

CpE 213: Digital Systems Design

Fall 2003 Syllabus

Reference Number

27040

Time

TR, 11:00-12:15

Venue

EECH G-31

Instructor

Sahra Sedigh-Ali

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Office: EECH 219

Office Hours: TR 1:30-3:00, or by appointment.

Prerequisites

CpE 111 (Intro to Comp Eng) and a C programming course, such as CS 53 (Intro to Programming) or CS 74 (Intro to Programming Methodology).

CpE 214 is strongly recommended as a co-requisite.

Prerequisites by Topic

1. Familiarity with C programming.
2. Knowledge of the functions of NAND, NOR, decoders, multiplexers, and similar combinational logic elements.
3. Knowledge of the functions of D flip-flops, registers, counters, and similar sequential logic elements.

Text

Required

The 8051 Microcontroller, I. Scott MacKenzie, 3rd edition, Prentice Hall, 1999.

Recommended Supplements

- *C and the 8051*, Tom Schultz, Prentice Hall, 1998
- *80C51 Based 8-Bit Microcontrollers*, Databook for the 80C51, Philips Semiconductors, 1998 Available at:
<http://www.umar.edu/~daryl/classes/ee213/notes.html>
- *The C Programming Language*, B. Kernighan and D. Ritchie, Prentice Hall, 1988
- *C: The Complete Reference*, Herbert Schildt, 4th edition, McGraw-Hill Osborne Media, 2000.
- Other manuscripts/notes available at:
<http://www.umar.edu/~daryl/classes/classes.html> (by Dr. Beetner)

Course Objectives

By the end of the course, you should be able to:

1. Analyze and design hardware and software for small digital systems involving microcontrollers.
2. Understand the organization of a simple digital computer.
3. Use the 8051 microcontroller and its standard peripherals.
4. Apply the C language in embedded computer systems.

Topics Covered

1. Introduction to microprocessor organization and operation, emphasizing the 8051 microprocessor subset (the WIMP51).
2. Introduction to computer architecture, with an emphasis on systems involving the 8051 microcontroller.
3. Machine and assembly language programming for the Intel 8051 and variants.
4. C language programming for embedded systems.
5. Case studies for embedded systems.
6. Interrupts, timers, counters and serial communication (C and assembly language).
7. Introduction to real-time embedded systems including real-time operating systems.

Class Attendance

You are expected to attend all classes. Attendance will be recorded for randomly selected class sessions. If you must miss a class, you are responsible for procuring any material, information, handouts, or announcements that you missed.

Homework

- You are expected to read appropriate sections of the textbook before presentation in class.
- Homework problems will be assigned in class.
- Assignments are due at the beginning of class.
- No late homework will be accepted.
- While you are expected to complete all homework assignments, the grader may randomly select only certain problems to grade.

You may work together to solve the homework problems, but the write-up should be done individually. Copying from anyone else's solution, as well as being dishonest, will deprive you of the opportunity to learn and to find out how much you know about the subject. If homework from two students is found to be effectively identical, both students will receive zero as the grade. If you cannot explain your answer for solutions at a later date, no credit will be given, even if the solution was correct.

Quizzes

There will be 3-5 brief announced or unannounced quizzes in class. A score of zero will be given for a quiz in case of absence. No makeup quizzes will be given.

Exams

Take note of the dates for the two tests and one final exam. Unless there is a valid excuse, failure to show up at an exam will result in a grade of zero. If there is a scheduling conflict wherein an examination from another course overlaps in time with any of these times, you should notify the instructor in writing (preferably email) at least two weeks ahead of time. According to the Student Academic Regulations all requests to change the final schedule because of conflicts or having three or more examinations scheduled on one day are to be made in the Registrar's Office at least **one week before the beginning of the final examination week (Friday, December 5)**. Students are expected to provide evidence of scheduling conflicts or other excuses before permission for a makeup exam can be granted.

Students needing special accommodations for exams should notify the instructor at least one week prior to the exam.

Academic Honesty

We expect every member of the UMR community to practice honorable and ethical behavior inside and outside of the classroom. Any action that might unfairly improve a student's score on homework, quizzes, or examinations will be considered cheating, and will not be tolerated. A few examples of cheating are:

- Submitting homework that is not your own work. While we encourage you to work together, your work should not be a copy of your partner's.
- Sharing results or notes during quizzes or exams.
- Bringing notes, in hard copy or electronic form, to an exam. This includes improper use of a programmable calculator.
- Continuing work on your exam after we have called for papers.
- Requesting a regrade on an exam or homework problem that has been altered after grading.

If you are unsure whether a certain act is considered cheating, please ask your instructor. Cheating on assignments or exams can result in a zero score for the assignment or exam, or a reduced or failing grade for the course, at the discretion of the instructor. Instances of cheating will be reported to university administrative officials for further action and possible suspension or expulsion from the university.

Grading (tentative)

Exam 1: 25%

Exam 2: 25%

Project (tentative): 10%

Final Exam (Comprehensive): 30%

Assignments & Quizzes: 10 %

Exam Dates

Exam 1: Tuesday, September 30

Exam 2: Thursday, November 6

Final Exam Friday, December 19 (8:00-10:00 am). Location to be announced.

Partial Credit and Regrades

Problems are rarely graded as all-or-none. Emphasis is placed first upon the understanding of the concept, followed by proper application of the concepts, and lastly on the correct answer. Show your work. You will not be severely penalized for minor mistakes, but answers without explanations may not be given full credit.

If you feel you deserve more credit on a problem than you were given, you may submit a written (preferably email) request for additional credit, clearly stating why you believe you deserve additional credit. Such a request will not be accepted until *24 hours* after an assignment or exam is handed back, and should be in the form of a memo or letter used when communicating between professionals on the job. Requests should be submitted within *five days* of receiving the assignment or exam. No such requests will be honored after the deadline has passed. A regrade can result in an increase, a decrease or no change in the grade.

Feedback

Your feedback is critical to my success as an instructor. In addition to the end-of-semester evaluations required by the department, I will periodically solicit your feedback, which can be provided anonymously. Your comments are appreciated and are welcome throughout the semester.

ANY INFORMATION PROVIDED BY THE INSTRUCTOR ON LATER DATES, IN WRITTEN OR ORAL FORM, WILL SUPERSEDE THIS DOCUMENT.

8/26/2003