CS 159: Advanced Programming  
James Madison University, Fall 2021 Semester, 3 Credits

Class Times:  
Section 4: Tu/Th, 1:00 PM – 2:15 PM  
Section 5: Tu/Th, 2:40 PM – 3:55 PM

Location:  
ISAT/CS 236

Prerequisite:  
B– or better in CS 149 or equivalent

Your Instructor

Dr. Chris Mayfield (mayfiecs@jmu.edu)  
Office: ISAT/CS 208    Phone: 540-568-3314

Note: The best way to contact me is by email or direct message.

Office Hours:  
M/W/F, 2:20 PM – 4:00 PM  
and other times by appointment

Goals and Objectives

Catalog description: “Students use advanced problem-solving strategies to develop algorithms using classes and objects and techniques such as recursion, exceptions, and file I/O. This course also focuses on designing small applications and effective testing strategies.”

By the end of CS 159, you should be able to:

- Use advanced programming techniques such as inheritance, polymorphism, abstract classes, and interfaces; exceptions, file I/O, and recursion; data structures such as multi-dimensional arrays, ArrayList, and HashMap.

- Implement appropriate object-oriented design techniques. Interpret UML diagrams and their relationship to the design process.

- Practice effective testing techniques to debug an application thoroughly during development.

- Read and understand software specifications; write code that conforms to requirements and to professional standards.

Last but not least, I hope you will have fun learning to develop more advanced kinds of programs!
Methods of Instruction

Spoiler alert! If you’re hoping for long lectures day after day, you signed up for the wrong course. Research has shown that active learning methods are more effective than passively taking notes. This course uses two instructional strategies: Process Oriented Guided Inquiry Learning (for group work) and Collaborative Learning (for in-class labs). Here is what a typical week looks like:

- **Monday:** Homework due at 11:00 PM. Finish up the previous week’s work, review your notes, and ask questions about what you don’t understand.
- **Tuesday:** POGIL activity, mini-lecture, homework debrief.
- **Wednesday:** Start on the next homework, if you haven’t already. Complete the assigned readings, and figure out what you need to learn this week.
- **Thursday:** Hands-on lab, examples, homework hints, Q&A.
- **Friday:** Complete as much of the homework as you can by the end of today so that it doesn’t loom over you all weekend! Ask questions as needed.

*Note: I generally will not provide assistance between Friday at 5:00 PM and Monday at 8:00 AM. If you choose to start homework at the last minute, you might be on your own. I will respond to communications sent over the weekend on Monday morning.*

Course Technologies

All course materials (e.g., handouts, slides, videos, sample code) will be posted on the course website:

https://w3.cs.jmu.edu/mayfiecs/cs159/

I will use Canvas for making announcements, posting sample solutions, and communicating grades:

https://canvas.jmu.edu/

We will use Discord for informal discussions, virtual office hours, and homework Q&A:

https://discord.com/

I will use Gradescope to give you detailed feedback on written assignments and exams:

https://gradescope.com/

You will use Autolab to submit programming assignments and labs before I grade your code:

https://autolab.cs.jmu.edu/

*Note: These technology decisions are subject to change, depending on how things go. If local health conditions require us to meet online, we will hold class synchronously via Discord.*
Free Textbooks!

Weekly readings will be selected from the following books, all of which are freely available online:

- **The Java™ Tutorials**
  [https://docs.oracle.com/javase/tutorial/](https://docs.oracle.com/javase/tutorial/)

- **Think Java, 2nd Edition**
  Allen Downey & Chris Mayfield
  [https://thinkjava.org/](https://thinkjava.org/)

- **Patterns for Beginning Programmers**
  David Bernstein

You are certainly welcome to read any other book(s) you like. Numerous textbooks about Java are available commercially. I’m happy to make recommendations, if these books don’t work for you.

Course Culture

Please help us maintain a collaborative learning environment that encourages questions, provides opportunities for significant learning, and actively involves everyone in discussions.

Professional Conduct

The ACM Code of Ethics and Professional Conduct ([https://www.acm.org/code-of-ethics](https://www.acm.org/code-of-ethics)) forbids discrimination and harassment of all types. If you feel someone is violating these principles (e.g., by making inappropriate or demeaning remarks), it is your responsibility to take action by informing me or, if you feel comfortable doing so, addressing the individual directly. I will do my best to preserve your confidentiality while addressing the issue.

