Syllabus & Course Policies
DMS 550 - Methods of Making II

State University of New York at Buffalo
Department of Media Study
Fall 2016

Friday 1:00-4:40pm CFA 246

Instructor: Brian Larson Clark
Office hours: Tuesdays 2:00-3:00pm (and by appointment), CFA 248A
Email: blclark2@buffalo.edu

Course Website: http://media-study.com/dms550

Course Description
This course introduces basic concepts and techniques for designing, constructing, and programming objects, spaces and media that sense and respond to their physical surroundings. Moving beyond the interface paradigm of screen, keyboard and mouse, physical computing enables alternate models for interaction with (and through) computers that afford more subtle and complex relations between a range of human and non-human actors. Combining presentations, discussions on the history of computer enabled art forms, and a series of hands-on technical workshops in computing methods and techniques, the course provides a critical and practical context for emerging forms of experimental practice. Topics include physical computing, interaction design, practical components of hardware design (electricity, electronics, microprocessors, components, sensors and actuators), and programming (variables, datatypes, control structures, functions, objects, communication protocols).

Prior expertise in computing is not required.

Required Texts
All required text will be distributed as pdfs and will be available on the course website.

Recommended Texts
Sullivan, Dan, and Tom Igoe. *Physical computing sensing and controlling the physical world with computers.* Boston: Thomson, 2004.

Mims, Forrest M.. *Getting started in electronics.* 3rd ed. Lincolnwood, Ill.: Master Publishing, 2003.

Required Hardware
Either:
Arduino Starter Kit: https://www.adafruit.com/product/1078 ($99.95)
Or:
Budget Pack for Arduino: https://www.adafruit.com/product/193 (Budget pack $34.95)

Software Used
Arduino: https://www.arduino.cc/en/Main/Software
Processing: https://processing.org/download/

Learning Outcomes & Assessment Grid for DMS 550 - Methods of Making II

1. Students should be able to program an Arduino to use data from a sensor to control an output (i.ie LED, motor).	**Completion of Project #1**
2. Students should be able to integrate a variety of sensors to build a project which creates meaningful interaction with its physical environment.	**Completion of Project #2**
3. Students are expected to use the skills acquired in the course complete and exhibit a stand-alone physical computing project.	**Completion of Final Project**

Disclaimer
This syllabus is subject to revision by the instructor.

Office Hours
Tuesday 2:00-3:00pm, CFA 248A. You are welcome to drop by during those hours or make an appointment to introduce yourself or discuss your work. If my regular office hours will not fit your schedule (If you have a class or work obligation during that time) talk to me or email me and we will work out an alternate time.

E-Mail
Be sure to check your UB email account regularly. When sending me an email please always include DMS-550 within the subject line.

Course Website
http://media-study.com/dms550

Course Work
Unless otherwise specified, assignments and projects must be submitted by the beginning of class the day they are due. Late work will be penalized unless you have a reasonable excuse and make arrangements in advance. If you are having trouble turning in work due to circumstances beyond your control, please let me know.

Grading Scale
93-100: A   90-92: A-   87-89: B+   83-86: B   80-82: B-
77-79: C+   73-76: C   70-72: C-   69-65: D   64 or less: F

Evaluation
Grades will be calculated as follows:
20% classroom participation/performance
25% Project 1
25% Project 2
30% Final Project

Academic Integrity
In general, you may not turn in work for this course which you will also use for credit in another course. If you have questions about this policy, please discuss it with me.

Plagiarism
Plagiarism is literary theft and a betrayal of trust. The term is derived from the Latin word for kidnapper and refers to the act of signing one's own name to words, phrases, or ideas which are the literary property of another. Plagiarism comes in many forms, all to be avoided: outright copying, or paraphrase, or a mosaic or disguised use of words and phrases from an unacknowledged source. To avoid plagiarism, make it your habit to put quotation marks around words and phrases, or to isolate and indent longer passages that you are using from someone else's writing. And be sure to cite the source, in a footnote or endnote or within parentheses in your text. The penalties for plagiarism can be severe: from an F for the particular assignment, to an F for the course, to referral of the case to the Dean of Education for administrative judgement. If you are unsure about how to use and document sources, please consult your instructor. PLAGIARISM ALSO INCLUDES THE UNAUTHORIZED USE OF VIDEO/AUDIO/ DIGITAL IMAGES OF OTHERS! FOR ANY CASE, YOU MUST PRODUCE ORIGINAL MATERIAL!

