EE313 Linear Systems and Signals (Fall 2010)

Instructor:	Prof. Brian L. Evans
Lecture Hours:	TTH 11:00am–12:30pm, ENS 127
Office Hours:	W 12:30pm–2:00pm, F 9:30–11:00 am, and immediately after lecture
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This course will build a mathematical foundation for analyzing linear signal processing, communication, and control systems.

Prerequisites

(1) EE 411 Circuit Theory, EE 331 Electrical Circuits, or BME 311 Network Analysis in Biomedical Engineering with a grade of at least C-. (2) M 427K Advanced Calculus for Applications I with a grade of at least C-. (3) Credit with a grade of at least C- or registration for M 340L Matrices and Matrix Computation. Hence, M 408C, M 408D, PHY 303L, and PHY 103N, with a grade of at least C- in each, are also pre-requisites.

Topical Outline

Representation of signals and systems; system properties; sampling; Laplace and z-transforms; transfer functions and frequency response; convolution; stability; Fourier transform; feedback; and control applications. Computer analysis using MATLAB.

Required Text

M. J. Roberts, *Signals and Systems: Analysis of Signals Through Linear Systems*, McGraw-Hill, ISBN 978-0072930443, June 2003.

Optional Textbooks

1. B. P. Lathi, *Linear Systems and Signals*, Oxford Univ. Press, 2nd ed., ISBN 019515833-4, July 2004.
2. James H. McClellan, Ronald W. Schafer, and Mark A. Yoder, *DSP First: A Multimedia Approach*, Prentice-Hall, ISBN 0-13-243171-8, 1998. On-line Multimedia CD ROM. *In lecture, several demonstrations will be run from the CD ROM. CD ROM is available online.*

Grading

20% Homework, 20% Midterm #1, 20% Midterm #2, 40% Final Exam. Midterm #1 (Thursday, Oct. 7th) and midterm #2 (Thursday, Nov. 18th) will be held during lecture. The Q drop deadline is Wednesday, Oct. 20th. Final exam will be on Dec. 10th, 2:00pm–5:00pm. Lecture helps connect the pieces of the class together. Attendance in lecture is highly correlated to your final grade and helpful in landing industry positions. Moreover, it allows you to get the most for your tuition dollar. Plus and minus grades will be assigned for the final letter grades. *Discussion of homework questions is encouraged. Please be absolutely sure to submit your own independent homework solutions. Late assignments will not be accepted.*

University Honor Code

"The core values of The University of Texas at Austin are learning, discovery, freedom, leadership, individual opportunity, and responsibility. Each member of the University is expected to uphold these values through integrity, honesty, fairness, and respect toward peers and community."

Official Correspondence

The University of Texas recognizes e-mail as an official mode of university correspondence. You are responsible for reading your e-mail for university and course-related information and announcements. You are also responsible to keep the university informed about changes to your e-mail address: http://www.utexas.edu/its/policies/emailnotify.php

Religious Holidays

By university policy, you must notify me of a pending absence at least fourteen (14) days prior to the date of observance of a religious holy day, or on the first class day if the observance takes place during the first fourteen days of the semester. If you must miss class, examination, or homework assignment in order to observe a religious holiday, you will be given an opportunity to complete the missed work within a reasonable amount of time after the absence.

College of Engineering Drop/Add Policy

The Dean must approve adding or dropping courses after the fourth class day of the semester.

Students with Disabilities

UT provides upon request appropriate academic accommodations for qualified students with disabilities. Please contact Office of Dean of Students at 471-6259 or ssd@uts.cc.utexas.edu.

Lecture Topics

Signals
Systems
Continuous-Time Convolution
Differential Equations
Discrete-Time Signals and Systems
Discrete-Time Convolution
Stability
Difference Equations
Fourier Series
Fourier Analysis
Fourier Transform Properties
Sampling Theorem
Laplace Transforms
Inverse Laplace Transforms
Transfer Functions
System Realization
Z-transform
Difference Equations
Frequency Response