

WSC055 Position Sensing Using a Microcontroller

Module Code and Title:	WSC055 - Digital Interfacing and Instrumentation
Coursework Title:	Position sensing using a microcontroller
Weighting of Module:	30%
Deadline:	Semester 1, Monday, Week 14 (21/1/2019 23:55)
Group or Individual:	Individual
Hand in Method:	Online submission via LEARN

Assignment Particulars

The design task for this assignment is to produce the code and electronic circuitry required to read position information and display the output using a bank of 8 LEDs. The coursework will be broken down into stages, with each section addressed in supervised laboratory sessions. These laboratories will make use of the STM32 F3 Discovery board, including the onboard & in-chip peripherals.

This assignment will be assessed from completing the portfolio with code excerpts and diagrams you produce as part of laboratory work. Your code should be clearly written, suitable annotated and sensibly labelled. Circuit diagrams may be hand drawn but must be neat and clearly labelled. The tasks will include the following steps:

- Digital outputs via GPIO interfacing – enabling a GPIO port to control the state of 8 LEDs
- Analogue inputs – enabling analogue voltages to be input to the microcontroller
- Scaling – introduction of electronic circuits to enable full use of digital range
- Timer-based interrupts – use the on-board timers to control the sample rate

The assignment must be an individual submission. Group work is encouraged for problem solving but the work submitted must be your own. The word document template for portfolio can be found on the learn server

Learning Objectives

By the end of this coursework, you will be able to:

- Develop and deploy C-code required to interface with basic external analogue sensors using a microcontroller
- Design an interface to a required level of resolution and sample rate
- Design fundamental analogue circuitry for conditioning signals

Feedback Information

Feedback information will be available on your submission, along with the associated marks, on the learn server within 3 weeks following your submission.

Marks Available:

The following table shows the marks available for each section of the coursework

Section 1: Digital Outputs vis GPIO Interfacing	10 Marks
Section 2: Analogue Inputs	14 Marks
Section 3: Timer-based interrupts	12 Marks
Section 4: Sample Rate	6 Marks
Total:	42 Marks

If you have any questions or problems, please email Peter Hubbard (p.d.hubbard3@lboro.ac.uk).