**Department of Computer Science and Engineering**

**Foundations of Data Structures**

**CSCE 2110.501 - Summer 2025**

**Class Timings:** Tuesday and Thursday, 2:00 PM – 3:50 PM, FRLD 380

**Instructor:** Zeenat Tariq, [Zeenat.Tariq@unt.edu](mailto:zeenat.tariq@unt.edu)

**Office**: FRLD Staff Room

**Office Hours:** Thursday 1:00 PM to 2:30 PM [or by appointment].

**Teaching Assistant: Seemaparvez Shaik,**seemaparvezshaik@my.unt.edu

Office Hours: In person: Thursdays 12-1 pm

Zoom link: Every week on Friday  <https://us05web.zoom.us/j/82996581207?pwd=5cOUuTKFP5ZzCMTHNTH5aoKvmIrreL.1>

**Course Webpage:** All the course related material will be posted on the course webpage which is available through Canvas (<https://learn.unt.edu>).

**Textbook:**

**Primary Text**: *C++ Plus Data Structures* by Nell Dale, 6th Edition, Jones & Bartlett Learning

*Additional Material(for some topics): Data Structures and Algorithm Analysis in C++; Mark Weiss, 2013. ISBN 9780132847377*.

**Course Description**

This course introduces basic data structures such as arrays, linked lists, stacks, queues, and trees. It provides a foundational understanding of how data is stored and accessed efficiently, focusing on the practical applications of data structures and fundamental algorithms.

**Prerequisite(s):** Completion of CSCE 1040 with a grade of C or better.

Basic skills in programming would be required for practical coding.

**Course Outcomes**

* Understand basic data structures such as arrays, linked lists, stacks, queues, and trees.
* Implement fundamental data structures using C++.
* Analyze basic algorithms using time complexity (Big O notation).
* Apply recursion to solve problems.
* Understand and implement sorting algorithms (e.g., bubble sort, insertion sort).
* Understand basic hash tables and collision resolution techniques.
* Develop problem-solving skills using these data structures and algorithms in C++.

**Grading:**

|  |  |
| --- | --- |
| Recitation and Class Activities | 20% |
| Quizzes | 20% |
| Homework Assignments | 30% |
| Exam | 30% |

**Class Activities:** There will be several class activities for the discussed topics during the class session that will reinforce the concepts that we learned in the class. These class activities will be scheduled during the class timing.

**Quizzes:** There will be two quizzes from the topics discussed in class and will be scheduled during the class timing.

**Programming Assignments:** The programming assignments are an integral part of the course and are intended to provide experience in the application of the design techniques discussed in lecture. Programming assignments will be assigned on **Thursdays** as per the schedule and with a due date of about **two weeks** after it is assigned. There will be two programming assignments assigned. While there is flexibility in developing your solution on your personal system, it is essential that programming assignments are ultimately completed and submitted on the CSE servers. Any evidence of group participation or copying from unauthorized sources will be interpreted as academic dishonesty.

**Exams:** There will be a midterm and final exam. The exams are closed books and closed internet. Mobiles phones are not allowed and browsing the internet is not allowed. Exams will include material from the modules, the readings, homework, and labs and should be taken individually and not as a team.

***Note:*** *Final exam times will follow the university registrar's schedule for Summer 2025 Finals, and no exceptions will be made for conflicts. If you have a scheduling conflict, please contact the faculty to resolve it. You will be notified in advance if there are any changes to the schedule or if the exam is moved to the prior week.*

**Missing Classes, Assignments, or Exams:** Attendance at all exams, and class activities is mandatory. Throughout the semester, a student may miss classes, assignments, or exams due to many reasons. Most of the reasons will not be accepted as an "excused" absence. Assignments, or exams can be made-up only under extraordinary circumstances and only when notification is given to me before the assessment, quiz, or exam is administered. A no-show for an assessment or exam without prior notification and a verifiable excuse (proper official documentation) will result in a grade of zero (0) for that assessment, quiz, or exam.

**Disputing Grades:** If you have a dispute with how an assignment, or exam is graded, contact the grader, and discuss it with them. The grader will listen to your concern, and act on it, at their discretion. In any case, they will sign the assignment verifying that they saw it again. Note that instructor or grader addition errors should follow the above procedure. Assignment, quiz, exam, and homework grades are disputable for **one week** from the day the grades were assigned on Canvas.

**Supporting Your Success and Creating an Inclusive Learning Environment**

Every student in this class should have the right to learn and engage within an environment of respect and courtesy from others. We will discuss our classroom’s habits of engagement and I also encourage you to review UNT’s student code of conduct so that we can all start with the same baseline civility understanding ([Code of Student Conduct](https://policy.unt.edu/policy/07-012)) (<https://policy.unt.edu/policy/07-012>).

**Disability Services/Special Needs:**

UNT follows all federal and state laws and regulations regarding discrimination including the Americans with Disability Act of 1990 (ADA). If you have a disability and need a reasonable accommodation for equal access to education or services, please contact the Office of Disability Accommodation. Please initiate this process and inform me during the first two weeks of class.

**ADA accommodation statement:**

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the [Office of Disability Access](https://studentaffairs.unt.edu/office-disability-access) website (<https://studentaffairs.unt.edu/office-disability-access>). You may also contact ODA by phone at (940) 565-4323.

