

CS 2110 [A, B, C] – Computer Organization and Programming

Syllabus – Spring 2027

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Instructor	Sections	Lecture Times & Locations	Office Hours & Location(s)
Dr. Joonho Kim	B & C	B: Tue/Thu, 3:30pm – 4:45pm, 103 IC C: Tue/Thu, 12:30pm – 1:45pm, 115 D. M. Smith	___ - ___, 138 CCB
Dr. Mark Moss	A	A: Tue/Thu, 2:00pm – 3:15pm, 132 TSRB	___ - ___, 217 CCB

Purpose of Course: This course introduces you to **the fundamentals of how computers work** from both the hardware and software points of view. It serves as a “roadmap” for the rest of the computer systems courses that you will take here. After taking this course, you will have a better understanding of how a program is translated into commands for execution on hardware, and how the hardware executes those commands using, ultimately, electrons to do the work.

Prerequisite: CS 1331

Books: (1) **Patt & Patel:** Introduction to Computing Systems: From Bits & Gates to C++ & Beyond **3rd Ed (2019)**
 (2) The C Programming Language, Kernighan & Ritchie [optional, recommended]
 (3) Our class notes (made available [after lectures](#))

Reading Topics: (The “Living Schedule” on Canvas)

Topic	P&P Section(s)		
Course Intro, Bits, & Data Types	1.1-1.7, 2.1-2.4	Assembly I/O	9.1-9.5
Operations on Bits & Other Representations	2.5-2.7	Intro to C, Variables, Scopes	11.1-11.6, 12.1-12.2
Digital Logic Structures	3.1-3.2	Operators, Conditional Constructs, Iteration Constructs	12.3-12.7, 13.1-13.6
Combinational Logic Circuits	3.3	Pointers	16.1-16.2
Logic Synthesis	(Notes)	Arrays, Strings	16.3-16.4
Basic Storage Elements	3.4-3.5	Functions, Calling convention	14.1-14.5
Sequential Logic Circuits	3.6-3.7	Recursion, Calling convention	17.1-17.8
Von Neumann Model, LC-3, & Instruction Processing	4.1-4.4	Testing and Debugging	15.1-15.6
The ISA & Operate Instructions	5-1-5.2	Structures in C	19.1-19.3
Data Movement Instructions & Control Instructions	5.3-5.5	Dynamic Memory Allocation	19.4-19.6
Data Path, Problem Solving, & Debugging	5.6, 6.1-6.2	I/O in C	18.1-18.6
Assembly Language Programming, Assembly Process, & Assembly of Multiple Programs	7.1-7.4	Introduction to C++	20.1-20.5
Stack, Queue, Character Strings	8.1, 8.4-8.5		
Subroutines, Traps	8.1, 9.3		

Course Workload:

The course has projects, quizzes, homework assignments, and a final exam:

- 25% Projects (5 projects, 5% each)
- 40% Exams (4 exams, 10% each)*
- 8% Homework (8 assignments, 1% each)**
- 3% Lecture Attendance & Participation†
- 3% Lab Attendance & Participation††
- 21% Final Exam

***Quizzes will be held during some of the Supervised Lab sessions, and in-person attendance is required.**

****Homework #0:** You are required to *visit your instructor's* office at least once *during their Office Hours & before April 12th*. You must announce that your visit is “for Homework #0” and bring an official GT ID. Be prepared to stay for at least three minutes to answer a question or two. This counts as a real homework! *If for some reason you cannot meet this requirement, please contact your lecturer via email three weeks before the due date.*

†You must attend lectures to earn the associated credit: You are permitted 3 unexcused absences (see also Rule 6 below). We might employ an automated system to monitor attendance; and, if so, then you will be expected to configure your system (e.g., load the appropriate application on your device) to receive credit. Each additional absence will result in a loss of 0.5% (1/6th) of your lecture attendance points.

††You must attend labs to earn the associated credit: You are permitted 3 unexcused absences (see also Rule 6 below). Lab absences do NOT apply to mandatory quiz dates: missing a quiz will still result in a zero unless prior arrangements have been made with the Instructional Staff and Division of Student Life Office (per Rules 6 & 10). Each additional absence will result in a loss of 0.5% (1/6th) of your lab attendance points.

Course Rules:

1. **Reasonable accommodations will be made for students with verifiable disabilities.** In order to take advantage of available accommodations, students must register with [Disability Services](#).
2. **Final grades will use the scale:** [100:90] = A, (90:80] = B, (80:70] = C, (70:60] = D, (60:0] = F.
3. A linear “shift of means” curve might be applied to your final score. (Historically, this has been *at most* +2 points.)
4. **There might be a small number of extra credit opportunities in this course.** These opportunities will be offered at the sole discretion of the instructors. Focus on making the most of the established assignments and exams for your final grade.
5. Some assignments will be due during the final instructional days of the semester.
6. If you have any major personal problems (family/illness/etc.), please go to the Division of Student Life Office.
7. **All assignments must be turned in on time.** Late assignments are capped using the **late assignment window** as follows:
 - On time: 100% (maximum score)
 - After deadline, before 24 hours after deadline: 70% (maximum score)
 - After 24 hours, before 48 hours after deadline: 50% (maximum score)
 - After 48 hours: 0%
8. **You are also responsible for ensuring that what you turned in is what you meant to turn in.** If you have any problems submitting via Canvas, email the Head TA what you would have submitted BEFORE the end of the late assignment window. No submissions will be accepted after the submission window (later than 48 hours) has closed – **no exceptions**.
9. **Lab attendance is as important as lecture attendance.** Lectures provide a comprehensive overview of the key concepts along with additional insights from the instructors. During the labs, the TAs will discuss important information pertaining to projects and assignments. They will also conduct illuminating exercises that complement the concepts presented in the lectures. More importantly, lab sessions also have a smaller number of students, which facilitate more open and active discussion and interaction. Lectures, labs, and your own preparations offer multiple ways for you to absorb the material.
10. **Quizzes and the Final Exam must be taken at the scheduled date and time.**
 - a. Missing a quiz: Failure to attend a quiz will result in a zero (0) score. One exception: if – and only if – your excuse for missing the quiz is approved by the instructor, then the missing quiz score will be replaced with your Final Exam score.
 - b. Missing the Final Exam: Failure to attend the Final Exam will result in a zero (0) score. You must contact the Head TA or your instructor *in advance* if you have an Institute-approved excuse to reschedule the Final Exam.

