

**Department of Electrical and Computer Engineering
University of Massachusetts/Amherst**

**ECE 331: Hardware Organization and Design, Fall 2022
(Required Course)**

Catalog Data:

An introduction to computer architecture and hardware design. Topics include computer abstractions and technology, performance evaluation, instruction set architectures, computer arithmetic, pipelining, memory systems, and interfacing. Laboratory assignments will include the use of machine languages and assembly languages. State-of-the-art computer simulation tools are used as part of the course. (3 credits)

Prerequisites:

C or better in ECE124

Instructors:

Jeremy Gummeson, 215B Knowles Engineering Building, jgummeso@umass.edu

Teaching Assistants:

Bharadwaj Madabhushi, bmadabhushi@umass.edu

Redwan Rahman, rrahman@umass.edu

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Course Meeting Times:

Lectures: M W F, 11:15 AM-12:05 PM, Hasbrouck Laboratory, 126

Instructor Office Hours: Thursdays (3:00 – 5:00 PM, <https://umass-amherst.zoom.us/my/jgummeson> or KEB215B)

TA Office Hours: Mondays, Wednesdays, and Fridays 5:00-7:00 PM, Location TBD)

Textbook:

Computer Organization and Design: ARM Edition (1st Edition), David Patterson and John Hennessy; Published by ZyBooks; ISBN: 9780124077263. (digital textbook, see instructions in lecture slides, Piazza)

Course Goals:

Students completing this course will be able to:

1. Design a simple RISC microprocessor which uses pipelining
2. Use assembly language to program a microprocessor
3. Develop and analyze a memory system for the RISC microprocessor
4. Understand contemporary computer design issues including multi-cores, performance, and energy consumption

Grading:

Midterm Exam 1: **20%** (timed exam, week of 09.25)

Midterm Exam 2: **20%** (timed exam, week of 10.30)

Final: **20%** (timed exam, 12.20)

Zybook exercises: **10%** (Completed in the ZyBook platform by Deadline)

Homeworks (7-8): **15%** (Written homework submitted via gradescope)

Labs (2): **15%** (Distributed and turned in via Gradescope)

Attendance Policy:

Lectures will be delivered live in Hasbrouck. Attendance is strongly encouraged, but not required. Videos of live lectures will be made available during the afternoon of each lecture day.

Assignment Submission Policy:

All assignments are submitted electronically and due at the specified deadline. Each student is allowed **10** total grace days that can be used across a combination of homeworks and labs. ZyBooks readings and exercises must be completed by the deadline.

Academic Honesty Policy:

Limited collaboration between peers on homework and labs is expected and encouraged with credit given for significant contributions. We have a zero tolerance policy for representing work completed by someone else as your own; this includes use of online resources, such as Chegg. Homework assignments, labs, and exams found to violate this policy will receive a grade of 0.