CSCI 237: Computer Organization

Syllabus for Spring 2025

General Info

Instructor:	Jeannie Albrecht
Email:	jeannie@cs.williams.edu
Office:	TCL 305
Lectures:	MWF 11:00-11:50 in Schow 030B
Labs:	WR 1-2:30 in Ward Lab
Webpage:	http://www.cs.williams.edu/~jeannie/cs237/index.html
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 **(recommended)**

Course Description

This course provides a programmer's view of how computer systems execute programs, store information, and communicate. It enables students to become more effective programmers, especially in dealing with issues of performance, portability and robustness. It also serves as a foundation for courses on advanced topics, such as security, operating systems, distributed systems, and graphics, where a deeper understanding of systems-level issues is required. At the same time, a model of computer hardware organization is developed from the gate level upward. Topics covered include: machine-level code and its generation, performance evaluation and optimization, computer arithmetic, memory organization and management, and (maybe) networking protocols and supporting concurrent computation.

Grading Details

Grades will be computed as follows:

- 10% Homework
- 30% Programming Labs
- 30% Midterm Exam
- 30% Final Exam

Each of these items are explained in detail in the following sections.

Homework

The homework portion of your grade will be determined by short assignments on Glow. Homework will be used to test comprehension on important course concepts and help students prepare for the exams. I will drop your lowest homework score from your final grade. Late homework will not receive credit.

Programming Labs

There are weekly programming lab assignments. All lab programs are graded on design, documentation and style, correctness, and efficiency. 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.

Midterm and Final Exam

There is a written midterm and final examination in this course. 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.

Workload Expectations

Attendance and participation is required in both lecture and lab. You are encouraged to ask questions, point out problems, and make observations during class.In general, beyond the 4 hours we spend together during our class and lab meetings, students should expect to spend (on average) approximately 10 hours per week on work related to class. Aside from the weekly lab and homework assignments, students are responsible for reading supporting material and investigating online resources (documentation, tutorials) as necessary.

Community

We embrace diversity. We welcome all students and expect everyone to contribute and support a respectful and welcoming environment. If you have concerns, please share them with your instructor or the college administration.

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, 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.

Intellectual Property

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.

Accommodations

If formal accommodations need to be made to meet your specific learning or physical abilities, you should contact your instructor as possible to discuss appropriate accommodations. You should also contact the Director of Accessible Education or the Deans office. We will work together to ensure this class is accessible and inclusive.

Health

If you are experiencing mental or physical health challenges that are significantly affecting your academic work, you are encouraged to contact your instructor and/or speak with Deans Office staff. If you feel ill and are unable to come to class, please contact your instructor to make up any missed work.

Calendar

The following calendar is a (very) tentative schedule of topics that we will cover in class.

Week 1	Representing and Manipulating Information (CSAPP Ch 1–2)
Weeks 2–3	Machine-Level Representation of Programs (CSAPP Ch 3)
Weeks 4–6	Processor Architecture (CSAPP Ch 4)
Week 7	Optimizing Program Performance (CSAPP Ch 5)
Week 8	The Memory Hierarchy (CSAPP Ch 6)
Weeks 9–10	Virtual Memory (CSAPP Ch 9)
Week 11	Network Programming (CSAPP Ch 11)
Week 12	Concurrent Programming (CSAPP Ch 12)