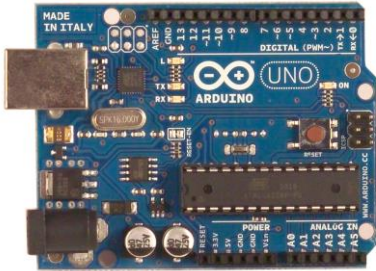Welcome to "Microcontrollers and ROVs" at Linn-Benton Community College. The goal of this class is to learn the uses of microcontollers in a hands-on format.

A microcontroller is a small computer on a single integrated circuit with programmable input/output peripherals. Physicists are interested in microcontrollers as these tend to be a main tool we use to collect data from the universe and to the control the devices that make up our experimental apparatus.

A complimentary goal of this class is to increase the skill level of students wishing to take part in a Research and Design Cohort (RDC) during Winter and Spring term. Our RDCs include: the LBCC Remotely Operated Vehicle team which will compete in the Summer 2021 Marine Advanced Technology Education Center (MATE) competition currently planned to happen in Austin, TX; the LBCC Space Exploration Group, and a new group to be announced soon.

In this class we will build a mini-ROV that can ascend or descend to any desired depth using microcontrollers for both data collection and peripheral control. The skills that you gain here in this class will help with all the above RDCs.

There are many microcontrollers on the market. For this class we have chosen the Arduino Uno microcontroller. The advantages of the Arduino Uno include a large global Arduino community with whom you can share work, its low cost, and its small size.

Instructor:

Greg Mulder

MH 109   541-917-4744

mulderg@linnbenton.edu

Office Hours:

   M 9-9:50am;

   T,W 10-10:50am

Course Materials:

All course reading materials are kept at http://minirov.info/ph131

You will need to purchase a miniROV kit from the LBCC bookstore.

Course Format: There are 10 Checkpoints everyone in class is expected to accomplish by the end of Week 8. Following the Arduino spirit, everyone in the class is expected to assist others in the class in their development of their mini-ROV. We will work in groups of two where each group will get two sets of Arduino equipment. If your group finds yourself ahead of the class, you should offer assistance to others. Likewise, if you find yourself struggling to understand a concept then you should seek elucidation from the instructors or other students in the class.

Course Checkpoints:
Checkpoint 1: Download software from http:// arduino.cc.
Checkpoint 2: Make the light blink.
Checkpoint 3: Read someone else's blinking light.
Checkpoint 4: Graphically display the data collected from your light sensor.
Checkpoint 5: Read a pressure sensor.
Checkpoint 6: Learn to run a motor using PWM and an H-Bridge.
Checkpoint 7: Learn to control the motors via feedback from the pressure sensor.
Checkpoint 8: Learn to waterproof motors.
Checkpoint 9: Put together your mini-ROV
Checkpoint 10: Test your ROV designed to achieve and maintain a specified depth.

Grading: Each day you attend class you should write up a short description of what you did that day in your DropBox Technical Report Journal. You receive 5 points for each days' entry. Make sure that you sign yourself into class each day on the class list. When you complete a Checkpoint, you should check yourself off on the Checkpoint Sheet also kept in our classroom.

Grading Scale:

90%-100%	A
80%-89%	B
70%-79%	C
60%-69%	D
< 60%	F

Other possible grades at LBCC:

I -- Incomplete. An 'I' grade is assigned if for some reason a student cannot complete all components of the course by the end of the academic term. To receive an 'I' grade, the instructor and student must agree upon a contract that will spell out when uncompleted work will be turned in. The student has until the end of the next term to complete all unfinished work

Y -- No basis for grade. A 'Y' grade is given if there is not enough competed work for the instructor to assign a grade. Generally, a 'Y' grade cannot be assigned to as student who has completed more that the first three weeks of class.

Students in need of accommodations: Students who may need accommodations due to documented disabilities, who have medical information which the instructor should know, or who need special arrangements in an emergency, should speak with the instructor during the first week of class. If you have not accessed services and think you may need them, please contact Disability Services, 541-917-4789.

Student Basic Needs Assistance: Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live, and believes this may affect their performance in the course, is urged to contact the Single Stop Office for support at SinglestopatLBCC@linnbenton.edu or 541-917-4877.