CSCI 237: Computer Organization

Syllabus for Fall 2022

General Info

Instructor: Kelly Shaw
Office: TCL 309
Phone: x2772
Email: kshaw@cs.williams.edu
Lecture: MWF 12:00–12:50pm in Schow 030A
Labs: Th 1:00–2:30pm, 2:30–4:00pm in TBL 301

Textbooks: *Computer Systems: A Programmer's Perspective (3rd Edition)*, by Randal E. Bryant and David R. O’Hallaron (required)
*The C Programming Language (2nd Edition)*, by Brian W. Kernighan and Dennis M. Ritchie (required)


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; and memory hierarchies, organization and management.

Course Work

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 mid-term 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.

Labs. On most weeks, there will be programming lab assignments. **Attendance in lab is mandatory;** there are valid reasons to miss lab, but *unexcused lab absences or latenesses will result in course failure*.

All programs will be graded on correctness, efficiency, design, documentation, and style. Programs should be turned in electronically by 11pm on the due date.

Each student may use a maximum of **three free late days** during the semester with **a maximum of two late days used per assignment**. A late day permits you to hand in an assignment up to 24 hours late, without penalty. Once late
days are exhausted, late work will not be accepted; the most recent on-time submission will, however, be graded so that partial credit may still be obtained.

To use a late day, you must:
- Email the instructor in advance.
- By the regular submission deadline, submit the work you have completed so far, with a comment at the top of your README.md file that says: “Incomplete assignment, late day requested.”.
- When you have submitted the completed assignment, email the instructor and remove the “Incomplete assignment” comment from the README.md file.

Late days are provided to help students deal with unforeseen circumstances and to allow some balancing of occasional uneven work demands. They should be used judiciously; if you find yourself struggling with the workload of this (or any other) course, I encourage you to reach out to the instructor.

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 TAs and instructor 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 24 hour period. Quizzes will be open book and open notes, but you may not discuss the quiz with anyone other than the instructor.

Exams. There will be one midterm and one final exam. The midterm will be held in lab on Thursday, October 27th. 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:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final exam</td>
<td>25%</td>
</tr>
<tr>
<td>Midterm exam</td>
<td>25%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Laboratory assignments</td>
<td>40%</td>
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</tbody>
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Honor Code

Laboratory assignments are to be the sole work of each student (or in the case of collaborative assignments, each assigned student pair). When solving lab assignments, discussing or looking up online how to use different libraries (i.e., syntax) and tools (e.g., gdb) is allowed. However, discussing or searching for solutions to questions on lab assignments is explicitly not allowed.

Students may never collaborate on writing code (unless with their assigned collaborator) and should never look at another student’s code (other than their assigned partner) from this semester or past semesters. Sources like StackOverflow are only appropriate for diagnostic purposes, like identifying cryptic error messages. You should never search out code on StackOverflow or similar forums.

One way to be sure you are not violating the honor code is to refrain from writing/typing/crafting your answers when talking with others—have all discussions away from any keyboard, and cite your discussions in your work.

Uncredited collaborations or code will be considered a violation of the honor code and will be handled appropriately. If in doubt of what is appropriate, do not hesitate to ask me. I am happy to discuss this issue at any time.


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 TBL 301 and TCL 312, 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:

- Peer Academic Support Network: Tutors can be arranged when 1-1 help is required beyond that available from your instructor and TAs. Scheduled tutoring sessions (appointment and drop-in) can be found at [https://tutortrac.williams.edu](https://tutortrac.williams.edu). Instructions for scheduling sessions can be found at [https://academic-resources.williams.edu/peer-academic-support/](https://academic-resources.williams.edu/peer-academic-support/).

- Math & Science Resource Center: Support is available for students grappling with the more quantitative aspects of their coursework. [https://academic-resources.williams.edu/peer-academic-support/math-science/](https://academic-resources.williams.edu/peer-academic-support/math-science/)

- 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](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 concern.

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 Isolation/Quarantine

In an attempt to keep our classroom environment as healthy as possible, you will be required to wear a mask at all times in the classroom and in the instructor’s office. (You will be expected to follow the CS department’s policy regarding wearing masks in the computer labs outside of class meeting times.) Please step out of the classroom or the instructor’s office if you must take off your mask for any reason. **If you feel ill, please do not come to class.** I will be happy to work with you to make sure you can make up any missed portions of class.

### Isolation/quarantine due to COVID-19

Please let me know if you are unable to attend class due to COVID restrictions. I will work with you to develop a plan that allows you to continue making progress in the course during your time in isolation/quarantine.

### Recordings and class materials

Classes may be recorded for the benefit of students enrolled remotely and those who may be unable to attend live. I will inform you whether the course or any particular sessions are being recorded. By participating with your camera
on, using a profile image, or with audio unmuted, you are consenting to having your video, image, and audio recorded. If you do not want to be recorded, please be sure to keep your camera off, do not use a profile image, and keep your microphone muted. Students who choose to not be recorded may participate by means of the chat feature.