

# CSCI 362: Data Structures

Jingnan Xie

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## Instructor

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Office Hours: Mon, Fri 02:00 PM–02:55 PM

Tue 12:00 PM–01:00 PM

Wed 01:00 PM–03:00 PM

Feel free to contact me through email or phone.

## Course Description

This course is a systematic study of data structures and their algorithms, organized around the unifying concept of data and code abstraction. Emphasis is placed on ADT-based and object-oriented design, incremental development and testing, and comparison of data structure implementations. Topics include abstract data types (ADTs), objects, algorithm design and analysis, trees, sorting, searching, hash tables, and graphs. This course includes a laboratory component and is currently taught using C++.

*Prerequisite(s):* Grade of C- or better in both CSCI 140 and CSCI 162

## Course Outcomes

At the end of this course, a successful student will be able to

1. Implement elementary data structures such as linked lists, stacks, queues, and binary trees;
2. Apply a variety of more advanced data structures, such as hash tables, balanced search trees, and graphs, to solve problems;
3. Perform simple algorithm complexity analyses;
4. Formulate divide-and-conquer algorithms using recursion; and
5. Describe the importance and key points of a professional code of ethics.

## Course Information

	Section 01	Section 02
Lecture Days	Monday, Friday	Monday, Friday
Lecture Times	1:00pm-1:50pm	3:00pm-3:50pm
Lecture Room	Roddy 136	Roddy 136
Lab Day	Tuesday	Tuesday
Lab Time	1:10pm-3:00pm	3:10pm-5:00am
Lab Room	Roddy 136/Linux	Roddy 136/Linux

## Textbook

- *Note:* The textbook is optional but highly recommended
- Weiss *Data Structures and Algorithm Analysis in C++, 4e* ISBN: 978-0132847377

## Course Policies

### Responses

I will respond to emails within 24 hours unless an exception is noted through email, D2L, or in class. Please note that this means if you email me the night before an exam or assignment submission, I am not guaranteed to respond. Start labs when they are assigned.

### Announcements

I will frequently post announcements through email and new/additional material on D2L. Under inclement weather, due dates may be pushed back or changed at my discretion, so please pay attention to all announcements.

### D2L (Desire2Learn)

I will use D2L as the grade portal for classes. The submission portion may also be leveraged for homework assignments. Lecture material and notes are also accessible through D2L.

### Office Hours

I hold office hours for your benefit. Please do not hesitate to show up to office hours! If you find that my office hours do not fit your schedule, let me know so we can arrange for a time that does work.

### My Expectations of Students

- Arrive prepared and on time for class
- Engage in active discussion during lecture
- Ask questions. Do not hesitate to clarify a concept
- Do your best work and be confident in your abilities
- Check email frequently for announcements and additional information

- Adhere to Millersville University’s Academic Honesty Guidelines

## Lecture

Attendance of the lecture is mandatory. I encourage everyone to make an active attempt toward participating. There are times where many examples throughout the lecture are better suited to be done with pen and paper. Please refrain from using your computer for any other reason than note-taking/class-taking. I also do not expect to see any mobile phones in use during class.

## Laboratory

Attendance of any laboratory component is also mandatory. Assignments will be given and will most likely take more time to complete than the lab period. You are permitted to leave the lab period if and only if you have completed the assignment. **Missing lab periods will result in a 2% grade reduction per occurrence**

## Grading Policy

- 5% of your grade will be determined by your attendance during the semester
- 30% of your grade will be determined by two midterm exams during the semester
- 30% of your grade will be determined by the final exam
- 35% of your grade will be determined by laboratory and homework assignments
- Up to 2% will be added to your grade *at the professor’s discretion* based on active participation during lecture and laboratory periods.

I will grade on a ten-point grading scale. I will round any grades. An 89.51 will be classified as a A-.

