Techno College of Engineering Agartala

An Engineering College Approved by AICTE, MHRD, Govt. of India
Affiliated to Tripura University (A Central University),
Department of Electrical & Computer Engineering

List of Laboratory Experiments

Data Structure & Algorithms Laboratory							
Course Code	**Hours / Week**				**Maximum Marks**		
PC ECS 409	L	T	P	C	**CIA**	**SEE**	**Total**
	0	0	2	1	40	60	100
Number of classes: 24 hours			**Prerequisites:** Data Structure & Algorithms				
Branch: ECSE			**Semester: IV**				

Course overview:

This laboratory course provides hands-on experience in designing, implementing, and analyzing fundamental data structures and algorithms using programming. Students will work on arrays, stacks, queues, linked lists, trees, graphs, and sorting/searching techniques. Emphasis is placed on practical coding skills, algorithmic problem solving, and understanding data structure operations and their applications.

Course objectives:

1. **To implement and manipulate basic data structures** such as arrays, stacks, queues, and linked lists.
2. **To understand and apply tree and graph traversal algorithms** including DFS, BFS, and binary tree operations.
3. **To develop algorithms for sorting, searching, and expression evaluation** using stack and queue concepts.
4. **To solve problems involving complex data structures** such as sparse matrices, polynomial operations, and graph algorithms like minimum spanning tree and shortest path.

Course outcomes:

CO Number	CO Description	K-level
CO-1	Assess performance efficiency of sequential algorithms.	K-6
CO-2	Construct data structures to enable algorithms and implement sequential algorithms for performance.	K-5
CO-3	Apply essential data structures such as lists, stacks, queues, treesand graph.	K-3
CO-4	Apply essential data structures such as lists, stacks, queues, treesand graph.	K-3
Sl. No.	**EXPERIMENT NAME**	**CO**

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1.	Program to calculate series	CO1
2.	Implementation of array operations.	CO2
3.	Stacks and Queues: adding, deleting elements, Circular Queue: Adding & deleting elements Merging Problem.	CO3
4.	Evaluation of expressions operations on multiple stacks & Queues.	CO3
5.	Implementation of linked lists: inserting, deleting, and inverting a linked list.	CO3
6.	Implementation of stacks & queues	CO3
7.	Conversion of infix to postfix expression.	CO3
8.	Evaluation of postfix expression.	CO3
9.	Using linked lists: Polynomial addition, Polynomial multiplication Sparse Matrices: Multiplication, addition.	CO3
10.	Sparse Matrices: Multiplication, addition.	CO3
11.	Recursive and Non-recursive traversal of Trees.	CO3
12.	Threaded binary tree traversal. AVL tree implementation.	CO3
13.	Implementation of Tree, sorting and searching algorithms, Hash implementation: searching, inserting and deleting, searching & sorting techniques.	CO3
14.	Finding simple interest for a given Principal, Time and rate of Interest.	CO1
15.	Finding sum, average, maximum and maximum in an integer array.	CO1
16.	Searching and insertion of element in integer array	CO2
17.	Implementation of different sorting techniques in integer array.	CO2
18.	Construction of Graph using 2-D array for directed and undirected, weighted and unweight graphs.	CO3
19.	Implementation of minimum spanning tree in a given graph.	CO3
20	Construction of binary tree using linked list ADT.	CO3
21	Implementation of Depth First Search in binary tree.	CO3
22	Implementation of Breadth First Search in binary tree.	CO3
23	Pre order Tree Traversal technique.	CO3
24	In order Tree Traversal technique.	CO3
25	Post order Tree Traversal technique.	CO3
26	Finding shortest path in a given graph.	CO3

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