

ECE 379: Introduction to Computer Engineering

Spring 2006, MWF 12:05-12:55, EH2265

URL: <http://www.cae.wisc.edu/~mikko/379/>

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Office hours: EH4613, M 1-2, W 1-2:30

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Course Description and Course Objectives

This course is intended for freshmen engineering students, to serve both as a general introduction to engineering for all engineering majors, but also as a foundational course for the computer engineering degree program. The course provides bottom-up coverage of the critical concepts in the operation and design of computing systems, starting with transistors, then logic gates, then complex logic structures, then gated latches and memory. The course removes all of the mystery about the operation of computer systems by methodically and progressively explaining the implementation and behavior of each important layer of abstraction in the hardware of a computer system.

The course will also explore the increasingly pervasive role that computing devices--particularly those embedded in appliance-like systems--play in modern society, as well as the historical importance of computing as a powerful tool and enabler for virtually all engineering and scientific disciplines. Within that context, the course will discuss the ethical, economic, social, and political impacts that computers have had on our society in the past fifty years and will continue to have in the future.

There are no prerequisites for this course.

The course will provide students with:

1. A basic understanding of several aspects of computer engineering practice, including basic hardware design and low-level assembly-language programming.
2. Awareness of some of the ethical, social, political, and economic influences on and impacts of engineering.
3. Introductory skills in teamwork with peers.
4. Experience in written and oral communication with an engineering audience.
5. Preliminary development of the habits of mind that engineering study and practice require.
6. Elementary knowledge of other disciplines in engineering.

Course Textbook

"Introduction to Computing Systems: from bits and gates to C and beyond"; Yale N. Patt and Sanjay J. Patel; McGraw Hill, 2003, 2nd edition

Homework

There will be approximately six homework assignments (about one every other week) which may not be weighted equally. Some assignments will require the review of material that is touched upon, but not covered in depth in class. The homework assignments must be completed in groups of up to three students. Each group should submit only one completed homework, and all members of the group will receive the same grade; however, each homework submitted must include a statement of work that summarizes the contributions of each student in the group. The intent here is to encourage you to develop relationships with your fellow students and form study groups; these connections will prove invaluable in your later engineering courses. No late homework will be accepted.

Departmental Advising Sessions

You are required to attend the College of Engineering departmental advising sessions during the semester (dates to be determined) to learn more about the various engineering disciplines taught by the college. You will have to submit a brief report documenting what you have learned. This report will count as one of your homework assignments.

Programming Projects

There will be three machine- and assembly-language programming projects due throughout the semester. The

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projects must be accompanied with documentation in the form of a brief written report. The project grades will be determined based on the correctness and readability of your programs, as well as the quality of the written report. I strongly encourage students to work the the university's writing center to improve their written communication skills.

Quizzes

There will be approximately 12 (about one per week) unannounced in-class quizzes to assess how well students have learned material that has been covered recently in lecture. Some of these quizzes may involve solving problems in groups of two or three students.

Examinations

There will be two in-class midterm examinations and a comprehensive final on Tuesday, May 9, at 10:05am.

Grading

Homework	20%	Midterm 1	15%
Programming Projects	15%	Midterm 2	15%
In-class Quizzes	15%	Final Exam	20%

Communications Channels

I strongly encourage you to meet with me during my office hours, or call me or send e-mail. Introducing yourself to me, expressing concerns, offering suggestions, and seeking advice are among the welcome topics. Make sure you monitor the web site for this course which contains course information, lecture notes, pointers to project resources, and the latest announcements.

Course Outline (subject to change)

Week	Dates	Assignments	Topics	Readings
1	1/18, 1/20		Welcome Aboard	Ch 1
2	1/23,1/25,1/27	HW #1 out	Bits, Data Types, and Operations	Ch 2
3	1/30,2/1,2/3	HW #1 due	Digital Logic Structures	Ch 3
4	2/6,2/8,2/10	HW#2 out	Digital Logic Structures cont'd	Ch 3
5	2/13,2/15,2/17	HW#2 due	The von Neumann Model	Ch 4
6	2/20,2/22,2/24	Midterm 1	Review and Midterm	Ch 1, 2, 3, 4
7	2/27,3/1,3/3	HW#3 out	The LC-3	Ch 5
8	3/6,3/8,3/10	HW#3 due, Prog#1 out	Programming	Ch 6
Spring Break				
9	3/20,3/22,3/24	HW#4 out, Prog#1 due	Assembly Language	Ch 7
10	3/27,3/29,3/31	HW#4 due, Prog#2 out	Input/Output	Ch 8
11	4/3,4/5,4/7	Prog#2 due, Midterm 2	Review and Midterm	Ch 5, 6, 7, 8
12	4/10,4/12,4/14	HW#5 out	TRAP Routines and Subroutines	Ch 9
13	4/17,4/19,4/21	HW#5 due, Prog#3 out	The Stack	Ch 10
14	4/24,4/26,4/28	HW#6 out, Prog#3 due	Catch up	
15	5/1,5/3,5/5	HW#6 due	Review	Ch 1-10
16	5/9		Final Exam, 10:05am Tuesday	--