

EE 5314 (5319) Embedded Microcontroller System Design
Summer 2004
MW 6:00-7:50pm, 109 NH

Instructor:

Jason Losh, Ph.D.

jlosh@uta.edu

Office Hours are 5:30-6pm MW in 148NH, after 7:50pm W in 148 NH, or in 509 NH by appointment. E-mail is the quickest method of contacting me on non-class days.

Textbook:

No textbook will be required for this course. Extensive references, datasheets, application notes, and class notes will be provided on the course web site at <http://omega.uta.edu/~jlosh/>.

Catalog Description (Fall 2004 version):

5314. EMBEDDED MICROCONTROLLER SYSTEMS (3-0). Hardware/software development techniques for microcontroller systems with emphasis on hardware-software interactions, programming internal peripherals, and real-time control and conditioning of external devices. Topics include: code efficiency issues, pin reuse issues, interrupt-driven processing, USART operations, I2C and SPI bus peripherals, and use of internal peripherals.

Prerequisite Background:

Very good knowledge of at least one microprocessor or microcontroller is mandatory. Essential background includes assembly language programming, memory organization, memory mapping, bus timing, basic i/o interfacing, and interrupt operation.

A good understanding of BJT and FET circuits, Fourier series and transforms, 1st and 2nd order control loops, and basic communications will also be very useful.

Course Topics:

- Course introduction and discussion of course objectives
- Presentation of suggested topics
- Harvard v. von Neuman architectures
- Comparison of microcontroller and microprocessor architectures
- Study of 18F452 microcontroller built-in devices including timers, PWM, interrupts, i/o ports, and a/d converters
- Determining microcontroller memory, speed, and capabilities to solve a task
- Interfacing with I2C, 1-wire, SPI, serial, PSP
- Measurement and instrumentation applications
- Device control: Motors, servos, relays, heavy AC and DC loads
- Real-time control applications

Important Dates:

First Day of Classes (Tuesday, 6/1), Census Date (Monday, 6/7), End of First Drop Period (Monday, 6/28), Test 1 (Wednesday, 7/7), Last Day to Drop or Withdraw (Monday, 7/26), Test 2 (Wednesday, 8/4), Project Due (Monday, 8/9 at 6pm), Last Day of Classes (Monday, 8/9), Grades Due (Monday, 8/16), and Grades Available (Tuesday, 8/17).

Performance Assessment:

- Grade scale: A (90-100), B (75-89), C (60-74), D (50-59), and F (0-49)
- Grade calculation: (Test 1 + Test 2 + Project) / 3
- The instructor reserves the right to make reasonable changes in performance evaluation as needed.

Graders:

Dharsan Bhandari, darshanbhandari@hotmail.com

Chinniah Anand, chinniahnanand@vsnl.net

Office Hours in Rm 148 NH (lab): MW 8-10pm, TTh 6-9pm, S 9-3pm

The lab may also be open for open lab hours from 9am-5pm M-F subject to available staff.

Tests:

- Calculators, rulers, pencils, pens, books, and notes will be allowed during tests.
- Any device capable of compiling or emulating microcontrollers or microprocessors can not be used during in-class portions of the tests.
- The take home portions of Test 1 will be due within one week of assignment.
- No makeup will be provided for any test.
- Any request for re-grading must be submitted to the grader within one week of the return date.
- For all tests, Web students shall take exams at the same time as on-campus students.
- For all tests, VCR students may take tests during the normal scheduled class time or up to one week later.

Projects:

- Project teams will consist of one to three team members (with signed ethics statement).
- Project is due at the beginning of the class on Monday, 8/9.
- Projects will be defended on 8/9 during class hours.
- Off campus (VCR and Web) students shall also meet this deadline for the project.

Academic Honesty:

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents' Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22). ANY CHEATING WILL RESULT IN SEVERE PENALTIES. All work submitted must be original. If derived from another source, a full bibliographical citation must be given.

To be eligible to participate in two member project teams and work common class projects, you will be requested to sign and return a letter acknowledging the College of Engineering Ethics policy.

Americans with Disabilities Act:

If you require an accommodation based on disability, please feel free to meet with me during the first week of the semester to make sure that you are properly accommodated. Contact Dr. Cheryl Cardell (272-3670) or Mr. Jim Hayes (272-3364) for more information.