Syllabus

Developing and Designing Interactive Devices

Spring 2018
CS5424/INFO 5345

Teaching Team

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Description

This course provides an introduction to the human-centered and technical workings behind interactive devices ranging from cell phones and video controllers to household appliances and smart cars. This is a hands-on, lab-based course. For the final project, students will build a functional Internet of Things prototype of their own design, using Javascript, single-board Linux computer, embedded microcontrollers, and other electronics components. Topics include electronics prototyping, interface prototyping, sensors and actuators, microcontroller development, physical prototyping and user testing.

Attendance

It is important to be in class. Students are expected to be present throughout each semester at all meetings of classes for which they are enrolled. You do not need our permission if you need to miss class for some reason. We cannot promise that the absence will not impact your performance in the class.

One very good reason to miss class is illness. In light of the rise of influenza cases during this season, the Center for Disease Control recommends students with flu-like symptoms self-isolate until at least 24 hours after they are free of fever. To be clear: please do not come to class if you are sick.

If you do miss class, contact the teaching team to arrange to turn in deliverables. The expectation is that you will contact fellow students to find out what occurs in class, to catch up on course announcements, and to otherwise make up for lost time.

If you will be late with your assignment or lab for some (very good) reason, you should get this cleared prior to the deadline with the teaching team.

Textbook

Practical Electronics for Inventors, 4th edition
Paul Schertz & Simon Monk
In stock on Amazon.com

Course site

Please find the course website on http://blackboard.cornell.edu

Grading

Your final grade will reflect your performance on the following:

Lab assignments (40%)
Final project (25%)
Homework assignments (25%)
Class participation (10%)

While technical functionality will be a major component of homework, labs and the final project, this is a design class. A sizable portion of the class grade will be based on a subjective evaluation of your device designs. Very technically simple designs can be great, and very technically complex designs can be wanting, so focus on developing a "design eye" rather than trying to make the most ambitious feature-laden projects imaginable.

Late Policy

Homework assignments will be due in class on Thursdays. Lab assignments will be due by class on Tuesdays. Since the labs are cumulative—that is, each one largely depends on your understanding of the previous one—it is essential to stay caught up.

Integrity

We will strictly follow Cornell's policies on academic integrity as outlined in the Academic Integrity Handbook.

In this class, we make substantial use of open-source software. We encourage you to make use of found code and online examples, and also for the class to act as a microcosm of the open-source community by assisting and collaborating with one another. That said, proper attribution of all work, assistance and collaboration is absolutely critical in this endeavor. We expect you to be absolutely meticulous in documenting and celebrating shared ideas and code.

Accessibility

We are happy to make accommodations to make this course accessible to all students. Please contact the teaching team if you need help. Also, the Office of Student Disability Services (http://sds.cornell.edu) may have services available.

Schedule

The following is a provisional schedule. This is the inaugural run of this class. We will be changing the schedule in response to feedback.

Week	Topic	
1	January 25 Introductions & Course overview	
2	January 30 Introduction to Single Board Computing (Unix & Raspberry Pi) Software and Hardware Engineering Practices	Feburary 1 Lab: Chatbot
3	February 6 Distributed Applications (Node.js & Web interfaces) Open Source Applications & Libraries I	February 8 Lab: Networked Camera
4	February 13 Physical Prototyping & Fabrication	February 15 Lab: Chat Box
5	February 20 FEBRUARY BREAK	February 22 Field trip to Maker Lab Digital Fabrication
6	February 27 Basic Circuits Microcontroller Architecture	March 1 Debugging Lab: Digital Timer
7	March 6 Introduction to Firmware Programming Open Source Applications & Libraries II	March 8 Lab: Data Logger
8	March 13 Displays & Actuators Interaction Design	March 15 Lab: Etch a Sketch
9	March 20 Using ICs	March 22 User testing & Validation

10	March 27 Project preliminary proposal development	March 29 Project preliminary proposal development
11	April 3 SPRING BREAK	April 5 SPRING BREAK
12	April 10 Cables, connectors and other mechanical concerns	April 12 Studio time for Projects
13	April 17 Computer Aided Design & Manufacture	April 19 Project check-in
14	April 24 Special Topics	April 26 Studio time for Projects
15	May 1 Special Topics	May 3 Project final check off
16	May 8 Final project presentations & demonstrations	