11. **The deadline for re-grades is 2 weeks after an assignment grade is posted** or returned to the class. Regrades are only for correct answers accidentally marked as partially or completely wrong. **There are no regrades for higher partial credit (i.e., no “point fishing”).**
12. You will be automatically signed up for a Piazza forum for this course. The link will be made available via Canvas. The course Piazza forum is only for posting technical questions about assignments, tests, etc. Do not give away answers to questions on Piazza!
13. The Canvas and Piazza announcements must be read every day.
14. Notetaking via laptop computer, tablet and paper will be permitted initially. Any computing activities must be focused solely on taking notes and fulfilling course activities. If these conditions are violated, and especially if these violations cause significant disruptions to other students in the class, then these privileges may be suspended.
15. Recordings of lecture, lecture materials and other artifacts are copyrighted by your instructors. **No non-educational reproduction of any materials, including lecture records and recordings, is permitted.**

Academic Misconduct:

Preamble: *The goal of all assignments in CS 2110 is for you to learn. Learning requires thought and hard work. Copying answers thus prevents learning. More importantly, it gives an unfair advantage over students who do the work and follow the rules.*

1. **As a Georgia Tech student, you have read and agreed to the [Georgia Tech Academic Honor Code](#).** The Academic Honor Code defines Academic Misconduct as “**any act that does or could improperly distort Student grades or other Student academic records.**”
2. You must submit an assignment or project as your own work. **No collaboration on answers is permitted. Absolutely no code or answers may be copied from others. Such copying is Academic Misconduct.**
3. Using code from GitHub, via Googling, from Stack Overflow, etc., is Academic Misconduct (Honor Code: Academic Misconduct includes “*submission of material that is wholly or substantially identical to that created or published by another person or persons*”).
4. Publishing your assignments on public repositories, GitHub, etc., that is accessible to other students is unauthorized collaboration and thus Academic Misconduct.
5. Suspected Academic Misconduct will be reported to the Division of Student Life Office of Student Integrity. It will be prosecuted to the full extent of Institute policies.
6. We use accepted forensic techniques to determine whether there is copying of a coding assignment.
7. Submitting an assignment with code or text from an AI assistant (e.g., ChatGPT) is academic misconduct.
8. **If you are not sure about any aspect of this policy, please ask your lecturer.**

Using AI Assistants:

Anything you did not write in your assignment will be treated as an academic misconduct case. If you are unsure where the line is between collaborating with AI and copying AI, we recommend the following heuristics:

Heuristic 1: Never hit “Copy” within your conversation with an AI assistant. You can copy your own work into your own conversation, but do not copy anything from the conversation back into your assignment.

Instead, use your interaction with the AI assistant as a learning experience, then let your assignment reflect your improved understanding.

Heuristic 2: Do not have your assignment and the AI agent open at the same time. Like the previous heuristic, use your conversation with the AI as a learning experience, then close the interaction down, open your assignment, and let your assignment reflect your revised knowledge.

Heuristic 3: Do not integrate or activate AI-based tools directly into your composition environment. Just as you should not let a classmate write content or code directly into your submission, so also you should avoid using tools that directly add content to your submission.

Deviating from these heuristics does not automatically qualify as academic misconduct; however, following these heuristics essentially guarantees your collaboration will not cross the line into misconduct.

Coding Guidelines (C/C++ code):

1. You must turn in ALL files specified in the “Deliverables” section of the assignment instructions. We reserve the right to impose a penalty on submissions that do not follow the given submission directions.
2. You must provide a ***Makefile*** that compiles and links your code by default. **If you are given a Makefile with the project, we expect your code to compile with make. (don’t worry, we’ll explain what all this means later)**
3. Your code must compile with **gcc** on Ubuntu 22.04 LTS. If your code does not compile, then you will receive a zero/0.
4. You will be penalized if your code produces warnings when compiled with the given Makefile, or the following flags if no Makefile is provided: **gcc -Wall -Wextra -Wstrict-prototypes -pedantic -O2**
5. Code should be well commented and use a clean, consistent (readable) style (i.e., proper indenting, etc.). We may impose style requirements and deduct for non-conforming solutions. This is **not** the [obfuscated C code competition](#)!

<p>Statement for not mentioned policies and issues: Any policies and issues not mentioned in this syllabus will follow policies and procedures according to the Georgia Institute of Technology: http://policylibrary.gatech.edu</p>
