Department of Electrical and Computer Engineering

EEL 4730 – Programming Embedded Systems
Spring 2015

Instructor   :   Dr. Herman Watson
Office Hours   :   by appointment
                              Monday 9:30-11:00 am
                              Tuesday & Thursday 3:30 – 5:00 pm

Office   :   EC - 3951
Sec. Phone   :   305.348.2807
Email   :   watsonh_fiu@yahoo.com (Note underscore)

Classroom/Time
                     :   T, Th – EC 1105 5:00 – 6:15 pm

Web Page   :   http://web.eng.fiu.edu/watsonh/

Catalog Description:
Embedded Systems implementation using programming of synchronous state machines to capture
behavior of time-oriented systems for running on microcontrollers.
(3 Credits)

Textbook:
Frank Vahid and Tony Givargis
Programming Embedded Systems
An Introduction to Time-Oriented Programming
ISBN 978-0-9829626-2-6 (e-book)
UniWorld Publishing
www.programmingembeddedsystems.com

Course Objectives:
Through successful completion of the course, the student will:
        Understand the stages of the embedded system problem solving process and
        and a relationship to the development of software for implementation.
        Use C Language to capture and study time-oriented behavior of systems.

Relationship of course to program outcomes:
        a) an ability to apply knowledge of mathematics, science, and engineering
        c) an ability to design a system, component, or process to meet desired needs within realistic
        constraints such as economic, environmental, social, political, ethical, health and safety,
        manufacturability, and sustainability
        e) an ability to identify, formulate, and solve engineering problems.
        h)the broad education necessary to understand the impact of engineering solutions in a global,
        economic, environmental, and societal context
        k)an ability to use the techniques, skills, and modern engineering tools necessary for
        engineering practice

Topics Covered:
- Introduction to embedded systems
- Bit-Level manipulation in C
- Time-ordered behavior and state machines
- Time intervals and synchronous SMs
- Input/output
- Concurrency
- Creating a task scheduler
- Communication
- Utilization and scheduling
- Embedded system coding issues

Grading Scale:		
A	92-100	"Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook."
A-	90-92	
B+	88-90	
B	82-88	
B-	80-82	
C+	78-80	
C	72-78	
C-	70-72	
D+	68-70	
D	62-68	
D-	60-62	
F	< 60	

Department Regulations Concerning Incomplete Grades
To qualify for an Incomplete, a student:
1. Must contact (e.g., phone, email, etc.) the instructor or secretary before or during missed portion of class
2. Must be passing the course prior to that part of the course that is not completed
3. Must make up the incomplete work through the instructor of the course
4. Must see the Instructor. All missed work must be finished before last two weeks of the following term.

Policies:
- **Academic Misconduct:** For work submitted, it is expected that each student will submit their own original work. Any evidence of duplication, cheating or plagiarism will result at least a failing grade for the course.
- **Absences:** Resolution of absences and materials missed are student responsibility
  - **Unexcused Absences:** Two unexcused absences are permitted during the term. More than two will result in the loss of points from your final grade. (1 point per absence above two, 3 points per absence above 5).
  - **Excused Absences:** Only emergency medical situations or extenuating circumstances are excused with proper documentation.
    - 1. Review documentation with the lecturer,
    - 2. email as a written record to watsonh_fiu@yahoo. (Note underscore)
      - description of the absence
      - date(s) of absence
- **On Time:** As in the workplace, on time arrival and preparation are required. Two "lates" are equivalent to one absence. (Leaving class early is counted the same as tardy.)
- **Deadlines: Work is due at the beginning of the class period on the date specified.** Late submissions within one week will receive up to half credit. After one week, late work will not be accepted. Late submissions are graded after the final exam.
- **Submissions: This class is paperless**. Submissions are made using the web form listed on the class web site. All submissions must be
  - a single document,
  - web accessible and readable with a browser
  - with a single URL reference.
- **DO NOT** submit work by email.
- Instructor reserves right to change course materials or dates as necessary.

Grading Scale: NOTE: There are *no makeup exams* offered

Topic	Percentage
Exam 1 *no makeup*	17%
Exam 2 *no makeup*	20%
Exam 3 *no makeup*	25%
Final *no makeup*	25%
Homework	10%
Participation	3%

Class Schedule:
Twice a week, 75 minutes each session: T Th

Wk	Date	4730 Weekly Topic Spring 2015	HW: Due
1	01/12/15	Chapter Z1 - Introduction	HW1-Z1: 01/20/15
2	01/19/15	Chapter Z2 Bit-Level Manipulation in C	HW2-Z2: 01/27/15
3	01/26/15	Chapter Z3 Time-ordered Behavior and State Machines (MLK Holiday Monday 01/21)	HW3-Z3: 02/03/15
4	02/02/15	**Review / Exam 1**	HW4-Z4: 02/10/15
5	02/09/15	Chapter Z4 Time Intervals and Synchronous SM's	HW5-Z4: 02/17/15
6	02/16/15	Chapter Z6 Input / Output	HW6-Z6: 02/24/15 HW7-Z5: 02/24/15
7	02/23/15	Chapter Z5 Concurrency and Multiple Synch SM's	HW8-Z5: 03/03/15
8	03/02/15	**Review / Exam 2**	
9	03/09/15	Spring Break	
10	03/16/15	Chapter Z8 Simple Task Scheduler	HW9-Z8: 03/24/15
11	03/23/15	Chapter Z7 Communication & Peripherals (03/17 Monday - Last Drop)	HW10-Z7: 03/31/15
12	03/30/15	Chapter Z10 Utilization and Scheduling	HW11-Z10: 04/07/15
13	04/06/15	**Review / Exam 3**	
14	04/13/15	Chapter Z9 Programming Issues Chapter Z11 Basic Control Systems	Outline and study on your own
15	04/20/15	Chapter Z12 Basic Digital Signal Processing	Outline and study on your own
16	04/27/15	**Final Exam**	