USC EE 301L – Linear Systems – Fall 2012

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Office Hours: TBA

Grader: TBA

Lecture: Monday, Wednesday 14:00-15:20 in VKC 260
Labs: Wednesday 16:00-17:50 or 18h00-20h00 in OHE 230

Webpage: https://blackboard.usc.edu
– All HWs, handouts, solutions will be posted in PDF format
– Message board can be used if student like
– Student has the responsibility to stay current with webpage material

Other Requirements: Basic computer skills (e.g., plotting).

Grading: 17% Homework
11% Lab Reports
24% Midterm Exam 1 (2 hours)
24% Midterm Exam 2 (2 hours)
24% Final Exam (2 hours)

Exam Dates:

• Midterm Exam 1: Monday, October 8, 14:00-15:20
• Midterm Exam 2: Monday, November 5, 14:00-15:20
• Final Exam: Friday, December 14th, 14h00-16h00 as set by the university

Homeworks and Labs: Homeworks will be assigned every two weeks. Lab meets every week, but each lab assignment will be allotted to lab meetings. Lab reports and HW assignments will be collected on alternating weeks. Labs will focus on applications of the material from lecture and homework, with an emphasis on improving MATLAB skills. Several labs around the midterms will include guest lectures illustrating the role of linear systems in research and applications in the areas of signal processing, controls and communications.
Course Objective: To obtain a working knowledge of signals, linear time invariant systems, and transform techniques for both continuous and discrete time. To gain an appreciation for the role that these methods play in electrical engineering systems analysis and design. To provide preparation for 400-level classes in communications, signal processing, and controls. To become proficient with MATLAB as a tool for analyzing LTI systems.

Class Policies:

- **Final grades** will be assigned by a combination of student score distribution (curve) and the discretion of the instructor.

- **Homework Policy**
  - Late HW will not be accepted. A late assignment results in a zero grade. Please have your homework turned in by the beginning of lecture on the date that it is due.
  - Homework will be assigned and collected weekly
  - Show your work in your homework solution; the correct answer alone is worth only partial credit.
  - Homework collaboration is encouraged. This is discussing problems and solution strategies with your classmates, the TA, and/or the instructor and is to be distinguished from copying solutions of others which is prohibited.

- **Exam Policy**
  - Make-up Exams: No make-up exams will be given. If you cannot make the above dates due to a class schedule conflict, you must notify me by the last day to add/drop. If I cannot accommodate your schedule, you must drop the class. In the case of a medical emergency, a signed letter from your doctor is required. This letter must include the telephone number of your doctor.
  - Exams will be closed book (possibly with a crib sheet allowed).
  - The weight of each exam in the course grade is proportional to the duration of the exam.
  - All exams are cumulative, but with an emphasis on material presented since the last exam.

- **Attendance:** Lecture and laboratory session attendance is encouraged and students are responsible for all material presented in both. The laboratory session will focus on example problems and MATLAB examples.

- **Academic Integrity Policy:** As per university guidelines published in SCampus. Disciplinary action for instances of cheating will be pursued to the full extent.

Textbooks:

- **Required Textbook (ordered):**

- **References:**

- **Note:** There are a number of books that are similar to Oppenheim and Wilsky. Poularikas and Seely is one example.

**Class Material**

1. Introduction and Motivation: Signals & Systems (1.1-1.3)
2. Signals & Systems Preliminaries (1.4-1.6)
3. Linear Time-Invariant Systems (2.1-2.3)
4. Linear Time-Invariant Systems (2.4-2.5)

**Midterm Exam 1**

5. Fourier Series Representation of Periodic and Time-Limited Signals (Chapter 3)
6. Continuous Time Fourier Transform (Chapter 4)
7. Sampling and Reconstruction (Chapter 7)
8. Discrete Time Fourier Transform (Chapter 5)

**Midterm Exam 2**

9. Application of Fourier Analysis to LTI Systems (Chapter 6)
10. Applications in Communications and Signal Processing (Chapter 8)
11. The Laplace Transform with Application to Control (Chapter 9, 11.1-3)
12. The Z-Transform (Chapter 10)
13. Advanced topics and applications (covered by handouts, time permitting)