

# Digital Development Workshop · Wearables

Fall 2018 Studio Workshop

Professor: Zach Pino

Tuesdays 2:00pm to 5:00pm @ DTC 485 + 6th Floor Studio + ???

## Description

This recurring course teaches current and emerging electronics and programmatic prototyping tools, so that students are able to fluently develop their ideas into interactive and responsive outcomes. Digital Development challenges students to explore how a combined knowledge of design research methods, contemporary technologies, and engineering prototyping tools can contribute to better and more informed designed outcomes. Each semester, the course takes on a specific topic and a new set of technologies, allowing students to retake the course and acquire new skills and exposure to other technological prototyping tools.

In Fall 2018 Digital Development, the Arduino prototyping platform will be used to collect information directly from the human body by developing wearable technologies. Human health factors, social behaviors, and experienced environmental conditions will all be accessed through the near-infinite variety of sensors compatible with the Arduino platform. Students will learn to work with these sensors, while contending with the physical challenges associated with placing technology onto the human body including rechargeable battery-power, waterproofing, persistent data storage and online access, and on-body ergonomics and comfort. Discussions for preparing and working with the collected data, as well as the ethical implications of constant data collection and the Quantified Self movement, will help students understand the appropriate applicability of their technical learnings and experimentations. A final brief will challenge students to develop their own wearable device and use it to collect data about their everyday lives.

## Format

Each class will be divided into an interactive tutorial focusing on a specific technical topic, followed by building time in which students will be presented with an assigned real-world challenge for their designs to conquer.

Weekly homework will task students with building circuits, writing code, and prototyping hardware.

## Office Hours

Mondays 12pm-2pm (Dedicated)

Thursdays 9am-12pm (Global)

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## Learning Objectives

- ▶ Gain fluency with the Arduino prototyping platforms
- ▶ Find and implement open source code and libraries
- ▶ Write well-structured code in Arduino-Flavored C++
- ▶ Develop perseverance through confronting technological limitations and failures
- ▶ Demonstrate a high-level understanding of bodily attachment, ergonomics, biometrics, waterproofing, passive HCI, and power management
- ▶ Implement a wide variety of analog and digital sensors and synthesize the results into a computational understanding of the world
- ▶ Use mathematical, computational, and physics principles to address design problems

## Requirements

- ▶ Command of Adobe Illustrator, InDesign, and Photoshop or equivalents
- ▶ Willingness to prototype many ideas quickly
- ▶ Comfortability with working in teams and providing honest critique

## Course Outline

1. Introduction to Arduino Platform, Electricity, and Functional Programming
2. Simple Digital Sensors - Buttons and LEDs
3. Simple Digital Sensors - Light/Temperature Sensor and RGB LEDs
4. I2C Sensors - Accelerometers, Gyroscopes, IMUs
5. SPI Sensors - Data Logging
6. Sound Collection and Analysis - Microphones and SD Card Data Collection
7. Proximity Detection - RFID
8. Fancy PWM · DC Motors and Servos
9. User Feedback - Displays, Screens, Buzzers
10. Product Hardening, Battery Power Management, and Waterproofing
11. Data Visualization Tools and Uploading Data to the Internet
12. Project Worktime
13. Project Worktime
14. Final Presentation

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## Expectations

- ▶ Minimum 10 hours of outside-of-class idea development and execution time
- ▶ Weekly research and tutorial completion
- ▶ Weekly deliverables that may require excursions and/or materials sourcing
- ▶ Weekly uploads of code and circuit diagrams with questions for review

## Grading

Students will be evaluated on the scope and ambition of their iteration and exploration, aesthetic quality of their work, participation and collaborative enthusiasm, and the clarity and legibility of their developed ideas.

■ Class Contribution   ■ Regular Development   ■ Ambition   ■ Execution

