# 316 Data Structures

## Fall  2020

**Instructor:** Dr. En Cheng

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**Office Hours on MS Teams:** Monday 4:50-5:20PM  & Wednesday 4:50-5:20PM  & Thursday 3:30-4:30PM (or by appointment)

**Course Prerequisites:** 3450:221/215 Calculus I; 3460:210 CS II

**Course Descriptions:** The study of data structures is core to the CS curriculum, providing the techniques and tools necessary to construct efficient solutions for real world problems. This course presents the fundamentals of data structures including linked structures, lists, stacks, queues, graphs, and tree structures for problem resolution. As such, it is a study of the design, implementation, and choosing the appropriate data structures required to solve specific problems.

## Course Objectives

- Equip students with an understanding of common abstract data types and their corresponding implementations
- Understand the performance and memory tradeoffs of different concepts and implementations
- Reinforce problem solving and programming skills using the C++ Programming Language

**Textbook:** Data Structures and Other Objects Using C++ ($4^{th}$ edition), by Michael Main, Walter Savitch

## Tentative Course Outline

- Elementary data structures
- Stacks and queues
- Sequential and linked implementation of stacks and queues
- Recursive thinking
- Binary trees and general trees
- Binary search trees and balanced binary search trees
- Sorting algorithms - selection sort, insertion sort, heap-sort, merge-sort, and quick-sort
- Searching methods - sequential search and binary search
- Hashing
- Graphs

## Assignments and Tests

- Programming assignments.
- One close-book midterm.
- One close-book final.
- Quizzes.

## Grading Policies

Your grade will be based on assignments (35%), a midterm exam (25%), a final exam (25%), quizzes (10%), and class participation (5%). Exams are closed book and closed notes. Each  programming  assignment  is

worth roughly the same amount. Late assignment submissions will be penalized 10% per day late. No credit for work more than 48 hours late.

A: 94%-100%, A-: 90%-93.9%, B+: 87%-89.9%, B: 84%-86.9%, B-: 80%-83.9%, C+: 77%-79.9%, C: 74%-76.9%, C-: 70%-73.9%, D+: 67%-69.9%, D: 64%-66.9%, D-: 60%-63.9%, F: Less than 60%.

**Program Submissions**

All programs will be submitted using Brightspace. **DO NOT submit programs that are not reasonably correct!** To be considered reasonably correct, a program must work correctly for sample data provided with the assignment. Programs failing to meet these minimum standards will be returned ungraded. Late submission penalty will be added on top of this penalty. **A minimum requirement for passing this course is the completion of all programming assignments (each must be reasonably correct).**

**Attendance:** Students are expected to attend all class meetings prepared and to participate in classes.

**Registration:** All students attending the class must register. Students who fail to register are not permitted to participate.

**Scholastic Honesty and Professional Integrity:** All work turned in for grade shall be exclusively the work of the student whose name appears on the work. Different submissions with equivalent syntax or control flow shall be considered plagiarized. Do not share your code with other students.

Incidents of academic dishonesty (such as cheating or plagiarism) will be handled in accordance with university policy by the Office of Student Conduct. In particular, the use of sources other than the textbook without citation, including other books and the World Wide Web, will be viewed as plagiarism. More information can be found at https://www.uakron.edu/studentconduct/code-of-conduct.dot.

**Accessibility:** Any student who feels that she or he may need an accommodation based on the impact of a disability should contact the Office of Accessibility at 330-972-7928. The office is located in Simmons Hall, 105. More information is available at https://www.uakron.edu/access/.

**Title IX:** The University of Akron is committed to providing an environment free of all forms of discrimination, including sexual violence and sexual harassment. This includes instances of attempted and/or completed sexual assault, domestic and dating violence, gender-based stalking, and sexual harassment. Additional information, resources, support and the University of Akron protocols for responding to sexual violence are available at http://www.uakron.edu/Title-IX/

**Face Covering Policy:** To protect the health and safety of our community, students, faculty, staff and visitors must wear face coverings that cover their mouth, nose, and chin while on campus. This includes all hallways, public spaces, classrooms and other common areas of campus buildings, as well as offices, labs, work spaces, and outdoor settings when 6-feet social distancing cannot be maintained. Students needing accommodations may contact the Office of Accessibility.

Students not wearing a face covering in class will be reminded to do so. Faculty should direct students who need a mask to the Student Union, the Student Recreation Center, or Simmons Hall to pick up their free masks. If a student refuses to wear a face covering (or to wear one properly), the faculty member will ask the student to leave the classroom. As a last resort, campus police may be called. The faculty member may submit a student conduct referral form to the Office of Student Conduct. Students who fail to follow this policy will be subject to progressive discipline that may result in the student's removal from the in-person course.