



**Instructor:** Jacob Peters, PhD candidate in Organismic and Evolutionary Biology

**Course Listing:** ENSC P-14810

**Course Name:** *Build your own weather station: An introduction to microcontrollers*

**Location:** Geological Museum 103B

**Time:** Mon-Fri, 12:00 - 3:00 pm

### **Course description:**

Microcontrollers have transformed the way that people interact with technology. In the early days of digital technology, only experts could design, build and distribute electronic devices. In the past decade, open source microcontrollers have made custom electronics affordable and accessible to anyone willing to watch a tutorial on YouTube. In this class we will build an Arduino-based weather station to introduce students to data collection with microcontrollers. Students will connect open source sensors to the Arduino using a solderless breadboard. They will also follow guided tutorials to program the Arduino to acquire data from the sensors and save the data to an SD card. The data that students generate will be plotted in Google Sheets. At the end of the course students will propose a microcontroller project of their own and present it to the class.

### **Course objective:**

I want students to leave this class with the confidence that they could design and build a microcontroller-based project on their own using open source tools.

**Office hours:** TBD

**Resource text (Optional- You are not required to buy this!)**

*“Programming Arduino: Getting Started with Sketches”, Second Edition, by Simon Monk*

**Course Schedule:**

Date:	Topic	Activity	Homework
Mon, July 22	Intro. to Electronics/Coding	Blinking Light	
Tues, July 23	Control Structures	LED "knight rider"	Assignment 1 due
Wed, July 24	Digital and Analog Input/Output	temperature sensor, light sensor, laser trip-wire activity	Assignment 2 due
Thurs, July 25	Arrays	Multiplexer exercise	Assignment 3 due
Fri, July 26	Serial Input, Libraries	barometric pressure sensor, install clock	Assignment 4 due
Mon, July 30	Student Presentations	Student Presentations	Student Presentations
Tues, July 31	Strings, Memory, Logging, Plotting	install LCD Display, install SD card data logger	Assignment 5 due
Wed, Aug 1	install weather stations	wind sensor, rain sensor	Assignment 6 due
Thurs, Aug. 2	Retrieve weather stations and plot data	Work on final project	Assignment 7 due
Fri, Aug. 3	Student Presentations	Student Presentations	Student Presentations

**Grading Policy**

All scripts written in class will be given a completion score. All students should receive these points if they participate in class. Each homework assignment and presentation will include a rubric detailing how it will be evaluated. 50% of the students overall score will be based on homework assignments and presentations and 50% will be based on in-class scripting assignments. Late work will be docked 15% for each day that it is late. Students with an overall score of 70% or higher will receive a passing grade.

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