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	ENGR 3222	jkaps@gmu.edu
Teaching Assistant:	Panasayya Yalla		pyalla@gmu.edu
Lectures:	3:00 – 4:15 pm, Monday and Wednesday		Krug Hall 5
Textbook:	Computer Organization and Design, The Hardware / Software Interface by David A. Patterson and John L. Hennessy, Morgan Kaufmann; revised 4th edition, 2011, ISBN: 978-0-12-374750-1 (or earlier editions till 3rd revised).		

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

  and either
- CS 262 Introduction to Low-Level Programming

  or
- CS 222 Computer Programming for Engineers

Homework:

Homework will be assigned on a weekly basis (up to 12 assignments total). Homework is due on **Monday** 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. **Late submission will result in 20% deduction per day. Homework cannot be submitted later than Wednesday at the end of class** because then the solutions will be posted. Only one randomly picked question of each homework will be graded. The solutions will cover all questions.

Writing intensive requirement:

One of the homework assignments in this course will require writing an essay of 500 - 1000 words on the topic assigned by the instructor. This essay should meet the university standards for the writing intensive requirement, and will be evaluated as part of student's writing portfolio. The essay will also be used for evaluation of one of the ABET accreditation outcomes in both BS EE and BS CpE programs.

Projects:

This course features six projects which are based upon each other. Students in ECE 445 will be granted access to the ENGR Room 3208 computer lab to complete their projects All projects must be tested using Xilinx ISE. Students are encouraged to discuss with TA options for working remotely. **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 3 days past the due date. The projects are weighted as follows: Project 1: 3%, Project 2: 5%, Project 3: 10%, Project 4: 5%, Project 5: 5%, Project 6: 7% for a total of 35%.

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:** Wednesday March 6th.
- **Final Exam:** Monday May 13th, **1:30 pm** – 4:15 pm.

Grading:

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

	Total
Projects	35%
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 and projects with other students and/or obtain the assistance of the TA. Nevertheless, **you must write down your own homework solutions** which represent your understanding of the material. Projects must be completed individually. No part of a project submission can be copied from another student of the class or any other source.

Duplicating someone else's work such as but not limited to homework solutions, hard-ware/software designs, diagrams, source code, project reports, 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, pagers have to be 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.