

Department of Electrical and Computer Engineering
520.353 Control Systems
Fall 2009

2009-2011 Catalog: Modeling, analysis, and an introduction to design for linear feedback control systems. Topics include state-space and transfer function representations; stability and performance measures; system analysis using root locus and frequency response methods (Nyquist, Bode); fundamental limitations of LTI feedback; introduction to state-space methods (3 credit hours/Elective)

Prerequisite(s): 520.214 Signals and Systems
110.201 Linear Algebra or 550.291 Linear Algebra and Differential Equations

Textbook: G.F. Franklin, J.D. Powell, and A. Emami-Naemi, Feedback Control of Dynamic Systems, Fifth Edition, Prentice Hall, 2006.

Course Objectives: To develop basic techniques for representation and analysis of linear time-invariant feedback systems, emphasizing the single-input single-output case.

Topics Covered:

1. Models of dynamical systems (time and frequency domains)
2. Response properties of SISO LTI systems
3. Performance and stability
4. Classical analysis tools (Root locus, Bode, Nyquist)
5. Fundamental limitations of LTI feedback
6. State-space representations, system response
7. Introduction to state-space methods (reachability, observability)

Class Schedule: Three – one hour classes/week

Contribution of Course to Meeting the Professional Component (credit hours):

Engineering Science	Engineering Science and Design
3	

Relationship of Course to Program Educational Outcomes (✓ those that apply):

x	Apply mathematics, probability and statistics, basic science, and computer science
	Design and conduct experiments, analyze and interpret data
x	Identify, formulate and solve electrical engineering problems
x	Use technical skills and modern engineering tools to design to meet needs
	Communicate effectively and work on multidisciplinary teams
	Contemporary issues, ethical responsibilities, environmental, health, safety issues
	Engage in life-long learning

Updated April 1, 2009 by: Danielle Tarraf