Fabrication for Physical Computing

New York City College of Technology Spring 2018

Class site

https://github.com/entertainmenttechnology/Earle-MTEC2250-Spring2018

Instructor

- Grayson Earle
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- Office Hours: V-203, Monday: 12-12:50, Wednesday: 12-2:15, and by appointment

Description

This course is an introduction to digital and physical fabrication processes. We will use Google SketchUp, 3D Printing, and the woodshop to complete a series of small projects. This class combines hands-on exploration with theoretical discussions about tangible media. Quizzes will be held regularly on readings and lecture material. There will be an emphasis in this class on creating playful machines and participating in the open-source community.

Students will be expected to spend at least 2 hours outside of class each week advancing projects and/or responding to reading material. Assignments must be synced to your individual GitHub repository. You must participate in group discussions and critiques in this course.

Learning Outcomes

- The ability to design files for 3d printing using SketchUp
- Troubleshooting 3d print design problems (normals, holes, etc)
- A basic understanding of the wood shop and how to build simple objects
- A basic understanding of designing for laser cutting
- The ability to program microcontrollers for user input and motor control
- The ability to solder, wire, and enclose projects
- A general understanding and practice of the iterative design process

Recommended Text

- <u>Making Things Move</u> by Dustyn Roberts
- <u>Getting Started with Arduino, 3rd Edition</u> by Massimo Banzi

Attendance

Punctuality is one of the most respected virtues in the industry. If you have a reputation for showing up on time, you will always find people willing to trust you and to hire you. Use this class

as an opportunity to build the habit of punctuality. It will be very difficult for you to learn the material if you are not in class. If you must come in late, please be respectful of the class and try not to disturb anyone as you enter. If you know ahead of time that you will be late or absent, please contact me before the start of class so we can arrange for you to make up material you will be missing.

Please refer to the latest student handbook for the university-wide policy on attendance.

Academic Integrity Standards

You are responsible for reading, understanding and abiding by the NYC College of Technology StudentHandbook, "Student Rights & Responsibilities," section "Academic Integrity Standards." Academicdishonesty of any type, including cheating and plagiarism is unacceptable. "Cheating" ismisrepresenting another student's efforts/work as your own. "Plagiarism" is the representation ofanother person's work, words or concepts as your own.

Lab Rules

No food. No drink. Keep it in your backpack.

Grading

- Participation/Attendance: 20%
- Quizzes: 35%
- Projects: 45%

Schedule

Week 1

- Course Introduction
- Prepare GitHub accounts
- Introduction to projects involving digital fabrication

Week 2

- SketchUp Demo
- SketchUp Lab
  - Basic control
  - Primitive shapes
  - Spheres
  - Rotation
  - Additive/subtractive design
- Design a keychain in SketchUp for 3d print

Week 3

- Print keychains
- SketchUp Lab
  - Precision & Measurement
  - Designing for existing objects

Week 4

- Woodshop training

Week 5

- Laser cutter demo
- Designing for a laser cutter
- Laser cutter design for custom controllers

Week 6

- Making things move
- Motors & Mounting Motors

Week 7

- Fabrication for motors
- Going low-tech: using cheap, found materials
- Schedule for laser cutter and wood shop for next projects!

Week 8

- Automating mechanical tasks
- Playful machine workshop

Week 9

- Playful machine workshop

Week 10

- Brainstorm: Alternative controllers
- Designing for controller fabrication

Week 11

- Sketch out game cabinets/controllers

Week 12

- Fabrication workshop

Week 13

- Fabrication workshop

Week 14

- Final project showcase