

COURSE INFORMATION

Credits 1

Instructors: Michael E. Huster, Ph.D.
and Daniel Cross, Ph.D.

Location: TBD

Office: TBD

Times: TBD

Office hours: Mon. 10 – 12

Prerequisite: TBD

COURSE DESCRIPTION

This course covers how modern microcontrollers, successors to the Arduino, can be used to cheaply and easily build and run lab experiments. They are programmed in high-level languages like micropython or C++, so the learning curve is easy for students who have taken a programming course.

You will learn how to build devices that do some experiments with very little external circuitry, then work on experiments that use external sensor and control boards. The microcontroller can control an experiment, read the results, and even do analysis like average data, fit data to curves, and display the frequency spectrum of data. My favorite microcontroller, The Raspberry Pi Pico W (aka PicoW) costs \$6 and has WiFi, so you can post data directly to the Internet.

But there is more! There are hundreds of sensor and control breakout boards that extend what these microcontrollers can do. You will see how the experiments you can do are almost unlimited.

This is a one credit laboratory course that meets once a week for 2 hours and 50 minutes.

GRADING

Item	# of Items	Points/Item	Points	Percentage
Weekly Lab Notebook Entries	11	10	110	44
Project Presentation	5	20	100	40
Final Project	1	40	40	16
Total			250	100

TENTATIVE SCHEDULE

Note: The labs actually done may differ from this list due to equipment malfunction, new labs being added to the curriculum, or other contingencies.

Date	Topic	Lab
8/26	1 - Introduction to the Pico W	Install Thonny programming environment on your laptop. Load latest version of micropython (aka uPy) in the Pico W. Write a blink LED program.
9/2	2 – Programming the Pico W	

9/9	3- PicoW Interfaces
9/16	3 – a
9/23	4 – a
9/30	5 – a
10/7	6 – a
10/14	7 – a
10/21	8 – a
10/28	9 – a
11/4	10 – a
11/11	11 – a
11/18	12 – a
12/2	13 – a
12/9	14 – a
Final	