DATA STRUCTURES THROUGH 'C'

Credits: 4   **Semester: II**
Subject Code:BS18202   **No. of Lecture Hours:75**

Objective: To focus on different methods of sorting, searching, storing data and understanding time and storage efficiency.

Outcomes: Students will be able to
CO1: Choose appropriate data structures to represent data items in real world problems
CO2: Illustrate non-linear data structures like linked list
CO3: Organize the data using sorting in various linear data structures and determine time complexity
CO4: Construct data with nonlinear data structure using trees.
CO5: Explain the concept of graphs and b trees

	UNIT – I	**15hrs**
1.	Introduction to Data Structures	1
2.	Stacks	
	Definition and various operations performed on stacks	5
3.	Queues	
	Definition and various operations performed on queues	5
4.	Stack applications	
a.	Notations - Prefix, Postfix, Infix	1
b.	Conversions – Infix to Postfix, Infix to Prefix	3

	UNIT – II	**15hrs**
1.	Data Representation, Concept of linked list	2
2.	Advantages of Linked List, Types of linked list	1
3.	Linear Linked list	
	Various operations performed on singly linked list	4
	Doubly Linked List	
	Various operations performed on singly linked list	4
4.	Circular Linked List	2
a.	Applications of Linked Lists	2

	UNIT – III	**15hrs**
1.	Trees	
a.	Definition and properties	2
2.	Binary Trees	
a.	Definition and Representation of Binary trees	2
b.	Operations: insertion, deletion, search	2
c.	Tree traversal techniques- in order, pre order, post order	3
3.	AVL trees	
a.	Definition and representation of AVL Trees	3
b.	Operations on AVL trees- insertion, deletion	3

UNIT – IV   **15hrs**
1. Sorting methods
a. Bubble sort   2
b. Insertion sort   2
c. Selection sort   2
d. Merge sort   2
e. Quick sort   2

2. Searching methods
a. Linear search   2

b. Binary search   2
3. Comparison and analysis   1

UNIT – V   **15hrs**
1. Graphs
a. Terminology & Representations   1
b. Definition and representation of graph   2
c. Graph Traversal -BFS, DFS   3
2. B-Trees
a. Definition and representation of B-Trees   2

b. Operations on B- Tree-insertion, deletion, search   2
3. File Structures - Physical Storage Media File Organization   2
   Sequential Files, Indexing and Hashing, Primary indices, Secondary indices   2
   Indexing and Hashing Comparisons.   1