**Academic Dishonesty:**

All the provisions of the University code of academic integrity apply to this course. In addition, it is my understanding and expectation that your signature on any test or assignment means that you neither gave nor received unauthorized aid. For homework and programming assignments, while discussion is allowed, direct copying is not, and students must turn in individual submissions. All students are required to know, observe, and help enforce the UNT Code of Student Academic Integrity. Cheating will result in disciplinary action according to UNT Policy 18.1.16. The penalty for a first offense can range from a formal warning to an ‘F’ for the course. Regardless of the penalty imposed, a record of the offense will be kept in the Office of the Dean of Students.

**Other Policies:**

Students should refer to any other polices from University, College and/or Department.

**Attendance and Participation**

Research has shown that students who attend class are more likely to be successful. You should attend every class unless you have a university excused absence such as active military service, a religious holy day, or an official university function as stated in the [Student Attendance and Authorized Absences Policy (PDF)](https://policy.unt.edu/policy/06-039) (<https://policy.unt.edu/policy/06-039>).  If you cannot attend a class due to an emergency, please let me know. Your safety and well-being are important to me.

**Communication Expectations:**

The best way to reach me outside of class/office hours is via email. During the week I will respond to your email within 24-48 hours. During the weekend, response time may be longer. This includes personal concerns or questions about the class or an assignment. The TA/IA and I strive to get grades back between 1-1.5 weeks from the due date, though that is not always possible when the class is large. Communication is expected to be professional and respectful. Online Communication Tips: (<https://clear.unt.edu/online-communication-tips>) are available When contacting either the instructor or TA/IAs please include "**CSCE 2110.508**" in the subject line.

**Announcements:**

Stay tuned and make sure to check Canvas frequently. Important announcements will be posted there.

**Class Policies:** Please note that portable phones, pagers, and late arrivals are disruptive to the instructor and to your peers. The use of cell phones, beepers, or communication devices is disruptive and is therefore absolutely prohibited during class and exams. Turn off your cell phone while in class and while taking exams. If I catch you using these devices in the class or during the exams, the penalty can range from a formal warning to an ‘F’ for the course and you will be asked to leave the class. Except in emergencies, students using such devices must leave the classroom for the remainder of the class period. I know that some of you may wish to take notes directly on your computer and I have no problem with that. If, however, you choose to access your email, search the web, play games, or instant messenger your friends during class, you will have 5% deducted from your final grade for each transgression. If I am late arriving to class, it will be because of circumstances beyond my control. You are expected to remain for 15 minutes past the scheduled class start time while I attempt to communicate my situation and relay instructions.

**Student Perceptions of Teaching (SPOT):** Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The short SPOT survey will be made available **by the end of Semester** to provide you with an opportunity to evaluate how this course is taught.

**Assessing Your Work**

**Course Policies:** You are expected to spend at least 10 hours per week for this course. Keep all your graded assignments, and tests for study and review. You should track your own progress on Canvas and be aware of current grades throughout the term. If you would like to look at the graded assignments, meet me during my office hours or setup an appointment. Final grading will be done as follows. **A**: >= 90%, **B**: >= 80% and < 90%, **C**: >= 70% and < 80%, **D**: >= 60% and < 70% and **F**: < 60%. Grades will be curved if necessary. Grades cannot be changed after they have been electronically entered into the university’s system except for instructor error. Any extenuating circumstances that may adversely affect your grade must be brought to my attention before the final course grades are recorded. To be considered, such circumstances must be unusual, unavoidable, and verifiable.

**Course Requirements/Schedule**

**Syllabus Revisions:** This syllabus may be changed as the course progresses. Notice of such changes will be sent by canvas or in class announcement.

**Tentative Course Schedule:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Topic** | **Content** |  |
| Week 1 | Introduction to Data Structures & Programming Tools | - Introduction to Data Structures and Abstract Data Types (ADT) - IDE Setup and Basic Programming in C++ |  |
| Week 2 | Arrays and Strings | - Static Arrays vs Dynamic Arrays - String Manipulation: Basic Operations and Functions |  |
| Week 3 | Linked Lists | - Singly Linked Lists and Basic Operations - Doubly Linked Lists - Circular Linked Lists | Quiz 1 |
| Week 4 | Stacks and Queues | - Stack and Queue Fundamentals (LIFO and FIFO) - Implementation with Arrays and Linked Lists | Assignment 1 |
| Week 5 | Recursion | - Base Case and Recursive Case - Simple Recursive Algorithms (Factorial, Fibonacci) | MidTerm |
| Week 6 | Trees (Binary Trees) | - Introduction to Trees - Binary Tree Traversal (Pre-order, In-order, Post-order) - Basic Binary Search Trees (BST) |  |
| Week 7 | Heaps and Priority Queues | - Introduction to Heaps (Min-Heap, Max-Heap) - Implementing Priority Queues | Quiz 2 |
| Week 8 | Hash Tables | - Basic Hash Functions - Collision Resolution Methods (Chaining, Open Addressing) | Assignment 2 |
| Week 9 | Introduction to Sorting Algorithms | - Simple Sorting Algorithms (Bubble Sort, Insertion Sort) - Introduction to Time Complexity |  |
| Week 10 | Review and Final Exam Preparation | - Recap of Data Structures - Practice Problems and Final Exam Preparation | Final Exam |