

# Syllabus: mpsm 311 Electronic Projects for Artists II

Instructor: Dana Moser [dmoser@massart.edu](mailto:dmoser@massart.edu)

This 3-credit course meets Mondays 1:30-6:30

(Additional course info is at: <https://www.curiousart.org/eprojects2>)

## Course Description:

(-Note: *Electronic Projects for Artists* is now a 2 semester long course. The Fall MPSM377 is followed in the Spring by MPSM311.) The purpose of this studio course is to provide skills and information that will be useful for artists who use electrical devices in their artworks. Examples will be shown to help students in incorporating/integrating electrical circuits and sensors in a variety of media including sculpture, installation and performance.

This, part 2 of the course, involves writing software (programming) microcontrollers and connecting them with custom multimedia software running on desktop computers. These may be used in sculptural installation, performance, robotics, wearable art, etc. Many examples will be shown. We will be using ATmega328 ICs (microcontrollers), integrated on the "Arduino" development board, programmed in a special version of the C programming language.

The idea is to process information about environmental conditions such as light, temperature, sound and human gesture to respond with controllable switches, timers, motors and sound devices. This involves interfacing microcontrollers with programmable, interactive multimedia desktop software environments including Processing, MAX and pd (PureData). No previous experience with programming is necessary. Pre-written examples will be provided that can be edited and used by students. Course materials, downloadable handouts and online resources to support the course are on the class website: <https://www.curiousart.org/eprojects2/>

## Course Objectives:

In addition to teaching students to write custom software to program hardware (microcontrollers) to communicate/interact with multimedia on desktop computers, an important theme of this course is interactivity. Many examples will be shown and created in class so that students will be able to use sensors to control the display and playback of multimedia (light, sound and video) using software they have written. The course will cover both personal, gestural human interactions as well as networked interactions using the Internet.

## Course Materials:

All materials necessary for the successful completion of this course will be provided throughout the semester. However it is strongly recommended for students wanting to get into electronics that they procure their own components and tools, especially breadboards and diagnostic tools like a multimeter. As they are introduced throughout the semester, we will provide information about convenient and economical sources for these. All of the software necessary for the course is available to download free of charge during the Spring 21 semester.

## Departmental Goals:

Some of the SIM Departmental goals that this course addresses include:

- Learning how to articulate artistic goals and concepts and translate them into actualized projects.
- Acquiring hands-on skills in technology and interdisciplinary practice.
- Being exposed to the widest range of artistic mediums, ideas and practice.

## Minimum requirements to receive credit for this course:

### 1. Attendance

Please let the instructor know if you will have to miss a class. It will be difficult for a student to complete the work necessary for credit to be given if there are more than 2 absences.

### 2. Successful completion of all assigned software projects (described below)

### 3. Participation with in-class projects

### 4. Project Description

(This is due 2 weeks before the final class.)

### 5. Completion of a final project of your own design (This is due on the final week of class.)

## Course Assessment and Grading:

This is a pass/no credit course. If by mid-semester the pre-determined milestones for the course have not been reached the student will receive a mid-semester warning. If by the end of the semester the student has not completed at least 80% of the minimum course requirements, the student will receive a grade of NC. Faculty will assess the student's progress during in-person meetings, in-class project reviews, and email correspondence.

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## Week-by-Week Description of the classes:

### 1. Course Introduction: Analog Electricity Review, Microcontroller Introduction

Introductions, and general description of the course.

Students will be grouped with lab partners for breadboarding circuits.

We will begin with a review of principles for working safely with electricity in artistic projects.

The review will include vocabulary for describing the behavior of circuits (voltage, current, impedance and power.)

Also in this class we will introduce microcontrollers and demonstrate the process of downloading and setting up the free programming **Integrated Development Environment (IDE)**.

### 2. Microcontroller Programming Concepts: The Arduino and C

Interfacing the Arduino with sensors (switches) is demonstrated

Core programming concepts will be reviewed and used in example programs:

- libraries
- variables and variable assignment
- functions
- conditional testing and looping
- microcontroller input and output

### 3. Integration with Processing

- Numbers vs. ASCII
- Issues with the Arduino and serial data
- Introduction to the Adafruit Circuit Playground (optional)
- Sensor interaction with Processing ("Throw - Catch" data between sensor and desktop)

In this class we introduce a desktop programming language environment called "**Processing**."

