Course Syllabus
ECE/ENGRD 2300 Digital Logic and Computer Organization
Spring 2025, Tuesday and Thursday 1:25-2:40pm, Bill and Melinda Gates Hall G01

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1. Course Information

Lectures:	Tue and Thu 1:25-2:40pm, Gates B01
Labs:	Mon 11:15am-2:15pm and 7:30-10:30pm, Wed 7:30-10:30pm, Phillips Hall 238

Instructor:	Prof. Zhiru Zhang <zhiruz -at- cornell.edu>
Office Hour:	Thursday 4:30-6:00pm, Online
Staff Email:	ece2300-staff-L -at- cornell.edu

Website:	https://www.csl.cornell.edu/courses/ece2300
CMSX:	https:// cmsx.cs.cornell.edu/
Ed Discussion:	https://edstem.org/us/courses/72685

Textbook:	D.M. Harris and S.L. Harris, Digital Design and Computer Architecture, RISC-V Edition, Morgan Kaufmann, 2021. (amazon)

2. Course Description and Objectives

An introductory course in computer engineering that teaches the fundamental concepts of digital logic design and computer organization. Lecture topics include binary numbers, Boolean algebra, logic gates and combinational logic, sequential logic, state machines, memories, instruction set architecture, processor organization, caches and virtual memory, input/output, and case studies. Design methodology using both discrete components and hardware description languages (HDLs) is covered in the weekly laboratory portion of the course.

By the end of this course, students should be able to: (1) understand Boolean logic and state machines as theoretical foundations of digital systems; (2) conceive, analyze, design, and build combinational and sequential digital logic solutions to everyday problems; (3) understand the basic structure and functionality of microprocessor, and build a simple one using FPGA hardware; (4) understand the structure and operation of memory hierarchies and I/O systems.

3. Course Organization

This course includes a combination of lectures, laboratory sessions, optional review sessions, homework assignments, quizzes, and exams. **All handouts for this course will be posted on the course website.**

3.1. Lectures

Lectures will be from 1:25pm to 2:40pm every Tuesday and Thursday excluding the academic holidays. Students are expected to arrive on time, be attentive during lectures, and participate in the online discussions.

The lecture sessions will cover the following topics. Please note that some of these topics are tentative and may be covered in a slightly different order.

3.2. Quizzes

There will be short pop quizzes during most lectures to cover key topics discussed in the current or previous lecture. The overall quiz grade will be determined by the average of all quizzes, excluding the FOUR lowest scores.

3.3. Lab Assignments

The course will include five lab assignments to design, implement, and test a set of real-life digital systems on FPGA boards. There will be prelab assignments due before each lab session. Some labs require that students submit a report to summarize the findings in the lab. Students are highly encouraged to take advantage of the assigned lab sessions to check-off their functional design(s). As an alternative, they can also complete the check-off during TA office hours, although higher priority will be given to regular Q&A related to labs and homework.

3.4. Exams

The course includes two prelims and a final exam. Prelim 1 will take place **in-class** on Thursday February 27th. Prelim 2 will be held on Thursday April 10th. If you have a scheduling conflict with any exams, please inform the instructor at least two weeks ahead of the exam.

3.5. Homework

The course will include eight problem sets distributed throughout the semester to help students solidify the understanding of the important concepts covered in lecture. The problem sets are to be completed individually. Students are encouraged to type their solutions; otherwise, they must scan their handwritten version into a legible PDF. Unreadable submissions will not be graded.

4. Course Policies

This section outlines various policies regarding grading, assignment submission, academic integrity, and accommodations for students with disabilities.

4.1. Grading

The final grade is calculated based on the following scheme:

- Participation – 3%
- Quizzes – 5%
- Homework – 12%
- Prelim 1 – 14%
- Prelim 2 – 16%
- Final – 20%
- Labs – 30% (Lab 1 : 3%, Lab 2 : 5%, Lab 3 : 7%, Lab 4 : 10%, Lab 5: 5%)

While students are expected to complete all problems of each homework, only a subset of the problems on each problem set may be graded for a score. Which problems will be graded for will NOT be announced in advance.

