VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. II Semester	**L**	**T/P/D**	**C**
	3	**0**	**3**

(A19ES1IT01) DATA STRUCTURES

COURSE OBJECTIVES:
- To introduce various searching and sorting techniques
- To demonstrate operations of linear and non-linear data structure
- To develop an application using suitable data structure

COURSE OUTCOMES: After completion of the course, the student should be able to

CO-1: Understand basic concepts of data structures and analyse computation complexity
CO-2: Apply linear data structures to implement various sorting, searching techniques
CO-3: Apply various operations of linear and non-linear data structures
CO-4: Analyze appropriate and efficient data structure to implement a given problem

UNIT-I:
Introduction to Data Structures: Abstract Data Types (ADT), Asymptotic Notations. Time- Space trade off. Searching: Linear Search and Binary Search Techniques and their time complexities.
Linear Data Structures: Stacks - ADT Stack and its operations: Applications of Stacks: Recursion, Expression Conversion and evaluation.

UNIT-II:
Linear Data Structures: Queues - ADT queue, Types of Queue: Linear Queue, Circular Queue, Double ended queue, operations on each types of Queues

UNIT-III:
Linked Lists: Singly linked lists: Representation in memory, Operations: Traversing, Searching, insertion, Deletion from linked list; Linked representation of Stack and Queue.
Doubly linked List, Circular Linked Lists: All operations

UNIT-IV:
Trees: Basic Tree Terminologies, Different types of Trees: Binary Tree, Binary Search Tree, AVL Tree; Tree Operations on each of the trees and their algorithms with time complexities. **B-Trees**: Definition, Operations.

UNIT-V:
Priority Queue: Definition, Operations and their time complexities.
Sorting: Objective and properties of different sorting algorithms: Quick Sort, Heap Sort, Merge Sort; Radix sort

UNIT-VI:
Dictionaries: Definition, ADT, Linear List representation, operations- insertion, deletion and searching, Hash Table representation, Hash function-Division Method, Collision

Resolution Techniques-Separate Chaining, open addressing-linear probing, quadratic probing, double hashing, Rehashing.
Graphs: Graph terminology –Representation of graphs –Graph Traversal: BFS (breadth first search) –DFS (depth first search) –Minimum Spanning Tree.

TEXT BOOKS:
1. Fundamental of Data Structure, Horowitz and Sahani, Galgotia Publication
2. Data Structure, Lipschutz, Schaum Series

REFERENCES:
1. Algorithms, Data Structures, and Problem Solving with C++, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. How to Solve it by Computer, 2nd Impression by R.G. Dromey, Pearson Education