|  |  |
| --- | --- |
| Logo Fast | **NATIONAL UNIVERSITY**  **of Computer & Emerging Sciences, Lahore** |

Department of Computer Science

**CS2001 – Data Structures**

**Spring 2023**

**Instructor:** Samman Ashraf **Email:** samman.ashraf@nu.edu.pk

**Office Hours:** TBA

**Credit Hours:** 3 + 1 **Prerequisite** Object-Oriented Programming

**Course Objectives:**

CS2001 is a core Computer Science course with Computer Programming as its prerequisite. The objectives of this course are:

* Introduce students with data structures and their associated algorithms
* Introduce the concept of efficient data structures and how this efficiency can be measured
* Prepare students to select appropriate data structure for a given computational problem.

**Text Book:**

Any one of these books is recommended as a text book:

* Mark Allen Weiss, *Data structures and algorithm analysis*, Pearson Education, 2007.
* Adam Drozdek, *Data structures and algorithms in C++*, Course technology, 2004.
* Nell Dale, *C++ Plus Data Structures*, 3rd Edition, Jones and Bartlett, 2003.

|  |  |
| --- | --- |
| **LECTURES** | **TOPICS** |
| 1 | Introduction |
| **2** | Time Complexity Analysis and Asymptotic Bounds |
| **4** | List, Stacks, and Queues <Array based> |
| **4** | Linked Lists  Review of pointers  Singly linked lists |
| **MIDTERM 1** | |
| **2** | Doubly linked lists, circular lists and corresponding iterators  Linked list bases stacks and queues |
| **2** | Recursion |
| **5** | Trees  Binary trees and their traversals  Binary search trees (Insertion, Deletion and Search) |
| **2** | Height Balanced Binary Search Trees (AVL Trees) |
| **MIDTERM 2** | |
| **2** | Heaps and heap sort |
| **1** | Data compression and Huffman coding |
| **1** | Hashing  Hash tables and hash functions Collision resolution |
| **2** | Graph data structure, Breadth first search and Depth first  search |

**(Tentative) Grading Criteria:**

Assignments **(10%)** Quiz **(10 %)** Midterms **(30 %)**

Project **(10%)** Final Exam **(40 %)**

**Course Policies:**

* + Quizzes may be unannounced.
  + All assignments and course work must be done individually.
  + In case of cheating, both parties will be considered equally responsible.80% attendance is required for appearing in the exams.No Late Submissions
  + No Makeup Quizzes.
  + 80% attendance is required for appearing in the Final exams.

**Passing criteria:**

Minimum requirement to be eligible to pass this course is to get at least 50% marks in the course. All CS department's grading policies apply. Grading scheme for this course is **Absolute**.