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Fall 2013

### CEG 4330/6300-02: Microprocessor-Based Embedded Systems

Jack Jean

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## CEG 4330/6330-2 MICROPROCESSOR-BASED EMBEDDED SYSTEMS

Fall 2013, 3:35—4:30 PM, Mon., Wed., Fri., at 154 RC

**Instructor:** Jack Jean

**Office Hours:** 2:30-3:30 PM, M,W,F; 7:35-8 PM, M,W; 334 RC, 775-5106, jack.jean@wright.edu

**Textbook:** **Software and Hardware Engineering: Assembly and C Programming for the Freescale HCS12 Microcontroller**, 2<sup>nd</sup> edition, Fredrick Cady, Oxford, 2008.

### **References:**

- **Embedded Systems: Design and Applications with the 68HC12 and HCS12**, 1st edition, Steven Barrett and Daniel Pack, Pearson, 2004.
- **The HCS12/9S12: An Introduction**, 2nd edition, Han-Way Huang, Delmar Cengage Learning, 2009.
- **Arduino Project Book**, included with Arduino Starter Kit

### **Weekly Schedule:**

Week	Contents	Materials to Read
1	Overview, Lab Preparation, C Language	Chap. 1, Chap. 2, Chap. 10
2	Simple Parallel I/O, HCS12 Assembly Language	Chap. 11, Chap. 7
3	HCS12 Assembly Language, Timer and Output Compare	Sec. 14.4
4	Timer and Output Compare, Interrupts and Resets	Chap. 12
5	Interrupt Programming, SCI, SPI,	Chap. 12, Chap. 15
6	ADC and Sensor Interface	Chap. 17
7	ADC and Sensor Interface, <b>Midterm</b>	Chap. 17
8	Input Capture	Sec. 14.5
9	More Timer Functions	Sec. 14.2, 14.3, 14.6, 14.9, 14.10
10	Real-Time Operating Systems	Class Notes
11	Real-Time Operating Systems	Class Notes
12	Embedded System Examples	Class Notes
13	System Architecture	Class Notes
14	Hardware Design Issues	Class Notes
15	Hardware Design Issues	Class Notes

**Grading:** Final letter grade: 90+ (A), 80+ (B), 70+ (C), 60+ (D), otherwise (F).

- Lab. - 30%. *You must attain at least 60% in Laboratory to pass this course.*
- HW - 10%
- Quiz - 10%. Unannounced quizzes (closed book and notes) will be given at the beginning of classes.
- Midterm - 20%; October 11, Friday; open book and notes.
- Final - 30%; December 11, Wednesday, 2:45 PM- 4:15; Not comprehensive, open book and notes.
- Students taking CEG6330 will be assigned more analysis works for assignments/tests.

## Schedule of Laboratory Experiments:

Week	Lab No.	Experiment
1		No Lab
2	1	Laboratory Familiarization (10%)
3	1	
4	2	Speaker, Keypad, and Timer Control (20%)
5	2	
6	2	
7	3	LCD Interfacing and ADC Control (30%)
8	3	
9	3	
10	4	System Integration (30%)
11	4	
12	4	
13	4	
14		No Lab (Thanksgiving)
15	4	

Unannounced quizzes (10%) will be given in the lab to test your preparation and understanding of lab assignments.

Section	Lab Time
9	11:15-1:05 Wednesday
10	11:15-1:05 Friday
11	1:25-3:15 Friday
12	8-9:50 Friday

Everyone is required to attend weekly 2-hour Labs in Room 339, Russ Center (RC). You will have 24-hour ID-card access to 339 RC to work on your own. Both Theory and practical Laboratory experience are important. You must attain a passing grade in Laboratory to pass this course.

For each lab (except Lab 1), you need to turn in your prelab answers two days (excluding weekends) before your scheduled lab section for grading. You may turn in the prelab answers either in person to the lab instructor or simply slide them under the door of RC339A (the small office at the left hand side right after you enter the lab). On the prelab you turn in, you must clearly identify your lab section. For Lab 1, bring your prelab answers to your scheduled lab section for grading.

The lab instructor, his office, office hours, and email address are as follows.

- Mr. Nir Wiener
- Office: RC 339A (inside the lab); Office Hours: to be arranged
- Email: wiener.3@wright.edu