EECS 150B DISCRETE-TIME SIGNALS AND SYSTEMS
(Required for CpE, CSE, and EE)

Catalog Data: **EECS 150B Discrete-Time Signals and Systems (Credit Units: 4)**
Analysis of discrete-time linear-time-invariant (DTLTI) systems in the time domain and using z-transforms. Introduction to techniques based on Discrete-Time, Discrete, and Fast Fourier Transforms. Examples of their application to digital signal processing and digital communications. Prerequisite: EECS70A/CSE70A. Same as CSE120A. EECS150B/ CSE120A and EECSH150B may not both be taken for credit. Formerly ECE120A. (Design units: 0)

Textbook: Phillips, C. L., Parr, J. M., and Riskin, E. A., *Signals, Systems and Transforms,* 4rd Edition, Prentice-Hall, 2007.

References: Oppenheim, Alan V., Schafer, Ronald W., and Buck, John R. *Discrete Time Signal Processing,* 2nd Edition, Prentice Hall, 1999.
Shenoi, B.A. *Introduction to Digital Signal Processing and Filter Design,* 1st Edition, Wiley-Interscience, 2005.

Coordinator: Glenn Healey

Relationship to Program Outcomes: This course relates to Program Outcomes
CpE: a, e, and m as stated at:
http://undergraduate.eng.uci.edu/degreeprograms/computer/mission
CSE: a as stated at
http://undergraduate.eng.uci.edu/degreeprograms/compsci/mission
EE: a and e as stated at:
http://undergraduate.eng.uci.edu/degreeprograms/electrical/mission

Course Outcome/Performance Criteria: Students will:
Analyze discrete-time linear time-invariant (DTLTI) systems using time-domain techniques. (CpE a, e, m) (CSE a) (EE a, e)
Analyze DTLTI systems using z-transforms. (CpE a, e, m) (CSE a) (EE a, e)
Analyze DT signals and systems using discrete-time Fourier transforms (DTFT), discrete Fourier transforms (DFT), and fast Fourier transform (FFT). (CpE a, e, m) (CSE a) (EE a, e)
Describe simple applications of the above techniques to digital signal processing and digital communications.(CpE a, e, m) (CSE a) (EE a, e)

Prerequisites By Topic: Knowledge of calculus through integration of trigonometric functions, as well as knowledge of differential equations.

Lecture Topics: Discrete-Time Linear Time-Invariant Systems (Time Domain) - Chapters 9 & 10 (Week 1, 2, and 3)
Discrete-Time Linear Time-Invariant Systems (Z-Domain) – Chapter 11 (Week 3, 4 and 5)
Discrete-time and Discrete Fourier Transforms and Applications – Chapter 12 (Week 6, 7, 8, and 9)

Class Schedule: Meets for 3 hours of lecture and 1 hour of discussion each week for 10 weeks.

Computer Usage: Computer usage is not required. Most of the problems have analytical solutions however for those that have numerical solutions, calculators and computers may be used.

Laboratory Projects:

Professional Component: Contributes toward the Computer Engineering, Computer Science and Engineering, and Electrical Engineering Topics Courses.

Design Content Description

Approach:

Lectures:

Laboratory Portion:

Grading Criteria:

Weekly Homework Assignments:	15%
Midterm Exam 1:	20%
Midterm Exams 2:	25%
Final exam:	40%
	100%

Letter grades are based on a curve about the median score, that is assigned a B-minus grade.

Estimated ABET Category Content:

Mathematics and Basic Science: 0 credit units or 0%
Engineering Science: 4 credit units or 100%
Engineering Design: 0 credit units or 0%

Prepared by: Glenn Healey **Date:** July 2008

CEP Approved: Fall 2005