Diversity and Inclusion

Learning environments should be built on mutual respect and support a diversity of thoughts, perspectives, experiences, and identities. Please advise me regarding any concerns or personal circumstances (including your name’s proper pronunciation, any name or pronouns not reflected on MyMadison, or significant extracurricular commitments) that might be relevant to your full participation in this course.

Academic Honesty

Students who violate the Honor Code ([http://www.jmu.edu/honorcode/code.shtml](http://www.jmu.edu/honorcode/code.shtml)) will receive a reduced or failing grade *in the course*. Other penalties may be imposed, and all violations will be reported to the Honor Council. Automated tools may be used on any assignment, at any time, to detect inappropriate collaboration and to determine the originality of submissions.
Methods of Evaluation

Participation

Most in-class activities will include a graded component. They are generally due at the end of class or 11:00 PM on the same day. You are encouraged to work with other students both during and after class time. I will drop several scores in this category to allow for occasional absences.

Homework

Written and/or programming exercises will be assigned each week. These assignments are generally due on Mondays at 11:00 PM (when the TA hours end). You are welcome to discuss assignments with other students, but the solutions and source code you submit must be entirely your own work. Programs will be graded on correctness, documentation, and overall code quality.

Midterms/Final

We will have two midterms during class and a comprehensive exam during finals week. Each exam will consist of two parts: one for written problems, and one for programming. If you must be absent during an exam for a legitimate reason, please contact me at least one week beforehand to make special arrangements. Some portion of the exams may be given asynchronously.

Grading Criteria

Your grade in CS 159 will be based on:

- 25% Final Exam
- 20% Midterm #2
- 15% Midterm #1
- 25% Homework
- 15% Participation

Letter grades will be assigned on the scale A=90–100, B=80–89, C=70–79, D=60–69, F=0–59, with potential minor adjustments after considering the overall performance of the class and actual distribution of numeric scores. I will use “+” and “–” grades at my discretion. I do not assign WP or WF grades except in extreme circumstances.

Students who do not earn 60% of the points on the final exam will receive a letter grade no higher than C– for the course.

Late Work Policy

Deadlines exist so that I can release homework solutions promptly. Therefore, late work will not be accepted without special permission. I am willing to work with you if your circumstances suddenly change (e.g., if you or family members become hospitalized).
University Requirements

Adding/Dropping

You are responsible for enrolling in courses and verifying your schedule on MyMadison. The last day to add a semester course is Monday, 09/13/2021 (permission required after Friday, 09/03/2021). The last day to withdraw from a course with a W grade is Wednesday, 10/27/2021.

Attendance Policy

You are expected to participate in every class, either in person or online. I understand that things come up, and you might need to be absent occasionally. That’s why I automatically drop several scores in the participation category. Don’t ask if you “missed anything important”—every class is important. If you are not feeling well or suspect you might be sick, please stay at home!

Disability Services

If you have a documented disability and need accommodations in this course, please register with the Office of Disability Services (http://www.jmu.edu/ods, Student Success Center, Room 1202, 540-568-6705). They will provide you with an Access Plan Letter to verify your need for services and make recommendations for the course. I will be happy to discuss your access plan with you.

Excused Absences

Students who are unable to attend class due to JMU sponsored activities (such as sports, band, academic competition, field trips, etc.) or personal religious observances may request reasonable accommodations. Please notify me during the first week of class regarding potential absences so that we can determine alternative methods for you to complete the required work.

University Closings

For severe weather and other unexpected circumstances, watch for announcements relating to make-up dates. See http://www.jmu.edu/JMUpolicy/1309.shtml for JMU’s cancellation policy. Although the schedule may adapt to canceled classes, assignment deadlines generally do not change.

Your Well-Being

As a university student, there may be times when personal stressors interfere with your academic performance and/or negatively impact your daily life. If you or someone you know is experiencing mental health challenges at James Madison University, please connect with the Counseling Center located within the Student Success Center on the 3rd floor. You can learn more about available services by visiting https://www.jmu.edu/counselingctr or calling 540-568-6552. Their services are free and confidential. Other available support resources to consider include, but are not limited to, the Office of the Dean of Students, the Health Center, and Learning Strategies Instruction.