

CS 0447 — Computer Organization & Assembly Language

Department of Computer Science
University of Pittsburgh
Fall 2018

Catalog Description

The purpose of this course is to study the components of computing systems common to most computer architectures. In particular, this class is meant to introduce data representation, types of processors (e.g., RISC V. CISC), memory types and hierarchy, assembly language, linking and loading, and an introduction to device drivers.

Instructor Information

Name: Dr. Thumrongsak Kosiyatrakul (Tan)
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Office: 6215 SENSQ
Office Hours: (MW) 9:00 am – 12:00 pm and whenever my office door is open

Teaching Assistant Information

Name: TBA
Email: TBA
Office: TBA
Office Hours: TBA
Note: **Please check CourseWeb for updated information**

Grader Information

Name: TBA
Email: TBA
Office: TBA
Office Hours: TBA
Note: **Please check CourseWeb for updated information**

Meeting Time and Location

Lecture: (TTh) 9:30 am – 10:45 am; A115 Public Health
Recitation: (T) 6:00 pm – 6:50 pm; 6110 SENSQ
Recitation: (Th) 6:00 pm – 6:50 pm; 6110 SENSQ

Course Web Address

We will use CourseWeb for announcements, lecture slides, examples, projects, labs, pop quizzes solutions, and exam solutions. Make sure you are able to access the CourseWeb at courseweb.pitt.edu or via my.pitt.edu.

Textbook

David A. Patterson and John L. Hennessy. *Computer Organization and Design. The Hard-*

ware / Software Interface, Fourth or Fifth Edition. Morgan Kaufmann (MK) Publishers.

Course Objective

This course introduces the structure of computer architecture how a CPU is constructed from logic gates and how it can be controlled by software. The design of the CPU will be focused on performance and how to improve the performance. By the end of the semester, you should be familiar enough to understand:

- how data (numbers and instructions) are represented in computer
- how instructions can be translated to machine codes,
- how to design a CPU from logic gates to have desire behavior according to machine codes.
- how to measure performance of a computer,

Prerequisites

Completed or currently enrolled in CS 0445 — Data Structures.

Outcome Measurement

Your final grade is based on the following:

- **Midterm Exam** (18% of final grade)
- **Final Exam** (20% of final grade): The final exam allows you to demonstrate your understanding of the material. The final exam will only focus on the material toward the end of the semester. However, some basic concepts from earlier chapters may be included.
- **Projects** (40% of final grade): There will be 4 projects (10% each) and one hardware design project throughout this semester. Projects and their instructions will be posted on the CourseWeb. **No late submission will be accepted.**
- **Labs/Recitation** (15% of final grade): There will a number of very small programming assignments (labs) throughout the semester. Each lab must be submitted onto CourseWeb by the due date before 11:59pm. **No late submission will be accepted.** Each lab is a very small programming assignment which should not take more than half an hour to finish. Your TA will explain some details/hints about each lab during recitation and help you if you have any problems. Note that it is a good idea for you to take a look at each lab and start working on it as soon as possible.

These labs (recitation sessions) are mandatory. TA will check your name at the end of every lab. If you submit a lab but you do not attain that lab, 50% will be deducted from that lab. If you finish your lab early, you can show your result to your TA and let your TA checks your name right away.

- **Take Home Quizzes** (5% of final grade): Roughly an hour after each lecture, a short quiz will be posted on the CourseWeb. Each quizzes allow you to demonstrate what you have learned during each lecture. These are open book and open note quizzes and you must submit the quiz the next day (by the end of day) after each lecture. You are not allowed to take the quiz after the due date has past. **Note** that not every lecture will have a quiz. It is **your responsibility** to check for announcements in CourseWeb to see whether a quiz is available. These announcements generally posted an hour after the end of the lecture.
- **Assessment Tests** (2% of final grade): On the first/second week and the second to last week of class, you are required to take assessment tests during your recitations. Each assessment test counts as 1% of your final grade regardless of your score of each test. **Note** that the score of your assessment tests will not be used to determine your letter grade.

Note that the above weight may be changed during the semester. The scale for the term based on the class average at 75% is shown below (curve down is possible if the class average is lower than 75%):

Percentage	≥ 90	≥ 89	≥ 88	≥ 80	≥ 79	≥ 78	≥ 70	≥ 69	≥ 60	< 60
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D	F

Outline Schedule

The following is an outline of our schedule:

- Number Systems and Representations
- MIPS Assembly Language
- Midterm Exam
- Arithmetic Logic Unit (ALU) design
- Floating-Point Representations
- Datapath design
- Final Exam

Other Information

Academic Integrity

All students are expected to adhere to the standards of academic honesty. Any student engaged in cheating, plagiarism, or other acts of academic dishonesty would be subject to disciplinary action. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity <http://www.pitt.edu/provost/ail.html>. This may include, but is not limited to the

confiscation of the examination of any individual suspected of violating the University Policy.

Disability Services

If you have disability, contact both your instructor and the Office of Disability Resources and Services (DRS), 216 William Pitt Union, 412-648-7890/412-383-7355 (TTY) as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Statement on Classroom Recording

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use.