COURSE PLAN

Department	:	Computer Applications
Course Name & code	:	Data Structures and Algorithms Lab & MCA 4261
Semester & branch	:	II Semester & M.C.A.
Name of the faculty	:	Miss Linda Varghese; Dr Sandhya Parasnath Dubey

No of contact hours/week:	L	T	P	C
	0	1	3	1

Course Outcomes (COs)

	At the end of this course, the student should be able to:	No. of Contact Hours	Marks
CO1:	Understand the working of basic searching and sorting algorithms	02	-
CO2:	Understand the memory representation of data structures like sparse matrices and polynomials	02	-
CO3:	Understand the implementation of data structures like stack, queue, circular queue, linked lists, trees and graphs	05	-
CO4:	Apply the data structure stack to solve some examples	02	-
CO5:	Understand the working of advanced sorting methods	01	-
	Total	12	-

Assessment Plan

1. Continuous Evaluation	60%
6 evaluations of 10 marks each =60 marks	
2. Lab Examination	40%
• 2 questions of 20 marks each	

Lesson Plan

L. No.	Topics	Course Outcome Addressed

L1	Mapping of 2-D arrays to 1-D arrays:
	    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).
		CO1

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.	CO1

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
		CO2

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)	CO2
L5	1) Evaluation of Postfix expression 2) Evaluation of Prefix expression	CO3
L6	1) Implementation of Queue using arrays 2) Implementation of Circular Queue using arrays	CO4
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. 3) Implementing stack using Singly linked list. 4) Implementing queue using Singly linked list	CO3

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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
L11	1. Merge Sort 2. Implement the following searching techniques. a) Sequential search. b) Binary search (Iterative method). c) Binary search (Recursive method).	CO3
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: Miss Linda Varghese; Dr. Sandhya Parasnath Dubey

(Signature of the faculty)

Date: 28-02-2022

Approved by: Dr. Karunakar A Kotegar

(Signature of HOD)

Date: 28-02-2022

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

FACULTY	SECTION	FACULTY	SECTION
Miss Linda Varghese	A		
Dr. Sandhya Parasnath Dubey	B		

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