

<b>Branch Name:</b>	IMCA
<b>Program Code:</b>	CS301
<b>Course Name:</b>	DATA STRUCTURES-I Practical
<b>Course Code:</b>	1CS3010303P
<b>Pre-requisite Course:</b>	Basic knowledge of programming language like C

### Course Objectives:

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

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

### LAB/Practical with C Language or Object Oriented Programming Language C++

<b>1.</b>	<b>Array</b> 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.
<b>2.</b>	<b>Stack</b> 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).
<b>3.</b>	<b>Queue</b> 3.1 Write a program for Single Queue operation (Insertion, Deletion, and Display). 3.2 Write a program for Circular Queue operations (Insertion, Deletion, and Display). 3.3 Write a program for Double Ended Queue operations (Insertion, Deletion, and Display).
<b>4</b>	<b>Link List</b> <b>(Operations: Display, Insert, Delete, Search etc.)</b> 4.1 Write a program for Link List. 4.2 Write a program that implements singly linked list for the above operations. 4.3 Write a program that implements doubly linked list for above operations. 4.4 Write a program that implements circular linked list for the above operation

### Text Books:

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

### Reference Books:

- "Fundamentals of Data Structures in C", Horowitz, Sahni, Anderson-Freed, , University Press (2<sup>nd</sup> edition-2007)
- "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](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's Taxonomy Level
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.	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

**Mapping of CLOs with Pos & PSOs**

Course Learning Outcomes	Program Outcomes(POs)												Program Specific Outcomes(PSOs)	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	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**