked storage representation. Representation of linked lists in Memory. Linked list operations: Traversing, Searching, Insertion, Updation and Deletion. Circular linked lists, Doubly Linked lists, Header linked lists. Applications of Linked lists.	12
3	Stacks and Queues: Array Representation of Stacks, Stacks using Dynamic Arrays, Linked Stacks .Stack Applications: Conversions of expressions, evaluation of expressions, Recursion. Queues: Array Representation, Circular Queues, queues using Dynamic arrays, Dequeues, Priority Queues, Linked Queues.	12
4	Trees: Basic tree concepts, General trees and their representations. Binary Trees, Array and linked Representation of Binary Trees, Binary tree operations: Binary Tree Traversals, Insertion, deletion, searching. Binary Search Trees – Insertion, Deletion, Traversal and Searching. Binary expression Trees: Construction of expression trees for different notations, Evaluation of Expression.	12
5	Graphs: Basic concepts, Graph storage structures, Graph Traversal methods: Depth first search and Breadth first search, Applications of DFS and BFS.	08

Text Books:

1. Fundamentals of Data Structures in C - Ellis Horowitz and Sartaj Sahni, 2nd edition, Universities Press, 2014
2. Richard F. Gilberg and Behrouz A. Forouzan, "Data structures, A Pseudo code Approach with C", 3rd edition, Cengage learning 2013.

Reference Books:

1. Data Structures - Seymour Lipschutz, Schaum's Outlines, Revised 1st edition, McGraw Hill, 2014
2. Yeddyiah, Augenstein, Tannenbaum: Data Structures Using C, First edition, Pearson Education, 2019.

Web Resources:

1. <https://nptel.ac.in/courses/106102064/>
2. <https://nptel.ac.in/courses/106105085/>
3. http://www.nptelvideos.com/computer_science/datastructures_algorithms.php