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