**ENGR 4020 Lab 5 [25 pts]**

**Hall Effect Encoders**

**Demonstrate by 3/2/2020**

**Submit by 3/3/2020**

**Tasks**

The motors in your robot kit come with simple Hall effect encoders. You are provided the very simple datasheets, along with an extra motor set and encoders. Your goal is to get a reliable encoder signal from this system.

The encoders provide 8 state changes per wheel revolution if connected to the output shaft, and 948 state changes/revolution if connected to the motor shaft.

Use the encoder connected to the motor shaft and demonstrate that quadrature waves are received on the oscilloscope. A screenshot of the oscilloscope demonstrating this is required in your lab notebook.

The second objective is to write code for the mbed which will read the outputs of the Hall Effect encoder two reflective photosensors to two digital ports and display the encoder count and absolute rotation to the serial terminal. The monitor should count up if the wheel is spun in the clockwise direction and count down if the wheel is spun counter clockwise. The program should be able to handle and display both positive and negative numbers.

**Requirements**

1. Document this lab exercise in your lab notebook, including any circuits and code generated. You must also include the screenshot of the oscilloscope with quadrature waves displayed.
2. Demonstrate functionality of the encoder to the instructor by the due date.
3. Submit your code as .cpp files on Canvas.