

Utilizing the Arduino Microcontroller

Phys 2400 – 1 Credit

Spring 2017 (Jan 8 – Feb 27)

Thursday 3:00–5:00 PM, SER 132

Instructor: Don Rice

This class consists of seven 2-hour lecture/lab breakout sessions which will introduce the Arduino microcontroller, its software, and various useful sensors and actuators that may be used with it. The techniques demonstrated in class will enable the student to construct various inexpensive measurement and control devices. The student will construct a project at the end of the class. Lectures and assignments will be coordinated through Canvas (canvas.usu.edu).

Pre-requisites: the student is expected to have and be familiar with a Windows, Macintosh, or Linux laptop with a standard USB port. No programming, electronics, or other technical knowledge is required.

Textbook: instead of a textbook, students are required to purchase the *Kuman for Arduino Project Complete Starter Kit*, available from Amazon for about \$30. This kit includes an Arduino microcontroller and all parts needed for class exercises. Introductory e-books are also included in the kit. Students may purchase additional components from various sources for their own projects if desired.

Course Outline:

1. Installing Arduino software; introduction to the Arduino and the starter kit
2. Prototyping with LEDs, switches, and other components; “shields” for advanced functions
3. Simple programming and using software from the Internet
4. Analog to digital conversion, types of sensors, and environment sensing example
5. Digital to analog conversion, types of actuators, and stepper motor example
6. Final project development and testing (2 weeks)

Grading: points will be given for in-class activities and homework. There will be five homework assignments that will involve constructing and demonstrating simple applications. A final project chosen by the student will be demonstrated at the end of class. The final grade will be based on attendance: 10%; homework: 50%; final project: 40%.

Disability Resource Center: USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, 435-797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.