CPE 325 – Embedded Systems Laboratory
Laboratory Policies
Spring 2014

Class Info: Section: 01
Meeting time: Tuesday & Thursday 2:20 – 3:40
Location: EB 227

Instructor: Amos Christiansen
Email: ahc0007@uah.edu
Office: TBD
Phone: TBD
Office Hours: Wednesday 12:45 – 3:45; or by appointment

References: Davies, John H., *MSP430 Microcontroller Basics*
MSP430x4xx Family User's Guide
MSP430x2xx Family User's Guide
Contact your TA if interested in purchasing your own MSP430 kit

Course Objective:
The objective of this course is to examine both hardware and software aspects in building embedded computer systems, as well as methods to evaluate design trade-offs between different technology choices. The students should be able to develop an appreciation of technology capabilities and limitations and appreciation of all system components necessary to be able to design and implement a basic embedded computer system and interface it to the outside world. Experiments performed in the Microcontroller Laboratory should provide considerable experience, allowing students to develop programs in assembly language and C and program embedded systems to perform required functions.

Grading:

13 Laboratory assignments:	85%	
6 Quizzes (lowest dropped):	15%	

B:	80% - 89%
C:	70% - 79%
D:	60% - 69%
F:	below 60%

Grading of Laboratory Assignments:

A: 90% and up

Functionality (design specifications met):	30%
Design (approach to problem, robustness):	30%
Demonstration (knowledge of problem and program):	25%
Documentation (formatting, comments, flow chart):	15%

Instructors may penalize laboratory assignment grades if the policies outlined below are not adhered to.

Lab Policies:
During lab sessions, the instructor will review the material and you will begin working on the assignments. Additionally, you may be required to take a quiz and/or demonstrate due assignments at the beginning of class. It is very likely that your assignments will take longer than the time allotted to lab meetings. Make good use of the lab meetings by asking questions.

During program demonstrations, you must show your program documentation, demonstrate your code, and discuss how the program works and solves the specified problem. You must answer any questions related to the lab assignment asked by the lab instructor.

In order to receive credit for your lab you must submit your code to the dropbox on Angel by the specified due date. You then must demonstrate your submitted code to the instructor on the due date. **Zero credit will be given for programs that are submitted but not demonstrated.**

All assignments must be completed and demonstrated by the due date; no late submissions will be entertained. **If you must miss a lab, you must email your instructor prior to the lab meeting to arrange a make up demonstration, and the code must still be submitted to the drop box on time.**

Your lab programs must be written by you. Any evidence of copying and/or plagiarism will result in a 'zero' for that assignment and the appropriate disciplinary actions taken. If you are uncertain what Academic Misconduct is, please review Article III, Section C in the student handbook, p.98. If you are still uncertain about this topic, please contact the instructor.

Your default UAHuntsville e-mail address will be used for all official correspondence for this class. It is incumbent upon the student to check his/her e-mail account regularly to be aware of the important announcements or emergencies regarding the course or the schedule.

In the lab, turn off or silence your mobile phones. If you need to take a call, do so outside the lab.

You will be provided access to the lab around the clock by using your UAH ID card. You must swipe your card on the first day of class in order for the system to be updated with your information. You may access the lab at any time when another class is not being taught. You may not allow anyone in to the lab who does not have the proper access. If you have any issues with accessing the lab with your card, please contact Tim Torrie (torriet@eng.uah.edu).

The experimenter boards in the lab are UAH property and must be treated with due care. You may not move any of the jumpers on the board without instructor approval, and not hardware may be removed from the lab. You may not switch boards from the workstation where they are located. If you have a problem with your board, please alert your instructor, and the problem will be addressed.

All code must be properly documented. Program listings should include program description in the header and program statements should be properly formatted with appropriate comments. Your program should start with a header that includes your name, Lab #, Assignment # and Lab Section. For example, the header should include the following:

```
/*-------------------------------------------------------
* Name: John Doe
* Lab assignment:
* Lab Section:
* Date: Jan 24, 2011
* Instructor: INSTRUCTOR NAME
* Program: Counts the number of characters E in a string
* Description: describe how you implemented your program
*-------------------------------------------------------*/
```

Tentative Lab Schedule:

Date		Lab	Topics	Quiz	Assignment	Due
Thursday	21-Aug	1	Intro to IAR, software documentation and flowcharting		Assignment 1	
Thursday	28-Aug	2	Numerical bases, data types in memory, printf		Assignment 2	Assignment 1
Thursday	4-Sep	3	Intro to assembly, simulator debugging,		Assignment 3	Assignment 2
Thursday	11-Sep	4	Subroutines, parameter passing, HW multiplier	Quiz 1	Assignment 4	Assignment 3
Thursday	18-Sep	5	Intro to I/O ports, board hardware, debounce, port special functions		Assignment 5	Assignment 4
Thursday	25-Sep	6	C Programming, Oscillators, clocks, interrupts	Quiz 2	Assignment 6	Assignment 5
Thursday	2-Oct	7	Timers (watchdog, timer A, timer B)		Assignment 7	Assignment 6
Thursday	9-Oct	No Class (Fall Break)				
Thursday	16-Oct	8	USCI, UART, HyperTerminal, Serial App and packets	Quiz 3	Assignment 8	Assignment 7
Thursday	23-Oct	9	USCI cont., USI, SPI		Assignment 9	Assignment 8
Thursday	30-Oct	10	ADC, reference voltage, unit calculation, accelerometer, temp sensor	Quiz 4	Assignment 10	Assignment 9
Thursday	6-Nov	11	DAC, MATLAB lookup table		Assignment 11	Assignment 10, Final Lab Topic
Thursday	13-Nov	12	Wireless Accelerometer project	Quiz 5	Assignment 12	Assignment 11
Thursday	20-Nov	13	Final project	Quiz 6	Assignment 13	Assignment 12
Thursday	27-Nov	No Class (Thanksgiving)				
Tuesday	2-Dec	13	Final project			Assignment 13

Lab Rules and Guidelines

In order to minimize confusion during the semester and to ensure proper function of lab equipment, students enrolled in CPE 325 must comply with the following rules. Students not complying with these rules may be penalized by their lab instructor or referred to the department heads.

- At the beginning of the semester, you should choose a station where you will work for the remainder of the semester. Because students may save their programs on their machine, it is important to sign on to the same station every class meeting.
- Students of CPE 325 may access the lab outside of their lab section's hours; however, if another lab begins, the student must vacate their station.
- Each station has a debugger and an experimenter board. Students may not remove or disconnect either device from their station. If you are having problems with your debugger or board, notify your lab instructor.
- Your experimenter board has many headers which are connected by short jumpers. You may not change the jumper configuration on the board unless specifically directed to do so by your instructor. Doing so may damage or permanently disable the board.
- Students must maintain tidy stations. Before vacating your lab station, make sure the any peripherals (accelerometers, spare boards, antennas) are put back where they belong. If anything has been damaged or doesn't work, you must report it to your lab instructor so that functioning parts can be obtained.