ME 421 Automatic Control

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Time: 8:30-9:45 MW, Room Number: SEB 1242
Grading: 1 Midterm (25 %) 5 Quizzes (30%) Computational Project (5%) Homework (5%) Final (35%)
Note that no make-up quiz or exam will be given without prior arrangement
All HW assignment will be posted on Webcampus with a due date.
Office Hour: M through TH 10:00-12:00 AM

Course Description (2008-2010 Catalog):

Introduction to feedback system concepts; mathematical modeling of mechanical, hydraulic, electromechanical and servo systems; feedback system characteristics and performance; stability; design and compensation of control systems.

Prerequisite Course: EE 292, ME 330
Prerequisite by Topic:

- Electrical Circuits
- Analysis of Dynamic Systems

Textbook:

Feedback Control of Dynamic Systems, 6th ed., G. Franklin and et. al., Prentice-Hall

Course learning outcomes:

1. Develop an understanding of the fundamental principles governing the feedback control of dynamic systems.
2. Develop the ability to design feedback control systems to specified performance objectives, and predict the behavior of these systems using mathematical models.
3. Practice numerical and symbolic analysis of feedback system dynamics using state of the art software tools.

UNLV Policy

Academic Misconduct – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: http://studentconduct.unlv.edu/misconduct/policy.html.

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Any other class specific policies (e.g., absences, make-up exams, extra credit policies, plagiarism/cheating consequences, policy on pagers/mobile phones, specialized department or college tutoring programs, bringing children to class, policy on recording classroom lectures, etc.)

Date	Topic	Chapter
8/27(M)	Introduction	chap 1
8/29(W)	Dynamic Model Review	chap2
9/3(M)	**Labor Day Recess**	
9/5(W)	Dynamic Model Review	chap2
9/10(M)	Dynamic Responses-Laplace & Transfer Function	chap 3
9/12(W)	Block diagram / Transient & SS Responses	chap 3
9/17(M)	Pole-zeros in transient response/Stability (Routh's criterion)	chap 3
9/19(W)	**Quiz 1 for Chapter 2 and 3 and solution session**	chap 3
9/24(M)	Feedback System and System Types	chap 4
9/26(W)	Basic Control Laws	chap 4
10/1 (M)	Error analysis	chap 4
10/3(W)	**Quiz 2 for Chapter 4 and solution session**	
10/8(M)	Root-Locus & Feedback System	chap 5
10/10(W)	Root-Locus guidelines & Matlab Solution	chap 5
10/15(M)	Compensation schemes	chap 5
10/17(W)	Design examples with Matlab	chap 5

--- (**Mid Semester)** ---

Date	Topic	Chapter
10/22 (M)	**Quiz 3 for Chap 5 and solution session**	
10/24 (W)	**Midterm Exam (Chap 1 through 5)**	
10/29(M)	Frequency Response of Dynamic System	chap 6
10/31(W)	Controller Design by Frequency Response	chap 6
11/5(M)	Bode plots	
11/7(W)	Nyquist stability analysis	chap 6
11/12(M)	**Veteran's Day Recess**	
11/14(W)	Closed-loop frequency response	chap 6
11/19(M)	Compensation schemes	chap 6
11/21(W)	**Quiz 4 for Chap 6 and solution session**	
	(Thanksgiving Recess)	
11/26(M)	State Space Design 1	chap 7
11/28(W)	State Space Design 2	chap 7
12/3(M)	**Quiz 5 for Chap 7 and solution session**	
12/5(W)	Review	

Dec. 12 (Wednesday) 8:00-10:00 A.M. Final Exam covers all course material