

CSCI 237: Computer Organization

Syllabus for Fall 2024

General Info

Instructor:	Kelly Shaw
Office:	TCL 309
Phone:	x2772
Email:	kshaw@cs.williams.edu
Lecture:	MWF 10:00–10:50am in Clark 105
Labs:	W 1:00–2:30pm, 2:30–4:00pm in TBL 301
Web Page:	http://www.cs.williams.edu/~cs237/
Textbooks:	<i>Computer Systems: A Programmer's Perspective (3rd Edition)</i> , by Randal E. Bryant and David R. O'Hallaron (required) <i>The C Programming Language (2nd Edition)</i> , by Brian W. Kernighan and Dennis M. Ritchie (recommended) <i>How to Become a Straight-A Student: The Unconventional Strategies Real College Students Use to Score High While Studying Less</i> , by Cal Newport (recommended)
Slack Workspace:	https://cs237-fall2024.slack.com

Course Objectives

This course provides a programmer's view of how computer systems execute programs, store information, and communicate. The course will enable students to become more effective programmers, especially in dealing with issues of performance, portability and robustness. The course material also serves as the foundation for courses on compilers, networks, operating systems, distributed systems, storage systems, graphics, and parallel programming, where a deeper understanding of systems-level issues is required. At the same time, the course develops a model of computer hardware organization from the gate level upward.

Topics covered include: machine-level code and its generation; performance evaluation and optimization; computer arithmetic; datapath design; memory hierarchies, organization and management; and processes.

Course Work

Attendance and participation is required in both lecture and lab. You are encouraged to ask questions, point out problems, and make observations during class.

Beyond attending the lectures and labs, you should expect to:

- read the assigned textbook readings before each class,
- watch one recorded mini-lecture per week,
- prepare for and complete the weekly programming labs,
- complete ungraded written practice questions,
- complete weekly quizzes, and
- study for and complete the midterm and final exam.

Some students program quickly but read slowly, some do the opposite. The typical student should expect to spend at least 10 hours a week beyond the lecture and lab meeting hours. If you find yourself spending substantially more time than that (on a regular basis), discuss the issue with the instructor.

Programming Labs. On most weeks, there will be programming lab assignments. All programs will be graded on correctness, efficiency, design, documentation, and style. Programs should be turned in electronically by the posted due date. Late submissions may be penalized 20% per day. Labs will not be accepted more than four days late. **Attendance in lab is mandatory. Repeated absence or tardiness to lab may result in failure of the course.**

We will primarily use the Computer Science Department's Linux computers for our programming assignments. Most assignments will be completed using the C programming language. More complex labs will be worth more points towards your final grade than simpler labs.

Practice Problems. Practice problems will be assigned periodically to complement the course material. They will help you prepare for the weekly quizzes and the exams. Practice problems will not be graded, but the course staff will be available to answer questions and give feedback. You are encouraged to work collaboratively with other students to solve practice problems.

Weekly Quizzes. Quizzes will be based on material covered in lecture, labs, assigned reading, and practice problems. Quizzes will be timed (30 minutes) and will be available on Glow for a 48 hour period. Quizzes will be open book and open notes, but you may not discuss the quiz with anyone other than the instructor. All quizzes will be weighted equally. Your lowest quiz grade will be dropped.

Midterm and Final Exam There will be one midterm and one final exam. The midterm will be held in lab on **Wednesday, October 23rd**. The final exam will be a scheduled exam during the final exam period; its date and time will be determined later in the semester by the registrar's office. The exams are closed book, closed notes, and stress conceptual understanding of the material. Details regarding the specific format of the exams will be discussed in class.

Grading. Grades will be determined as follows:

Final exam:	30%
Midterm exam:	30%
Quizzes:	10%
Programming labs:	30%

Honor Code.

For programming assignments in computer science courses, the Honor Code is interpreted in very specific ways. Labs are expected to be the work of the individual student unless otherwise designated, and they should be designed and coded by them alone. Help locating errors and interpreting error messages is allowed, but a student may only receive help in correcting errors of syntax; help in correcting errors of logic is strictly forbidden. In general, if you are taking photos of someone else's screen, looking at someone else's screen, or telling someone else what to type, it is likely your work is no longer the work of an individual student. Assistance in the design or coding of program logic will be considered a violation of the Honor Code.

