Spring 2016
ITLS 5270/6270
Craft Technologies

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Craft Lab EDUC 222
Friday Labs 2-4pm

Lecture: Wednesday 1:30-4:00pm, EDUC 280
Optional Lab: Friday 2:00-4:00pm, EDUC 222

Course Description & Goals

Welcome to the world of tangible, computational crafts where computers are sewable and circuits are made with conductive thread! In this tools course, we will work with hard and soft technologies, like MakeyMakey and LilyPad Arduino, to make wearable and interactive projects that merge computing and crafting. More broadly, we will discuss and design projects related to the "maker movement" in education. Through these projects, you will gain hands-on experience with latest maker materials and technologies. While we will meet weekly to discuss course readings, the majority of your time will be spent on learning and making introductory projects and your final project which you will **design** and **document** for a DIY community such as Instructables. Graduate students in the course will engage in additional readings concerning learning theories and recent research.

Course Overview

Class 1 January 13: Exploring Conductivity

Class 2 January 20: Exploring Simple Circuits
>>> Makey Makey Challenge Due January 20

Class 3 January 27: Exploring Soft Circuits
>>> Paper Circuit Project Due January 27

Class 4 February 3: Makey Makey + Scratch Game
>>> Soft Circuit Project Due February 3

Class 5 February 10: Makey Makey + Scratch Game

Class 6 February 17: Game Arcade
>>> Makey Makey + Scratch Game Due February 17

Class 7 February 24: Human Sensor Project Intro

Class 8 March 2: Human Sensor Project Work

Class 9 March 16: Human Sensor Project Exhibition
 >>> Human Sensor Project Due March 16

Class 10 March 23: Design Jam + Final Project Intro

Class 11 March 30: Final Project + Design Spotlight

Class 12 April 6: Final Project + Design Spotlight

Class 13 April 13: Final Project + Design Spotlight

Class 14 April 20: Final Project + Design Spotlight

Class 15 April 27: Craft Technologies Exhibition at CACHE MAKERS

Course website

You will need to use Canvas extensively in this course, and will be expected to stay connected and up-to-date with that system. All due dates will be kept current in Canvas. Communication outside of class will primarily happen through Canvas announcements, so make sure that your technology is setup in such a way that you receive these announcements. Please check out the Canvas tutorial videos at this link: https://resources.instructure.com/courses/32/pages/canvas-student-tour- videos

Required Materials

The course fee provides you with access to technologies, crafting supplies, and project materials necessary to complete the projects outlined in this syllabus. Course fee also covers use of the Mac Lab including computer hardware, computer software licensing, and other equipment usage replacement and repairs.

There is no required textbook for this course. We will provide all course readings via Canvas.

Grading

Class Attendance, Preparation, and Participation (10%)
Weekly Reflections (15%)
Exploration Projects (15%)
      Makey Makey Challenge (5%)
      Simple Paper Circuits (5%)
      Soft Circuits (5%)
Programming Projects (30%)
      Makey Makey + Scratch Game (15%)
      Human Sensor Project (15%)
Final Design Project (30%)

Class Attendance, Preparation, and Participation (10%)

This class will be run as design studio during which we discuss relevant themes and make projects. A successful discussion will depend on every member of the group actively collaborating as both learners and teachers. We assume that each of us has valuable perspectives and experiences that will inform our collective, developing knowledge about making and learning. We expect that you will have read the texts carefully and will be prepared to actively participate in our discussions. It is important that you come to class on time. If you are going to miss a class you <u>must</u> contact the instructors <u>prior</u> to the class. The design portion of the class will involve experimenting with new technologies and crafting your own projects. We will follow a design, document, share sequence through which you will design with a new tool, document your process, and share this with the class.

