

**Learning Goals****Topics**

1. Measurement Fundamentals and Error Analysis
  - understanding of measurement principles including accuracy and precision
  - ability to assess and manage experimental error in engineering calculations
  - knowledge of measurement techniques for common variables, such as pressure, flow and temperature
2. Characterization of Experimental Data
  - knowledge of probability concepts that relate to experimental measurements
  - ability to describe measurements using common distributions
  - ability to represent distributions using standard graphical and computing techniques
3. Statistical Methods
  - understanding of the relationship of sample statistics to background distributions
  - ability to compute sample statistics and confidence intervals
  - ability to apply hypothesis tests common to engineering analyses
4. Model Building
  - understanding of the concepts of regression analysis, including correlation and analysis of residuals
  - ability to compute linear, including multilinear and curvilinear, and nonlinear regression
  - ability to express confidence intervals on model parameters
  - ability to assess goodness of fit and discriminate amongst competing models
5. Design of Experiments
  - understanding of factorial design of experiments and response surface methods
  - ability to plan an efficient experimental campaign based on factorial design
  - understanding of the principles of analysis of variance as they apply to factorial design
  - ability to process and interpret the results of factorial experiments
  - ability to develop response surface models from the results of factorial experiments and use these models for prediction and evaluation

**Catalog Description**

Students learn to analyze and interpret data. Topics include typical engineering measurements, graphical presentation and numerical treatment of data, statistical inference, regression analysis, and design of experiments. Prerequisites are GEEN 1300 and APPM 2360.