CSCI 237: Computer Organization

Syllabus for Fall 2020

General Info

Instructor: Kelly Shaw
Office: TCL 309
Phone: x2772
Email: kshaw@cs.williams.edu
Lectures: Virtual
In-person meetings:
Tu 1:30–2:45 in TBL 301
Tu 3:15–4:30 in TBL 301
We 8:15–9:30 on Zoom
We 10:00–11:15 in TBL 301
We 11:45–1:00 in TCL 217A
We 1:30–2:45 in TBL 301

Web Page: http://www.cs.williams.edu/~cs237/
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 viewing the recorded lectures and attending weekly small-group meetings, you should expect to:

- read the assigned textbook readings before each class,
- prepare for the weekly programming labs,
- complete the weekly labs,
- complete ungraded written practice questions,
- complete weekly quizzes, and
- study for 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 recorded lecture and in-person meeting hours. If you find yourself spending substantially more time than that (on a regular basis), discuss the issue with the instructor.

Small-group Meetings. Students are expected to attend the weekly small-group meetings for which they registered. **Attendance in these sessions is mandatory.** There are valid reasons to miss these sessions, but *unexcused absences or latenesses may result in course failure.*

Programming Labs. On most weeks, there will be programming lab assignments. Although a separate lab meeting session will not be possible, students should come prepared to work on their lab assignments for part of their weekly small-group meeting sessions.

All programs will be graded on correctness, efficiency, design, documentation, and style. Programs should be turned in electronically by 11pm (east coast time) on the due date, typically on Thursdays. 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 your 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, please reach out to the instructor.

Practice Problems. Practice problems will be assigned weekly 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 instructors will be available to answer questions and give feedback. You are encouraged to work collaboratively on these problems with other students.

Quizzes. Weekly quizzes will be based on material covered in class, lab assignments, and practice problems. Quizzes will be posted on Mondays for a 24 hour period. Students must complete quizzes on their own without assistance from other students or teaching assistants.

Exams. There will be one midterm and one final exam. The midterm will be made available for a 24 hour period on Thursday, Nov. 12. The final exam will be a scheduled and timed exam made available for a 24 hour period during the final exam period. 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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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). 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 the instructor. For a full description of the Computer Science Honor Code please see https://csci.williams.edu/the(cs)-honor-code-and-computer-usage-policy/.

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 the instructor. In addition, TAs are available to help you with challenges you might face as you work through the course material and lab assignments. If you find yourself facing challenges beyond the typical, I encourage you to reach out. Talk to the instructor, a friendly face from the Dean’s Office, or some of the many professionals across campus who stand ready to help, including:

- The Peer Tutor Program: Tutors can be arranged when 1-1 help is required beyond that available from your instructor and TAs. https://academic-resources.williams.edu/peer-academic-support/individual-tutoring/
- 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/
- Accessible Education and Disability Support Center: Some students with documented disabilities may require accommodations in certain situations. If that’s you, take advantage of the options available. https://academic-resources.williams.edu/disabilities/
- 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

Inclusivity

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 nonvisible categories. I welcome all students in this course and expect that all students contribute to a respectful, welcoming and inclusive environment. If you feel that you are not being welcomed, included, or accepted in this class, please come to me or a college administrator to share your concern.

Public health for in-class meetings

In an attempt to keep our classroom environment as healthy as possible, you will be required to wear a mask at all times, keep 6 feet between you and other individuals, and clean your work area upon entering and exiting the classroom. If possible, please wash your hands or use hand sanitizer before entering the classroom. 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.
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.