City Tech || Spring 2019

Ins & Outs || MTEC 2280

Mondays & Wednesday 10.00-11.40 am

Voorhees Hall Room V321

Office Hours || By Appointment (Mondays after class is best)

Instructor: Chester Dols || cdols@citytech.cuny.edu

GITHUB || https://github.com/entertainmenttechnology/Dols-MTEC-2280-Spring2019

SLACK || mtec-2280-spring2019.slack.com

Course Description:

This course is an introduction to interactive technology with physical interfaces. This class combines hands-on exploration, group collaboration, discussion of theory, and healthy critique to learn the basics of physical computing, electrical circuits, and interface design. Students will explore, play, and experiment with sensors, switches, and code to develop insightful devices and tools which are engaging, novel, expressive. Emphasis will be placed on communicating between physical and digital systems.

Objectives:

- The ability to 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/schematic
- Perform calculations using Ohm's Law and Power Law. Apply them in electrical systems.
- Program microcontrollers (Arduino in Java)
- Build control circuits with analog and digital components
- Be exposed to a range of sensors, triggers, and actuators which allow for programmed interactivity

Materials: (Please bring the following to every class)

- Learning Processing: A Beginner's Guide to Programming Images, Animation, and Interaction, by Daniel Shiffman, Morgan Kauffman, Second Edition, 2015. (Available in print, digital, and rentable formats.)
- Make: Getting Started with Arduino 3rd Edition by Massimo Banzi & Michael Shiloh, starting April 3rd.
- Arduino kit, starting April 3rd. Required and recommended components to be announced.
- A computer (please communicate to me if a computer will need to be made available for you

to participate.)

- External storage device or cloud service for storing and backing up your work.
- A sketchbook (paper and writing utensil).

Course Schedule:

Jan. 28	'Hello World': Introductions	New Media & Interaction
Jan. 30	Intro to Processing	Syntax and Canvas
Feb. 4	Intro to Processing cont.	Variables, Data, & Math functions
Feb. 6	Programming Interaction	Interactive drawing tools
Feb. 11	Programming Change	Time based animations
Feb. 13	Patterns and Repetition	Loops
Feb. 18	Setting Parameters and Events	If Statements, Conditionals, State Changes
Feb. 20	Functions	Making and using functions
Feb. 25	*Midterm Projects Announced*	Object Oriented Programming
Feb. 27	Interaction & Narrative	Storyboarding and Diagramming Interaction
Mar. 4	Setting the Stage	Images, Fonts, Customizing Buttons
Mar. 6	Physics and Forces	Movement, Velocity, Direction, Easing
Mar. 11	Midterm: Desk Reviews	Review Critical Material: TBD
Mar. 13	Midterm: Desk Reviews	Review Critical Material: TBD
Mar. 18	Midterm: Presentations & Critique	Midterm projects due.
Mar. 20	What is Physical Computing?	Review tools, projects, and applications of P-Comp
Mar. 25	Electricity Basics	Circuits and Schematic Diagrams
Mar. 27	Electricity Basics Cont.	Parallel vs. Series

Apr. 1	Microcontrollers	Intro to microcontroller: Arduino
Apr. 3	Programming for Arduino	Light Blink and Button Push
Apr. 8	Programming for Arduino	Conditionals, State Change, Variables, etc.
Apr. 10	Environmental Sensors	Sensors, Analog vs. Digital, Serial
Apr. 15	Sound and Simple Movements	PWM, DC Motors, Servos, Piezos
Apr. 17	Programmable LEDs	LEDs & Arduino Libraries
Apr. 22	NO CLASS (Spring Break)	
Apr. 24	NO CLASS (Spring Break)	
Apr. 29	*Final Projects Announced*	Arduino to Processing Communication
May 1	Making Things Move	Digifab & Complex Mechanisms
May 6	Wireless Communication	Wifi, Ethernet, Bluetooth, BLE, Huzzah
May 8	Final: Desk Reviews	Review Critical Material: TBD
May 13	Final: Desk Reviews	Review Critical Material: TBD
May 15	Final: Presentations & Critique	Final Project Due

The topics and schedule are subject to change as needed. Assignment details and requirements are announced in class and posted to our GitHub Wiki each week.

Evaluation:

- Participation 20% of final grade: An assessment of each student's participation in the course will be made based upon their contributions to in-class discussions in class labs. Participation grades are not based on mastery of course content but rather meaningful and consistent engagement in class discussions and group work.
- Weekly Assignments 35% of final grade
- Midterm Project 20% of final grade
- Final Project 25 % of final grade
- *All work must be submitted on time, even if you are absent on that class day. Any late assignment will drop one letter grade per class session that it is late.*

Communication:

- To contact your instructor with a brief, private question or message, send a DM (Direct Message) through Slack. This is preferred over email.
- 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.
- *Please be as transparent as possible. If you are struggling with class materials or dealing with issues outside of the classroom, please communicate this with the instructor. The more they know, the more they can work with you to come up with solutions.*

Expectations:

- Arrive on time and attend all classes— see below for attendance policy.
- Spend at least 3-5 additional hours a week (outside of class) on class projects and exercises.
- Midterm and Final Projects may require additional time, depending on your ambition. Budget more time each week than may be needed.
- Check our GitHub wiki for assignments (typically announced and posted at the end of class on Mondays).
- Check Slack regularly for group and private messages.
- Maintain a well organized GitHub repository.
- 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!
- If you are regularly struggling with any of the above: contact your instructor!

Attendance:

- 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, 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.
- In order to collaborate in group projects, a student must maintain a passing participation grade.
- Midterm and Final 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.

Policies & Procedures

- Late Assignments: Assignments may be submitted after their due date but will be reduced by a letter grade for each day they are late. Attendance is required for exams and critiques. Make-up exams will only be allowed if documentation of an emergency can be demonstrated to the class dean and me.
- Academic Integrity: 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 catalogue.

  Instructor's note: all borrowed text, code, or media used for this course must be attributed to the original creator. Any direct text quotes from another source must be specified with quotes and appropriately cited. 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. Any instance of plagiarism will be reported to the MTEC Program Director as well as the Chair of ENT.
- Accessibility for Students with Disabilities: In order to receive disability-related academic accommodations students must first be registered with the Student Support Services Program (SSSP). Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with Ms. Linda Buist, the program manager of SSSP (Phone: 718–260–5143, e-mail: lbuist@citytech.cuny.edu). If you have already registered with SSSP, please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.