Teacher at Sea Alumni Association Professional Development

Multi-Sensors and Data Loggers with Public Sensors (online course)

This course is geared towards upper elementary-college teachers who want to build more complex sensors with their students. In this course, you will learn how to build a multi-sensor to measure temperature, light and distance, with an option to add in a data logger using the Public Sensors Kit. You will learn how to create circuits using a breadboard and run Python code to collect data from the sensors. **This course will take approximately 15 hours to complete** (4 hours of required online meetings plus approximately 11 hours of asynchronous learning) and will be conducted through an online learning management system and will feature both synchronous and asynchronous activities.

This course will be co-taught with Sasha Seroy, PhD, a lecturer in Biological Oceanography at the University of Washington. Sasha is passionate about ocean technology and bridging science and education and worked with other students and faculty at the UW School of Oceanography to develop the Public Sensors kit used in this course.

Prerequisite: An understanding of simple circuits and basic knowledge of coding (you will not be writing code but making modifications to code).

Course Objectives:

- Build a temperature, light, and distance sensor + data logger
- Troubleshoot the sensor if problems occur
- Design a basic experiment with the sensor
- Collect and analyze data using sensor
- Modify basic Python code
- Create a graph using data collected
- Create an activity/lesson/unit using the sensor and share with other educators

Course Dates:

- One-hour **required** online meetings on **Jan. 17th, Jan. 24th, Jan 31st, and Feb. 7th** at **4:30 PM PT / 7:30 PM ET**

Course Overview and Statement of Work

Student Responsibilities:

- Active participation in both synchronous and asynchronous activities of the virtual course. This will include participation in discussions, virtual meetings, and completion of required activities. **Note**: if you are unable to attend a live virtual meeting, you will need to watch the recording and complete a reflection.
- A commitment to using sensors and data in your curriculum.

Deliverables for Successful Course Completion:

1. Signed Statement of Work
2. Required assignments (see course overview below)
3. Attendance and participation in required online meetings
4. Create a lesson using the sensors to use with your students

Costs Associated with Course to be Paid for by the Alumni Association:

- The Public Sensors Kit supplies are valued at $150
- The course and materials are free of charge to alumni

Materials You Provide:

- Computer with USB port
- Reliable Internet
- Materials to test sensors (i.e., a source of light/dark, heat/cold)
- Access to a spreadsheet program, such as Microsoft Excel, Google Sheets, or Open Office
- Camera to take photos for assignments (a phone camera will work fine)

I _____understand that if I fail to participate in the course activities, I may be required to return the course materials to the Alumni Association. I also understand that I must complete all required activities to receive a certificate of course completion

_____   _____

Signature   Date

Multi-Sensors and Data Loggers with Public Sensors
Course Overview

I. Course Introduction Due by: Jan. 15th	II. Build a Multi-sensor (Part I) Jan. 17th at 4:30pm PT / 7:30pm ET	III. Build a Multi-sensor (Part II) Jan. 24th at 4:30pm PT / 7:30pm ET
Preview the online course, explore your Public Sensors Kit and familiarize yourself with the materials. • **Activity:** Review the course materials • **Homework:** Sign and upload the Statement of Work	We will meet one another in our first online meeting and build the first part of multi-sensor, the temperature sensor. • **Activity:** Online virtual meeting to build the temperature sensor • **Homework:** Reflection/discussion and temperature sensor applications	In this lesson, you will build the light and distance sensor. • **Activity:** Online virtual meeting to build the light and distance sensor and connect data logger • **Homework:** Reflection/discussion and light/distance sensor applications
IV. Explore the Multi-Sensor On your own between Jan. 24 - Jan. 31	**V. Analyze Data** Jan. 31st at 4:30pm PT / 7:30pm ET	**VI. Classroom Applications** Feb. 7th at 4:30pm PT / 7:30pm ET
Now that you have built your sensor, how can you put it to use? Explore resources and design your own experiment. • **Activity:** Explore sensor applications and data resources • **Homework:** Design and execute an experiment testing out your sensor	You will learn how to take the data from your multi-sensor and create a graph. • **Activity:** Extracting data from your data logger • **Homework:** Create a graph from the data you collected using the sensor	In our final meeting, we will discuss classroom applications for the sensors/kits, brainstorm options for the final assignments, and discuss real-world applications for sensors. • **Activity:** Online virtual meeting • **Homework:** Final assignment classroom application plan
Final assignment: Classroom application plan DUE Feb. 18th, 2024		