ECE 844 - Digital Signal Processing
Spring Semester 2010
Classroom: 219 Riggs Hall
Meeting Times: T,TH 3:30 - 4:45 pm

Instructor: Dr. John N. Gowdy
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Office: 211 Riggs Hall
Office Hours: M 4:00 - 5:00; W 2:00 -3:00; F 3:00-4:00

Textbook: Discrete-Time Signal Processing (third edition) by Oppenheim and Schafer.

Grading

Quiz 1	**25%**	**(Thursday, February 18)**
Quiz 2	**25%**	**(Thursday, April 1)**
Homework	**15%**	
Final Exam	**35%**	**(Friday, April 20, 11:30 am)**

Grading Scale

A: 85-100
B: 70-85
C: 60-70
D: 50-60
F: 0-50

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Goals and Objectives

To provide students with a strong background in the theory and applications of discrete-time signal processing.

Course Topics

Chapter 2 - Discrete-Time Signals and Systems

(Read entire chapter, for review.)

Example 2.18 (p. 51) - Fourier Transform of Complex Exponential Sequences (Unit 1)

Example 2.20 - Fourier Transform of Complex Exponential Sequences

Section 2.10 - Discrete-Time Random Signals (to be covered between sections 4.8 and 4.9) (Unit 5)

Chapter 4 - Sampling of Continuous-Time Signals

Example 4.4 (p. 171) - Discrete-Time Implementation of an Ideal Continuous-Time Bandlimited Differentiator) (Unit 1)

Example - Illustration of Example 4.4 with a Sinusoidal Input (Unit 1)

Section 4.5 - Continuous-Time Processing of Discrete-Time Signals (Unit 1)

Example 4.7 - Noninteger Delay (Unit 1)

Example 4.18 - Moving Average System with Noninteger Delay

Section 4.6 - Changing the Sampling Rate Using Discrete-Time Processing (Unit 2)

Section 4.7 - Multirate Signal Processing (Unit 3)

Section 4.8 - Digital Processing of Analog Signals (Unit 4)

Section 4.9 - Oversampling and Noise Shaping in A/D and D/A Conversion (Units 6, 7, and part of Unit 8)

Section 4.10 - Chapter Summary (read)

Chapter 5 - Transform Analysis of Linear Time-Invariant Systems

Sections 5.1 - 5.3 - Review of Selected Topics (Unit 8)

Section 5.4 - Relationship Between Magnitude and Phase (Units 8 and 9)

Section 5.5 - All-Pass Systems (Unit 9)

Section 5.6 - Minimum Phase Systems (Unit 9)

Section 5.7 - Linear Systems with Generalized Linear Phase (Unit 10)

Section 5.8 - Chapter Summary (read)

Chapter 6 - Structures for Discrete-Time Systems)

Sections 6.1 - 6.2 - Review of Selected Topics (Unit 11)

Example 6.3 - Determination of the System Function from a Flow Graph (Unit 11)

Section 6.4 - Transposed Forms (Unit 11)

Section 6.5 - Basic Network Structures for FIR Systems (Unit 11)

Section 6.6 - Lattice Filters (if time permits)

Section 6.7 - Overview of Finite-Precision Numerical Effects (Unit 12)

Section 6.8 - Effects of Coefficient Quantization (Unit 12)

Section 6.9 - Effects of Round-Off Noise in Digital Filters (Units 13, 14, and 15)

Section 6.10 - Zero-Input Limit Cycles in Fixed-Point Realizations of IIR Digital Filters (Unit 15)

Section 6.11 - Chapter Summary (read)

Chapter 7 - Filter Design Techniques

Sections 7.1 - 7.6 - Review of Digital Filter Design Techniques (Unit 16)

Section 7.7 - Optimum Approximations of FIR Filters(Units 16 and 17)

Section 7.8 - Examples of FIR Equiripple Approximation (Unit 17)

Section 7.9 - 7.10 - Chapter Summary (read)

Chapter 8 - The Discrete Fourier Transform

Sections 8.1 - 8.6 - Review of Selected DFT Topics (Unit 18 and 19)

Section 8.7 - Computing Linear Convolution Using the DFT (Unit 19)

Section 8.8 - The Discrete Cosine Transform (Unit 20)

Section 8.9 - Chapter Summary (read)

Chapter 13 - Cepstral Analysis and Homomorphic Deconvolution ((Units 21 - 24)

Chapter 10 - Fourier Analysis of Signals Using the DFT (selected topics if time permits)

Chapter 12 - Discrete Hilbert Transforms (selected topics if time permits)

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Attendance Policy

Attendance of each class is highly recommended but not required.

Late Professor Policy

Student are expected to wait 15 after the published starting time of class for the arrival of the professor.

Academic Integrity Statement

This course shall adhere to Clemson's official statement on academic integrity: "As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. In instances where academic standards may have been compromised, Clemson University has a responsibility to respond appropriately and expeditiously to charges of violations of academic integrity."

Disability Access Statement

"It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation."