

# **EE 6314 Advanced Embedded Microcontrollers Spring 2008**

## **Instructor:**

Jason Losh, Ph.D.

[jlosh@uta.edu](mailto:jlosh@uta.edu)

Office Hours will begin at 6:50pm MW outside the classroom for EE4328.

E-mail is the quickest method of contacting me on non-class days.

## **Textbook:**

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 EE6314-L listserv to receive the latest updates (go to <http://listserv.uta.edu> for details)

## **Catalog Course Description:**

**6314. ADVANCED EMBEDDED MICROCONTROLLER SYSTEMS (3-0).** Study of advanced microcontroller system designs with an emphasis on multi-tasking, real-time control of devices. Topics include: design of real-time control systems, programmable logic controller (PLC) hardware, USB peripherals, and network appliances. Prerequisite: EE 5314 or consent of instructor.

## **Comments on the Course:**

As in EE5314, all topics will be accompanied with working hardware and software. A common prerequisite and smaller class size allow this class to be conducted in a collaborative team style, where system design, specification, and implementation are accomplished through a combination of individual and group tasks, with different members of the team having responsibility for varying parts of the design. Some flexibility in grading may be provided in students wishing to solve more difficult assignments.

## **Prerequisite Background:**

Completion of EE5314 Embedded Microcontrollers is required. Alternatively, a leveling exam may be taken on the first day of class to determine eligibility for taking the course.

A good understanding of ANSI C is also required. On the PIC controller, code will be written using the CCS compiler and several Win32 applications will be written using Microsoft Visual C++® version 6.0 or later.

## **Course Topics:**

- Group decision on the class project topic
- Review of 18F4520 assembly code (setup example)
- Adding bootloader functionality
- Porting selected EE5314 demos to C code
- Design of a new hardware platform (with a superset of the class project requirements)
- Porting 18F4520 C code to new hardware platform
- Development of drivers for new peripherals (serial address/data buses, PS/2 keyboard, ethernet)
- Determination of the need for a real-time operating system (RTOS)
- Benefits and drawbacks of RTOS and alternatives to RTOS implementations
- Study of RTOS problems (priority inversion on Mars, blocking threads)
- Converting old device drivers and functions to RTOS-friendly handlers
- Construction of a real-time operating system
- Ethernet applications with MAC only support, ARP/RARP, ICMP (ping, ack, nack), IP, UDP
- Class Project

**Important Dates:**

First Class (Monday, 1/14), No Class (Monday, 1/21), Census Date (Wednesday, 1/30), Spring Break (Monday-Friday, 3/17-21), Last Undergraduate Drop Date (Friday, 3/28), and Last Graduate Drop Date (Friday, 4/11)

**Performance Assessment:**

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

**Graduate Teaching Assistant:**

All office hours are in the lab (148NH).

EE4328 GTA: Rajendra Chiguluri, [chigulurirajendra@gmail.com](mailto:chigulurirajendra@gmail.com), MW 7-10pm, Th 1-7pm, F 6-10pm

EE6314 GTA: Jennie Abraham, [jenniegloria@gmail.com](mailto:jenniegloria@gmail.com), M 9-2:30pm, T 9-4pm, 7-10pm, W 12-2:30pm

**Lab Orientation:**

EE department policy requires that students utilizing 148NH attend a safety orientation session.

**Projects (100% of Grade):**

- Project 1 (rtos) will consist of project teams of up to 3 members and will require that simple hardware be constructed.
- Project 2 (class project) will consist of project teams of varying sizes and will require some hardware and use of the common class hardware for some portions of the development process.
- Project deadlines may change slightly depending on the type of class project chosen.

**Academic Integrity:**

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, Series 50101, Section 2.2)

EE Department Policy requires that you sign and return a letter acknowledging the College of Engineering Ethics policy.

**Americans with Disabilities Act:**

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled Americans with Disabilities Act (ADA), pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability). Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.

**Student Support Services:**

The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance,

developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.