EE224 Syllabus Fall 2005
8/18/2005

E E 224. Signals and Systems I. (3-3) Cr. 4. F.S. Prereq: 201, Math 267. Mathematical Preliminaries. Introduction to signals and systems. Signal manipulations. System properties. LTI systems. Impulse response and convolution. Fourier Series representation and properties of Fourier Series. Continuous and discrete-time Fourier Transforms and their properties. Applications and demonstrations using Matlab.

Professor: Dr. Dickerson, 3123 Coover Hall (julied@iastate.edu)
Class Time: 4:10-5:30 TTH in Pearson 2115
Lab: 2205 Coover Hall
Web Page: www.eng.iastate.edu/~julied/classes/ee224 and WEBCT
Lab Instructors and responsibilities:
- **Grader**: N. Kumar, @iastate.edu
- **Lab Instructors**: Prof. Russell (sfr@iastate.edu); Prof. Yao Ma (mayao@iastate.edu); Peng Yu (pengyu@iastate.edu)
- **Lab Teaching Schedule**

Section	Day	Time	Lab Instructor
A	M	6:10-9 PM	Peng Yu
B	T	9-11:50 AM	Peng Yu
C	W	3:10-6 PM	Dr. Russell
E	Th	6:10-9 PM	Dr. Ma
F	F	12:10-3 PM	Dr. Ma
G	F	9-11:50 AM	Dr. Russell

Labs will consist of Matlab experiments, using a variety of signals and applications in electrical engineering (2-3 hours).

If a student has a disability that qualifies under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act and requires accommodations, he/she should contact the Disability Resources (DR) office for information on appropriate policies and procedures. DR is located on the main floor of the Student Services Building, Room 1076; their phone is 515-294-6624.

Grading Scheme for EE224

- **HW Assignments(Weekly):** 15% (lowest hw score will be dropped)
- **Weekly Quizzes (Starting Week2)**: 40% (lowest quiz score will be dropped)
- **Final**: 15%
- **Class Participation and Exercises:** 10%
- **Labs**: 20%

Note: I usually grade on a curve, so do not be alarmed if the average test scores are not in the range of 80,90,100. I want to see what the range of students can do on a test.

Tentative Class Schedule:

Week	Topic	Book Section and Lab Assignment
1	Introduction to signals and systems, real-world examples, review sinusoidal signals-amplitude, frequency and phase, time and phase shifts; Review complex numbers Complex exponentials,	Chap 1 all Ch 2-1 through 2-5 Appendix A
2	Sampled sinusoids, phasors, phasor addition and operations, examples of time signals and how most real-world signal can be approximated by a sum of sinusoids; signal manipulations;	2-5-2-8, 3-1Appendix B Quiz 1 Lab 1: Introduction to Matlab
3	The Spectrum of a Sum of Sinusoids. Beat Notes. Periodic Waveforms. More Periodic Signals. Fourier Series	3-1 – 3-3, 3-7; Quiz 2 Lab 2: Tuning Forks
4	Fourier Series Analysis and Synthesis; Fourier analysis of periodic signals, Spectral Representation	3-4 – 3-6; Lab 3: AM and FM sinusoidal signals
5	introduction to sampling and reconstruction in the frequency domain	4-1,4-2; Lab 4 FM synthesis of musical instruments
6	Discrete-to-continuous conversion, sampling theorem	4-2, 4-4 – 4-5
7	Discrete-time LTI systems using FIR filters, basic system manipulations and concepts	5-1 – 5-3.2, 5-5
8	Convolution, examples of LTI filtering	5-3.3, 5-4, 5-5
9	Convolution and LTI Systems; Sinusoidal Response of FIR Systems. Superposition and the Frequency Response.	5-6, 5-8, 6-1,6-2
10	Steady State and Transient Response. Properties of the Frequency Response. Graphing and interpreting the frequency response.	6-3 – 6-5, 6-7
11	Continuous-Time Signals. The Unit Impulse. Continuous-Time Systems.	9-1, 9-2
12	Continuous time Fourier Transforms, Impulse Responses of Basic LTI Systems. Convolution of Impulses. Evaluating Convolution Integrals.	9-3 – 9-6
13	Evaluating Convolution Integrals. Properties of LTI Systems. Basic LTI Systems. The Multiplication Property. Table of Fourier Transform Properties and Pairs. Applications of the FT.	10 Frequency Response, 11.1
14	Frequency response function, continuous LTI systems; sinusoidal response, ideal filters	11.1-11.7
15	Finite Fourier Sum. Too Many Fourier Transforms? Time-windowing. Analysis of a Sum of Sinusoids.	11.7-11.9