Please note that a student must at least satisfy the following minimum requirements in order to pass the course: (1) submit at least FIVE (out of 8) homework sets; (2) complete at least THREE (out of 5) lab assignments; (3) take ALL exams. If a student fails to meet any of these criteria, the student will automatically fail the course regardless of the actual numerical grade.

4.2. Participation

Your participation grade will be determined by a combination of different aspects of your participation in the course, including but not limited to your in-class (online) participation, contribution to the Ed Discussion forum, and instructor discretion.

4.3. Assignment Submission and Slip Days

Assignments include homework, prelabs, and lab reports. **Assignments must be submitted electronically in PDF format to the CMSX submission system by 11:59pm on the due date. Schematics and source code of the lab assignments must be submitted electronically as a single zipped file. A late submission yields ZERO points.**

As an exception to this policy, each student has a total of **10 slip days that may be used when submitting assignments throughout the semester**. These are intended to cover illnesses or potential schedule conflicts with other courses during "crunch time". In case you have a serious illness or emergency, please contact the instructor.

Each slip day provides a 24-hour extension. The late submissions are automatically tagged on CMSX and the slip day usage is tracked by the 2300 staff. **For any single prelab, you may use up to TWO slip days** not exceeding the number of slip days you have remaining. **For group assignments, every student in the group must have enough number of slip days remaining in order to request a late submission**, and the corresponding number of slip days will be deducted from the remaining slip days of each student in the group.

4.4. Regrade Request

All regrade requests must be submitted electronically via email to ece2300-staff-L@cornell.edu (regrade form on the course website). The request must state exactly what should be regraded and the detailed reason for the regrade request. The regrade request has to be received within one week from when the graded work is first made available to the student.

4.5. Usage of Artificial Intelligence (AI)

The course policy on AI tool usage, akin to GPT-like capabilities, strategically leverages their strengths while maintaining academic integrity and individual learning. Students can use AI

tools to enhance segments of report writing and improve clarity, coherence, and style. Yet, our focus is fostering critical thinking and originality. As such, AI's role must be supplementary, aiding content polish and precision, not replacing narrative crafting.

While the use of AI tools for report refinement is allowed, its application in lab assignments and problem sets is strictly prohibited.

4.6. Academic Integrity

The term "group" in this section refers to yourself if you work alone or to you and your partner in case of a group (team of two) assignment. The use of a computer in no way modifies the standards of academic integrity expected under the Cornell University Code of Academic Integrity.

The work your group submits is expected to be the result of your group's effort only. You are encouraged to study together and to discuss information and concepts covered in lecture with other students. You can give "consulting" help to or receive "consulting" help from such students. **However, this cooperation should never involve one group having possession of or observing in detail a copy of all or part of the work done by some other group, including work from previous offerings of this course or solutions from other sources such as Course Hero.** Should copying occur, both the student(s) who copied work and the student(s) who provided material to be copied will automatically receive a zero on the corresponding assignment along with extra penalty ranging anywhere from a deduction on the final grade to failure of the course and university disciplinary action. Please note that this implies that at no time are you allowed to grant anyone but your group partner access to your computer files.

During exams, you must do your own work. Communication among students is not permitted during the exams, nor may you compare or borrow notes, copy from others, or collaborate in any way. Students must not discuss an exam's contents with any other students who have not taken the exam.

In addition, course materials are intellectual property belong to the author. **Students are not permitted to buy or sell any course materials posted or distributed by the instructors as part of the course.** For example, students are not allowed to remove materials from course website or discussion forums and sell them to commercial vendors and Internet sites. Such unauthorized behavior will also constitute academic misconduct.

For more information, you are strongly encouraged to read Cornell University's Code of Academic Integrity, available at https://theuniversityfaculty.cornell.edu/dean/academic-integrity/code-of-academic-integrity/.

4.7. Accommodations for Students with Disabilities

In compliance with the Cornell University policy and equal access laws, the instructor is available to discuss appropriate academic accommodations that may be required for students with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances, so arrangements can be made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.