### 4. Desktop Interactivity Project with Processing plus Visiting Artist

- Creating an interactivity project with the Arduino and Processing

This class continues an example of data communication between the microcontroller and Processing software on the Desktop.

### 5. Continuing with interactivity examples

- Finishing serial communication and sensor interactivity between the Arduino, Circuit Playground and Processing.

### 6. Introducing Flow Control Programming

- Finishing and sharing the interactivity project

This class introduces "flow control programming" with **Pure Data (pd)**.

**6. Continuing with Flow Control Programming with MAX**

– “flow control programming” including a contrast-and-compare explanation regarding **Pure Data (pd)** and **MAX**.

**8. Continuing Programming with Max and Pd:**

More programming with the Circuit Playground development board including it’s various sensors and output functions communicating with Max and Pd.

**7. Comparison of Software for Programming Multimedia**

– Discuss/contrast/compare the desktop software used in this course: Processing, MAX and pd. The discussion/presentation will cover the strengths and weaknesses of these multimedia programming environments with respect to sensor interactivity and various media such as sound and video playback.

**9. Introduction to Data Visualization:**

The topic of Data Visualization is introduced with several working examples shown to demonstrate techniques employed by artists.

**10. Continuing with Data Visualization: Internet Interaction**

Students will use working code examples to build an interface for interacting with data. This will include examples that communicate with realtime Internet data. Examples showing the use of **Application Programming Interfaces (APIs)** will be used.

**11. OSC for networked interactions**

The “Open Sound Control” protocol will be demonstrated in working code examples.

**12. Final Project Descriptions Due**

We will go over the individual final project descriptions and discuss their applications as well as any possible corrections/improvements to project construction.

**13. Visiting Artist and In-Class Work Day**

For this class, we will have a visiting artist. There will also be time in class for de-bugging and work toward completion of the respective final projects.

**14. Final Projects Due**

Final projects are due for this class. Students will present their final projects for discussion, feedback and documentation.

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## **GRADING POLICY**

Two grading systems are used at the college; The Studio for Interrelated Media department uses a Pass/NoCredit/Incomplete grading system. Grades in SIM are defined as follows:

PASS – Work meeting all expectations for successful completion of the course.

NC – No Credit. Work or attendance that does not meet the expectations of the course. If you do not meet the minimum requirements and have not requested an incomplete (see below) you will receive a grade of NC. The NC grade may impact academic standing and financial aid.

INC – Incomplete. A temporary designation indicating that at least 80% of the course requirements have been met, that the remaining course requirements are expected to be completed, and a permanent grade issued by the subsequent mid-semester. After the work has been completed, the student is responsible for having an Individual Grade Sheet completed by the appropriate faculty member and filed with the Registrar. If the student does not complete

the coursework, a non-passing grade will be issued. INCS ARE ONLY GRANTED AFTER THE STUDENT HAS REQUESTED IT BEFORE THE LAST CLASS OF THE SEMESTER, SHOWN JUST CAUSE, AND COMPLETED A "PETITION FOR INCOMPLETE AND CONTRACT FOR COMPLETION OF INCOMPLETE". THE INC GRADE MAY IMPACT ACADEMIC STANDING AND FINANCIAL AID.

In the SIM Major Studio course:

W – Mid Semester Warnings are issued if a student has not presented any work in any form, is consistently absent, arrives late or leaves early, and/or does not participate in critiques.

### **SIM DEPARTMENT ACADEMIC PROGRESS**

A student who earns a grade of No Credit in a major requirement or two grades of No Credits in major electives over two semesters is placed on probation. A student on probation who earns a grade of No Credit in a major requirement is subject to dismissal from the department.

### **MASSART ATTENDANCE POLICY**

Students have a responsibility to attend all scheduled class meetings.

