ECE 451/ME 430 - SYSTEMS DYNAMICS AND CONTROL (4 credits)

Catalog description: Modeling and analysis of linear continuous systems in time and frequency domains. Fundamentals of single-input-single output control system design. PREREQ: ECE 351 and ECE 352 and (ENGR 212 or ENGR 212H); or ME 317

Credits: 4 Terms Offered: Fall, Winter

Prerequisites: ECE 351 and ECE 352 and (ENGR 212 or ENGR 212H); or ME 317

Structure: Lecture only (two 110-minute lectures per week)

Instructor: Dr. Kagan Tumer, 426 Rogers Hall, kagan.tumer@oregonstate.edu

Course Learning Objectives: Students must demonstrate the ability to:
1. Construct a mathematical model of a dynamic system that includes a control system (ECE ABET Outcomes a, e)
2. Simplify mathematical models to linear, time-invariant systems through linearization and/or block diagram reduction (ECE ABET Outcomes a, e)
3. Use time domain performance criteria to design single-input, single-output control systems that achieve specified time response, accuracy and stability requirements (ECE ABET Outcome a, c, e)
4. Construct and use frequency response tools to design single-input, single-output control systems that achieve specified time response and stability requirements. (ECE ABET Outcome a, c, e)
5. Use Matlab to design, simulate, and analyze the response of controlled dynamic systems (ECE ABET Outcome k)

Homework Topics:
HW 1: Laplace Transforms
HW 2: Transfer Functions
HW 3: Block Diagrams and State Space Representation
HW 4: Time Response of 1st and 2nd Order Systems
HW 5: 2nd Order Systems and Stability (+Matlab)
HW 6: Basic Control (+Matlab)
HW 7: Root Locus Technique
HW 8: Bode Plots (+Matlab)

Learning Resources:
Evaluation of Student Performance
Select Homework: 10%
Quizzes 20%
Midterm Exam: 30%
Final: 40%

Academic Dishonesty: You are permitted, and to a great extent encouraged, to work with others on homework sets. However, there is an obvious difference between constructive discussion of a particular problem and copying. Acts of academic dishonesty will not be tolerated and will be handled according to university policy. (See http://oregonstate.edu/admin/stucon/achon.htm for details.)

Students with Disabilities:
Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Effective Term: Fall 2011