

## LESSON PLAN

**Subject: Data Structures using C++**

**Subject code: MCA-20-12**

**Semester: Ist**

<b>Sr. No.</b>	<b>Topic</b>	<b>No. of Lectures</b>	<b>CO Covered</b>	<b>Teaching Methodology</b>
1	Introduction to Data Structures: Classification of Data Structures	1	CO1	Board
2	Complexity of Algorithms, Abstract Data Types	1		PPT
3	Arrays, Representation of Arrays in Memory, Operations on Array	1		Board
4	Implementation of Arrays in C++	1		Flip Learning
5	Strings and its Representation in Memory, Operations on Strings	1		PPT
6	Implementation of Strings in C++	1		Board
7	Pointers, Sparse Matrices	1		Board
8	Sorting: Bubble Sort, Selection Sort, and Insertion Sort	1		Board
9	Implementation of Sorting in C++	1		Board
10	Searching: Linear Searching, Binary Searching	1		Board
11	Implementation of Searching in C++	1		Board
12	Linked Lists: Introduction, Types and Operations (Insertion, Deletion)	1	CO2	PPT
13	Linked Lists Operations (Traversal, Searching, Sorting)	1		PPT
14	Implementation of Linked Representations in C++	1		Board
15	Applications, Dynamic Memory Management, Polynomial Representation and Addition	1		Board
16	Stacks: Representation of Stacks, Stack Operations	1		Board
17	Stacks: Applications, Recursion	1		Board
18	Implementation of Stacks in C++	1		Board
19	Queues: Representation of Queues, Queue Operations	1		Board
20	Circular Queues, Dequeue, Priority Queues, Applications	1		Board
21	Implementation of Queues in C++	1		Board

22	Trees: Definition and Basic Terminologies, Representation of Trees, Types of Trees	1	<b>CO3</b>	PPT
23	Binary Trees, Representation of Binary Trees	1		PPT
24	Binary Tree Traversals	1		Board
25	Binary Tree Traversals (Contd.), Threaded Binary Trees	1		Board
26	Binary Search Trees and Operations	1		Board
27	AVL Trees	1		Board
28	Heap, Heap-Sort	1		Board
29	M-Way Search Trees	1		Board
30	B-Trees, B <sup>+</sup> Trees	1		Board
31	Applications, Implementation of trees in C++	1		PPT
32	Graphs: Definitions and Basic Terminologies, Representation of Graphs	1		<b>CO4</b>
33	Graph Traversals	1	Board	
34	Operations on Graphs	1	Board	
35	Shortest Path Problem (Warshall's Algorithm and Dijkstra's Algorithm)	1	PPT	
36	Minimum Spanning Tree (Prim's and Kruskal's Algorithm)	1	PPT	
37	Applications, Implementation of Graphs using C++.	1	Board	
38	Sorting: Types of Sorting, Implementation of Different Sorting Techniques in C++: Merge Sort, Radix Sort	1	Board	
39	Counting Sort, Bucket Sort, Searching: Recursive Binary Search	1	Board	
40	Hashing: Hash functions, Collision Resolution, Implementation using Linear and Quadratic Probing, Chaining using C++	1	PPT	