

# EE 3316 Linear Systems Theory

University of Colorado Denver  
College of Engineering and Applied Science

Term: Spring 2009

Course dates/days/times: M W - 4:00PM to 05:15PM

Course location: NC 1515

Office Hours: M- 2:00-3:30PM

Professor: Jan T. Bialasiewicz

Office location: NC 2426

Phone: 303-556-4333

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## Course Design

*Catalog Description:* E E 3316-3. Linear Systems Theory. Introduces the fundamentals of signals and systems analysis. Topics include: time domain analysis of continuous and discrete time systems, frequency domain (Laplace and z-transform) analysis, applications to filters and feedback systems, Fourier transform for both continuous and discrete time signals, sampling and signal reconstruction, applications to communication systems and state space representation. Learning experience is enhanced by using MATLAB-based examples and experiments.

Prereq: E E 2142.

## Requirements

*Required Text:* B.P. Lathi, Linear Systems and Signals, Berkeley-Cambridge Press

*Assignments and Examinations:*

- 10 Homeworks (scheduled below) – each homework is due one week after it is assigned. No late homeworks will be accepted unless previously agreed.
- Exam I and Exam II (scheduled below in the course outline) – will be given only once on the scheduled day – no exceptions.
- Final Exam – comprehensive, time- 2hours. Scheduled by AHEC administration during the final week.

## Assessment Design:

### Grades:

Homeworks:	10% (1% each)
Exam I:	30%
Exam II:	30%
<u>Final Exam:</u>	<u>30%</u>
Total:	100%

Course Policies: No late work and no make-ups. Extensions only for valid reasons and only if agreed before the work is due. No electronic submissions of homeworks.

## Course Schedule

### Class Schedule

Date	Topic	Required Reading	Assignments
Aug 17	<b>Introduction to signals and systems:</b> system representation and classification, input-output description.	Ch. 1	Homework #1
Aug 19, 24, 26, 31 Sep 2, 9	<b>Time-domain analysis: continuous-time systems:</b> system model and response to non-zero initial conditions, unit impulse function and response, system response to external input: convolution, system stability, system behavior and its characteristic modes.	Ch.2	Homework #2 Homework #3
Sep 14, 16, 21, 23,28	<b>Continuous-time systems: Laplace transform analysis:</b> a review of Laplace transform and some of its properties, transfer function, block diagrams, system realization, system response to sinusoidal inputs.	Ch.4	Homework #4 Homework #5
Sep 30 Oct 5, 7	<b>Time-domain analysis: discrete-time systems:</b> system model and response to non-zero initial conditions, unit impulse response, system response to external input: convolution, system stability.	Ch.3	Homework #6
Oct 12	<b>TEST I</b>	Ch. 1, Ch.2, Ch.4	
Oct 14, 19, 21, 26	<b>Discrete-time systems: z-transform analysis:</b> z-transform, some of its properties and application to linear difference equations, transfer function, system realization, frequency response	Ch. 5	Homework #7 Homework #8
Oct 28 Nov 2	<b>Continuous-time signal analysis: the Fourier series:</b> representation of periodic signals by trigonometric Fourier series and exponential Fourier series	Ch. 6	Homework #9
Nov 4	<b>TEST II</b>	Ch. 3 & Ch.5	
Nov 9, 11, 16	<b>Continuous-time signal analysis: the Fourier transform:</b> nonperiodic signal representation, Fourier transform, some of its properties and its use to signal representation and system analysis, signal distortion and filters, signal energy.	Ch.7,	Homework #10
Nov 18, 30	<b>Sampling:</b> sampling theorem and some of its applications.	Ch8	
Dec 2	<b>Final Review</b>		
Finals week	<b>FINAL EXAM:</b> comprehensive		

## **Course Communication**

- Office hours: M, W 2:00-3:30 PM, contact the instructor by e-mail to schedule a meeting at different time.
- E-mail: [jan.bialasiewicz@ucdenver.edu](mailto:jan.bialasiewicz@ucdenver.edu)

## **Students called for military duty**

- If you are a student in the military with the potential of being called to military service and /or training during the course of the semester, you are encouraged to contact Paul Rakowski.