MTEC 2280, D334 – Ins and Outs Fall 2019

- Wednesday & Friday 10-11:40am, Room V-321
- Professor: Grayson Earle
- gearle@citytech.cuny.edu
- Office hours: by appointment

Course Description

An introduction to interactive technology with a focus on how we use technology to express ourselves and interact with our environment. This class combines a hands-on exploration of basic components of media, audio, and control circuits. Students also develop interfacing technologies from simple switches to multidimensional sensors, integrated circuits, and micro-controllers. Emphasis will also be placed on communicating between physical and digital systems.

Learning Outcomes

- Program basic visual applications in Processing
- Recognize and use appropriate terminology for electrical systems and theory.
- Measure Voltage and Resistance of components and circuits
- Recognize and use correct symbols on a circuit diagram
- Program micro-controllers
- Build control circuits with analog and digital components

Course Materials

- Slack
- GitHub
- Flash drive & other portable drives or Dropbox/Google Drive account to back up files
- Readings (will be supplied for you as downloadable PDFs or links)
- [Arduino kit](#) *you must purchase this ASAP*

Texts

- Schiffman, Daniel. Learning Pocessing, 2nd Edition
- Banzi, Massimo. Getting Started with Arduino, 3rd Edition
- Collins, Nicolas. Handmade Electronic Music, 1st Edition

Expectations

- Arrive on time and attend all classes—see below for attendance policy.
- Spend at least 2-4 additional hours a week (outside of class) on class projects, readings, playing games & writing in game journal.
- Check GitHub for assignments and materials (typically announced and posted at the end of class on Mondays).
- Check Slack regularly for group and private messages.
- Actively participate in class discussions & group critiques.
- Back up your work regularly.
- Follow good device etiquette: No cell phone use during class. Laptops only used for lecture note-taking and related class activities.
- Thoughtfully contribute to a positive classroom environment, while actively supporting and challenging your classmates' ideas.
- Push yourself creatively and technically. Be ambitious. Work hard. Stay open and curious!

Communication

- To contact your instructor with a brief, private question or message, send a DM (Direct Message) through Slack.
- If you have a question that may be relevant to the group (about homework, etc.), post in the #general channel on Slack for all to see and comment on.
- Use Slack for easy communications with your classmates as well—you can DM individuals or selected groups.
- To discuss a longer matter with your instructor, DM to set up an appointment for office hours.

Attendance Policy

- Students are expected to attend every class, arrive on time, and actively engage/participate.
- If you will be absent, or if you are running late, DM your instructor ASAP.
- In the case of an absence, contact a classmate for notes and what you missed, check OpenLab for assignments, and contact the instructor if you have

additional questions.
- Lateness and absences will impact your grade. Worse, not showing up will impact everyone else in the class. As most of our projects are collaborative, we are dependent on everyone's presence and full participation.
- All in-class activities are graded for participation. Unexcused absences will result in a 0 for participation for the day.
- Unexcused lateness counts as 1/3 absence when up to 25 minutes late, 1/2 absence when 26-50 minutes late, and a full absence beyond that point.
- Absences may be excused in the following cases: documentation of illness provided by a doctor, religious observance with advance notice, official school-related activity (with documentation and advanced notice), and on a case-by-case basis for other critical events.
- Project critiques are mandatory and cannot be made up. Missing a critique will result in a deduction of one letter grade for the corresponding project.

Academic Integrity Standards

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

Instructor Note: Code borrowed from another source at more than four lines in length must be attributed as a //comment within the code itself. If you are unsure of whether or not your work may constitute plagiarism, please check with your instructor before submitting.

Grading

- Participation/Attendance: 20%
- Assignments: 30%
- Final Project: 30%
- Quizzes: 20%

Grading Rubric

VALUES	Excellent (90-100)	Good (80-89)	Fair (70-79)	Poor (60-69)	Unsatisfacto (0-59)
Concept	Core concept is intriguing, original, and well-explored	Core concept is intriguing but lacking in examination	Core concept is present and supported by the work	Core ideas are scattered without consideration	No clear concept, or work doesn't reflect it
Progress	Clear and consistent progress from ideation to execution	Progress was made, but was not consistent	Evidence of procrastination, "last minute" pushes or crunch	Lack of progress in 1-2 areas resulting in project deficiencies	Little to no progress sho on the proje
Presentation		Concept is supported through presentation, but 2 or more areas of the design are lacking or distracting	Concept is weakly supported through presentation, project requirements met at a "bare minimum" level	1-2 presentation requirements are not met.	3+ presentation requirements are not met.
Skills	Clear demonstration of skills in all development areas (visual, text, audio, interaction, programming)	Clear demonstration of skill in 2+ development areas	Demonstrates skills, but omits topics covered in class.	Evidence of skills, but under-utilization of techniques learned in class	Does not use any techniqu learned in class.

