On March 7 and 8 the ENGR-325 lab will be one that you design. The expectation that you will do some sort of measurement as part of the lab. Likely the measurement will involve using a sensor and electronic measurement equipment (I'm not ruling out an all mechanical measurement, but it must be more than just using calipers or similar). If you have an idea related to your senior project or a personal interest, that is good. If no ideas come to mind, I list some possibilities below.

For Monday, Feb. 22, ENGR-325 homework # 6 is to:

1)   Pick a lab 9 topic
2)   Convince another person to join you.
3)   Work up a draft description of the lab:
      a)   A statement of what you will be attempting to measure.
      b)   Goals such as how "good" the measurement needs to be.
      c)   Identification of variables and parameters that must be considered, i.e a first draft
             of what needs to be done correctly to get good results.
      d)   Resources required, i.e. materials and instrumentation.

Lab Project Ideas

1)   Determination of material modulus of elasticity from vibration analysis
        A 1/4" thick, 1" wide cantilever has 4 strain gauges mounted on it. Excite the bar,
        digitize the waveform created by the electrical output of the strain gauges, and process the
        data to find young modules.

2)   Thermistor based flow meter
        Flow can be determined with two thermistor temperature sensors. A thermistor is a
        resistor that is very sensitive to temperature, i.e. its resistance is highly temperature
        dependant. For flow detection, pass a current through the thermistor & note the change of
        resistance as the flow (and hence heat transfer from thermistor to fluid) changes. The
        second thermistor is used to measure the ambient temperature of the fluid.

3)   Vibration analysis of a defective bearing
                monitor vibration with microphone, amplify, digitize with A/D, fft to find
                frequencies.

4)   Calibrate an LVDT transducer.

5)   Loudspeaker characterization
                Frequency response on axis
                Frequency response vs angle off-axis
6)   Calibrate a MTS-103 solid state (transistor) type temperature sensor using a thermistor as
        a reference, along with boiling pt and freezing point references.