Academic Dishonesty Policy

The university takes academic dishonesty very seriously in order to ensure the quality of the degrees awarded at Iowa State. Students' work must be an honest reflection of their knowledge and skills. Academic dishonesty includes the following:

- cheating and/or using unauthorized information,
- facilitating academic dishonesty in others,
- falsifying data,
- misusing computers,
- misrepresenting another's work as one's own,
- Plagiarizing (misappropriating others' ideas),
- bribing,

Procedures for cases of alleged academic misconduct include an inquiry, an investigation, and a hearing. Sanctions for those found responsible of the violation can range from a disciplinary reprimand to expulsion from the university. Sanctions can be appealed. The Judicial Affairs staff of the Dean of Student's Office maintains disciplinary records for a period of up to seven years, following state and federal laws.

Homework Policy

A. Homework will be performed individually. You may consult and discuss with others, not copy. Identical papers will all be given zero scores for that assignment regardless of who copied and who was copied from.
B. A lot can be learned by working with others, however it can be easy to nod your head that you understand as well. The best way to work with others is to work separately on the problems and then get together to discuss and review your answers.
C. You should make a photocopy of your solutions, and hand in the original on the due date.
D. I will usually post solution in pdf format on webCT after class the day the assignment is due.
E. If I make a mistake in my homework solutions, the first person to contact me by email and point out the mistake will receive +5 points each on their final homework grade. But it must be by email, not in person or over the telephone.
F. Homework is due at the **beginning** of the lecture **in** the classroom unless specific arrangements have made ahead of time. Homeworks turned in after I have started lecture will be penalized 10%. **Homeworks shoved under my office door, that are not found until after class, will be considered late. Late homework assignments (turned in after HW solns posted) will be not be accepted.**

Quiz Policies
A. No makeups will be permitted, unless by **prior** agreement. Quizzes and final exam are closed book, but you are allowed a single formula sheet, 8-1/2 by11, both sides, for each quiz, and plus an extra sheet for the final. **NO CALCULATORS**

B. You are responsible for anything I write on the board during a test. Be alert.
C. If you do not understand what I am asking in a test problem, ask me during the test - don't tell me later that the problem was unclear. If you have a question during a test, come forward and ask me personally. Do not speak out and disturb the other students.
D. Please show and explain all work if you hope for partial credit.
E. I will reconsider grading if you feel that you did not get fair treatment. You must come to me within a week to get a re-grade. I will never lower your grade.

EE 224 Lab Policies

- The students should come on time to their lab session and be prepared for it.
- The Instructor Verification sheets are to be signed by the lab instructor and turned to him/her at the end of the lab. If the student cannot finish the lab during the scheduled lab time, he/she should try attending another section **of that same lab** and turn in the verification sheet and the lab report no later than the beginning of the next scheduled lab session. This is to push students to finish the lab on-time and prevent them from working on a previous lab when the lab instructor is teaching a new lab.
- No food or drinks are permitted in the lab.
- Students are encouraged to work in pairs, however, each student is to work on his/her own computer. Before the lab instructor can mark the answer sheet, each student has to show him/her the graphs and simulation results and explain your code.
- The lab instructors are here to help you, so do not hesitate to ask them questions.
- If a student cannot attend a lab, he/she should contact the lab instructor schedule attendance at another lab section.
- Labs are **mandatory**.
- If you attend the particular lab (or are not able to with prior permission) and submit it before the start of the lab next week, no points will be deducted.
- If you do not attend the lab, but submit it before the start of your lab next week, 4 points will be deducted.
- If the lab is submitted after the start of next lab, no points will be awarded.
- 10 minutes at the start of each lab will be reserved for lab instructors to check the previous week's labs.
- **It is mandatory to complete the pre-lab before the beginning of the lab. Failure to do so incurs a penalty.**