| Collaboration | Consistently provides honest, supportive feedback to peers, responsible in meeting team goals, communicates effectively. | Generally supportive, responsible, and good communication, with a few issues | Multiple issues/problems with collaboration, meeting goals, or communicating | Little to no evidence of communication, goal setting, and collaboration in a team setting. | Disrespectfu to fellow students wor with negativ impacts to class/team dynamics. |

Schedule

Week 1 (8/28 & 8/30)

- Wednesday

    - General technical setup, usernames, logins, etc.
    - Course Introduction
    - Pixel theory, color theory

- Friday

    - Processing Lab
    - Basic interaction & system variables

- Homework

    - Read Learning Processing Lesson One (ch 1-2)
    - Create a static drawing in Processing using 2d primitive shapes and colors

Week 2 (9/4 & 9/6)

- Wednesday

    - Dynamic Processes
    - Introduction to Random
    - Variables
    - KeyPress

- Friday

    - Processing Lab

- Homework

    - Read Learning Processing (ch 3-4)
    - Create a simple "drawing app" prototype based on the concepts we went over in class so far

Week 3 (9/11 & 9/13)

- Wednesday

    - Conditions with if()
    - Iteration with while() and for()
    - Projects & Artists: Sol Lewitt & Bridget Riley

- Friday

    - Processing Lab

- Homework

- Read Casey Reas, excerpt from Software & Art
- Learning Processing (ch 5-6)
- Re-create 3 Sol Lewitt Line Drawings using Processing

Week 4 (9/18 & 9/20)

- Wednesday

  - Quiz

- Friday

  - Creating a Menu
  - State Changes

- Homework

  - Read Banzi (ch 1-3)
  - Create a sketch that has a menu system, which allows you to have at least three mini sketches within the same application. Feel free to work from previous sketches

Week 5 (9/25 & 9/27)

- Wednesday

  - Introduction to Arduino
  - Review of basic circuitry and breadboards

- Friday

  - Arduino Lab: Resistors, Buttons
  - Button Game

- Homework

  - Read Banzi (ch 4-6)
  - Re-create the Button Game in Processing, add your own spin to it

Week 6 (10/2 & 10/4)

- Wednesday

  - Projects & Artists: Laurie Anderson, Tristan Perich
  - Arrays & LEDs

- Friday

  - Arduino Lab: Making noise

- Homework

  - Read Banzi Appendix (p. 91+)
  - Create 3 different sounds using digitalWrite and other functions. DO NOT use a sound library, such as Tone. Each sound must be very different than the last.

Week 7 (10/9 & 10/11) * no class 10/9

- Wednesday

  - Arduino Lab: Making more noise

- Homework

  - Read The Art of Handmade Electronic Music by Nicolas Collins

- Homework

  - Read Chapter 1 ELECTRICITY From Forest Mims' Getting Started with Electricity

Week 8 (10/16 & 10/18) * no class 10/16

- Friday

    - Mid-term check-in
    - Potentiometers
    - Arduino Lab: Arduino -> Processing

- Homework

    - Seek out and write about 3 physical computing projects that you find interesting

- Wednesday

    - Servo motors (and Arduino libraries)
    - Lasers
    - Serial communication
    - Arduino Lab: Making a cat toy (2-axis laser, controlled via Processing)

- Friday

    - Arduino Lab: Automating your cat toy
    - Review

- Homework

    - Draft a final project proposal

- Wednesday

    - Quiz

- Friday

    - Serial: Arduino -> Processing, or Hardware -> Software
    - Video playback in Processing

- Homework

    - Refine final project proposal based on discussion

- Wednesday

    - Potentiometer servo control with robot arms

- Friday

    - Processing/Arduino Lab: Software -> Hardware, Serial
    - Setting variables in Arduino via KeyPress in Processing

- Homework

    - Work on final project

- Wednesday

    - Sensor lab

- Friday

    - Special topics

- Homework

    - Work on final project

- Soldering workshop
    - Thinking about building permanent installations
- Work on final project

Week 14 (11/27 & 11/29)

- Special topics
- Work on final project

Week 15 (12/4 & 12/6)

- Special topics

- Work on final project

- Homework

    - Finish final prototype and presentation

Week 16 (12/11 & 12/13) * no class 12/13 for reading day

- Due: Final project
- Final Presentations

Week 17 (12/18)

- Final Presentations