1. **Course number and name**
   ENGR 300: Engineering Experimentation

2. **Credits and contact hours**
   3 units. Two 1-hr lectures and one 2-hr, 45-min lab session per week.

3. **Instructor’s or course coordinator’s name**
   Instructor: Mutlu Ozer, Instructor (lecture); Mutlu Ozer, Instructor and Dipendra Sinha, Professor (lab)
   Course coordinator: Ed Cheng, Associate Professor

4. **Text book, title, author, and year**
   
   a. **other supplemental materials**
      ENGR 300 Laboratory Manual.

5. **Specific course information**
   a. **brief description of the content of the course (catalog description)**

   b. **prerequisites or co-requisites**
      ENGR 201 or 206, ENGR 205, ENG 214 with grade of C- or better.

   c. **indicate whether a required, elective, or selected elective course in the program**
      Required for Civil Engineering; required for Electrical Engineering; required for Mechanical Engineering.

6. **Specific goals for the course**
   a. **specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.**
      - Ability to plan an experiment, identifying the primary variables of interest.
      - Ability to make sound engineering assumptions.
      - Ability to select appropriate instrumentation for measurements.
      - Acquisition of “hands-on” skills in using instrumentation.
      - Understanding of good laboratory practices.
      - Ability to work on teams.
      - Ability to set up and troubleshoot experiments.
      - Knowledge of data acquisition systems and components.
      - Ability to understand and specify/select data acquisition components.
      - Ability to specify signal conditioning specifications.
      - Knowledge of instrumentation characteristics.
• Knowledge of theory and operation of devices for measuring solid-mechanical quantities.
• Knowledge of theory and operation of devices for measuring pressure, temperature, and humidity.
• Knowledge of theory and operation of devices for measuring fluid flow rate, fluid velocity, and fluid level.
• Ability to compute descriptive statistics for experimental data.
• Ability to understand probability concepts and read statistical distribution tables. Ability to quantify the uncertainty of experimental data.
• Ability to carry out linear regression and understand measurements of correlation for paired data sets.
• Ability to write simple technical memo/letter.
• Ability to write a formal engineering report.
• Ability to make an oral presentation using visual aids.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
Course addresses ABET Student Outcome(s): a, b, c, d, e, g, k.

7. Brief list of topics to be covered
• Introduction and General Characteristics of Measurement Systems
• Measurement Systems with Electric Signals
• Computerized Data-Acquisition Systems
• Discrete Sampling and Analysis of Time-Varying Signals
• Statistical Analysis of Experimental Data
• Experimental Uncertainty Analysis
• Measurement of Solid-Mechanical Quantities
• Measuring Pressure, Temperature, and Humidity
• Measuring Fluid Flow Rate, Fluid Velocity, Fluid Level and Combustion Pollutants
• Dynamic Behavior of Measurement Systems
• Guidelines for Planning and Documenting Experiments