***LAB BASICS***

Course Title**: DATA STRUCTURES AND ALGORITHM LAB**

Course Code**: CSL-221**

Credit Hours**: 3+1**

Prerequisite**: CSL-210**

Course Instructor**:** **Engr. LARAIB SIDDIQUE**

Lab Instructor**:** **Engr. AYESHA KHAN**

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**Course Objectives & Description:**

This course introduces the formal concepts of data structures, algorithms, and their interrelationships. This course also develops skills in the design of algorithms and data types and introduces abstract methods for analyzing and comparing data structures-and algorithms. At the end of this course students will be familiar with a range of important data structures and algorithms to develop computing solutions to various problems. Contents include Introduction to Data Structures, Introduction to Algorithms, Arrays, Searching Techniques, Sorting Techniques, Stacks, Recursion, Queues, Linked List, Trees, and Graphs.

**Course Learning Outcomes (CLOs):**

Upon completion of this course, students will be able to:

|  |  |  |  |
| --- | --- | --- | --- |
| **CLO #** | **CLO Statements** | **Bloom’s Taxonomy Code** | **Associated PLO** |
| CLO 1 | Follow the instructions to implement guidelines complying the concepts of data structures and algorithm | P3 | PLO5 |
| CLO 2 | Display the spirit of self-reliance to complete the lab journal timely and professionally. | A3 | PLO9 |
| CLO 3 | Show the ability to act upon a sequence of steps pertaining to designing and configuring the important concepts of advance algorithms. | P4 | PLO3 |
| CLO 4 | Design & implement Data Structures projects according to the specific requirements ensuring objective-based approach to implement appropriate data structure algorithms | P4 | PLO5 |
| CLO 5 | Display project management skills and objective based approach to develop networking solutions in a teamwork environment | A3 | PLO11 |
| CLO 6 | Explain different concepts of Data Structure and Algorithms using Arrays, Searching Techniques, Sorting Techniques, Stacks, Recursion, Queues, Linked List, Trees, and Graphs. | A2 | PLO10 |

**Weekly Breakdown:**

|  |  |  |
| --- | --- | --- |
| **Week** | **Lab**  **Number** | **Title of Lab** |
| **1** | **1** | Introduction to Arrays |
| **2** | **2** | Linear Search and Sorting |
| **3** | **3** | Linked List |
| **4** | **4** | Doubly and Circular Linked List |
| **5** | **5** | Stacks |
| **6** | **6** | Recursion |
| **7** | **7** | Open Ended Lab I |
| **8** | **8** | **Lab Mid Exam**+ Merge Sort & Quick Sort |
| **9** |  | **MID EXAMS** |
| **10** | **9** | Queues |
| **11** | **10** | Binary Search |
| **12** | **11** | Static Tree and Binary Search Tree |
| **13** | **12** | Dynamic AVL Tree, B-Tree |
| **14** | **13** | Heap, Bucket and Radix Sort |
| **15** | **14** | Hashing |
| **16** | **15** | **Lab Final Exam** |
| **17** | **16** | Project Demonstration and Viva |
| **18** |  | **FINAL EXAMS** |

***NOTE:***

1. *This schedule is subject to revisions as conditions may warrant.*
2. *Topics will be covered in sequence no matter if city observes any planned or unplanned holidays.*
3. *The information in this course outline is subject to revision as conditions may warrant.*

***LAB ASSESMENT METHOD***

**Method of Evaluation and Structure:**

A student’s grade will be based on multiple measures of performance as mentioned below:

|  |  |
| --- | --- |
| **LAB EVALUATION** | |
| **Evaluation Instruments (EI)** | **Marks** |
| **LAB JOURNAL** | **40** |
| * **LAB PERFORMANCE+OEL (P3)** * **LAB FILE SUBMISSION (A5)** | **30**  **10** |
| **ASSIGNMENT I (P3)** | **10** |
| **PROJECT** | **30** |
| * **DEMONSTRATION (P4)** * **MANAGEMENT(A5)** | **20**  **10** |
| **EXAM** | **20** |
| * **MID LAB EXAM (P2)** * **FINAL LAB EXAM (P2)** | **5**  **15** |
| **TOTAL:** | **100** |

**Mapping of CLOs to PLOs (Program Learning Outcomes)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| PLOs | CLOs | | | | |
| CLO 1 | CLO 2 | CLO 3 | CLO 4 | CLO 5 |
| PLO:1 (Engineering Knowledge) |  |  |  |  |  |
| PLO:2 (Engineering Problem Analysis) |  |  |  |  |  |
| PLO:3 (Designing and Development) |  |  |  |  |  |
| PLO:4 (Investigation) |  |  |  |  |  |
| PLO:5 (Modern tool usage) |  |  |  |  |  |
| PLO:6 (Engineer and Society) |  |  |  |  |  |
| PLO:7 (Environment and Sustainability) |  |  |  |  |  |
| PLO:8 (Professionalism and Ethics) |  |  |  |  |  |
| PLO:9 (Individual and Team Work) |  |  |  |  |  |
| PLO:10 (Communication) |  |  |  |  |  |
| PLO:11 (Project Management) |  |  |  |  |  |
| PLO:12 (Lifelong Learning) |  |  |  |  |  |