PG DEPARTMENT OF COMPUTER SCIENCE				*CLASS: I M.Sc.* Computer Science				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/week**	**CIA**	**Ext**	**Total**
I	Major Core Practical - 1	21P1DMP1	Data Structures and Algorithms in C++ LAB	2	4	40	60	100

Nature of Course				
Knowledge and skill			Employability oriented	✓
Skill oriented	✓		Entrepreneurship oriented	

Course Objectives

1. To impart the knowledge on fundamental ADTs.
2. To learn the organized structures of Trees and Hashing.
3. To understand the concepts of updatable Queues and Sorting
4. To apply the Graph Algorithms on related applications.
5. To design optimized algorithms with efficacy.

Unit	Content	Hrs	K-Level	CLO
I	1. Write a program in C++ to find GCD of given two integers. 2. Write a program in C++ to find the power value for given base and raise value. 3. Write a program in C++ to read N elements in arranged order and perform Binary Search technique. 4. Write a program in C++ to find the maximum subsequence sum from the given list of values. 5. Write a program in C++ to check the Balancing of Parenthesis in a given Expression. 6. Write a program in C++ to convert a given Infix Expression in to its equivalent Postfix Expression. 7. Write a program in C++ to evaluate a given Postfix Expression. 8. Write a program in C++ to perform the basic operations of a Circular Queue using Array.	12	Up to K2	1
II	9. Write a program in C++ to perform the basic operations of Sequential List using Linear Linked List. 10. Write a program in C++ to perform the basic operations of a Hash Table using Hash Function. 11. Write a program in C++ to perform the basic operations of a	12	Up to K3	2

	Binary Search Tree. 12. Write a program in C++ to construct an Expression Tree for a given Postfix Expression and print the same in all three orders.			
III	13. Write a program in C++ to read N elements and arrange them in order using Shell sort technique. 14. Write a program in C++ to read N elements and arrange them in order using Heap sort technique.	12	Up to K3	3
IV	15. Write a program in C++ to read a Graph and print it using BFS and DFS methods. 16. Write a program in C++ to find the order of edges for a given Graph using Topological Sort Algorithm. 17. Write a program in C++ to find All-Pairs Shortest-Path for a given Graph.	12	Up to K4	4
V	18. Write a program in C++ to read N elements and arrange them in order using Quick sort technique. 19. Write a program in C++ to read N elements and arrange them in order using Merge sort technique. 20. Write a program in C++ to construct a optimal Binary Search Tree and Print the same.	12	Up to K4	5

Book for Study

Data Structures and Algorithm Analysis in C++ by Mark Allen Weiss, Fourth Edition, Pearson Publications.

Books for Reference

1. "Data Structures with C" by Seymour Lipschutz, Mc Grow Hill Publications.
2."Data Structures and Algorithm Analysis in C" by Mark Allen Weiss, Second Edition, Pearson Publications.
3. "An Introduction to Data Structure with Application" – THM, II Edition – 1991.

Web Resources

1. http://freecodecamp.org
2. https://www.dzone.com
3. https://lecturenotes.in

Rationale for Nature of the course

- Developing logic and structured program, organizing data in software development.

Activities on Skill Oriented

- Implement Programming
- Mini Projects

Activities on Employability Oriented

- Software Development
- Data Analysis

Pedagogy

Projector Demonstration and Practical sessions.

Course Designer(s) Name

1. Mr. K. RajaSaravanaKumar
2. Mrs. R. LakshaPriya

Lesson Plan

UNIT	Topics to be Covered	Hours	Mode
I	Write a program in C++ to perform GCD & power value calculation, Binary Search technique, Infix, Prefix, Postfix operations. Write a program in C++ to perform the basic operations of a Circular Queue using Array.	6 6	Demo & Practical Session
II	Write a program in C++ to perform the basic operations of Sequential List, Hash Table, Binary Search Tree, and Expression Tree.	12	Demo & Practical Session
III	Write a program in C++ to read N elements and arrange them in order using Shell sort, Heap sort technique.	12	Demo & Practical Session
IV	Write a program in C++ using BFS and DFS methods, Topological Sort Algorithm. Write a program in C++ to find All-Pairs Shortest-Path for a given Graph.	6 6	Demo & Practical Session
V	Write a program in C++ to read N elements and arrange them in order using Quick sort , Merge sort technique. Write a program in C++ to construct a optimal Binary Search Tree and Print the same.	6 6	Demo & Practical Session

Course Learning Outcomes

On the completion of the course, the students will be able to

CLOs	COURSE LEARNING OUTCOMES	K – Level
CLO 1	Design and analyze the problem statements and various ADTs.	**Up to K2**
CLO 2	Gain knowledge of non linear data structure like trees and hash which can be applied to solve problems.	**Up to K3**
CLO 3	Describe the computational efficiency of various sorting techniques.	**Up to K3**
CLO 4	Design and implement the graph operations and its application.	**Up to K4**
CLO 5	Analyze the complexity of different algorithms to solve real life problems.	**Up to K4**

Mapping of CLOs with POs

CLOs / POs	PO1	PO2	PO3	PO4	PO5	PO6
CLO 1	3	2	3	3	2	-
CLO 2	3	3	3	3	2	-
CLO 3	3	3	3	2	2	2
CLO 4	3	3	3	3	2	2
CLO 5	3	3	3	3	2	-

(3– Advanced Application, 2 – Intermediate Level, 1- Basic Level)