ME 120 Experimental Methods   Fall 2006

ME 120 Term Project – Open Ended Measurement Challenge

Overview

This semester you get to work on a measurement challenge of your own design using what you have learned in the class. The goal of the project is to carry out an engineering experiment from conception, through definition, choice of instrumentation, data collection, data analysis, and documentation.

Suggestions for Topic Selection

You have freedom to choose what you would like to work on. Keep in mind that you will have approximately two laboratory periods in which to carry out the experiment, so you will want to keep it relatively simple. If nothing comes to mind, you can choose an experiment from the list below. In either case, you must get ***prior*** approval from your instructor before you start on the project.

Experiments

1. Measure g, the acceleration due to gravity.
2. Investigate the electrical and mechanical "bounce" behavior of mechanical switches.
3. Build and calibrate an LVDT using an Analog Devices single-chip solution (see http://www.mikesflightdeck.com/lvdts.htm for a simple LVDT design).
4. Measure the viscosity as a function of temperature of olive oil, water, and shampoo and whether these liquids are Newtonian or not.
5. Measure the strain in the cantilever beam used in the beam experiment.
6. Measure the discharge rate and life of a AA battery.
7. Measure the floor-to-ceiling temperature gradient in E133 over a 24 hr. period.
8. Calibrate the load sensor from Assignment 3 or one loaned by your instructor, and compare to the information given on the datasheet.
9. Measure the sound pressure level of several disk drives and analyze the frequency content of their operating noise.
10. Measure the thermal time constant of several sizes of thermocouples.
11. Design an experiment for ME 120
12. Explore the use of some data acquisition hardware made by Interface Amita

(See Prof. Furman for other ideas)

Deliverables and Schedule

Deliverable	Date
Select a partner and sign up with instructor. Turn in Team Information Sheet.	by October 4, 2006
Choose measurement challenge. Turn in Term Project Proposal.	by October 11, 2006
Submit detailed outline of experiment plan. Plan must contain: • clear statement of objectives • detailed description of experimental apparatus and procedure • detailed description of how data will be presented in the report (e.g., "a graph of temperature vs. height of thermocouple, etc.)	by October 25, 2006
Carry out experiment plan	by November 22, 2006
Present results (oral presentation in your lab section), and submit report	by December 6, 2006

Additional Notes

If possible, I would like you to use LabView to acquire and analyze the data from your experiment. I have several USB-based data acquisition devices for groups to borrow, if it will be too difficult to perform the experiment in the ME 120 lab using the data acquisition hardware that it contains.