# CSCE 2110 - Foundations of Data Structures

Course Information & Syllabus (Fall 2025)

https://hengfan2010.github.io/teaching/25F-2110

## Basic Course Information

- **Instructor:** Dr. Heng Fan
- **E-mail:** heng.fan@unt.edu (best way to reach out)
- **Office:** Discovery Park F284
- **Phone:** 940-565-3209
- **Office Hours:** Wednesday 8:30 - 10:30 am or by appointment
- **Lecture**
  - **Time:** Monday/Wednesday 1:00 - 2:20 pm
  - **Classroom:** LIFE A204
- **Recitation**
  - **Section 211:** Wednesday 11:30 - 12:20 pm (room: NTDP F270)
  - **Section 213:** Thursday 9:30 - 10:20 am (room: NTDP F210)
  - **Section 215:** Wednesday 11:30 - 12:20 pm (room: NTDP F236)
- **Teaching Assistant (TA)**
  - **Bing Fan:**
    Office hours: 2:00 - 4:00 pm on Monday (Office: F232) or by appointment
    E-mail: bingfan@my.unt.edu
  - **Phongsiri Nirachornkul:**
    Office hours: 11:00 - 1:00 pm on Tuesday (Office: GAB 330) or by appointment
    E-mail: PhongsiriNirachornkul@my.unt.edu

## Course Description

The goal of this course is to introduce students to various advanced data structures (such as lists, stacks, queues, trees, hash tables, graphs), algorithms (such as a variety of sorting algorithms, tree-related algorithms, and graph-related algorithms), and their implementations. By the end of this course, each student will have a strong understanding of fundamental data structures, appreciate the levels of abstraction used in their design and analysis, and improve their software development skills through implementation and application of these data structures and related algorithms. Topics may include:

- Review of C++ and object oriented programming
- Arrays and lists
- Analysis of algorithms
- Stacks and queues
- Basic tree-based data structures
- Tree traversal algorithms
- Advanced tree-based data structures
- Hash tables
- Sorting algorithms
- Graph-based data structures
- Depth-first and breadth-first search algorithms and applications
- Shortest distance path and minimum spanning tree problems and algorithms

## Textbook

- ***Introduction to Algorithms***, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, 3rd Edition.
  (We will use the e-book this semester).

## Prerequisite(s)

**CSCE 1040** or **CSCE 1045**: know how to write C/C++ program and compile on your own.

## Expected Student Outcomes

Student outcomes are measurable achievements to be accomplished by the completion of the degree. These outcomes are evaluated as part of our ABET accreditation process.

- Understand and be able to analyze fundamental data structures such as stack, queue, tree, hash tables, and graph
- Understand and be able to analyze the complexities of algorithms
- Understand and be able to analyze different algorithms such as various sorting algorithms, traversal algorithms, depth-first search and breadth-first search algorithms, shortest path solving algorithms, and minimum spanning tree algorithms
- Apply the appropriate data structures and related algorithms to solve practical problems
- Be able to implement and above data structures and algorithms in C/C++
- Collaborate with other students in a team towards the design and development of programming solutions for projects

## Grading

- Quizzes: 25%
- Assignments: 40%
- Midterm exam: 15%
- Final exam: 20%
- Course project: 5% (bonus)

**Quizzes:** There will be 5 or 6 in-class quizzes during the whole semester. Each quiz may contain 4-5 questions. There will be **no** makeup quizzes except for cases mentioned in the make-up policy.

**Assignments:** There will be 4 or 5 homework assignments (all are programming exercises). Please note the following rules for the assignments:

- You **must** do the homework assignments (4 or 5) by yourselves. Do **not** share your code.
- Each assignment will specify the material to be turned in. All programming assignments **must** be in C++. The reason for using C++ is to make grading easier.
- Assignments mush be turned in using Canvas and contain ample comments and descriptions. Assignments via e-mails will **not** be accepted.
- A README file in .txt format is needed for each assignment to instruct how to run your code. All programs will be compiled and executed on the university's machines, and any that fail to compile or execute on that system may lose points.
- For late submissions, a late penalty of 10% will be applied for up to 3 calendar days. No credit will be given after 3 days.

