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

FAST School of Computing

**CS2001 – Data Structures**

**Fall 2022**

**Instructor Name:** Uzair Naqvi  **TA Name:** TBA

**Email address:** uzair.naqvi@nu.edu.pk **Email address:**

**Office Location/Number:** M-118 **Office Location/Number:**

**Office Hours:** Mon, Wed 02:00 PM -03:30 PM **Office Hours:**

**Course Information**

**Program:** BS **Credit Hours:** 3 **Type:** Core

**Pre-requisites (if any):** CS1004 - Object Oriented Programming

**Course Website (if any)**:

**Class Meeting Time:** Sec BCS-3B: Tues, Thurs 10:00am – 11:20am

**Class Venue:** CS-5

**Course Description/Objectives/Goals**

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.

**Course Textbook**

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.
* Michael T. Goodrich, Roberto Tamassia and David M. Mount, Data structures and algorithms, 2nd Edition, John Wiley & Sons, 2011.

**Tentative Weekly Schedule**

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| Lectures | Topics |
| 1 | Introduction |
| 2 | Time Complexity Analysis and Asymptotic Bounds |
| 5 | Linked Lists Review of pointers  Singly linked lists, doubly linked lists, circular lists and corresponding iterators |
| 2 | Stacks and Queues |
| MiDTerm 1 | |
| 2 | Recursion |
| 3 | Trees Binary trees and their traversals  Binary search trees (Insertion, Deletion and Search) |
| 3 | Height Balanced Binary Search Trees (AVL Trees) |
| 2 | Heaps and heap sort |
| MiDTerm 2 | |
| 1 | Data compression and Huffman coding |
| 2 | Hashing Hash tables and hash functions  Collision resolution |
| 3 | Graph data structure, Breadth first search and Depth first search |
| 2 | Advanced Topics |

**(Tentative) Grading Criteria**

1. Assignments (20 %)
2. Quizzes (10 %)
3. Midterms (30 %)
4. Final Exam (40 %)

**Grading Scheme:** Absolute

**Course Policies**

* + Quizzes will be announced.
  + There will be no makeup quiz.
  + Minimum requirement to pass this course is to obtain at least 50% marks.
  + All assignments and course work must be done individually. **Plagiarism** in any work (Quiz, Assignment, Midterms, and Final Exam) from any source (Internet or a Student) will result in **F** grade.
  + No Late Assignment Submissions
  + All the CS department’s grading policies apply.