Use of ChatGPT (or other similar tools that generate code) or Google is allowed in this class for finding documentation about code. For example, it is acceptable to search for information about specific errors in your code or for finding more information about how to use a specific STL data structure. Under no circumstances, however, should you search for partial or complete solutions. You should cite use of these tools when appropriate. Violations of this policy will be considered a violation of the Honor Code. If you need additional information about what is considered acceptable use, please ask your instructor.

If you do not understand how the Honor Code applies to a particular assignment, consult your instructor. Students should be aware of the Computer Ethics outlined in the Student Handbook. Violations (including uninvited access to private information and malicious tampering with or theft of computer equipment or software) are subject to disciplinary action. The College and Department also have computer usage policies that apply to courses that make use of computers. You can find more information on the course webpage.

Please do not post your solutions to the programming labs or weekly quizzes in any public forum, including public Github repositories. Students taking this course should not be looking for solutions online, but providing the temptation of solutions is inappropriate. This applies not only during this semester but in the future as well.

Help!!!

Help. We all need it. There are many resources available when *you* need it. You are encouraged to discuss any questions, concerns, difficulties, or thoughts about the course with me. In addition, TAs are available to help you with challenges you might face as you work through the course material and lab assignments. TAs will hold their student meeting times in CS computer labs, according to the schedule posted on the course webpage. If you find yourself facing challenges beyond the typical, I encourage you to reach out. Talk to me, a friendly face from the Dean's Office, or some of the many professionals across campus who stand ready to help.

Students with disabilities or disabling conditions who experience barriers in this course are encouraged to contact me to discuss options for access and full course participation. The Office of Accessible Education is also available to facilitate the removal of barriers and to ensure access and reasonable accommodations. Students with documented disabilities or disabling conditions of any kind who may need accommodations for this course or who have questions about appropriate resources are encouraged to contact the Office of Accessible Education at oaestaff@williams.edu.

Students experiencing mental or physical health challenges that are significantly affecting their academic work or well-being are encouraged to contact me and/or speak with a dean so we can help you find the right resources. The deans can be reached at 597-4171.

Some other campus resources:

- Tutoring: Individual content tutoring is readily available for this class for free. Content tutoring is a resource for you to practice your knowledge of course material and ask questions of students who learned it recently. Find more information about individual tutoring at <http://bit.ly/indivtutoring>. Reach out to Madison Kelsey (mjk5@williams.edu) with any questions.
- Math and Science Resource Center (MSRC): The Math and Science Resource Center (MSRC) is located in Schow 030B and is open from 8:00 - 10:00 PM, Sundays to Thursdays. The MSRC is a free resource where you can collaborate on problem sets and talk through difficult concepts with a peer tutor. Not all courses are covered in the MSRC at all times. Please consult the schedule at <http://bit.ly/msrcerc> to see when tutors for your class are available. Contact Madison Kelsey (mjk5@williams.edu) with any questions.
- The Health Center: Sometimes your challenges are not course-related. The Health Center provides a range of medical, psychological, and health/wellness services. <https://health.williams.edu>.

Inclusion and Classroom Culture

The Williams community embraces diversity of age, background, beliefs, ethnicity, gender, gender identity, gender expression, national origin, religious affiliation, sexual orientation, and other visible and non visible categories. I welcome all students in this course and expect that all students contribute to a respectful, welcoming, and inclusive environment. If you have any concerns about classroom climate, please come to me to share your concerns.

In this class, we use the name and gender pronouns that individuals ask us to use as a sign of mutual respect. I will use the pronouns you have indicated on GLOW unless you alert me to a different pronoun. That said, everyone makes mistakes—in general, should you use an incorrect pronoun or name, the best course of action is to make a quick correction and move on, rather than dwelling on it.

Public health and COVID-19 Safety

If you are sick (especially if you have Covid symptoms or have tested positive for Covid), please do not come to class or to in-person office hours.

Recordings and class materials

As per College policy, no part of this course may be reproduced and/or distributed. In particular, no videos recorded as part of this class may be shared with anyone external to the course. Please see the Williams College policy online.

Calendar

The following calendar is a tentative schedule of topics that will be covered in class and is subject to change.

Week 1	C basics
Weeks 2-4	Data representation
Weeks 5-7	Machine language representation of programs
Week 8-9	Processor datapath
Week 10-12	Memory systems
Week 13	Processes