FACULTY OF COMPUTER SCIENCE
Master of Computer Application (Sem-II)
In Effect from Academic Year 2023-24

Branch Name:	MCA
Program Code:	CS201
Course Name:	Data Structure Practical
Course Code:	3CS2010202P
Pre-requisite Course:	Basic knowledge of programming language like C, C++

Course Objectives:

1. To extend proficiency in implementation of Data Types.
2. To be able to carry out the study of various Algorithms of Time and Space Complexity.
3. To get a good quality understanding of applications of Data Structures.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
				Theory		Practical		
Lecture	Tutorial	Practical	Credit	University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Total
-	-	3	3	-	-	25	25	50

Practical Experiment

LAB/Practical with Object Oriented Programming Language C++

1. Array

1.1 Write a program to insert, Traversing, Delete, Sorting a single Dimension Array.
1.2 Write a program to Marge two array lists.
1.3 Write a program Insert, traversing, Delete, Sorting a 2-Dimension Array.
1.4 Write a program for Addition, Subtraction, and Multiplication of matrices.

2. Stack

2.1 Implement Stack by using static & dynamic storage representation.
(Push, pop, peep, display, isempty, isfull)
2.2 Write a program to print n Fibonacci series.
2.3 Write a program to find factorial of n number.
2.4 Find X^N, i.e. power (x,n) .

3. Queue

3.1 Write a program for Single Queue operation (Insertion, Deletion).
3.2 Write a program for Circular Queue operations (Insertion, Deletion).
3.3 Write a program for Double Ended Queue operations (Insertion, Deletion).

4 Link List

(Operations: Display, Insert, Delete, Search etc.)
4.1 Write a menu driven program that implements singly linked list for the above operations.
4.2 Write a menu driven program that implements doubly linked list for above operations.
4.3 Write a menu driven program that implements circular linked list for the above operation

5 Tree & Graph

5.1 Write a program to create a binary search tree and print it's elements in order
(Write iterative code).
5.2 Write a program to create a binary search tree and print it's elements in preorder
(Write iterative code).

5.3 Write a program to create a binary search tree and print it's elements in postorder (Write iterative code).
5.4 Write a program to create a graph in an adjacency list structure. (Node directory structure) traverse It in DFS.
5.5 Write a program to create a graph in an adjacency list structure. (Node directory structure) traverse it In BFS.

6 Sorting & Searching

6.1 Write a program for linear Search.
6.2 Write a program for binary Search.
6.3 Write a program for implementation of Bubble Sort.
6.4 Write a program for implementation of Insertion Sort.
6.5 Write a program for implementation of Quick Sort.

Text Books:

1. "An Introduction to Data Structures with Applications", Jean-Paul Tremblay, Paul G. Sorenson, Tata McGraw-Hill, 2nd Edition, (2007).
2. "Data Structures Via C++: Objects by Evolution", A. Michael Berman, , Oxford Univ. Press (2004)
3. "Sorting & Searching - The Art of Computer Programming" D E Knuth, , Vol. 3, Pearson Education (1998).

Reference Books:

1. "Fundamentals of Data Structures in C", Horowitz, Sahni, Anderson-Freed, , University Press (2nd edition-2007)
2. "Data Structures Using C & C++", Tenenbaum, PHI.

List of Open Source Software/learning website:

1. https://www.w3schools.in/data-structures
2. https://www.tutorialspoint.com/data_structures_algorithms/index.htm

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom'sTaxonomyLevel
CLO1	To be able to describe and classify fundamental concepts of object-oriented programming, basic and advanced data structures.	2 Understand
CLO2	To choose the best algorithm to solve a problem by considering various problem characteristics, such as the data size, the type of operations, etc.	1 Remember 3 Apply
CLO3	To create the algorithms and program of various operations on Queues, Stacks, Linked Lists, Trees, Graphs, Sorting, Searching, Hash tables.	2 Understand 3 Apply
CLO4	To evaluate algorithms with respect to time and space complexity	3 Apply 2 Understand
CLO5	To be able to design, implement and debug small-to-moderate programs to manipulate and manage data elements while exhibiting the object-oriented programming skills.	7 Create 6 Evaluate 5 Analyze
CLO6	To be able to explain, understand, compare and apply algorithms and principles of object-oriented programming and advanced data structures to a specific situation.	2 Understand 1 Remember

FACULTY OF COMPUTER SCIENCE

Master of Computer Application (Sem-II)

In Effect from Academic Year 2023-24

Mapping of CLOs with Pos & PSOs

Course LearningOutcomes	Program Outcomes(POs)													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CLO1	**M**	**M**	**L**		M		**L**	M	L	M		**M**	**H**	**M**
CLO2	M	M	H			**M**	M			**H**	L	L	**H**	**M**
CLO3	H	M	H		**M**	**M**		**M**	L	M		H	**L**	**M**
CLO4	M		**H**	**M**	M	**L**	M	**L**	**M**		H	H	H	**M**
CLO5	H	M	H		**M**	**M**		**M**	L	M		H	**L**	**M**
CLO6	M		**H**	**M**	M	**L**	M	**L**	**M**		H	H	H	**M**

H: High, M: Medium, L: Low