**Midterm and final exams:** The exams will be during class on TBD. These exams must be taken in class unless otherwise specified in advance.

**Course project:** The course project is optional, and each team (up to two team members) should work independently for the project. It will be a coding task to implement a practical system using appropriate data structures and algorithms. Do **not** share the solution and code. More details about the project will be announced in a certain class.

**Grading scale (based on 100 points):**

- 90−100 = A
- 80−89 = B
- 70−79 = C
- 60−69 = D
- below 60 = F

No exceptions will be made.

## Attendance Policy

Students are required to attend all lectures and recitations in order to gain the full benefit of the course. While I will be posting my slides before class, they may not contain all of the content discussed during class, nor the examples presented on the board. You are responsible for any missed material and completing all work by the assigned due dates. You should notify the instructor or teaching assistant of your absence as soon as possible if you are not able to attend class or recitation.

## Recitation Policy

Recitations are designed to reinforce key concepts from lectures and support the development of course project if you choose to do the project. Attendance is mandatory. Failure to attend recitations or to arrive on time may negatively affect your project outcomes and result in a loss of recitation credit.

## Make-up Policy

For most situations there will be no make-up work for any assessment in this course. However, in the event of an unavoidable absence for one of the reasons below, email the instructor as soon as possible so we can work out a solution. The following events are grounds for make-up work: being a participant in a conference in which you are presenting; being in an athletic or other UNT associated event in which you are an active participant; a family emergency; a severe illness; military duty; or in certain cases and with some restrictions a religious event. Additionally, in the case of a missed assignment due to illness, make-up work will only be allowed by providing the instructor with a physical copy of a signed doctor's note. See the UNT Attendance Policy for more information.

## Content Responsibility Policy

Students are responsible for all content presented during class and required readings from the textbook. While attendance will be taken in class, you will be expected to know and understand the requisite topics and concepts. If you are confused or unsure about anything, please ask the instructor or teaching assistant know.

## AI Course Policy

AI-generated submissions are not permitted and will be treated as plagiarism. In case a student needs to use an AI tool, they must ask for the instructor's permission before utilizing AI writing

software (such as ChatGPT and all other similar tools) for any assignments in this course. Utilizing these tools without obtaining permission could jeopardize your academic integrity.

## UNT Policies

**Academic Integrity and Consequences:** According to UNT Policy 06.003 (`https://policy.unt.edu/policy/06-003`), Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

In addition, the CSE department policies on Academic Integrity and Student Conduct apply for this course – these are available at the following webpage: `https://engineering.unt.edu/cse/students/resources/academic-integrity.html`. Any exceptions to this policy are noted explicitly in the syllabus.

Most lectures in class will have homework assignments. Students may discuss the homework problems and approaches with each other but must work on their solutions individually unless otherwise stated in the assignment. Students must not copy homework from any source, including other students or the internet. No collaboration is allowed in quizzes and exams.

**Acceptable Student Behavior:** Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Center for Student Rights and Responsibilities to consider whether the student's conduct violated the Code of Student Conduct. The university's expectations for student conduct apply to all instructional forums, including university and electronic classroom, labs, discussion groups, field trips, etc.

**Americans with Disabilities Act:** We cooperate with the Office of Disability Accommodation to make reasonable accommodations for qualified students (cf. Americans with Disabilities Act and Section 504, Rehabilitation Act) with disabilities. If you have not registered with ODA, we encourage you to do so. If you have a disability for which you require accommodation, please discuss your needs with the instructor or submit a written Accommodation Request on or before the fourth-class day.

## Disclaimer

Please note, this syllabus is to serve as a guide and may be subject to changes. For up-to-date information, assignments, and class material, students are recommended to check out course website or Canvas regularly. This syllabus may be updated in the future to reflect changes. The updated version will be available in the course website and on Canvas.