

**ECE-300 Signals and Systems
Spring 2008**

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Text: *Signals and Systems* by Ziemer, Tranter, and Fannin, Fourth edition, Prentice-Hall, 1998.

GRADING POLICY

(3) Exams	12% each
Final Exam*	30%
Labs	8%
Lab Practical	6%
Homework	10%
Matlab/Prelab work	5%
Quizzes	5%

Notes:

- (1) In general, you must have a passing average (greater than or equal to 60%) on the exams to pass the class. *The quizzes will count as part of this exam average.*
- (2) While each exam (except the final) will focus on material since the previous exam, you are responsible for all previous material. *Anything covered from the beginning of class up until the time of an exam is fair game for the exam.*
- (3) Homework assignments are **due at the beginning of class on Tuesday.** No late homework will be accepted without prior approval.
- (4) You must acceptably complete each lab to pass the class.
- (5) Prelabs will be part of your homework assignment. Each person is to do the prelab problems.
- (6) You are expected to do your own work. You can certainly talk with each other and help each other, but the work you hand in should be your own. As an example, if two people hand in the same Matlab and both came from the same directory, neither will receive any points!
- (7) Unless specifically told otherwise on a particular problem, you are expected to work out the problem by hand (or use Matlab).

Quizzes:

Each week we will have a quiz, usually (though not always) on Thursday. Usually before the quiz I will post a “practice quiz” to give you an idea of the kinds of problems I expect you to be able to solve on that week’s quiz.

Labs:

A portion of your course grade is derived from your work in the laboratory exercises chosen to enhance the lecture material and your learning. You must want to participate to learn this material, and you will be rewarded for your work. **PASS**

NOTHING UP -- that is the only way to truly learn. **DO NOT** let your lab partner do the work for you.

Your primary means of recording your work for the laboratory is by means of a worksheet or memo. *Most labs will be done individually while a few will be done with a lab partner.*

- 1) Each lab is worth 10 points.
- 2) Labs are due at the end of your lab period.
- 3) Your grade in the laboratory is determined by your lab work and your lab practical.
- 5) You will only be allowed to bring your lab assignments and laptop to the lab practical-- it is to your advantage to keep well maintained lab worksheets and make sure any software used or developed in lab is on your laptop.
- 6) You will be required to turn in your Matlab code at the end of most of the labs. *The code should be written specifically for the problem you are solving or you will lose points. A good idea is to copy the code you need to a new file, then remove the pieces you do not need once the code is working.*

Course Objectives

After completing this course, the student shall be able to:

1. Represent a variety of signals and system responses both mathematically and graphically.
2. Appropriately characterize signals.
3. Appropriately characterize systems.
4. Determine the average power, DC value, and RMS value of a signal.
5. Perform convolution both analytically and graphically.
6. Determine and relate the impulse and step response of a system.
7. Represent a periodic signal by a Fourier series, and describe its frequency content from that representation.
8. Predict the output of a filter excited by an arbitrary periodic or aperiodic input waveform.
9. Represent a signal or an impulse response by a Fourier transform.
10. Use standard Fourier transform pairs and properties to simplify calculation of forward and inverse transforms of both energy and power signals.
11. Classify filters as lowpass, highpass, bandpass, or bandstop. Interpret lowpass and bandpass filter specifications, and understand the concept of distortion.
12. Find and sketch the time and frequency domain representations of a signal after sampling.

SYLLABUS

- Class 1 (3/3) – Introduction
Class 2 (3/4) – Periodic functions
Lab 1 - Concept Inventory Exam, Introduction to Matlab
Class 3 (3/6) – Step, ramp, impulse functions
- Class 4 (3/10) – Impulse functions
Class 5 (3/11) - Power and energy signals
Lab 2 - Matlab scripts and functions
Class 6 (3/13) - System properties
- Class 7 (3/17) – System properties
Class 8 (3/18) – System properties
Lab 3 – Transistor Lab
Class 9 (3/20) – Impulse Response
- Class 10 (3/24) – Convolution
Class 11 (3/25) – Convolution
Lab 4 – System impulse and step response
Class 12 (3/27) – **Exam 1**
- Class 13 (4/7) – BIBO stability, Fourier Series
Class 14 (4/8) – Fourier Series
Lab 5 – Measurement of Fourier Coefficients
Class 15 (4/10) – Fourier Series
- Class 16 (4/14) – Parseval's Theorem and line spectra
Class 17 (4/15) – Response of systems to periodic inputs
Lab 6 – Periodic signals as system inputs
Class 18 (4/17) – Fourier Transforms
- Class 19 (4/21) – Fourier Transform properties
Class 20 (4/22) – Fourier Transform properties
Senior Symposium - No lab
Class 21 (4/24) – **Exam 2**
- Class 22 (4/28) – Fourier Transform Tables
Class 23 (4/29) – Response of systems to aperiodic inputs
Lab 7 – Audio Signals
Class 24 (5/1) – Response of systems to aperiodic inputs
- Class 25 (5/5) – Analysis of ideal filters
Class 26 (5/6) – Real Filters
Lab 8 – Filter Design
Class 27 (5/8) – Sampling
- Class 28 (5/12) – Sampling
Class 29 (5/13) - **Exam 3**
Lab 9 - Lab Practical
Class 30 (5/15) - Sampling