Course Code	Course Title	L	T	P	C
PMCA501P	**Data Structures and Algorithms Lab**	0	0	2	1
Pre-requisite	NIL	**Syllabus version**			
		**1.0**			

Course Objectives:

1. To become more familiar with basic understanding of the algorithmic techniques and also to master the implementation of different data structures.
2. To learn and implement several sorting and graph algorithms.

Course Outcomes:

1. Categorize appropriate data structures as per the given problem definition
2. Solve problems using linear and non-linear data structures
3. Demonstrate operations like searching, insertion, deletion and traversing mechanism on various data structures

Indicative Experiments	Hours
1. **Linear Data Structures - Stacks, Queues and Linked Lists** Implement stack functions using arrays Implement multiple stacks Implementation of multiple queue Implement queue functions using arrays Implementation of circular queue Reversing a queue Reverse a singly linked list Merge two linked list Remove duplicate nodes from sorted linked list Program to find size of doubly linked list Rotate circular linked list by n nodes Find nth node from the end of circular linked list	**9 hours**
2. **Non Linear Data Structures - Trees and Graphs** Merge two binary trees Determine whether the given two binary trees are identical or not Implement backtracking using depth first search Detecting a cycle in the graph Determine the height of a binary search tree Identify if the given binary search tree is valid or not.	**9 hours**
3. **Greedy Approach** Implement kruskal's algorithm Implement prim's algorithm	**4 hours**
4. **Dynamic Programming** Implement floyd-warshall algorithm Implement knapsack problem	**4 hours**
5. **Divide and Conquer Approach** Quick sort Merge sort	**4 hours**

	Total Laboratory Hours	30 hours
Text Book(s)		
1.	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", 2022, 4th Edition, MIT Press, USA.	
Reference Books		
1.	Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", 2019, 4th Edition, Pearson Education, Delhi.	
2.	Michael T. Goodrich, Roberto Tamassia, and Michael H. Goldwasser, "Data structures and Algorithms in Python", 2013, John Wiley and Sons, Inc., United States of America.	
Mode of assessment: CAT, Exercises, FAT		
Recommended by Board of Studies	04-05-2023	
Approved by Academic Council	No. 70	Date	24-06-2023