Offensive Content
In class we will examine a broad range of creative work. Thee may be selections with some students will find offensive in content or tone. In such cases, students are permitted to leave the room without penalty, at their own discretion.

General Policies

A. Student athletes must provide an official letter with the dates of their meets and travel days during the first weeks of classes. Make up quizzes and exams that fall during those days must be rescheduled with the instructor at least 3 days before departure. As a rule of thumb, we will administer make-ups and move work deadlines to the day before the student leaves town.

B. Students are not allowed to eat in the classroom. Please eat before or after class.

C. Students are expected to follow the guidelines for appropriate behavior outlined in the University Catalog. Disruptive behavior will not be tolerated.

D. If you need to depart early, do so quietly after having cleared it with your instructor at the beginning of the class.

E. The grade of incomplete will be given only to students who have some serious, well-documented medical condition or in cases of family tragedy, etc. and who have satisfied the attendance policy and are missing only one major assignment. No incomplete will be given to substitute for a poor or failing grade or for any other reasons. A written agreement must be drafted and signed by the instructor and the student. The instructor reserves the right to request completion of the incomplete prior to the 12 months set by the University.

F. Final grades are final. Once grades are submitted they will not be changed. Thus, students should refrain from cajoling instructors (via email, phone, in person, etc.) into changing the final grade, which goes against the University policy.

Attendance
You are expected to be here each day, on time and ready to go. You are expected to have completed any assigned reading and to participate in class discussions, critiques, and the work at hand. Participation in class will account for part of the course grade.

A. Regular attendance is required for the development of proficiency skills.

B. Attendance means attentiveness, cooperation, and active participation in class.

C. Students are responsible for the material covered and the homework assigned on the day/s they were absent

D. In case of an ongoing problem, such as a personal crisis or chronic illness, the student should resign form the course and retake it when the circumstances allow for the fulfillment of the requirements.

E. Tardiness: arriving after class has started may count as an absence or partial absence.

F. Leaving the classroom for a considerable period of time will be considered an absence.

It is a long semester and things come up, so you may miss class a total of three (3) times for any reason, but after that your final grade will be automatically reduced a half-letter grade for each additional absence.

Class Work
A. Students are expected to do their own work on all assignments and course work.

B. Academic dishonesty will result in a failing grade and disciplinary actions by the university. Examples of academic dishonesty are: copying the work from the Internet or a book, having someone else do the work for you, or cheating during an exam or quiz.

C. Be prepared for class each day by having done the assigned readings, etc.

D. Homework will be assigned during each class by the instructor.

E. It is the student's responsibility to bring any questions on the homework to the attention of the instructor.

F. Homework will be turning in to the instructor on the designated date.

Students With Disabilities

If you have a disability (physical, learning, or psychological) which may make it difficult for you to carry out the course work as outlined, and/or requires accommodations such as recruiting note takers, readers, or extended time on exams and assignments, please contact the Office of Accessibility Resources, 25 Capen Hall, 716-645-2608, http://www.student-affairs.buffalo.edu/ods, and also your instructor during the first two weeks of class. ODS will provide you with information and will review appropriate arrangements for reasonable accommodations.

Weapons as Props

If you are planning a student production which involves using any prop which could be interpreted to be a weapon (toy gun, BB gun, knife, etc.) AND you are planning to shoot on the UB campus or any other public place, you MUST obtain WRITTEN permission from the University Police or the equivalent authority before you shoot. If you do not, you will face serious problems, including possible expulsion from the University.

<u>Sexual Harassment</u>

Sexual Harassment of employees and students, as defined below, is contrary to University policy and is a violation of federal and state laws and regulations.