Weekly Reflections (15%)

Project Reflections are due to Canvas discussion board every week by midnight on Tuesday. In a narrative, blog-style post (500 words), outline both your **design** and your **learning**. In addition to outlining your project design, it is expected that you will reflect on your own learning and draw on some ideas from the course, including ideas from the readings. You are also welcome to draw on ideas, theories, and experiences from other disciplines (humanities, sciences, engineering, kinesthetics, etc.).

Pictures, videos, and diagrams are strongly encouraged and often required. Your reflection of these projects is equally as important as your completion of the designs themselves. Use the following questions to help guide your reflection:

- What challenges did you face? (i.e., what went wrong?)
- What successes did you have? (i.e., what went right?)
- What resources did you use to figure things out? (i.e., peers, guides, online help, professor, etc.)
- What is your idea for your next project?
- What did you learn from working with these tools/materials?
- Outline your recommendations and advice for those who might work with these tools/materials in the future.
- *One paragraph connecting to readings and/or ideas from the course. (Required for Graduate Students)

Exploration Projects (15%)

Explore Conductivity: Makey Makey
> Introduction: Watch & Demo Makey Makey videos http://www.makeymakey.com/
> Project: Makey Makey Challenge to explore conductivity of everyday objects

Explore Switches: Paper Circuits
> Introduction: Complete Paper Circuit project
> Project: Create your own 3D paper circuit with a switch and 2 LED's- be creative!

Explore Soft Circuits: E-textiles
> Introduction: Sew a simple circuit on fabric
> Project: Sew a bracelet, wristband, or pouch with two LEDs and a snap switch.

Programming Projects (30%)

Explore Programming Part 1: Scratch
> Introduction: Create account and play some games http://scratch.mit.edu/
> Project: Create a Scratch game with a tangible controller using Makey Makey

Explore Programming Part 2: Arduino
> Introduction: Download Arduino and explore Arduino.cc
> Project: Small human sensor project with a LilyPad Arduino, 3 LED lights, and sensor

Final Design Project (30%)

For the final design project, you can choose to work with any of the materials and tool kits introduced in the course, and combine them if you want to. We want you to use materials you've used *and* experiment with new materials. The expectation for this project is far greater than for the exploration and programming projects, namely that *this must be an **original** project* and distinct enough from any earlier design projects. You are welcome to remix others' ideas, but we invite you to be creative. You can create

an interactive art installation, build a solution to a problem, or fill a practical need in your own life. We want you to take risks and challenge yourself, but we also want you to complete the project within the given timeframe, so *you must consult the instructors before beginning your final project.*

This project has three main elements in addition to the design itself: presentation, documentation, and design rationale.

Presentation (due in class April 27): You are expected to present a prototype of the final design project and a rough draft of the Instructables video/documentation at our last class meeting.

Documentation (final draft due online May 4, Midnight): You are expected to document your process and create an Intructables.com entry or Educational Tutorial to guide others on how to make a similar project.

Design rationale (due online May 4, Midnight): You are expected to write up an explanation of your design and pedagogical rationale. This should include explicit connections to course readings and theories and/or from other disciplines. Undergraduates: 2 pages (~1,000 words) Graduates: 4 pages (~2,000 words)

COURSE READINGS & ACTIVITIES

Indicates Graduate Student Assignments

Date	Topic	Activities
Week 1: January 13	Exploring Conductivity	Intro to Makey Makey
Explore: http://www.makeymakey.com/ **Readings:** Silver, J., Rosenbaum, E., Shaw, D. (2012). Makey Makey: Improvising tangible and nature-based user interfaces. In *Proceedings of the ACM Tangible Embedded and Embodied Interaction* (pp. 367-370). Kingston, Ontario.		
DUE January 20 Makey Makey Challenge		
Week 2: January 20	Exploring Simple Circuits	Makey Makey Challenge Showcase
Readings: Qi, J. & Paradiso, J. (2015, June). Crafting technology with circuit stickers. In *Proceedings of the 14th International Conference on Interaction design and Children* (pp. 438-441). Atlanta, GA: ACM. Qi, J. & Buechley, L. (2010). Electronic Popables: Exploring paper-based computing through an interactive pop-up book. In *Proceedings of the 4th Conference on Tangible and Embedded Interaction* (pp. 121-128). New York, NY: ACM.		