≥ 93	≥ 90	≥ 87	≥ 83	≥ 80	≥ 77	≥ 73	≥ 70	≥ 67	≥ 63	≥ 60	< 60
A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

**YOU MUST ATTEMPT ALL EXAMS, HOMEWORKS, AND ASSIGNMENTS TO PASS THE COURSE.**

**YOU MUST EARN AT LEAST A 70% EXAM AVERAGE TO EARN A C- IN THIS COURSE.**

## Labs

Labs will have a grading turnaround time of one (1) week from the due date. Lab grades can only be contested for up to one week from when the grade is posted on D2L. **Three grace days** will be provided throughout the semester without penalty. **Otherwise, no late submissions will be permitted.**

## Homeworks

Homework assignments will be submitted digitally through D2L or Autolab (depending on which is more appropriate). **No late submissions will be permitted with homework assignments.** All homeworks will have a grading turnaround time of one (1) week from the due date. Homework grades may only be contested for up to one week from when the grade is posted on Desire2Learn.

## University Policies

### Academic Dishonesty Policy

- **Things you may do:**
  - Discuss approaches to solving a problem, as long as the discussion remains **above the level of detail** expected for the course.
  - Seek aid in resolving compiler messages.
  - Email me or visit me during office hours.
  - Go to tutoring to ask about theoretical concepts
- **Things you may not do:**
  - Copy a code fragment verbatim
  - Copy a code fragment and rename variables
  - Visit any website with purchasable solutions (e.g. Chegg)
  - Post to or visit websites with resources to problems (e.g. StackOverflow)
  - Obtain any solution on open repositories (e.g. GitHub)
  - Obtain a solution from someone who has previously taken the class

*Obtaining a solution on the Internet or elsewhere and submitting it as your own work is plagiarism and will result in severe disciplinary measures.* Be sure you can explain every line of every program you submit. **Writing code is no different than writing a paper – if it was not your original idea, then you should not submit it as your own work.** If you have to question whether or not something is acceptable, it is likely **not** acceptable.

### Title IX

Millersville University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment, comply with Title IX of the Education Amendments of 1972, 20 U.S.C. §1681, et seq., and act in accordance with guidance from the Office for Civil Rights, the University requires faculty members to report to the University's Title IX Coordinator incidents of sexual violence shared by students. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project. Faculty members are obligated to report to the person designated in the University Protection of Minors policy incidents of sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred.

Information regarding the reporting of sexual violence, and the resources that are available to victims of sexual violence, is available at <http://www.millersville.edu/sexualviolence/index.php>

### Counseling Resources

Students sometimes face mental health or drug/alcohol challenges in their academic careers that interfere with their academic performance and goals. Millersville University is a caring community and resources are available to assist students who are dealing with problems. The Counseling Center (717-871-7821) is an important resource for both mental health and substance abuse issues. Additional resources include: Health Services (871-5250), Center for Health Education & Promotion (871- 4141), Campus Ministries, and Learning Services (717-871-5554).

## Planned Course Schedule<sup>1</sup>

- Week 01, 08/21 - 08/25:** Introduction, C++ Primer, [Intro to C++ Lab](#)
- Week 02, 08/28 - 09/01:** Pointers and `std::vector`, [Lab Time](#), [Using `std::vector` Lab](#)
- Week 03, 09/04 - 09/08:** Implementing `std::vector`, [Vector](#)
- Week 04, 09/11 - 09/15:** Iterators and `std::list`, [Lab Time](#), [Using `std::list` Lab](#)
- Week 05, 09/18 - 09/22:** Implementing `std::list`, [List](#)
- Week 06, 09/25 - 09/29:** **Exam 1**, Using `std::set`, [Sieve](#)
- Week 07, 10/02 - 10/06:** Binary Search Trees, Implementing `std::set`, [SearchTree](#)
- Week 08, 10/09 - 10/13:** Balanced Binary Search Trees, [Lab Time](#), [2-3-4 Trees](#)
- Week 09, 10/16 - 10/20:** Hash Tables, [Lab Time](#), [HashMap](#)
- Week 10, 10/23 - 10/27:** **Exam 2**, Divide-and-Conquer Sorting, [Recursion Lab](#)
- Week 11, 10/30 - 11/03:** Non-Comparison-Based Sorting, [Sorting Lab](#)
- Week 12, 11/06 - 11/10:** Disjoint Sets, [Lab Time](#), Graphs (terminology, DFS, BFS), [DisjointSet](#)
- Week 13, 11/13 - 11/17:** Graphs (topological sort, Prim's, Kruskals), [Graph Lab](#)
- Week 14, 11/20 - 11/24:** Thanks Giving Break
- Week 15, 11/27 - 12/01:** Final Week

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<sup>1</sup>Subject to change