Electrical & Computer Engineering Department
Portland State University
Fall 2022

Course: ECE 341 Introduction to Computer Hardware

Instructor: M. A. Khayer, PhD
Email: mkhayer@pdx.edu

5-6pm

Office Hours (class-related): T ~~6 – 7~~. Office hours will be through zoom meetings. Students will have to notify the instructor of their intent to join an office hour session by email ahead of time so both parties can prepare to join the zoom meeting in time.

Overview: This course presents an overview of computer architecture, digital logic, computer programming from a hardware point of view. Topics covered include: digital logic, arithmetic operations, memory, input/output, computer system components, computer architecture, pipelining, CISC/RISC overview.

At the conclusion of this course, students will be able to:

1) Knowledge of the software / hardware interface and how a programmer can improve performance
2) Knowledge of forces that drive the development of new computer architectures and design
3) Ability to interpret different performance criteria used to make design decisions
4) Ability to write machine description using HDL in register-transfer level that can execute instructions
5) Understanding what decisions must be made to develop a successful HW/SW system design

CS 201 is a pre-requisite: Students are expected to have a basic knowledge of computer organization, instruction set architecture data representation in binary and hexadecimal notation, and assembly language programming.

Text: Digital Design and Compute Architecture (RISC-V Edition)

Authors: Sarah Harris / David Harris

ISBN: 978-0-12-820064-3

Canvas: Course information including lecture notes, homework assignments and solutions, exam reviews and various handouts will be on Canvas (https://canvas.pdx.edu). Announcements will be on the home page and the discussion board; you are encouraged to post questions and comments on the discussion board as well. You are highly encouraged to print out the lecture notes and bring them to class to reduce note taking.

Software/CAD Projects: Separate syllabus and details documentation will be published about software simulation and projects by the course TA.

Homework: Homework is an important component of this class; the only way to learn the techniques of circuit analysis is by practice. We will go over the problems in class and solutions will be posted on Canvas. There will 4-5 homework/assignments throughout the course duration.

Exams: There will be one midterm, bi-weekly quizzes, and a final. Exam dates/times will be announced in class a week early. All homeworks/quizzes/exams will be administered through Canvas. Questions will be uploaded and be available for an allowed period of time. Students will be able to work on the quizzes/ exams on their available/convenient time during that open time period, and then will upload their work in the Canvas, either by taking pictures or scanning the solution papers, but in one file (including all pages).

Exams are closed book, with one page (front and back) of notes and formulas and with no worked problems. If you have to miss an exam, you must discuss it with me beforehand; make-ups will be given only for compelling reasons.

Class Participation: The course is in-person, and there will be 10% grade points for class participation.

Grading: Your evaluation will be based on the following:

Attendance	10%
Homework	10%
Midterm	20%
Quizzes	20%
CAD Projects	20%
Final exam	20%

DRC: If you are a student with a documented disability and registered with the Disability Resource Center (DRC), please contact me *during the first week of the term* to make appropriate accommodations. DRC can be reached at 725-4150.

Academic Honesty: We take academic honesty very seriously. Our department policy is to report all instances of plagiarism or cheating to the university. If you are not sure what constitutes plagiarism, ask and we'll talk about it. Simply put – turn in only your own work or credit the source.

Title IX: As an instructor, one of my responsibilities is to help create a safe learning environment for my students and for the campus as a whole. We expect a culture of professionalism and mutual respect in our department and class. You may report any incident of discrimination or discriminatory harassment, including sexual harassment, to either the Office of Equity and Compliance or the Office of the Dean of Student Life. Please be aware that as a faculty member, I have the responsibility to report any instance of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information about sexual harassment or sexual violence with a confidential employee who does not have this reporting responsibility, you can find a list of those individuals. For more information about Title IX, please complete the required student module Creating a Safe Campus in your D2L.

Schedule: The following schedule is tentative and may be adjusted as the course progresses. If you miss class be sure to check for changes in assignments or exams.

Week	Topic	Reading
1-2	Introduction, representation of information, number systems, logic gates, digital abstraction	Chapter 1
3-4	Logic gates, combination and sequential logic	Chapter 2-3
5-6	Arithmetic design: addition, subtraction, comparators, ALU shifters, memory and logic arrays	Chapter 5
7-8	Mid-Term exam / Architecture	Ch 6
9-10	MicroComputer: single-cycle and multi-cycle design, pipelining memory, input/output basics, parallel processing	Ch 7 - 9
11	Missing classes/review/Final Exam	