

COURSE TITLE : **DATA STRUCTURES**
COURSECODE : **3071**
COURSE CATEGORY : **B**
PERIODS PER WEEK : **5**
PERIODS PER SEMESTER : **90**
CREDITS : **5**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Stack and Queue	21
	Test I	1
2	Linked List	21
	Test II	1
3	Tree	21
	Test III	1
4	Graph, Searching and Sorting	21
	Test IV	1
	Total	90

OBJECTIVES

MODULE I

1.1.0 Introduction to different Data Structures

- 1.1.1 Discuss about different data structures-linear and non linear
- 1.1.2 Discuss about basic data structure operations – insertion, deletion, search, traverse

1.1.1 Understanding Stack and its operations

- 1.1.1 Define stack
- 1.1.2 Array representation of stacks
- 1.1.3 Algorithm to implement push and pop operation of a stack
- 1.1.4 understanding Infix, prefix and Postfix Expressions
- 1.1.5 Applications of stack-recursion-infix to Postfix conversion

1.1.2 Understanding Queues and its operations

- 1.1.1 Define Queue
- 1.1.2 Array representation of queue
- 1.1.3 Algorithm to implement insertion and deletion operations in a linear queue
- 1.1.3 Define Circular queue
- 1.1.4 Algorithm to implement circular queue and its operations
- 1.1.5 Familiarize Priority Queue and Dequeue

MODULE II

2.1 Understanding Linked List and its operations

- 2.1.1 Linked List vs Arrays
- 2.1.2 Memory allocation and de allocation of linked list
- 2.1.3 Algorithms to implement Insertion, deletion, traversing and searching nodes in Singly Linked List
- 2.1.4 Algorithms to implement Linked stack and Linked queue
- 2.1.5 Algorithm to implement Polynomial addition using Linked list
- 2.1.6 Familiarize Doubly Linked List and Circular Linked List

MODULE III

3.1.1 Understanding Trees and its operations

- 3.1.1 Introduction to Binary trees and Key terms related to trees
- 3.1.2 Linked representation of binary trees
- 3.1.3 Discussion about binary search trees
- 3.1.4 Algorithm for different operations of binary search tree – insertion, deletion, traversals and search
- 3.1.5 Discuss about Expression trees and Threaded binary trees

MODULE IV

4.1.1 Understanding Graph and its operations

- 4.1.1 Definition
- 4.1.2 Graph Terminology
- 4.1.3 Directed Graph
- 4.1.4 Directed Graph Terminology
- 4.1.5 Representation of Graph
 - 4.1.5.1 Adjacency Matrix representation
 - 4.1.5.2 Adjacency List
- 4.1.6 Graph traversal Algorithms – BFS ,DFS
- 4.1.7 All pairs Shortest Path Algorithm – Warshall's Algorithm

4.2 Searching and Sorting Algorithms

- 4.2.2 Discuss about efficiency of an algorithm-complexity
- 4.2.2 Comparison of Linear search and Binary search algorithms
- 4.2.3 Comparison of Bubble sort and Quick sort algorithms

CONTENT OUTLINE

MODULE I : STACK AND QUEUE

Data structures-linear and non linear-insertion, deletion, search, traverse- stack- representation-push and pop operations -Infix, Prefix, Postfix Expressions Applications of stack-recursion-infix to postfix conversion

Queue-Array representation of queue-insertion and deletion - Circular queue- Priority Queue and Dequeue

MODULE II : LINKED LIST

Linked_List vs Arrays-Memory allocation and de allocation -insertion, deletion, traversing and searching nodes in Singly Linked List -Linked stack and Linked queue-Polynomial addition- Doubly Linked List and Circular Linked List

MODULE III : TREES

Binary trees -Linked representation -binary search trees– insertion, deletion, traversals and search- Expression trees and Threaded binary trees

MODULE IV : GRAPH

Definition-Graph Terminology-Directed Graph-Directed Graph Terminology-Representation -Graph traversal Algorithms – BFS,DFS- Shortest Path Algorithm

Searching and Sorting Algorithms-efficiency of an algorithm-complexity-Linear search and Binary search -comparison-Bubble sort and Quick sort algorithms

TEXTBOOK

1. Data Structures using C by Reema Thareja, Oxford University Press

REFERENCES

1. Fundamentals of Data Structures in C Horowitz,Sahni,Anderson-freed Universities Press