Faculty are responsible for clearly stating their expectations for performance and attendance through the course syllabus, and during the first week of classes. This includes their manner of recording attendance and whether any portion of a student's grade is based on attendance and/or class participation. Faculty are obligated to recognize legally protected activities, such as religious holidays, military service, and jury duty.

Students are responsible for making themselves aware of course attendance policies, and for meeting all course expectations as outlined in the course syllabus regardless of missed class time.

Students are responsible to communicate in a timely manner in written form (e.g. in an email) with their faculty regarding any missed class time and related class work.

A student who feels circumstances may warrant withdrawal from a single course should contact their Advisor and the Office of the Registrar.

A student who wishes to request a medical leave of absence from the College should contact the Counseling and Wellness Center. Non-medical leaves of absence are coordinated through the Academic Resource Center.

A student who misses the first meeting of a class may be dropped from the roster by the instructor.

## **PLAGIARISM**

Whenever your work incorporates someone else's research, images, words, or ideas, you must properly identify the source unless you can reasonably expect knowledgeable people to recognize it. Proper citation gives credit where it is due and enables your readers to locate sources and pursue lines of inquiry raised by your paper. Students who do not comply will be penalized. For further information, see the MassArt Student Handbook or consult with the Academic Resource Center.

## **CLASSROOM ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES**

The Academic Resource Center (ARC) provides access for all matriculated MassArt students to academic advisors, success coaches, writing specialists and a "Success Squad" of peer tutors and peer advisors, all of whom support remote and hybrid learning. Specific ways the ARC can support students include:

- Skills for successful remote learning
- Writing assistance on papers, artist statements, and assignments
- Time Management
- Advising on major selection and course plans
- Reading strategies
- Test preparation and strategies

Appointments can be made at [massart.edu/arc-appt](https://massart.edu/arc-appt). Learn more about the ARC at [massart.edu/academic-resource-center](https://massart.edu/academic-resource-center).

Massachusetts College of Art and Design is committed to fostering the academic, personal, and professional growth of our students. We are especially committed to ensuring that students with documented disabilities, as defined under the Americans with Disabilities Act (ADA) and the subsequent Amendments Act (ADAAA), are provided equal access to all campus resources and opportunities. If you have a disability that may warrant accommodations, I encourage you to make an appointment with Student Accessibility Services staff within the Academic Resource Center (ARC) at [massart.edu/arc-appt](https://massart.edu/arc-appt). For more information, please visit the web page: <https://massart.edu/student-accessibility-services>.

### **WELLNESS**

Keep yourselves well (physically, mentally, emotionally, spiritually). We recognize that this Covid19 Pandemic situation is uncertain, disruptive and anxiety-inducing. The MassArt Counseling and Wellness Center is available to support on the phone, please contact them if you need it. They have also provided this resource on coping techniques if you are experiencing anxiety. If you are feeling overwhelmed, please reach out to [counseling@massart.edu](mailto:counseling@massart.edu) or call the main line 1-617-879-7760. These accounts are monitored, M-F, 9am – 5pm, and one of the counselors will reach out to within 24-hours. After 5pm and over the weekend, please contact 911 if it is an emergency.

Additional MassArt Resources: <https://massart.edu/covid19-resources>

### **MEDIA RECORDING**

This class may use video and audio recordings of faculty and students, both online and in person, to better support learning in a blended format. By enrolling in the course, students are consenting to being recorded in this class and may only withdraw such consent by informing the course instructor in writing. As these recordings may contain intellectual property as well as confidential student information (ex. student names, likenesses), sharing or transferring recordings of such content by any method currently available or any method that may become available in the future is not allowed and copies of such recordings should not be provided to others; uploaded, linked, embedded, or otherwise posted via file-sharing, social media, or other sites or services which could enable anyone to view or hear them who is not currently enrolled in the course; or share them in any other way. Access to video and audio recordings in this class is for personal educational use only and is available only to individuals currently enrolled in the class, unless faculty permission is expressly granted. Recording and/or sharing course materials including video and audio files without the written consent of the course instructor is a violation of College policies (ex. academic honesty) and will be reported to the Registrar and/or Dean of Students for further action and/or discipline.