University Of California, Berkeley
Department of Mechanical Engineering

ME 290U & CS 294 P : Interactive Device Design (3)

Graduate Course

Syllabus

CATALOG DESCRIPTION

This course teaches concepts and skills required to design, prototype, and fabricate interactive devices -- that is, physical objects that intelligently respond to user input and enable new types of interactions. The first half of the semester will be dedicated to a survey of relevant techniques in 3D modeling and fabrication; electronics and circuit board design; sensing and actuation for interaction; embedded software development, wired and wireless communication with mobile devices, computers, and networks; and user interface programming. In the second half of the semester, students will propose and carry out a significant design project of their own choice in groups. We encourage students to work on projects in health technologies (a CITRIS focus area); PhD students can also explore projects related to their area of research after consultation with us.

COURSE PREREQUISITES

- Because of the hands-on nature of this course, we have a strict capacity limit. Please **join the waitlist and come to the first class meeting.** We will describe how to petition to take the class during the first class.
- **Programming experience required:** This is a computer science course. You will program embedded systems for this course. You should be able to pick up a new language and API (with some help from us). Knowing the equivalent of the CS61A-C series at Berkeley should be sufficient.
- **User Interface Design experience very useful:** Your projects will have both software and hardware user interfaces. Some background in user interface design, e.g., INFO290 Tangible Interaction or CS160 User Interface Design is valuable.
- **3D modeling skills very useful, but not required:** You will model and fabricate parts on our FDM machine. If you want to get a head start, learn how to use SolidWorks, but we'll also have a tutorial.
- **Some electronics experience useful, but not required:** You will build basic sensing and actuation circuits. The threshold for doing this has decreased rapidly in recent years, but you will be soldering your own electronics. If you have taken the equivalent of EE40 or have built projects Arduino boards before, you'll be fine.

If you have no programming background, you should not take this course. If you do not have experience in at least one of (UI design, 3D modeling, electronics) you should not take this course. You must be comfortable with learning a sizable set of new tools and processes, quickly.

TEXTBOOK(S) AND/OR OTHER REQUIRED MATERIAL

There is no required textbook for this class. There will be readings assigned for many lectures. The readings will be available online through this wiki. You will have to submit reading responses for those lectures through links on this wiki.

This course requires payment of a **lab fee of $125** to use the CITRIS Invention Lab. Also expect additional out-of-pocket expenses for electronics and consumables for your class project.

COURSE OBJECTIVES

To educate students in the hybrid design skills needed for today's electronic products. These combine mechanical devices, electronics, software, sensors, wireless communication and connections to the cloud. Students also learn scale up procedures for volume manufacturing.

DESIRED COURSE OUTCOMES

3D printed prototypes, learned software, programming and design skills

TOPICS COVERED

Sensors, Discrete Input, CAD, Output, Distributed, Switch to Project Work, RP Methods

CLASS/LABORATORY SCHEDULE

3 Hours of Lecture

CONTRIBUTION OF THE COURSE TO MEETING THE PROFESSIONAL COMPONENT

Educating students in the design of modern mechanical/electrical products such as cell phones and related interactive devices

ASSESSMENT OF STUDENT PROGRESS TOWARD COURSE OBJECTIVES

10% Reading Responses

10% Class Participation (attendance, in-class participation, lead class discussion)

40% Homework Assignments

40% Class Design Project

PERSON(S) WHO PREPARED THIS DESCRIPTION
Bjoern Hartmann and Dan Chapman 4/18/13

ABBREVIATED TRANSCRIPT TITLE (19 SPACES MAXIMUM): INT DEV DES
TIE CODE: LECT
GRADING: Letter
SEMESTER OFFERED: Fall
COURSES THAT WILL RESTRICT CREDIT: None
INSTRUCTORS: Wright, P K, Hartmann, B
DURATION OF COURSE: 14 Weeks
EST. TOTAL NUMBER OF REQUIRED HRS OF STUDENT WORK PER WEEK: 9
IS COURSE REPEATABLE FOR CREDIT? No
CROSSLIST: Computer Science 294 P