January 13, 2015

EE 4390 — Section 01 — Spring 2015
Hamann, Jerry

Microprocessors

Course Information and Policies

Instructors:  Lecture: Jerry C. Hamann  Lab:  
Office: EN 5036  Office: EN 5030  
Office Hours: MTWF 9:30-10:30, MTW 2:10-3:00  
Mailbox in EN 5068: HAMANN  Email: hamann@uwyo.edu  
Phone: 307-766-6321

Text:  MSP430 Microcontroller Basics, John H. Davies,  

Development Board:  MSP-EXP430G2 LaunchPad, MSP430G2553 DIP Microcontroller,  
Texas Instruments (Available On-Line at Digikey, Mouser, Newark, etc.)

Grading:  
- Two Hour Exams 40%
- Final Exam 20%
- Homework 10%
- Laboratory 20%
- Quizzes 10%
- Total 100%

Grade Breakpoints:  
- A ≥ 93, A- ≥ 90, B+ ≥ 87, B ≥ 83, B- ≥ 80, C+ ≥ 77,  
- C ≥ 70, D+ ≥ 67, D ≥ 60, 60 > F

Course Description:  Design of microcomputers, controllers and instruments which use microprocessors. Semiconductor memory design, CPU architecture, bus structure and timing, input-output interfaces and devices, assembly language programming, assemblers, compilers, editors and simulators. Emphasizes design techniques. Laboratory.

Prerequisites: Students must have completed EE 2390 (Digital Systems Design) with a grade of C or better (concurrent enrollment in EE 2390 is not allowed).

Computing and Programming: No prior assembly language or higher-level language programming experience is assumed, however prior exposure to a procedural programming paradigm can be an advantage. Significant objectives of the course include development of best practices in assembly language and C language programming of the MSP430 microcontroller. Successful completion of the course will require extensive programming.

Exams and Quizzes: Examinations will be given on the days noted on the Course Schedule, unless circumstances dictate a change which will be announced in class. Quizzes will be given in class, typically on Wednesdays, on a near weekly basis. It is not possible to make up a missed exam or quiz without a University Excused Absence. A final practical examination will be conducted in the laboratory during the final weeks of the semester.

Homework: Homework sets will be given on a near weekly basis, with due dates as shown on the Course Schedule. Assignments must be handed in no later than the start of class on the specified due date. No credit will be given for late assignments. Solutions to the homework will be posted on the EE 4390 Section 01 Website accessible from WyoCourses. Typically only one problem from each set will be graded; students are responsible for verifying the solutions of the remainder.

Laboratory: Attendance at and satisfactory completion of all labs is required. Lab exercise instructions are provided in PDF form on WyoCourses for each of the lab assignments. A final exam will be given in lab. Utilization of a professional EE 4390 Engineering Notebook will be an essential requirement.

Issues of Expected Academic Practice: Students are encouraged to discuss course topics and assignments with one another. However, the homework, lab, quiz and exam solutions turned in by each student must consist of that individual’s own work as noted in the University Regulations. Representing another individual’s work, including program code, as one’s own is considered academically dishonest.
Re-Emphasis of Policies and Expectations

*Exceptions, if possible, must be arranged in advance with the instructor.*

1. Electronic mail, as registered with the University of Wyoming Office of the Registrar (WyoWeb and Banner), may be utilized frequently for course information and some assignments. Be sure to register your email and check it frequently.

2. The course WyoCourses website will be used to provide details of assignments, including supplemental materials, solutions, as well as grade summaries. The student is expected to become familiar with accessing the site and using it on a daily basis.

3. The laboratory is an integral part of the course. **All lab exercises must be completed to pass the course.** (“Completed” means both physical presence in the lab and submission of a satisfactory write-up of the lab report.) If the labs are not completed, a **grade of F** will be awarded for the class.

4. Homework is due at the **beginning** of the specified lecture period. **Late homework will not be accepted.** Homework placed under an office door or in a mailbox will not be accepted unless prior permission is obtained from the instructor.

5. Reading assignments, as specified on the Course Schedule, should be completed prior to the associated class or lab.

6. The homework and lab grader is given full authority to reject, without grading, homework or lab reports which are not presented in the required format, with attention to neatness and clarity.

7. Makeup exams and quizzes will only be made for a University Excused Absence as per University Regulation 6-713 and as verified with the Dean of Students Office.

Summary Course Objectives

At the end of the semester, the EE 4390 student should be able to...

- Describe the memory map and programming register model of the Texas Instruments MSP430 family of microcontrollers.
- Describe the power-on/reset behavior of the Texas Instruments MSP430, including the steps required to initialize and configure an MSP430 for a typical embedded application.
- Utilize MSP430 assembly and machine language to implement fundamental computational and input-output tasks, including configuration for and handling of interrupts and exceptions.
- Integrate assembly language and C modules to provide a complete implementation of a typical embedded process controller with an MSP430 core.
- Provide accurate measurements of the timing of microcontroller operations.
- Describe and configure standard serial interface connections (I\(^2\)C, SPI, etc.) between MSP430 microcontrollers and typical I/O modules.
- Complete the design of hardware and software interfaces for a rich variety of I/O devices and sensors (e.g. switches, push-buttons, LEDs, LCD displays, analog-to-digital converters, digital-to-analog converters, temperature sensors, motor drive circuits).

**Disability Services:** Students who have a physical, learning, or psychological disability and require accommodations, should contact the course instructor as soon as possible at the beginning of the term. Students must register with and provide documentation of their disability to University Disability Support Services (UDSS) in the Student Educational Opportunities Office (SEO), room 330 Knight Hall.