

Syllabus: MPSM-389 Art, Network, Interactivity

Instructor: Dana Moser dmoser@massart.edu

This 3-credit course meets Mondays 1:30-6:20 in North 271 (Electronic Projects Lab)
(Additional course info is at: <http://curiousart.org/network/>)

Course Description:

This course is an introduction to interactivity over networks (e.g. Local Area Networks, the Internet) using small programmable devices. Such devices (which include Arduino microcontrollers, Adafruit Feather Boards and Raspberry Pi computers) are used in the creation of "Smart" objects and the technological development commonly referred to as "The Internet of Things." The course provides software examples and development environments for students to write their own programs. Some experience with programming is helpful but not necessary. Networked, programmable devices enable audiences and artist-collaborators to have interactive experiences with a variety of media including text, image, sound and video. Objectives: In addition to teaching students to write custom software in programming hardware to communicate/interact with multimedia, an important theme of this course is interactivity. The course introduces methods for using digital networks as a vehicle for interaction with a variety of media including text, image, sound and video. As Generative Artificial Intelligence softwares are having a huge impact on the direction of culture at this moment, content related to AI will be integrated into the topics and class schedules described below, updated throughout the semester.

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. Interaction with Internet "servers" (computers that provide webpages and other services) will be introduced. The goals of the course include: familiarizing students with the various protocols and file type used for transactions on the internet, reviewing ways artists have used interactivity over networks and developing individual projects that use these technologies.

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. Software necessary for the course is installed on the machines in the lab.

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.
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. Client/Server architecture and the Web: file types and protocols

Introductions, and general description of the course. Examples of artworks that use interactions over networks (especially the Internet) will be presented.

2. Single board computing (Raspberry Pi Computers) and Introduction to the Unix Operating System

This class will introduce students to the ARM based SoAC Raspberry Pi Computer. This will include creating user accounts with passwords, login credentials as well as the file structure of the Unix operating system in use by the majority of servers currently on the Internet.

3. Programming Microcontrollers: The Arduino R4 WiFi board

Microcontrollers are programmable devices that can interface with a variety of computers in order to attach and interact with hardware (sensors) to exchange real-world data with software. This will include an introduction to the C programming language.

4. Interfacing sensors and interactivity over networks

This is a continuation of the previous class with more examples of programs written in C that allow the Arduino development board to share environmental data with servers over a network.

5. Programming GPIO interfaces using Python

Direct communication with the raspberry Pi computer through its "General Purpose Input/Output" ports using the Python Programming language is introduced.

6. OSC (Open Sound Control) for MIDI music and control data

An introduction of the OSC protocol as well as presentation of examples of artists' use of OSC in collaborative art projects.

7. Radio frequencies: Bluetooth, WiFi and Cellular

Radio frequency transmissions as a mode of interaction in the creation of artworks using networked interactions is presented with examples to build in class.

8. Adafruit Feather Boards

A variety of specialty produced hardware devices will be presented that include the functionality of: motor control, Lighting and audio playback.

9. Network Architectures: Edge Computing and Mesh Networks

Students will experiment in class with hacking game controllers including a generic Logitech device as well as the Microsoft Kinect. The methods we will use include using external sensors to communicate with game environments, as well as sending data from the controller to custom desktop software to control audio and video files.

10. Project Proposal: Realtime telepresence sound/video performance

In-class production of performative networked interactions.

11. 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.

12. 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.

13. Final Projects Presentations

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

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GRADING

Two grading systems are used at the college; choose the one appropriate for your course.

1. Letter grades (A, A-, B+, B, B-, C+, C, D, F, Incomplete) are given in courses offered in:

- Animation
- Architecture
- Art Education
- Fashion Design
- Graphic Design
- History of Art
- Illustration
- Industrial Design
- Liberal Arts
- Master of Architecture
- Master of Arts in Teaching/Art Education
- Master of Science in Art Education

2. Pass/No Credit/Incomplete grades are given in courses offered in:

- Studio Foundation courses
- Film/Video
- Fine Arts 2D
- Fine Arts 3D
- Photography
- Studio for Interrelated Media
- Master of Fine Arts

1. Grades are defined as follows:

- A – Exceptional work in all respects.
- B – Above average work, distinguished in certain but not all respects.
- C – Average. Individual departmental policies may set standards for the application of “C” grades toward progress in the major.

D – Below average work. This is the lowest passing grade; individual departments may set standards for the application of “D” grades toward progress in the major.
F – Failing work. No credit is given.

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

NC – No Credit Work that does not meet the expectations of the course.

INC – Incomplete. A temporary designation indicating that at least 80% of the course requirements have been met and that the remaining course requirements are expected to be completed, and a permanent designation issued by the subsequent mid-semester. 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 course work, a non-passing grade will be issued.

Department Academic Progress

A student who earns a no credit in a major requirement or two no credits in major electives over two semesters is placed on probation. A student on probation who earns a no credit in a major requirement is subject to dismissal from the department.

Course Attendance

The college-wide policy permits no more than two absences per semester for a course that meets once a week prorated for classes that meet on a different schedule.

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

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 Amendments Act of 2008 (ADAAA), are provided equal access to all campus resources and opportunities. If you believe you have a disability that may warrant accommodations, I urge you to contact Ms. Erla Shehu (Erla.Shehu@massart.edu or 617-879-7692) in the Academic Resource Center (formerly the Learning Center), Tower 550. The Academic Resource Center provides access to a learning specialist, an academic coach and professional tutors.