**EGR 425 Spring 2018  
Lab #5**  
**Due Fri Feb. 23, 2018 11:59PM**

* In this lab, the goal is to use ADC to display temperature and light readings. You will use the same setup as the previous lab and reuse the same Makefile, header file, and source file.

1. For hardware setup, refer to lecture #5, slide #38.
2. Use ADC to read the sensor readings and display it on LCD.
   1. Implement **void initADC()** to initialize ADC
   2. Implement **uint16\_t readTemperature()** to read temperature value
      1. The ADC value must be converted to Celsius using the formula described in lecture #5.
   3. Implement **uint16\_t readLight()** to read value from light dependent resistor
   4. In your main function, continuously read temperature and light. Then display the values to LCD.

**Important note on converting float to string:**

Once you calculate the Celsius value, you need to display it to LCD. Your LCD function can only print out a string. So the temperature float value needs to be converted to a string. In C, there is a function called **sprintf()** that will format a data to string.

Here is an example use:

**char str[10];**

**sprintf (str, "Value = %.2f", variableWithFloatValue);**

//%f means it’s a floating point value, and %.2f means fixed size of 2 decimal places

//after executing the sprtinf(), **str** has **“Value = 20.12”** as a string.

If you use the above 2 lines to convert a float to a string and output to LCD, it will display a question mark (?). This is because **by default the floating point conversion functionality for sprintf is not enabled** to save memory. There are 2 ways to solve this problem.

1. Write code to convert a float into 2 integers. 1 integer value for the whole numbers (before decimal point). 1 integer value for the numbers after decimal point. Then use sprintf() to format it into a string value.
   1. sprintf (str, "TEMP = %d.%d", int1, int2);
      1. %d means it’s an integer value
      2. sprintf() is enabled for integers by default. (just not enabled for floats)
2. Use linker options to force enable the floating point conversion functionality for sprintf().
   1. You may choose to go this route, but you need to find the options for yourself and add the options to the Makefile.

**Lab5 Deliverables**

1. Upload lab5.c