
# COMP 462: Directed Study in Embedded Systems

Fall 2017
Location: Sierra Hall 1432 / BTW 2285
Instructor: Jason Isaacs
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Office Hours (held in SIE 1432):
Tuesday 1:00 PM to 2:00 PM
Wednesday 4:00 PM to 5:00 PM

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## Course Description:

Covers the design of embedded systems. This includes the analysis of small computer systems designed for robotic mechanisms and common appliances such as cell phones and other hand held devices. Topics include the design, implementation and testing of software used in such systems with special attention paid to maximizing the use of limited computational resources and the need for event-driven real time system responses.

## Student Learning Outcomes

By the successful completion of this course, you will be able to:

- Sketch the key components of embedded system software
- Identify, reference and analyze embedded systems industry standards
- Sketch the key components of embedded systems hardware
- Select the appropriate software architecture for an embedded system design
- Produce software designs that use computer ports effectively
- Produce working software used as "drivers" for embedded systems
- Identify and sketch the key components of a real time embedded system
- Identify and sketch the key components of a robotic controller
- Produce working software that adds some elements of intelligence to a robot

# Learning Environment:

As this is a directed study course there will be no regular meeting times. It is expected that you enroll in the edX course Embedded Systems - Shape The World: Microcontroller Input/output. In addition to completing the quizzes and labs from the edX course you will also be expected to complete a final project as described below.

# Grading:

The course grade will be determined by a weighted average of quizzes, labs, and a final project.

**Quizzes – 15%**

- Please follow the modules outlined in the edX course and take the quizzes. Please screen capture and submit the course progress chart after completing each quiz.

**Labs – 60%**

- Please follow the modules outlined in the edX course and complete both the simulation labs and the physical labs. Please screen capture and submit the course progress chart after completing each lab.

**Final Project – 25%**

- The culminating assignment for the class will be a team project competition like the DARPA Urban Challenge. In this project, each team will build an autonomous car using techniques perfected in lab exercises. The goal of the project is to design an embedded system capable of navigating the first floor of Sierra Hall in a time trial race. More details to come….

# Instructor Communication Policy:

I will make every effort to respond to your email questions within 24 hours Monday through Friday. If for some reason, you have not received a reply after 24 hours, please feel free to email me again or call my office.

# Required Materials:

**Textbook Recommended**

Title: Embedded Systems: Introduction to ARM Cortex-M Microcontrollers
Author: Jonathan W. Valvano
Publisher: Create Space
ISBN: 978-1477508992

**Textbook Recommended (Available Online)**

Title: Introduction to Embedded Systems, A Cyber-Physical Systems Approach
Edition: 2nd Edition
Author: Edward A. Lee and Sanjit A. Seshia
Publisher: http://LeeSeshia.org
ISBN-13: 978-1-312-42740-2

**Lab Kit**

You will be required to purchase a lab kit. This kit contains the EK-TM4C123GXL microcontroller as well as all electronic components that you will need to complete the labs. You will need to purchase the EK-TM4C123GXL board from Texas Instruments and a set of electronic components. For more info: http://users.ece.utexas.edu/~valvano/arm/worldwide.html

# Course Policies:

**Disability Statement**

- If you are a student with a disability requesting reasonable accommodations in this course, please visit Disability Accommodations and Support Services (DASS) located on the second floor of Arroyo Hall, or call 805-437-3331. All requests for reasonable accommodations require registration with DASS in advance of need: https://www.csuci.edu/dass/students/apply-for-services.htm. Faculty, students and DASS will work together regarding classroom accommodations. You are encouraged to discuss approved accommodations with your faculty.

**Academic Dishonesty**

- By enrolling at CSU Channel Islands, students are responsible for upholding the University's policies and the Student Conduct Code. Academic integrity and scholarship are values of the institution that ensure respect for the academic reputation of the University, students, faculty, and staff. Cheating, plagiarism, unauthorized collaboration with another student, knowingly furnishing false information to the University, buying, selling or stealing any material for an examination, or substituting for another person may be considered violations of the Student Conduct Code (located athttp://www.csuci.edu/campuslife/student-conduct/academic-dishonesty.htm). Please ask about my expectations regarding academic dishonesty in this course if they are unclear.

**Course Policies Subject to Change**

- It is the student's responsibility to check CILearn for corrections or updates to the syllabus. Any changes will be posted in CILearn.

**Safety**

- Prior to your first lab session we will cover critical safety related rules for the lab. Any student found to be violating these rules will be asked to remedy the situation immediately. Upon second violation of the rule, the student may be asked to leave the lab and will receive zero credit for the assignment. You must receive safety training before you will be allowed to work in the lab.