Halverson, E.R. & Sheridan, K. (2014). The Maker Movement in Education. *Harvard Educational Review, 84*(4), 495-504.

*Papert, S. (1991). Situating constructionism. In I. Harel & S. Papert (Eds.), *Constructionism* (pp. 11-30). Norwood, NJ: Ablex Publishing.

DUE January 27 Paper Circuit Project		
Week 3: January 27	Exploring Soft Circuits	Paper Circuit Showcase

Readings:
Buechley, L. (2013). LilyPad Arduino: E-Textiles for Everyone. In L. Buechley, K. Peppler, M. Eisenberg, & Y. Kafai (Eds.), *Textile messages: Dispatches from the world of E-Textiles and Education* (pp. 25-38). New York, NY: Peter Lang.

Dougherty, D. (2013). The maker mindset. In M. Honey & D. E. Kanter (Eds.), *Design, make, play: growing the next generation of stem innovators* (pp. 7-11). New York, NY: Routledge.

*New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review, 66*(1), 60-92.

DUE February 3 Snap Bracelet/Pouch Project **Additional Homework:** Create a Scratch account at https://scratch.mit.edu/		
Week 4: February 3	Intro to Scratch Programming	Snap Bracelet Showcase

Readings:
Resnick, M., Maloney, J., Monroy-Hernández, A., Rusk, N., Eastmond, E., Brennan, K., & Silverman, B. (2009). Scratch: Programming for all. *Communications of the ACM, 52*(11), 60-67.

*Peppler, K.A. & Kafai, Y.B. (2007). From SuperGoo to Scratch: Exploring creative digital media production in informal learning. *Learning, Media, and Technology, 32*(2), 149-166.

Week 5: February 10	Game Design with Makey Makey + Scratch	Project Time

Readings:
Davis, R., Kafai, Y., Vasudevan, V., & Lee, E. (2013). The education arcade: Crafting, remixing, and playing with controllers for Scratch games. In *Proceedings of Interaction Design and Children* (pp. 439-442). New York, NY: ACM.

* Brennan, K. & Resnick, M. (2012). New frameworks for studying and assessing the

development of computational thinking. Paper presented at the annual meeting of the American Educational Research Association. Vancouver, BC, Canada.

DUE February 17 Makey Makey + Scratch Game		
Week 6: February 17	Game Design with Makey Makey + Scratch	Game Arcade
Watch: Leah Buechley Fablearn 2013 talk: http://edstream.stanford.edu/Video/Play/883b61dd951d4d3f90abeec65eead2911d		

Week 7: February 24	Intro to Electronic Textiles + Arduino	Project Time
Readings: *Kafai, Y.B., Fields, D.A., & Searle, K.A. (2012). Making technology visible: Connecting the learning of crafts, circuitry, and coding in youth e-Textile Designs. In *Proceedings of the International Conference of the Learning Sciences, Volume 1* (pp. 188-195).		
Week 8: March 2	Human Sensor Project	Circuit Diagrams
Readings: *Kafai, Y.B. & Peppler, K.A. (2014). Transparency reconsidered: Creative, critical and connected making with e-textiles. In M. Ratto & M. Boler (Eds.), *DIY Citizenship* (pp.179-188). Cambridge, MA: The MIT Press. *Litts, B.K., Kafai, Y.B., Dieckmeyer, E. (2015, September). Collaborative electronic textile designs by high school youth: Challenges and opportunities in connecting crafts, circuits, and code. In *Proceedings of 2015 FabLearn Conference on Creativity and Fabrication in Education.* ACM.		
SPRING BREAK March 7 – March 11 NO CLASS		
Week 9: March 16	Human Sensor Project Exhibition & Intro to final projects	Exhibition
Readings: *Peppler, K., & Glosson, D. (2013). Stitching circuits: Learning about circuitry through e-textile materials. *Journal of Science Education and Technology*,*22*(5), 751-763.		
DUE March 15 11:59pm Human Sensor Project		
Week 10: March 23	Designer Spotlight: Dennis	Design Jam

