Integrated MCA I1 Semester 3

Subject Name: Data Structures-Practical **Subject Code:** IMCA13302

Type of course: Professional Core Course

Prerequisite (if any): -

- Programming Language with C
- Mathematical Fundamentals

List of Courses where this course will be prerequisite:

- Computer Networks
- Machine Learning

Rationale: Data structure and algorithms help in understanding the nature of the problem at a deeper level. This helps the students to write efficient code while developing solutions to the problems in computer science.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks		Practical Marks		Total
L	T	P	C	TEE	CAT	TEP	CAP	
0	0	4	2	-	-	30	20	50

CAT: Continuous Assessment Theory comprised of CA1 and CA2 **CA1:** Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving ced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CAP:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

List of Practicals:

Sr. No.	Problem Statement
1	Write a program for insertion and deletion operations in an array.
2	Write a program to search for an element in an array using Linear Search and Binary Search.
3	Write a program to sort an array using Bubble Sort, Selection Sort and Insertion Sort, Quick sort.
4	Write a program to merge two arrays.
5	Write a program to add and subtract two matrices.
6	Write a program to multiply two matrices.
7	Write a program to implement stack operations using an array.
8	Write a program to evaluate a postfix expression using a stack.
9	Write a program to insert an element into a Singly Linked List: (a) At the beginning (b) At the end (c) At a specified position
10	Write a program to delete an element from a Singly Linked List: (a) At the beginning (b) At the end (c) A specified element
11	Write a program to perform the following operations in a Doubly Linked List: (a) Create (b) Search for an element
12	Write a program to perform the following operations in a Circular Linked List: (a) Create (b) Delete an element from the end
13	Write a program to implement simple queue operations using an array.
14	Write a program to implement circular queue operations using an array.

Suggested Specification table with Marks (Practical):

%Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
30	40	15	15	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr. no.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of public ation	Publication Edition
1	Expert Data Structures with C	R.B. Patel	Khanna Book Publishing Company	2023	4th Edition
2	Data Structures with C	Seymour Lipschutz	Schaum's Outlines, Tata McGraw-Hill	2011	2nd Edition
3	Data Structures Through C	YashavantKanetkar	BPB Publications	2022	4th Edition
4	Data Structures Using C	ReemaThareja	Oxford University Press	2014	2nd Edition
5	Fundamentals of Data Structures in C	Ellis Horowitz, SartajSahni, and Susan Anderson-Freed	Universities Press	2007	2nd Edition
6	An Introduction to Data Structures with Applications	Jean-Paul Tremblay, Paul G. Sorenson	Tata McGraw-Hill ISBN: 9780070651500	2007	2nd Edition
7	Data Structures and Algorithm Analysis in C	Mark Allen Weiss	Pearson Education ISBN: 8177583581	2002	2nd Edition

8	Design and Analysis of Algorithms	Parag H Dave, Himanshu B Dave	Pearson Education ISBN: 9332585482	2017	3rd Edition
9	Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L Rivest, Clifford Stein	The MIT Press, ISBN: 978-0262033848	2009	3rd Edition

Course Outcomes:

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % Weightage
CO-1	Understand the fundamental concepts of data structures and apply the concept of arrays	15
CO-2	Perform sorting and searching operations Analyse the sorting techniques	25
CO-3	Implement stack, queue	30
CO-4	Apply linked list operations	30

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13
CO-1	3	1	2	2	1	1	0	2	0	0	1	0	0
CO-2	3	2	3	2	1	1	0	2	0	0	0	0	0
CO-3	3	1	2	2	1	1	0	1	0	0	1	0	0
CO-4	3	1	2	2	1	1	0	1	0	0	1	0	0
Rationale*													

Rationale*: Explaining why it is matching this particular program outcome