NYC iSchool

Electronics!
Christina Jenkins / 2013-14

Course Description
This class is a hands-on introduction to basic electronics and programming. Students will work on three projects throughout the course: 3D printing, soft circuits (electronics that can be sewn into fabric), and the MaKey MaKey (a device that can be reprogrammed to turn conductive objects, like fruit, into musical instruments). We are not only interested in how these systems work, but also in how we might use them to prototype inventions and understand how humans can interact with computers in new ways. For example, what if we could turn the stairs into a playable keyboard? How does that change the way we feel about walking five flights to class? How does technology respond to human behavior, and how does it change it?

This course is grounded in the maker movement, which means that we're interested in new technologies (like 3D printing and microcontrollers that can be programmed to behave in different ways) and traditional methods (like sewing, making music and drawing), and in how those can be brought together. We're interested making real, physical things, not just talking about them. We're interested in sharing our experiments with the maker community, which means that we'll be documenting our work online with blog posts, photos, and videos.

Course Objectives
By the end of the course, students will have an understanding of basic electronics and how to use three platforms (our classroom's 3D printer, the Printrbot; the lilypad Arduino; and the MaKey MaKey) to prototype original projects that they invent themselves. When they are stuck, students will learn how to debug (fix) their own projects by working with colleagues and locating online documentation. Students will learn to document their work online to share their findings with others who are using the same platforms. Students will practice iterative design, which means that we anticipate frustration and "failures" and will incorporate new ideas and solutions into our work as we go along. Students will develop the confidence and technical ability to pursue more advanced work in electronics and programming.

Student Requirements and Expectations:
Students are expected to care for our shared classroom environment by returning furniture and objects to their established "homes" (as identified with labels), taking care to not waste materials, and contributing to a creative, collaborative and supportive culture in room 402. We will be engaged with activities that may be uncomfortable or unfamiliar at times. Creative thinking can be frustrating and difficult, and students are asked to approach these challenges with persistence and open minds.

131 Avenue of the Americas, 5th Floor, New York, New York 10013
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Course Timeline

Week	Topic	Major Assignments
1-2	**Introduction to Electronics: Paper Circuits!** <Students will use paper, copper tape and LEDs to create working models of simple circuits to understand the basic principles of electricity.>	Simple circuits on paper
2-3	** Note – students will rotate through each of the following activities at different times throughout the term* **Soft Circuits: Programming Wearable Electronics!** <Students will use the Lilypad Arduino, sewable LEDs, conductive thread and other materials to sew circuits into fabric. This may manifest in wearable garments or stuffed creatures. Advanced work will include programming the Arduino to adopt different behaviors appropriate for various projects.>	Final project with documentation on class blog
4-5	**The MaKey MaKey: Making music with conductive surfaces!** <Students will use the MaKey MaKey to initially create simple music pieces and then prototype more complex projects that take advantage of the MaKey's capacity to reprogram a computer's keyboard. Advanced work might include designing unique interfaces for making music, like piano stairs.>	Final project with documentation on class blog
6-7	**3D Printing with our Printrbot!** <Students will use Sketchup and other programs to print small 3-dimensional objects of their own designs. Advanced work might include prototyping specific objects that do not exist, or exist in more expensive forms.>	Final project with documentation on class blog

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Grading

OFFICIAL iSCHOOL GRADING POLICY:

- Productivity includes home work assignments, in class assignments, notes, notebook checks, being prepared for class, organization, supplies, flash cards, etc.
- Contributing Factors includes attendance, participation, lateness to class and turning in late assignments, behavior, effort, etc.

ELECTRONICS
Mastery: 70%
Productivity: 20%
Contributing Factors: 10%

Incomplete Grades:

Students who receive below a 65% will receive a 55 in the class. The student's productivity and contributing factors percentage grades will be locked in place at the end of the course, but a grade can be improved through demonstration of mastery (prior to the end of the following quarter).

Students who receive a 55 may be required to attend an after school class each week at a time to be determined by student and teacher.

Late Assignments

OFFICIAL iSCHOOL POLICY: Teachers will accept late productivity assignments 5 school days after the original due date. The assignment must be completed in the presence of the assigning teacher (i.e. during Office Hours, or by appointment). At this time the teacher has the option to assign additional work before deeming the original assignment complete.

All coursework is due on the date given at the beginning of the assignment/project. Late productivity work will be accepted up to five days after the due date, with a penalty of 10% off per day late. The assignment must be completed in my presence during my posted Office Hours, or by appointment.

Student Absences

If a student is absent, it is his/her responsibility to come to Office Hours the day he/she returns back to school find out what was missed the day he/she was absent. The student is expected to turn in any assignments due on the day absent on the day immediately following the absence. During an absence, students are expected to continue to check the course website and/or contact a classmate to keep up with course work.

Resources

- Students should get in the habit of checking iSchool email regularly, as teachers will communicate instructions, project feedback, etc. through email.
- Students should check the course Moodle daily, as assignments, templates, and resources will be posted there.
- Additional help is available during Office Hours or by appointment; My office hours are: Tuesday through Thursday, from 3:20 – 4pm.
- If you have additional concerns please e-mail me at: cjenkins@mail.nycischool.org

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