

**EE 6314 Advanced Embedded Microcontrollers**  
**Spring 2005**  
**MW 4-5:20pm, 112NH**

**Instructor:**

Jason Losh, Ph.D.

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

Office Hours will begin at 6:50pm MW in 148 NH.

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, strong performance in EE4342 may be sufficient for enrollment provided that extra attention is afforded to learning all EE5314 demo board programs.

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 18F452 assembly code (setup example)
- Adding bootloader functionality
- Porting EE5314 demos to C code
- Study of the limitations of the EE5314 hardware platform (missing peripherals and conflicts)
- Design of a new hardware platform (with a superset of the class project requirements)
- Porting 18F452 C code to new hardware platform
- Development of drivers for new peripherals (formal address/data buses, PS/2 keyboard, ethernet)
- Determination of the need for a real-time os (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
- USB controllers (time allowing)

### **Important Dates:**

First Class (Wednesday, 1/19), Census Date (Wednesday, 2/2), Project 1 Due Date (Monday, 2/14), First UG Drop Date (Friday, 2/25), Midsemester (Friday, 3/11), Spring Vacation (Monday-Friday, 3/14-18), Project 2 Due Date (Wednesday, 3/23), Last Drop Date (Friday, 4/15), Project 3 Due Date (Wednesday, 4/27)

### **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 + Project 3) / 3
- The instructor reserves the right to make reasonable changes in performance evaluation as needed.

### **Shared Graduate Teaching Assistants:**

Asma Al tamimi (EE6314), [asma\\_tamimi@hotmail.com](mailto:asma_tamimi@hotmail.com)

Falguni Thakker (EE4342), [falguni\\_t@yahoo.com](mailto:falguni_t@yahoo.com)

Office hours will be M 5-10pm, Tu 6-10pm, W 5-10pm, Th 5-7pm, F 6-10pm in 148NH.

The lab may also be open for open lab hours M-F 9am-6pm subject to available staff.

If the lab is empty as of 8:40pm (allowing ample time for students attending a 7-8:20pm to reach the lab), the GTAs may leave the lab.

### **Lab Orientation:**

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

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

- Project 1 (porting code to C) will be solved individually.
- Project 2 (RTOS) will consist of project teams of up to 3 members and will require that simple hardware be constructed.
- Project 3 (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 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.