

Lecture: - periods/week

Internal assessment: 25 marks

Lab/Practice: 3 periods/week

Semester end examination: 50 marks

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**Course Objectives:**

- The aim of this course is to develop skills to design and analyze simple linear and non linear data structures.
- Strengthen the ability to identify and apply the suitable data structure for the given real world problems.

**Learning outcomes:**

- To introduce the student to simple linear and non linear data structures such as lists, stacks, queues, trees and graphs.
- Provides an in-depth knowledge in problem solving techniques and data structures.
- To teach the student to write programs in C to solve the data structure problems.

**LIST OF PROGRAMS:**

**Week 1:**

1. Write a program to implement the operations on stacks.
2. Write a program for converting a given infix expression to postfix form
3. Write a program for evaluating a given postfix expression

**Week 2:**

1. Write a program to implement the operations on queues
2. Write a program to implement the operations on circular queues

**Week 3:**

8. Write a program to implement stack operations using singly linked list.
9. Write a program to implement the operations on doubly linked list.
10. Write a program to implement the operations on circular linked list.
11. Write a program for the representation of polynomials using circular linked list and for the addition of two such polynomials.

**Week 4:**

Write a program to implement searching techniques.

**Week 5:**

Write a program to create a binary search tree operations and also implementing the tree traversal techniques using recursion.

**Week 6:**

Write a program to perform B-tree operations: Insertion into a B-tree and Deletion from a B-tree.

**Week 7:**

Write a program to perform the following operations: Insertion into an AVL-tree and Deletion from an AVL-tree.

**Week 8:**

Write a program for finding the Depth First Search of a graph and Breadth First Search of a graph.

**Week 9:**

Write a program for finding the shortest path from a given source to any vertex in a digraph using Dijkstra's algorithm

**Week 10:**

Write a program to implement all sorting techniques

- Bubble sort
- Selection sort
- Insertion sort
- Heap sort

**Learning resources**

**Text Book:**

1. Horowitz and Sahni, *Fundamentals of Data Structures in C*, 2 ed.: University Press, 2007.

**Reference books:**

1. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH