# DATA STRUCTURES LAB

| I B. Tech. - II Semester | L | T | P | C |
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| Course Code: A3CS05 | - | - | 3 | 2 |

**COURSE OBJECTIVES**

1. To develop skills to design and analyze simple linear and nonlinear data Structures
2. To strengthen the ability to identify and apply the suitable data structure for the given real world problem
3. To gain knowledge in practical applications of data structures

**COURSE OUTCOMES**

Upon completion of the course, the students will be able to:

1. Design and analyze the time and space efficiency of the data structure
2. Identity the appropriate data structure for given problem
3. Analyze various data structures that can be applied to a given problem
4. Select the most appropriate data structure for a given problem

## EXPERIMENTS

**WEEK 1:**

1. Write a C program that uses functions to perform following operations on complex numbers a) read b) write c) add d) multiply (Use structure to represent complex number)
2. Write a C program that uses functions to perform following operations on Time in seconds, minutes and hours a) read b) write c) add d) sub (Use structure to represent Time)

**WEEK 2:**

1. Write a program for creation, Search and Traversal of Single Linked List
2. Write a program to perform insertion and deletion operations in Single Linked List

**WEEK 3:**

1. Write a program for creation, Search and Traversal of Double Linked List
2. Write a program to perform insertion and deletion operations in Double Linked List

**WEEK 4:**

1. Write a program to implement stack using Arrays
2. Write a program to implement stack using Linked List

**WEEK 5:**

1. Write a program to convert infix expression to postfix expression using stack
2. Write a program to evaluate postfix expression

**WEEK 6:**

1. Write a program to implement Linear queue using Array
2. Write a program to implement Linear queue using Linked List

**WEEK 7:**

1. Write a program to implement insertions and deletions in a circular Queue
2. Write a program to perform search and count operations in a circular queue

**WEEK 8:**

1. Write a program to implement insertions and deletions in a Deque using array
2. Write a program to perform search and count operations in a circular queue using linked list

**WEEK 9:**

Write a program to implement the following
A ) Linear search B ) Binary Search

**WEEK 10:**
Write a program to implement the following
a) Bubble sort b) Insertion sort c) Selection sort

**WEEK 11:**
Write a program to implement the following
a) Merge sort b) Quick sort

**WEEK 12:**
Write a C program that uses functions to perform the following:
a) Create a binary search tree of integers.
b) Traverse the above Binary search tree recursively in Inorder, Preorder and Postorder

**TEXT BOOKS:**
1. Fundamentals of Data structures in C, 2nd Edition, E.Horowitz, S.Sahni and Susan Anderson-Freed, Universities Press.
2. Data structures A Programming Approach with C, D.S.Kushwaha and A.K.Misra, PHI.

**REFERENCE BOOKS**:
1. Data structures: A Pseudocode Approach with C, 2nd edition, R.F.GilbergAndB.A.Forouzan, Cengage Learning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.
3. Data Structures using C, A.M.Tanenbaum,Y. Langsam, M.J.Augenstein, Pearson.
4. Data structures and Program Design in C, 2nd edition, R.Kruse, C.L.Tondo and B.Leung,Pearson