1. **Course number and name**  
   **ENGR 446: Control Systems Laboratory**

2. **Credits and contact hours**  
   1 credit hour; one three-hour session/week

3. **Instructor's or course coordinator's name**  
   Instructor: M. Azadi, Assistant Professor of Mechanical Engineering  
   Course coordinator: M. Azadi, Assistant Professor of Mechanical Engineering

4. **Text book, title, author, and year**  
   None required

   a. **other supplemental materials**  
      Mathworks.com resources for students.

5. **Specific course information**  
   a. **brief description of the content of the course (catalog description)**  
      Simulation and modeling of control systems using Matlab and Simulink.

   b. **prerequisites or co-requisites**  
      ENGR 447: Control Systems (may be taken concurrently).

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

6. **Specific goals for the course**

   a. **specific outcomes of instruction**

   - Students will be familiar with the basic concepts of system simulation  
   - Students will be reasonably well versed in the use of Simulink  
   - Students will be able to simulate systems from verbal system descriptions  
   - Students will be introduced to simulation techniques for hybrid systems  
   - Students will be familiar with basic procedures associated with interfacing real-life systems with computer-based controllers.  
   - Students will be able to write short technical memos to report the results of their simulations  
   - Students will use the Mathworks Control Systems Toolbox for implementing the various controller design techniques.
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, e, g, i, k.

7. Brief list of topics to be covered

   - Review of basic systems concepts
   - Effect of system parameters on system response
   - Use of Simulink in simulation of continuous systems
   - Simulink tools
   - Using of simulation in evaluating controller design
   - Basic introduction to the use of microcontrollers in control systems