CSE 325 Embedded Microprocessor System Design (Spring 2012)

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The course will place its emphasis to software/hardware integration and I/O programming. It will incorporate the state-of-the-art SOC platforms and the emerging embedded system development tools. We will gear to the integration of hardware modules to construct embedded systems, and the programming models and characteristics of various input/out interfaces. Either assembly language or any high-level languages will be chosen to meet computation, resource, and software development requirements.

Office Hours:
- 1:15pm-2:45pm, Tuesday and Thursday, Brickyard 552.

Learning Objectives:
- Demonstrate an ability to analyze microprocessor-based embedded systems, memory components, and bus connection.
- Demonstrate design skills for modular application and system software in microprocessor-based embedded systems.
- Apply software development tools to efficiently implement and debug programs running in microprocessor systems.
- Demonstrate an ability to analyze I/O interface units and to design software for managing I/O operations.

Pre-requisites:
- Assembly language, microprocessor organization, and experience of C programming language

Major topics:
- Introduction and review of instruction set and assembly language programming, instruction execution cycle and timing
- Memory devices, SRAM, DRAM, flash memory, and SDRAM controller
- Buses, access arbitration and timing
- Interrupts and DMA
- Timers and counters
- Serial communication: UART, SPI, and I2C
- Parallel I/O interface and signal handshaking
- Keyboards and LCD
- A/D-D/A converters
Development platform and projects:
- Freescale’s Tower MCF5225X-KIT and peripheral
- Introduction projects on understanding the programming environment on Code Warrior IDE and target development board.
- Lab assignments on I/O programming.
- CodeWarrior integrated development environment.

Reference Manuals and Books:
- CFPRM, ColdFire Family Programmer’s Reference Manual,
- CodeWarrior Development Studio for Microcontrollers V10.x Targeting Manual
- CodeWarrior Development Studio for Microcontrollers V10.x Getting Started Guide
- additional manuals and data sheets

Evaluation
1. Midterm exams (20%) (during the class period on March 1)
2. Lab assignments (50%)
3. Final exam (30%) (during the final exam period scheduled by the University, i.e. 12:10 - 2:00 PM, April 26)
4. The final grade will be curved. However, you will receive a minimum letter grade of A, B, and C if the weighed score is above 85, 75, and 65 respectively.

Important Notes
1. The exams are closed book and closed notes. Only the original and unmarked copies of manual pages, calculator, and a 3x5 note card are allowed.
2. A student with a proper excuse of being absent from the examination must notify the instructor prior to the time of an examination. Any students who do not take the examination at the scheduled time will receive a score of zero.
3. The lab assignments must be done individually. Late submission will not be accepted. The instructor reserves the right to ask any student to explain the work and adjust the grade accordingly.
4. To request a regrade of exam or assignments, you should attach a note stating the reasons that you feel a regrade is required and submit to the instructor within a week from the date that the grade is returned.
5. Plagiarism and other anti-intellectual behavior will be dealt with severely.