Syllabus

E 96

UCLA

Spring 2017

This class will give Computer Science freshmen an early introduction to practical engineering aspects of their discipline through hands-on development of an embedded system for use in the Internet of Things. Students working in small teams will design and build a device based on the Intel Edison module. The Grove sensor kit, which works with the Edison module, will allow students to include sensing to their devices. This course will introduce students to some basic engineering principles in the context of computer science, give them hands-on experience with building useful software and systems, and help students understand the importance of more advanced concepts introduced later in the Computer Science Program.

The class will meet for one session per week. Each session will include a short lecture, followed by practical work on designing and building a device. Grading will be based on the design, its implementation, documentation of the process, and results of testing the device. There will be no final exam or midterms in the class. Readings will be assigned from web links, so no textbook is required. Students are required to obtain an Edison kit and a Grove sensor kit. Information on obtaining those can be found https://lasr.cs.ucla.edu/classes/96_spring17/96_hardware.pdf.

Week 1 (April 3-9)

Lecture: Introduction to the class

Lab: Getting started with the Edison

Assigned readings:

Tutorial 1: An Introduction to the Intel Edison Platform, Shell Access and SFTP

Week 2 (April 10 - 16)

Lecture: Designing for the Internet of Things

Lab: Working on the Edison

Assigned readings:

Tutorial 2: An Introduction to Linux

Tutorial 3: An Introduction to OPKG and Vim

Week 3 (April 17 - 23)

Lecture: Sensors and peripheral devices

Lab: Sample sensor use

Assigned readings:

Tutorial 4: GPIO, Interrupts, Analog and I2C Interfaces

Tutorial 5: PWM, SPI and UART

Week 4 (April 24 –30)

Lecture: Networking basics

Lab: Learning about sockets

Assigned Readings:

Tutorial 6: An Introduction to Sockets and Internet Communication

Week 5 (May 1 - 7)

Lecture: Passwords and security basics

Lab: Using a light sensor for data input

Assigned readings:

To be announced

Week 6 (May 8 – 14)

Lecture: Evaluating security

Lab: Performing brute force password attacks

Assigned readings:

To be announced

Week 7 (May 15 - 21)

Lecture: Improving your designs

Lab: Working on design improvements

Assigned readings:

To be announced

Week 8 (May 22 –28)

Lecture: Designing secure systems

Lab: Working on design improvements

Assigned readings:

To be announced

Week 9 (May 29 – June 4)

Lecture: Advanced network security topics

Lab: Evaluating the improved designs

Assigned readings:

To be announcd

Week 10 (June 5 – 11)

Lecture: Presenting your work

Lab: Presentations of designs

No readings assigned for this week.

There is no final exam for this course. We may use the final period to evaluate projects, however, so please keep that time open.