ECE-300 Signals and Systems
Fall 2009

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Text: Fundamentals of *Signals and Systems* by M. J. Roberts, McGraw-Hill, 2008.

GRADING POLICY

(3) Exams	10% each
Final Exam	25%
Labs	10%
Homework	10%
Matlab/Prelab work	5%
Quizes	10%
Lab Practical	10%

Notes:

(1) In general, you must have a passing average (greater than or equal to 60%) on the exams to pass the class.

(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. Usually homework will be due on Thursday, but not always.*** 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).

Quizes:

Each week we will have a quiz, usually (though not always) on Thursday. Usually before the quiz a "practice quiz" will be posted to give you an idea of the kinds of problems you are expected 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.

4) 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.*

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.

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 (9/3) – Step, ramp, impulse functions
Lab 1 - Concept Inventory Exam, Introduction to Matlab

Class 2 (9/7) – Impulse functions
Class 3 (9/8) – Scaling and shifting
Class 4 (9/10) – Periodic signals
Lab 2 - Matlab scripts and functions

Class 5 (9/14) - Power and energy signals
Class 6 (9/15) - System properties
Class 7 (9/17) – System properties
Lab 3 – Transistor Lab

Class 8 (9/21) – System properties
Class 9 (9/22) – Impulse Response
Class 10 (9/24) – Convolution
Lab 4 – System impulse and step response

Class 11 (9/28) – Convolution
Class 12 (9/29) – BIBO stability, Fourier Series
Class 13 (10/1) – **Exam 1**
Lab 5 – Measurement of Fourier Coefficients

Class 14 (10/5) – Fourier Series
Class 15 (10/6) – Fourier Series and spectra
Class 16 (10/8) – Response of systems to periodic inputs
Lab 6 – Periodic signals as system inputs

Class 17 (10/12) – Parseval's Theorem
Class 18 (10/13) – Fourier Transforms

Class 19 (10/19) – Fourier Transform properties
Class 20 (10/20) – Fourier Transform properties
Class 21 (10/22) – **Exam 2**
Lab 7 – Audio Signals

Class 22 (10/26) – Fourier Transform Tables
Class 23 (10/27) – Fourier Transform Tables
Class 24 (10/29) – Response of systems to aperiodic inputs
Lab 8 – Periodic signals and circuits

Class 25 (11/2) – Sampling
Class 26 (11/3) – Sampling
Class 27 (11/5) – Analysis of ideal filters
Lab 9- Lab Practical

Class 28 (11/9) – Real Filters
Class 29 (11/10) - **Exam 3**
Class 30 (11/12) **–** Real Filters
Lab 10 – Filter Design