**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**