Unwanted sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature constitute sexual harassment when:
1. submission to such conduct is made either explicitly or implicitly a term or condition of an individual's employment or academic advancement;
2. submission to or rejection of such conduct by an individual is used as the basis for employment or academic decisions affecting such individual;
3. such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance, or creating an intimidating, hostile, or offensive environment.

No university employee of either gender shall impose a requirement of sexual cooperation as a condition of employment or academic advancement, or in any way contribute to or support unwelcome physical or verbal sexual behavior.

Any member of the university community who requires additional information or who wishes to make a complaint or receive a copy of the University procedures to be followed for complaints arising from matters related to the policies outlined above should contact the Office of Equity, Diversity, and Inclusion, 406 Capen Hall, 716-645-2266.

Examples of Sexual Harassment
- Sexual advances
- Touching of a sexual nature
- Displaying or distributing of sexually explicit drawings, pictures, written materials and/or computer (digital) images
- Sexual gesture or looks
- Sexual jokes or comments
- Pressure for sexual favors
- Touching oneself sexually or talking about one's sexual activity in the presence of others
- Spreading rumors about or rating other student's sexual activity or performance

What to do if harassed
Do:
- Trust your instincts.
- Tell harasser that their behavior is unacceptable
- Document the incidents in detail. Keep a journal with dates, times, possible witnesses, and other concise details.
- Tell someone about the incident and get emotional support
- Seek advice or counseling
- Inform school if behavior continues or of any threatening, intimidating, or retaliatory behavior.

Don't:
- Assume the behavior will go away if you ignore the harasser.
- Try to deal with the harassment alone -- get help;

Course Schedule & Assignments

This is a tentative schedule. Expect it to change. Due dates and expectations will be announced in class.

WEEK 1
9/2
Introduction to course
Topic: Physical computing
Course website will be created

WEEK 2
9/9
First project introduced
Topics: Basic electronic components, reading schematics, using a multimeter, soldering

WEEK 3
9/16
Topic: Basic Electronics, continued

WEEK 4
9/23
Topics: Overview of microcontrollers, introduction to Arduino
Topic: Working with sensors

WEEK 5
9/30
Topics: Actuator design, pulse width modulation (PWM), analog to digital conversion, working with servos and stepper motors
Assignment: First project due

WEEK 6
10/7
Second project introduced
Topics: Data types, protocols, working with serial data

WEEK 7
10/14
Topic: Concepts in interaction design
Software: Processing

WEEK 8
10/21
Topic: Concept development tools, circuit design, flowcharts

WEEK 9
10/28
Topic: Open source

WEEK 10
11/4
Topic: Hacking hardware, low-tech sensors and actuators
Possible Workshop: Circuit bending
Assignment: Second project due

WEEK 11
11/11
Topic: TBD

WEEK 12
11/18
Topic: Intro to Custom PCB Fabrication
Gerber files and printing your own PCBs
Software: Eagle CAD

WEEK 13
11/25 **Thanksgiving Break - No Class!**

WEEK 14
12/2
Project tuning and documentation
Final Project Review

WEEK 15
12/9
Project Exhibitions
Assignment: FINAL PROJECTS DUE

<u>Useful Online Resources</u>
Acroname: acroname.com
Active Surplus Electronics: activesurplus.com
Adafruit Industries: adafruit.com
Arduino: arduino.cc
DigiKey Electronics: digiket.com
Hack A Day: hackaday.com
Instructables: instructables.com
Inventables: inventables.com
Make Magazine: makezine.com
Mouser Electronics: mouser.com
Octopart: octopart.com
Openbuilds: openbuilds.com
Processing: processing.org
Pure Data: puredata.info
Solarbotics: solarbotics.com
SparkFun Electronics: sparkfun.com
Stack Exchange:stackexchange.com
Radioshack: radioshack.com
Thomas Kim: youtube.com/user/yeosujjang
Tom Igoe's Physical Computing Resources: tigoe.net/pcomp/resources