**Institute of Information Technology and Management, New Delhi**

**(Affiliated to GGSIP University)**

Lesson Plan for **DATA STRUCTURES LAB USING C**

Programme: **BCA** Semester: **II** Paper Code: **174** Academic Year: **2021-22**

**Course Objectives:**

. 1. To impart practical knowledge of different Data Structures.

2. Enable students to efficiently implement programs using C Programming language.

**Course Outcomes:**

CO1: The student shall able to understand various data structures after analyzing algorithms.

CO2: The Student will apply data structure algorithms and their design for any problem to be solved.

CO3: The Student will understand analytical techniques for analyzing the performance of any algorithm.

CO4: The Student will understand the different data structure through programming language.

CO5: The student shall able to synthesize efficient algorithm for given data structure.

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| **Course Outcomes** | **Programme Outcomes** | | | | |
|  | **PO1**  **Core Subject Knowledge** | **PO2**  **Enquiry-Based Learning** | **PO3**  **Cognitive Skills and Critical Thinking** | **PO4**  **Communication, Adaptive & Interpersonal Skills** | **PO5**  **Holistic Outlook** |
| **CO1** | High | Low | High | Low | Low |
| **CO2** | High | High | High | Low | Moderate |
| **CO3** | High | High | High | Moderate | Moderate |
| **CO4** | High | High | High | Moderate | Low |
| **CO5** | High | Moderate | High | Moderate | Low |

| **S No** | **Lecture Objective** | **Problem Statement** | **No Of Hours** | **Lecture Outcome** | **uNIT No.** | **Date On Which Completed** |
| --- | --- | --- | --- | --- | --- | --- |
| **L1** | To implement an arrays | Write a program to implement one-dimensional array   1. Insertion 2. Deletion 3. Traversal 4. Reverse 5. Merge | 4 |  | 1 |  |
| **L2** | To apply basic ,mathematical operations on multi dimensional arrays | Write a Program to perform operations on matrix like addition, subtraction, and multiplication | 2 |  | 1 |  |
| **L3** | To identify sparse matrix | Write a program to accept matrix from user and find out whether the matrix is sparse or not. | 2 |  | 1 |  |
| **L4** | To implement sparse matrix | Write a program to create a sparse matrix | 2 |  | 1 |  |
| **L5** | To execute Linear search algorithm | Write a Program to perform Linear search in an unsorted array. | 2 |  | 1 |  |
| **L6** | To perform Linear search algorithm | Write a Program to perform Linear search in a sorted array. | 2 |  | 1 |  |
| **L7** | To realize Binary search algorithm | Write a Program to perform Binary search in a sorted array. | 2 |  | 1 |  |
| **L8** | To implement sorting algorithm | Write a Program to perform Bubble and Insertion sort. | 2 |  | 1 |  |
| **L9** | To implement sorting algorithm | Write a Program to perform Selection sort and Merge sort | 2 |  | 1 |  |
| **L10** | To implement basic operation on linear linked list | Write a Program to perform insertion (Beg,Pos,end), deletion (Beg,Pos,End) and traversing on linear linked list. | 4 |  | 2 |  |
| **L11** | To Implement of a singly linked list | Write a Program to implement student record which contains student name, roll no., average marks using Singly linked list | 4 |  | 2 |  |
| **L12** | To implement basic operation on linear linked list | Write a program to create two Linked lists from a given list in following way. Input List:-1 2 3 4 5 6 7 8 9 10  O/p-first list -1 3 5 7 9  Second list :-2 4 6 8 10 | 2 |  |  |  |
| **L13** | To implement basic operation on linear linked list | Write a Menu Driven program to implement searching , sorting and Reversing in Linear Linked List | 4 |  |  |  |
| **L14** | To Create circular linked list | Write a Program to implement circular linked list and perform operations on it. | 2 |  | 2 |  |
| **L15** | To perform operation on doubly linked list | Write a Program to perform insertion and deletion on doubly linked list | 2 |  | 2 |  |
| **L16** | To implement polynomial addition | Write a program that implements polynomial addition | 2 |  | 2 |  |
| **L17** | To implement stack | Write a menu-driven program that implements static and dynamic stack | 2 |  | 3 |  |
| **L18** | To put into practice infix to prefix operation | Write a Program to convert an Infix expression to Prefix form. | 2 |  | 3 |  |
| **L19** | To implement infix to post fix operation | Write a Program to convert an Infix form to Postfix form | 2 |  | 3 |  |
| **L20** | To execute postfix to infix operation | Write a Program to convert expression in postfix form to prefix form | 2 |  | 3 |  |
| **L21** | To implement Linear queue | Write a Program that implements static and dynamic Linear queue | 2 |  | 3 |  |
| **L22** | To implement Circular queue | Write a Program that implements static and dynamic Circular queue | 2 |  |  |  |
| **L23** | To implement BST | Write a Program to create binary search tree and perform following operations:   1. Insertion 2. Deletion 3. Height of the tree 4. Searching 5. Display the binary tree in tree form | 2 |  | 4 |  |
| **L24** | To implement Recursive Algorithms | Write a Program to implement recursive algorithms for BST Traversal – Inorder, Preorder, and Postorder | 2 |  | 4 |  |

**TEXT BOOKS:**

[T1] Schaum’s Outline Series, “Data Structures”, TMH, Special Indian Addition, 17th Reprint, 2014

**REFERENCES BOOKS:**

[R1] Yashwant Kanetkar, “Data Structures Through C”,BPB Publications, 3rd Edition, 2019