1. ME 4031W, Basic Mechanical Measurements Laboratory

2. 4 credits, 4 contact hours

3. Instructors: P. Bruggeman, W. Durfee, C. Hogan, V. Srinivasan


5. Specific course information:
   b. Prerequisites: IE 3521, ME 3331, upper division ME student.
   c. Required course.

6. Course outcomes (related ABET student outcomes indicated in square brackets):
   a. An ability to apply the principles of uncertainty to data analysis from instrument measurement of a variety of properties. [1,6]
   b. An ability to analyze the response of instruments that are first order systems. [1,6]
   c. An ability to operate instruments and measurement systems to measure properties such as temperature, viscosity, pressure, flow and strain. [1,6]
   d. An ability to apply the principles of digital sampling and signal conditioning to measurement instruments. [1,6]
   e. An ability to write reports describing experimental setups, data collection, data analysis and data presentation. [3,4,6,7]
   f. An ability to work in groups and present results to a group. [3,5]
   g. An ability to use software and hardware for automated data acquisition. [6,7]
   h. An ability to design measurements for engineering systems. [1,2,3,4,6,7]

7. Course topics:
   a. Measurement fundamentals topics such as:
      i. Data analysis
      ii. Written and oral presentation
      iii. Uncertainty analysis
      iv. Calibration
      v. Regression and curve fitting
      vi. Sensors and transducers
      vii. Dynamic response of first order systems
      viii. Digital sampling
      ix. Signal conditioning/filtering
      x. Automated data acquisition
      xi. Feedback control
   b. Measurement of engineering properties such as: temperature, pressure, strain, force, acceleration, emissivity and fluid velocity.