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*
   Dabney and Harman, *"Mastering Simulink"* Prentice Hall, 2004.
   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