

EEL 4935/6935

Embedded Systems – Fall 2016

Description: This course covers the principles of hardware and software design for higher-end embedded systems inherent in many hardware platforms and applications being developed for engineering and science.

Prerequisites: EEL 4744 (Microprocessors)

Classes: MW 11:00 am – 12:15 ENC 1002

Instructor: Dr. Alexandro Castellanos
Office: ENB 379 (email: acastel2@usf.edu)
Office Hours: 10:00 – 12:00 of Thursday and also by appointment.

Text: Microchip PIC18F2455/2550/4455/4550 Data Sheet
<http://www.microchip.com/wwwproducts/Devices.aspx?product=PIC18F4550>

Reference (supplemental reading): Designing Embedded Systems with PIC Microcontrollers, Second Edition: Principles and Applications 2nd Edition. Tim Wilmshurst ISBN-13: 978-1856177504 ISBN-10: 1856177505

Instructor supplied material.

Grading:

Homework projects	Quizzes & Class Participation	30%
1 midterm exam		20%
2-hour final exam		20%
Final Project**		30%

For full credit, all your work should be shown in homework, quiz, computer assignments and exam.
** Final Project can be developed by a max number of 4 students

Approximate Grade Range

A	$90\% \leq \text{Grade}$
B	$80\% \leq \text{Grade} < 90\%$
C	$70\% \leq \text{Grade} < 80\%$
D	$60\% \leq \text{Grade} < 70\%$
F	$\text{Grade} < 60\%$

Note 1: PLUS AND MINUS GRADES WILL NOT BE USED.

GRAD/UNDERGRAD Grading Criteria:

Students enrolled in EEL 6935 will have homework and exam questions in addition to those required of students enrolled in EEL 4935. The additional questions will in general require a greater depth of analysis consistent with an advanced understanding of the course material.

Course Topics:

Chapter 1 Embedded Systems Introduction

Examples of Embedded Products (i.e., House appliances, Smart Phones, Robots, GPS systems, Digital Cameras, Industrial Controllers, etc...)
Cyber physical systems

Chapter 2 Hardware and Software for Embedded Systems Design

Hardware platform(s)
Processors, Chipsets, and Memory organization.
I/O ports
IDE software
Assembly language
Embedded System Instruction Set
Timers
Analog I/O using A/D
Programmed I/O vs Interrupt driven I/O
New trends in Embedded Systems platforms

Midterm

Chapter 3 Interfacing with the physical world

Driving high current and high voltage I/O devices
Using PWM to efficiently control external I/O devices
Common I/O interface Standards
Fundamental ESP Techniques: Software Readability, Software Maintainability.
Application Development using API's for I/O devices and GUI's
Interfacing with the physical world: sensor/actuator modeling and calibration
I/O device

Chapter 4 Introduction to the Internet of things (IOT)

Hardware security

Chapter 5

Proposed Final Project Design Review (1 week)

Design Final Project Implementation (2 weeks)

Final Project Demo and Presentation (1 week)

Final Exam

Attendance:

Attendance is mandatory for all class sessions and will be checked in a random manner.

Assignment Policy:

Homework and any class Assignments are to be submitted by the due date. No late submissions will be accepted without prior permission. Homework projects must be completed on your own (individual effort) and only discussion of the concept is allowed (no code sharing).

Exam Policy:

Final exam is closed books and notes. One page reference sheet for formulas and definitions is allowed but NO homework or any other worked out examples. There will be NO MAKE-UP for a missed exam without prior approval from the instructor (with sufficient advance notice given) except in the case of a documented medical emergency. Any deviation from this policy MUST be pre-approved by the instructor in writing.

Academic Dishonesty Policy:

Students are reminded that University policies pertaining to academic dishonesty commonly found in both UG and G catalogs will be applied in this course. Receiving or providing help on exams, assignments and project; Sharing of program codes and results, and not turning in individual work are all forms of cheating; Submissions that are "identical" in any way are clear evidence of cheating. Copying materials from textbooks and papers without properly referencing them or not giving due credit are forms of plagiarism. It is the student's responsibility to review and understand USF and EE Department policies and procedures on Academic Conduct, Dishonesty, and Disruption.

Accommodations:

Students in need of academic accommodations for a disability must consult with office of Services for Students with Disabilities to arrange appropriate accommodations. Students are required to give reasonable notice (typically 5 working days) prior to requesting an accommodation.

Observation of Religious Holidays:

Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to the instructor, in writing, by the second class meeting.

About Course Notes and Recording:

USF Policy 10-048 ... "Notes, recordings, handouts and other material provided by the instructor cannot be exchanged or distributed for commercial purposes or for any purpose not related to a student's study or enrollment absent the express written authorization of the instructor.

Selling or distributing notes, handouts, etc. without authorization or using them for any commercial purpose without the express written permission of the University of South Florida and the instructor is a violation of the USF Student Code of Conduct"...

Some variations may occur. Also, some additional topics may be added. The students will be notified by the instructor during the lecture period. The students are responsible for all material covered in the lectures.

Additional Course Info:

Students must purchase all materials and supplies as needed for the Homework and Final projects.