EE 5314 Embedded Microcontroller System Design
Fall 2006

Instructor:
Jason Losh, Ph.D.
jlosh@uta.edu
Office Hours are after 6:50pm MW outside the class room.
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/.

Listserv:
Please sign up for the EE5314-L listserv to receive the latest updates (goto http://listserv.uta.edu for details)

Catalog Description:
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 18F4520 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
- Measurement and instrumentation applications
- Device control: Motors, servos, relays, heavy AC and DC loads
- Real-time control applications

Important Dates:
First Class (Monday, 8/28), Labor Day Holiday (Monday, 9/4), Census Date (Wednesday, 9/13), Test 1 (Wednesday, 10/11), Lab Work Day / No Lecture (Monday, 10/30), Last Drop Date (Friday, 11/3), Test 2 (Monday, 12/4), Project Due (Wednesday, 12/6 at 4pm)

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.

Graduate Teaching Assistants:
Asma Al-Tamimi, Office Hours 7-8:30pm MW and 5-8pm F, 148NH, altamimi@arri.uta.edu
Varun Shenoy, Office Hours 5-7pm MW and 5-8:30pm TTh, 148NH, varunkshenoy@uta.edu
The lab may also be open for open lab hours M-F 9am-5pm 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.
- Web and VCR students shall take exams at the same time as on-campus students.

Cost:
No textbook will be required. The project cost is expected to be less than $50.
Provisions will be made to provide teams of 3 a programmer to check out for the semester. If adequate numbers of programmers are available, teams of 1 and 2 members will also be provided programmers for check out. Programmers are also available for use in 148NH. For students unable to utilize the provided programmers, a programmer costing between $110 and $200 will be required to complete the project.

Projects:
- Project teams will consist of one to three team members.
- Project is due at the beginning of the class on Wednesday, 12/6.
- Projects will be defended on 12/6 during class hours.
- Off campus (VCR and Web) students shall also meet this deadline for the project.
- A lab in 148NH is available to construct the hardware portion of your project and test your project, provided you attend a mandatory lab safety orientation.

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.

EE Department Policy requires that you 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.