C AND DATA STRUCTURES LAB

COURSE CODE: 20CA3105 **L T P C**

0 0 3 1.5

COURSE OUTCOMES:
At the end of the course student will be able to

CO1: Develop programs using recursive functions.
CO2: Implement stacks and queues using arrays
CO3: Develop Programs for searching and sorting algorithms.
CO4: Develop programs using concepts of trees.
CO5: Apply concepts of graphs.

List of Programs:

1.a) Write a C program to find the sum of individual digits of a positiveinteger.
b) A Fibonacci sequence is defined as follows: the first and second termsin the sequence are 0 and 1. Subsequent terms are found by adding thepreceding two terms in the sequence. Write a C program to generatethe first n terms of the sequence.
c) Write a C program to generate all the prime numbers between 1 and n,where n is a value supplied by the user.
d) Write a program which checks a given integer is Fibonacci number or not.

2. a) Write a C program to calculate the following Sum:
Sum=1-x2/2!+x4/4!-x6/6!+x8/8!-x10/10!
b) Write a C program to find the roots of a quadratic equation.

3 a) Write C programs that use both recursive and non-recursive functions
i) To find the factorial of a given integer.

4. Write C programs that implement the following data structures using arrays:
i) Stack ii) Queue.
5. Write C programs to implement the following Stack applications
i) Factorial ii) Evaluations of postfix expression.
6. Write C program to implement the following types of queues
i) Priority Queue ii) Circular Queue.
7. Write C programs to implement the following types of Lists
i) Singly linked list ii) Circular Linked list iii) Doubly linked list.
8. Write C programs to implement the following data structures using Lists
i) Stack ii) Queue.
9. Write C programs to implement the following search algorithms:
i) Linear Search ii) Binary Search iii) Fibonacci Search.
10. Write C programs to implement the following sorting algorithms
i) Bubble Sort ii) Insertion Sort iii) Selection Sort.
11. Write C programs to implement the following sorting algorithms
i) Merge Sort ii) Quick Sort.

12. Write a C program to implement binary tree using arrays and to perform binary tree traversals i) inorder ii) postorder iii) preorder.
13. Write a C program to perform the following operations using linked lists:
i) Insert an element into a binary search tree.
ii) Delete an element from a binary search tree.
iii) Search for a key element in a binary search tree.
14. Write C programs for the implementation of bfs and dfs for a given graph.
15. Write a C program for the implementation of Prim's algorithm to obtain the minimum cost spanning tree from a connected undirected graph.
16. Write a C program to implement Dijkstra's algorithm for the single source shortest path problem.

REFERENCES:

1. G A V PAI, "*Data Structures and Algorithms, Concepts, Techniques and Applications"*, Volume-1, 1st Edition, Tata McGraw-Hill, 2008.
2. Richard F. Gilberg&Behrouz A. Forouzan, "*Data Structures, A Pseudo code Approach with C"*, 2nd Edition, Cengage Learning India Edition, 2007.