Syllabus

Syllabus Version: 1.0

Class Hours per Week: 3.0 ∗ 2

Semester: Spring 2016

Location: xxx

Instructor: Aven Le Zhou

Email: zhoule7@gmail.com

Meeting Times: Tuesday, Thursday 2:00 PM – 5:00 PM

Description

In this course students will be asked to think beyond the conventional forms of human computer interaction (i.e. the keyboard and mouse) to develop interfaces that consider the entire body, the body's capacity for gesture, as well as the relationship between the body and it's environment. Students will learn the fundamentals of electronics and programming as they build projects using the Arduino microcontroller platform. Arduino is a small computer based on open source hardware and software. When used in conjunction with various sensors and actuators, Arduino is capable of gathering information about and acting upon the physical world. In addition to these physical computing techniques, students will also learn to harness the methods of traditional computation. The fundamentals of programming: variables, conditionals, iteration, functions and objects, will be explored through the use of the Processing programming language. Students will gain a deeper appreciation of the expressive possibilities of computation as they learn to author their own software, and not simply use that which has been provided to them. Additional topics will include digital modeling and fabrication using 3D printers and laser cutters, the manipulation, presentation, and exchange of data, algorithmic drawing and animation techniques, as well as control of images, video, and audio. Structured weekly exercises are aimed at building specific skills, however students are free to pursue their own diverse interests in their midterm and final projects.

Classroom Conduct

Classes begin promptly at the scheduled start time. Please arrive early so as not to be late. This class will be highly participatory with lectures being very conversational. You are invited and expected to contribute to in-class discussions.

Recreational use of phones, music payers, video game systems and other portable electronic devices is forbidden. Laptops are allowed for note taking, in class work, as well as relevant research only.

Learning Objectives

At the completion of this course students will be able to demonstrate basic understanding of:
  ● electricity and electrical components

- analog and digital inputs and outputs on microcontrollers
- fundamental programming concepts: variables, conditionals and iteration
- programatic methods for drawing and animation
- code organization techniques: functions and objects
- screen based and physical interaction design principles
- programatic methods for the manipulation of images, audio and video
- data formats, data manipulation and data visualization
- serial communication

Grading (not sure)

Grades will be determined based on the following breakdown:
- Attendance & Participation
- Exercises (lab assigments)
- Midterm Project
- Final Project

Attendance & Participation

Attendance in all class sessions is mandatory. Unexcused absences or lateness will adversely affect your grade.Your participation in this class is essential. Not only does it allow the instructor to gauge your interests and get to know you as an individual, but it also allows the instructor to asses your understanding of important concepts. It also provides the instructor with an opportunity to learn from your work.

Exercises

Exercises are defined in the weekly schedule and vary weekly depending on the topics covered in class. All exercises are required, and should be documented. Undocumented work will not be considered complete.

Midterm Project

Explore Processing (main) and Arduino (optional) by creating a small project that does something interesting, or entertaining, products or art projects. Try to illustrate your understanding of the fundamental concepts covered in class. Be sure to document your work. You may work alone or with a single partner. Midterm projects and documentation are due xx.xx.xxxx.

Final Project

Create an interactive system of your choice using Processing and Arduino. Focus on careful and timely sensing of the relevant actions of the audience that you're designing for and on prompt, clear and effective response. Any interactive project is going to involve listening, thinking and communicating. Whether it involves one cycle or many, the interaction should be engaging for your audience.

Be sure to document your project thoroughly on the documentation blog. Include details about all phases of development, both successes and failures. You may work alone or in groups. Final projects are due xx. xx. xxxx.

Weekly Schedule

		First Half		Second Half
week 01	**Tuesday**	Introduction	break	**Electricity, Circuits & Electrical Components**
	Thursday	**Microcontrollers & Arduino**	break	lab 01: arduino assignments
week 02	**Tuesday**	**Digital & Analog Inputs & Outputs**	break	**Processing & Drawing**
	Thursday	**Animation & Variables**	break	**lab 02: processing animation assignments**
week 03	**Tuesday**	**Conditionals, Iteration & Functions**	break	**Conditionals, Iteration & Functions**
	Thursday	**Mouse & Keyboard Interaction**	break	**lab 03: processing keyboard interaction assignments**
week 04	**Tuesday**	**Physical Interaction**	break	**Project Planning & Prototyping**
	Thursday	**Communication Between Processing & Arduino**	break	**lab 04: processing + arduino communication assigments**
week 05	**Tuesday**	**Objects & Arrays**	break	**Objects & Arrays**
	Thursday	**Midterm Project Workshop: 20mins/project * 10 individal projects**		

week 06	**Tuesday**	**Guest Specker Talking**	**break**	**Midterm Project Critiques**
	Thursday	**Intro to Digital Modeling & Fabrication**	**break**	**Intro to Rhino Modeling**
week 07	**Tuesday**	**Modeling Workshop**	**break**	**Modeling Workshop**
	Thursday	**Controlling High Current Loads**	**break**	**lab 05: lighting installation group assigment**
week 08	**Tuesday**	**Images & Audio**	**break**	**Video + Computer Vision**
	Thursday	**Kinect + leapmotion tracking**	**break**	**lab 06:boday tracking interface**
week 09	**Tuesday**	**Strings & Data**	**break**	**Strings & Data**
	Thursday	**Final Project Workshop: 20mins/project * 10 individal projects**		
week 10	**Tuesday**	**Final Project Workshop: 20mins/project * 10 individal projects**		
	Thursday	**Projects Set Up**	**break**	**Final Project Critiques**
week 11	**XXX**	**FINAL SHOW**		

Readings

Title: **Getting Started with Arduino**

Author: Massimo Banzi

ISBN: 1449309879

Edition: 2nd

Title: **Getting Started with Processing**

Author: Casey Reas and Ben Fry

ISBN: 144937980X

Edition: 1st

Title: **Learning Processing: A Beginner's Guide to Programming Images, Animation, and Interaction**

Author: Daniel Shiffman

ISBN: 0123736021

Publisher: Morgan Kaufmann

Publication Date: September 2, 2008

Edition: 1st

Additional required readings will be supplied in the coursepack, online, or as electronic documents.

Software

- Arduino
- Processing