

Course Syllabus

Welcome to Computer Organization. This course is an *intensive* introduction to the fundamentals of computer architecture. Relying heavily on the elementary principals taught in ECE 331 and ECE 332, we will discuss the basic design, or architecture, of computing hardware. Taking a largely bottom-up approach, we will focus on the microarchitecture level (the computing hardware itself) and the instruction set architecture level (the interface between software and the computing hardware). This course has a demanding design component; you will implement the concepts presented in lecture using real hardware design tools.

Topics: include instruction set architecture, addressing modes, RISC and CISC, computer arithmetic, evaluating performance, datapath and control, single cycle and multi cycle datapaths, exceptions and hazards, pipelining, cache and memory hierarchy, assembly language, processor simulation.

Faculty: Jens-Peter Kaps ST2-213 jkaps@gmu.edu
Teaching Assistants: Chethan Ananth ST2-203 cananth@gmu.edu

Lectures: 10:30 – 11:45 am, Tuesday and Thursday IN-132

Textbook: Computer Organization and Design, The Hardware / Software Interface by David A. Patterson and John L. Hennessy, Morgan Kaufmann; revised 3rd edition, 2007, ISBN-10: 0-12-370606-8 ISBN-13: 978-0-12-370606-5.

Office Hours:

Please check the class web page for the current office hour schedule. You should feel free to approach Dr. Kaps and the TA at any time if you need help in addition to the scheduled sessions. The best way to contact us is via e-mail.

Required Background:

- ECE 331 Digital System Design (grade C or better)
- ECE 332 Digital Electronics and Logic Design Lab

Homework:

Homework will be assigned on a weekly basis (up to 12 assignments total). Homework is due on Tuesday and is to be handed in on paper at the **beginning** of class. Homework is very helpful in preparation for exams and is required to achieve an 'A' in this class. Homework must be handed in on time to receive credit. **No late submission** is possible.

Machine Problems

This course features three significant projects, called machine problems (MP). Students in ECE 445 will be granted access to the S&T II, Room 203 computer lab to complete their machine problems. All machine problems must be tested using Aldec ActiveHDL. Students are encouraged to discuss with TA options for working remotely. MP1 will be completed individually; MP2 and 3 will be completed in small groups. **Late submissions** will be subjected to a **10% grade reduction per day** including weekends. No credit will be given to any submissions that are more than 7 days past the due date.

Exams:

There will be two exams during the course. Exams will be **closed book**.

A single (two-sided) blank note card (3" x 5") will be provided by the instructor on which you can write down **your own notes**. You are not allowed to use more than one card or to attach anything to this card. Your notes have to be hand written.

There will be NO make-up exams. (See Dr. Kaps for an exception.) Students who are more than 15 minutes late for an exam may not be admitted and will be assigned a grade of zero for the exam.

- **Midterm Exam:** Thursday October 18th.
- **Final Exam:** Thursday December 13th.

Grading:

The final grade is based on a weighted sum of your performance in exams, homeworks, recitations and class participation:

	Total
MP 1	10%
MP 2	15%
MP 3	10%
Midterm Exam	25%
Final Exam	30%
Homeworks	10%
	100%

Honor Code:

All rules of the GMU Honor Code system will be in effect. You must review the rules and be familiar with them.

You are encouraged to discuss homework problems with other students and/or obtain the assistance of the TA. Nevertheless, please write down your solutions which represent your understanding of the material. Duplicating someone else's homework solutions, hardware/software designs, diagrams, source code, and exam notes is considered cheating. If you use material from other sources such as but not limited to the web, books, journals, data sheets, etc. you must reference the source. Honor code violations will be followed up with full force.

Classroom Etiquette

Cellphones have to be turned off during class or at least put into silent mode. If you have an emergency need to answer a call please quietly leave the room BEFORE answering the call.

Lectures may not be recorded without express written permission from the instructor.

Students with Disabilities

If you need special assistance, please inform the instructor soon so that we can work something out.