

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.