

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