

## **ENGINEERING 9211**

### **EXPERIMENTAL METHODS**

#### **GOAL**

The goal of Experimental Methods is to give students practical skills that would allow them to design and construct better experiments.

#### **METHOD OF EVALUATION**

Homework and labs are worth 15%. There will be at least one lab per week. An experimental project is worth 25%. Quiz #1 (mid semester) is worth 30%. Quiz #2 (late semester) is worth 30%. Each quiz will be on a Saturday and start at 10am in 2056.

#### **EXPERIMENTAL PROJECT**

You must design, construct and test a simple control system. The goal is to give you some experience putting a system together. The project is worth 25% overall. A proposal worth 5% is due 19 September. A progress report worth 6% is due 17 October. Demos worth 7% will take place the week starting 28 November. A final report worth 7% is due 5 December. The project would make use of a breadboard controller constructed in the lab.

## **MAJOR TOPICS**

**ELECTRONICS [2]:** This module would cover hardware and software used for data acquisition and control. It would focus on PICs and NI DAQs.

**CONTROL CONCEPTS [2]:** Control can be an important part of any experiment. This module would review basic feedback control concepts.

**SENSORS [2]:** This module would start with an overview of basic sensor mechanisms. It would then focus on strain gage sensors. It would discuss sensor errors and problems such as aliasing.

**DATA PROCESSING [2]:** This module would focus on data processing techniques such as filtering and spectral analysis. It would also give an introduction to system parameter identification.

**CASE STUDIES [4]:** This module would present several case studies of experimental setup development.