Syllabus

Developing and Designing Interactive Devices
Fall 2019
CS5424/ECE5413/INFO5345

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. Topics include electronics prototyping, interface prototyping, sensors and actuators, microcontroller development, physical prototyping and user testing.

For the final project, students will build a functional interactive device of their own design, using Javascript, single-board Linux computer, embedded microcontrollers, and other electronics components.

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. Of course, the absence will impact your performance in the class; we will all work to minimize that impact.

Please do not come to class if you are sick. 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.

If you do miss class, 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.

Late Policy

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

Late assignments will be dropped one letter grade per day late.

Textbook

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

Course site

Please find the course website on https://github.com/FAR-Lab/Developing-and-Designing-Interactive-Devices

Grading

Your final grade will be based on:

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.

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.

Week	Topic	
1		August 29 Introductions & Course overview
2	September 3 Basic Circuits, Microcontrollers	September 5 Lab: Light it up
3	September 10 Firmware Programming, Interaction Design	September 12 Lab: Digital Timer
4	September 17 Displays and Actuators	September 19 Lab: Data Logger
5	September 24 Using Integrated Circuits	September 26 Lab: Paper Displays
6	October 1 Design, Making, Fabrication	October 3 Lab: Jack in a Box
7	October 8 EXTRA LAB TIME	October 10 Single Board Computers, Microcontrollers vs. Microprocessors
8	October 15 FALL BREAK	October 17 Lab: Chatbot
9	October 22 Networking/Communications/Distributed Applications	October 24 Lab: Video Doorbell
10	October 29 Project Madness	October 31 Project Time
11	November 5 Evaluating Products with People	November 7 Project prototype fair

12	November 12 Neural Nets on the Pi	November 14 Team project presentations
13	November 19 Refining Prototypes	November 21 Project check-in
14	November 26 David Goedicke Lecture	November 28 THANKSGIVING RECESS
15	December 3 Product Viability	December 5 Project Functional check off
16	December 9 6:30-7:45pm in Tata 141/151, Final Project Fair Project Presentations	

Documentation due - December 13