



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	:	School of Computer Engineering			
Course Name & code	:	Data Structures and Algorithms Lab & MCA 4242			
Semester & branch	:	II Semester & M.C.A.			
Name of the faculty	:	Mrs. Linda Varghese & Mr. Shanmukharaja M			
No of contact hours/week:		L	T	P	C
		0	1	3	1

Course Outcomes (COs)

<i>At the end of this course, the student should be able to:</i>		No. of Contact Hours	Marks
CO1:	Demonstrate the working of basic searching, sorting algorithms, and recursion	03	30
CO2:	Demonstrate the memory representation of data structures like sparse matrices, polynomials	02	15
CO3:	Demonstrate data structures like stack, queue, circular queue, linked lists, trees and graphs	05	35
CO4:	Apply the data structure stack to solve some problems	02	20
CO5:	Click or tap here to enter text.	Hrs.	Marks
Total		12	100

Assessment Plan

1. Continuous Evaluation	60%
2 evaluations of 20 marks each : 40 marks. Each evaluation observation book-6 marks, execution check- 7 marks, quiz-7 marks. Mid semester exam : 20 marks Total internal exam – 60 marks.	
2. Lab Examination	40%
<ul style="list-style-type: none"> • 2 questions of 20 marks each 	

Lesson Plan

L. No.	Topics	Course Outcome Addressed
L1	Mapping of 2-D arrays to 1-D arrays: 1. Map the following 2-D arrays (matrices) to 1-D arrays (lists). a) Upper triangular matrix b) Lower triangular matrix c) Diagonal matrix d) Tri-diagonal matrix e) Row-major f) Column-major Display the element at any specified position (row, column).	CO2
L2	1. Represent a sparse matrix using 1-D array. Use this 1-D array to reconstruct the original matrix. 2. Represent a polynomial using 1-D array and perform addition operation on two polynomials.	CO2
L3	Solving problems using Recursion: a) Tower of Hanoi for n disks (Recursion application) b) Factorial of a given number c) GCD of 2 numbers d) Fibonacci series upto nth term	CO1
L4	1) Implementation of Stack using arrays 2) Conversion of Infix expression to Postfix expression (using stack) 3) Conversion of Infix expression to Prefix expression (using stack)	CO3,CO4
L5	1) Evaluation of Postfix expression 2) Evaluation of Prefix expression	CO3,CO4
L6	1) Implementation of Queue using arrays 2) Implementation of Circular Queue using arrays	CO3
L7	1) Implement a sorted singly linked list. Include the following options: inserting a node, deleting a node and displaying the list. 2) Reverse a singly-linked list using recursion.	CO3

	3) Implementing stack using Singly linked list. 4) Implementing queue using Singly linked list	
L8	1) Implement a sorted doubly linked list. Include the following options: inserting a node, deleting a node and displaying the list in both directions. 2) Create a binary search tree and traverse it in preorder, inorder and postorder traversal methods	CO3
L9	1. Represent a directed graph in the following ways: a) Adjacency matrix b) Adjacency list 2.) Represent an undirected graph in the following ways: a) Adjacency matrix b) Adjacency list	CO3
L10	Implement the following sorting techniques. (a) Quick sort (b) Bubble sort (c) Selection sort (d) Insertion sort	CO3, CO5
L11	1. Merge Sort 2. Implement the following searching techniques. a) Sequential search. b) Binary search (Iterative method). c) Binary search (Recursive method).	CO3, CO5
L12	End-Semester Laboratory Examination	-
L13	Click or tap here to enter text.	CO
L14	Click or tap here to enter text.	CO

References:

1. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", 4th Edition, Addison Wesley, 2009.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein "Introduction to Algorithms", 3rd Edition, PHI Publications, 2009.
3. Sartaj Sahani, "Data Structures, Algorithms and Applications in C++", 2nd Edition, Universities Press, 2005. J. P. Trembley and Sorenson, "An Introduction to Data Structures with Applications" 2nd Edition, 36th Reprint, McGraw Hill, 2008.
4. J. P. Trembley and Sorenson, "An Introduction to Data Structures with Applications" 2nd Edition, 36th Reprint, McGraw Hill, 2008.
5. Click or tap here to enter text.

6. Click or tap here to enter text.
7. Click or tap here to enter text.

Submitted by: Mrs. Linda Varghese

(Signature of the faculty)

Date: 07-01-2026

Approved by: Dr. Radhika M Pai

(Signature of HOD)

Date: 07-01-2026

FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

FACULTY	SECTION	FACULTY	SECTION
Mrs. Linda varghese	B, C		
Mr. Shanmukharaja M	A		
