NATIONAL UNIVERSITY
of Computer & Emerging Sciences, Lahore

F A S T S c h o o l o f C o m p u t i n g

CS2001 – Data Structures
FALL 2021

Instructor Name: Abeeda Akram
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Office Location: Old-Admin Block Exam Hall
Office Hours: Monday- Wednesday 12:00 to 02:00 PM

TA Name: Muhammad Zubair Khan
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Course Information

Program: BS (CS) **Credit Hours:** 3+ 1 for Lab **Type:** Core

Pre-requisites: Object Oriented Programming

Class Meeting Time: BCS-3A Tue- Thu 10:00 – 11:30 AM **BCS-3B** Tue- Thu 11:30 – 1:00 PM

Class Venue: CS-10

Course Description/Objectives/Goals:

- 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 Learning Outcomes (CLOs):

At the end of the course students will be able to:	**Domain**	**BT* Level**
Understand data structures and their use.	C	2
Select efficient and appropriate data structures for different applications.	C	3

* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain

Bloom's taxonomy Levels: 1. Knowledge, 2. Comprehension, 3. Application, 4. Analysis, 5. Synthesis, 6. Evaluation

Course Textbooks:

- 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

Lecture Count	Topics
1	Introduction
3	Time Complexity Analysis and Asymptotic Bounds
4	Review of Pointers and class Templates **Linked Lists:** Singly linked lists, doubly linked lists, circular lists and corresponding iterators. Skip List (optional)
2	Stacks (Expression Evaluation), Queues
Mid 1	
2	**Recursion** with Time complexity Analysis
3	**Trees:** Binary trees and their traversals Binary search trees (Insertion, Deletion and Search)
3	Height Balanced Binary Search Trees (AVL Trees)
2	Priority Queues Or Heaps and heap sort
Mid 2	
1	Data compression and Huffman coding
4	**Hashing:** Hash tables and hash functions Collision resolution methods Universal hashing Bit vectors and bloom filters
3	**Graph:** Breadth first search and Depth first search Finding Paths, Cycles

(Tentative) Grading Criteria:

1. Assignments **(15 %)**
2. Quizzes **(10 %)**
3. Midterms **(30 %)**
4. Final Exam **(45 %)**

Grading scheme for this course is **Absolute** under application of CS department's grading policies.

Minimum requirement to pass this course is to obtain at least **50%** absolute marks

Course Policies:

- Quizzes may be announced or surprise.
- All assignments and course work must be done individually.
- **Plagiarism** in any work (Labs, Quiz, Assignment, Midterms, and Final Exam) from any source, Internet or a Student will result in **F** grade or deduction of absolute marks.
- No Late Submissions or Makeup Quizzes.
- 80% attendance is required for appearing in the Final exams.