CSCE 3110 - Data Structures and Algorithms

Course Information & Syllabus (Fall 2022)

https://hengfan2010.github.io/teaching/22F-3110/index.htm

Basic Course Information

Instructor:	Dr. Heng Fan
E-mail:	heng.fan@unt.edu
Office:	Discovery Park F284
Phone:	940-565-3209
Office Hours:	Thursday 2:30 – 4:30 pm or by appointment
Lecture Time:	Fall 2021: Tuesday/Thursday 1:00 - 2:20 pm
Classroom:	NTDP B142
TA:	Xiaoqiong Liu E-mail: xiaoqiongliu@my.unt.edu Office: F289; Office hours: Thursday 4:10-6:10 pm

Recommended Textbooks

- **Data Structures & Algorithm Analysis in C++ (4th edition)**, by Mark Allen Weiss
- **Introduction to Algorithms**, by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein

Prerequisites

CSCE 2100 and **CSCE 2110** or equivalent. You need to know how to write C++ program and compile on your own, and basic knowledge of elementary data structures.

Course Description

The aim of this course is to provide an introduction to the design and analysis of fundamental data structures and algorithms. The lectures will emphasize the theoretical aspects, while the homework assignments will focus more on the programming and hands-on experience, meant to reinforce the theoretical aspects covered in lectures. Topics include:

- Time and space analysis
- Recursion and recurrence relations
- Review of basic data structures, including arrays, lists, stacks, queues, etc.
- Tree-based data structures, including heaps, BSTs, AVL trees
- Hashing
- Data structures for storing graphs, elementary graph algorithms and their applications
- Algorithms for solving minimum spanning tree problem and their implementations

ABET Outcomes

After completing the course satisfactorily, a student is expected to:

- Understand time complexity of algorithms
- Be able to solve recurrence relations
- Understand and be able to analyze the performance of data structures for searching, including balanced trees, hash tables, and priority queues
- Apply graphs in the context of data structures, including different representations, and analyze the usage of different data structures in the implementation of elementary graph algorithms including depth-first search, breadth-first search, topological ordering, Prim's algorithm, and Kruskal's algorithm.
- Be able to code the above-listed algorithms

Grading

Quizzes:	20%
Assignments:	40%
Midterm exam (closed book):	15%
Final exam (closed book):	20%
Attendance:	5%
Course Project (optional):	5% (bonus)

Quizzes: There will be 4 or 5 in-class quizzes. Each quiz may contain 3-4 questions. There will NOT be any makeup quizzes.

Assignments: There will be 4 or 5 homework assignments (mixed with written and programming exercises).

- You are expected to do homework assignments (4 or 5) by yourselves. Even if you discuss them with your classmates, you should turn in your own. Do NOT share your code!
- Each assignment will specify the material to be turned in. All programming will be in C++ and must compile on a University Unix/Linux machine. No credit will be given for programs that do not compile.
- Assignments are due before class on the due date. Assignments may be turned in electrically using Canvas. A late penalty of 10% will be applied to all late assignments for up to 3 calendar days. No credit will be given after 3 days.

Midterm and final exams: The mid-term exam will be during class on TBD. The final exam will be on TBD.

Attendance: Attendance may be checked on randomly selected days. You are responsible for any missed material and completing all work by the assigned due dates. You should notify the instructor of your absence as soon as possible. For each absence over three, a student's final grade will be reduced by 1 point, but no more than 5 points accumulated.

Course project: The course project is optional, and you should work on your own for the project. It will be a coding task to implement a practical system using appropriate data structures and algorithms. Students may discuss the project, but don't 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

UNT Policies

Academic Integrity and Consequences: According to UNT 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.

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

This syllabus is to serve as a guide and may be subject to changes. Up-to-date information, assignments, and class material can be found in the course space on Canvas. This syllabus may be updated to reflect changes. The updated version will be available in the course space on Canvas.