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: V.V.Krishnan, Instructor  
   Course coordinator: V.V. Krishnan, Professor of Mechanical Engineering

4. **Text book, title, author, and year**  
   None required
   
   a. **other supplemental materials**  
      J.B.Daubney and T.L.Harman: Mastering SIMULINK, Prentice-Hall, 2004

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. Control  
      experiments using servomotors and industrial emulators. Control Project
   
   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.
• 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
• StateFlow approach to simulating hybrid systems
• Using of simulation in evaluating controller design
• Use of dSpace in control of physical systems
• Basic introduction to the use of microcontrollers in control systems