This “mini-course” will be an attempt to familiarize our ET students with the Arduino Uno R3 microcontroller development board and provide some hands on training to these students using available components.

The proposed plan is to meet once per week on Thursday evenings at 9:00 PM. The lecture will last no more than one hour, and the “mini-course” will run for eight weeks from September 8 2016 through October 27 2016.

Students are not required to purchase anything, but I would encourage them to have an Arduino Uno R3 and the necessary USB cable to connect to their laptop. I will give practice assignments after each meeting to be reviewed the following week. For those students that attend all sessions and participate, I am willing to give extra credit in my courses to which they are enrolled.

Proposed Topics to cover:

1. Arduino Uno R3 Hardware
   1. Digital I/O
   2. Analog I/O
   3. Power
   4. I2C
   5. On Board LED indicators
2. Arduino Software
   1. Integrated Development Environment (IDE)
   2. Programming / “Sketches”
   3. Pre-packaged libraries
   4. External libraries
3. Hardware Interfacing: Serial communications with USB and RS-232
4. Hardware Interfacing: Reading sensor on an analog input (i.e. – LM35/35)
5. Hardware Interfacing: Reading sensor on a digital input (i.e. – DS18B20)
6. Hardware Interfacing: Pulse Width Modulation (PWM) for motor control
7. Hardware Interfacing: Digital output (i.e. – controlling LED’s as 4-bit binary counter)
8. Hardware Interfacing: I2C with Sparkfun FM receiver board
9. Hardware Interfacing: SPI bus interfacing using a 2 X 16 LCD
10. Interrupt Service Routines (ISR) using a pushbutton
11. Designing a stand-alone microcontroller board
    1. Parts required
    2. Layout
    3. Soldering