	[Ramirez](#) from [USC](#) & [GLS](#)	
Readings: See Canvas for Designer Spotlight Resources		
Week 11: March 30	Designer Spotlight: [David Gagnon](#) from [ARIS](#)/[Field Day](#) (3:30-4pm)	Final Project Work
Readings: See Canvas for Designer Spotlight Resources		
Week 12: April 6	Designer Spotlight: Mark Lee Koven	Final Project Work
Readings: See Canvas for Designer Spotlight Resources		
Week 13: April 13	Designer Spotlight: Arnold Martin from [Absurd Realities](#) (2-3pm)	Final Project Work
Designer Spotlight Resources: See Canvas for Designer Spotlight Resources **[Arnold Martin's Portfolio](#)** **[Arnold Martin's Thingiverse Designs](#)** **Readings:**		
Week 14: April 20	Designer Spotlight: Rebecca Grabman from [Makeshop](#) (3-4pm)	Final Project Work
Designer Spotlight Resources: See Canvas for Designer Spotlight Resources **[Makeshop Instagram](#)** **[Makeshop Blog](#)** **[Makeshop Learning Practices](#)** **Readings:** Wardrip, P. S., & Brahms, L. (2015). Learning practices of making: developing a framework for design. In *Proceedings of the 14th International Conference on Interaction Design and Children*. New York, ACM.		
Week 15: April 27	**Craft Technologies Exhibition**	
Week 16: May 4	**Design Rationale + Instructable/Educational Tutorial Due**	

UNIVERSITY POLICIES & PROCEDURES

Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students.

The Honor Pledge: To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University's Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating**: using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
    - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done "individually;"
    - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
    - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
    - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
    - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
    - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.

- **Falsification**: altering or fabricating any information or citation in an academic exercise or activity.
- **Plagiarism**: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

Sexual Harassment

Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EEO Office at (435) 797-1266.

Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

Students with Disabilities

Students with ADA-documented physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations. Veterans may also be eligible for services. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, (435)797-2444. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print, digital, or audio) are available with advance notice.

Contacting the Disability Resource Center (DRC):

- On Campus: Room 101 of the University Inn
- Phone: 435-797-2444
- Website: http://www.usu.edu/drc/

Disability related resources for current students:

- DRC Student Handbook
- Deaf and Hard of Hearing Student Handbook
- Disability Related Scholarships
- Campus Resources
- Documentation Guidelines
- Online Resources for Students with Disabilities

Diversity Statement

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Student Services: http://www.usu.edu/studentservices/, 435.797.1712, studentservices@usu.edu, TSC 220
- Student Advocates: http://www.usu.edu/ususa/legal/, 435.797.2912, TSC 340,
- Access and Diversity: http://www.usu.edu/accesscenter/, 435.797.1728, mailto:access@usu.edu; TSC 315
- Multicultural Programs: http://www.usu.edu/accesscenter/multiculture/, 435-797-1728, TSC 315
- LGBTQA Programs: http://www.usu.edu/accesscenter/lgbtqa/, 435-797-GAYS, TSC 314
- Provost's Office Diversity Resources: http://www.usu.edu/provost/faculty/diversity/, (435) 797-8176

You can learn about your student rights by visiting:

The Code of Policies and Procedures for Students at Utah State University: http://www.usu.edu/studentservices/studentcode/

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: Article VII. Grievances.

Full details for USU Academic Policies and Procedures can be found at:

- Student Conduct
- Student Code
- Academic Integrity
- USU Selected Academic Policies and Procedures
- USU Academic Policies and Procedures
- Academic Freedom and Professional Responsibility Policy

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.