

ECE 3710 - Linear Systems Required Course

2006-2007 Catalog Data:

Systems and their models, state variable formulation. Stability and performance of feedback systems and their analysis in the s-plane. root locus methods. Analysis and synthesis of sampled-data linear feedback control systems.

Credit: 3 hours

Prerequisite: ECE 3100

Textbook(s) and Required Material:

Modern Control Systems by Richard C. Dorf and Robert H. Bishop, 10th edition, 2005

Mat Lab, Version 6.0, Release 14, Student Edition

Course Coordinator: Dr. Ralph Tanner

Instructor (Fall 2006): Dr. Dean R. Johnson

Prerequisites by Topic:

1. Transient and steady state analysis of linear circuits;
2. Transfer functions;
3. Laplace techniques.

Course Objectives: (ABET Learning Outcomes)

ABET learning outcome assigned to this course by ECE Assessment Plan: c and e

This course develops (objectives include listing of relevant ECE Department undergraduate learning outcomes)

1. an ability to analyze, design, simulate, and experimentally validate linear control systems while taking into account practical limitations of operations (c, e);
2. an ability to utilize circuit simulation and/or mathematical software tools for control system design and analysis; (a, c, e and k)
3. an understanding of negative and positive feedback systems and their application to circuit analysis and design (c);
4. an understanding of digital control (c);

Topics:

1. Introduction to Control Systems
2. Modeling of Physical Systems
3. Block Diagram Models
4. 2nd-Order Control Systems
5. Higher-Order Control Systems
6. Root Locus
7. Stability of Control Systems
8. MatLAB and Root locus
9. Adding a Controller
10. Digital Control Systems
11. State Variable Representation

Course/Laboratory Schedule: 3 hours lecture

Evaluation:

1. Examinations 80%

2. Homework & Quizzes 20%

Computer Usage:

Students use control system simulation software in homework.

Contribution to Professional Component:

ABET professional component content as estimated by faculty member who prepared this course description:

Engineering Design:	1 credit or 33.3%
Engineering Science	2 credits or 66.7%

Relation of Course to Learning Outcomes:

This course provides significant support for:

EE and CE program objectives Depth and Breath
ECE expected learning outcomes c and e

Person who prepared this description and date of preparation:

Prepared by: Dean R. Johnson

Date: May 24, 2007