ECE 4330 Syllabus
Linear Network and System Analysis
Credits: 4 (LCT: 4)
Fall 2015
Section # 11121
Tu & Thu, 5:30-7:20
Room: 237 Manoogian

Last Lecture: Thursday, Dec. 10

Final Exam: Thursday, Dec. 17
(5:30-8:00 pm)
The Final Exam covers all Lectures

Instructor Information:
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Mondays: 1:00-3:00
Wednesdays: 12:00-1:00
and by appointment

WSU Catalog Description:
Prereq: ECE 3330. Laplace transform for complete solution of linear network or system response. Homogeneity, superposition, and time invariance properties. Convolution; Fourier analysis of periodic signals; discrete-time signals, difference equations, and z-transform methods. Formulation of equilibrium equations for electromechanical systems. Linear incremental concepts. (T)
Very Important: Your Professor is known to be very strict when it comes to attendance and deadlines. He expects you to conduct yourself as a professional. Here are a few examples:

- He does not accept assignments submitted on the due date after he starts the lecture.
- If he sets a submission date for an assignment (say bonus problem) to be received by email before 5:00 pm on a certain day and you submit at 5:01 pm then he would not accept your submission.
- When taking a test if he announces the end of the test and that you need to turn in your work, but you continue to write then he will not accept your work and you will receive a zero.
- Arrive more than 5 minutes late to class and you will be counted absent and lose points (1% of your final average is subtracted for each unexcused absence.
- In case of an emergency, you must email him about your absence before class and you must bring with you a legitimate documentation for your absence (e.g., doctor’s note, court note, etc.)

Goals: To develop and understand of the theory and competence in the methods of analysis of linear systems and signals in the frequency domain.

Outcome Coverage:

(a) An ability to apply math, science and engineering knowledge. The homework, exams and project require direct application of mathematical, scientific and engineering knowledge.
(b) An ability to design and conduct experiments, as well as to analyze and interpret data. The homework and project require the student to design, conduct simulations using MATLAB and to analyze simulation data.
(c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, sustainability. The design in the project must be checked against real world operating condition and limits.
(e) Identify, formulate and solve engineering problems. Students must be able to identify the type of engineering problem and to apply the appropriate frequency domain technique
(g) An ability to communicate effectively. Students are required to write a comprehensive report on the project.
(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice. Students will learn to use frequency-domain techniques and MATLAB software for solving engineering problems.

Learning Objectives: At the end of this course, students will be able to:

1. Calculate the Convolution Integral
2. Determine the Fourier Series for periodic signals
3. Determine the Fourier Transform and Inverse Fourier Transform for aperiodic signals
4. Determine the Laplace Transform and Inverse Laplace Transform for linear systems and signals
5. Determine the Z-Transform and Inverse Z-Transform for discrete linear systems and signals


Prerequisites by Topic: (ECE 3330) (1) Circuit analysis and Kirchhoff's laws, (2) Transient and steady-state analysis of first and second-order networks, (3) An introduction to complex frequency concepts.

Topics:
1. Categorization and definition of signals and systems
2. Review of time-domain analysis of linear differential equations
3. Definition and calculation of the Convolution Integral
4. Fourier Series analysis of periodic signals
5. Fourier Transform analysis of aperiodic signals
6. Laplace Transform analysis of linear systems and signals
7. Sampling
8. Discrete-Time Signals and Systems
9. Z-Transform analysis of discrete-time systems and signals

Computer & Software Resources: Students are required to have access to computers with MATLAB (available in the college computer labs) and/or Mathcad software. Download it free (contact your professor for the software key).

Attendance: Attendance is mandatory. Each class session missed (without a legitimate excuse) leads to a loss of 1 point (1%) of the final score. Arriving to class more than 5 min late, or leaving class early will count as an absence!

Distribution of Points:
Home Work: Collected, but is not graded. Your homework effort is documented by your instructor and it may help with your final grade. Keep a copy of your homework solutions for your records. Tests are based on the HW and class notes.

Three tests: 60% (20% each).
Final: 40%

Grading Scale: A: 90-100, A-: 85-89.9, B+: 80-84.9, B: 75-79.9, B-: 70-74.9, C+: 65-69.9, C: 60-64.9, C-: 55-59.9, D: 45-54.9, F: 0-44.9

A grade of I will be available only if the student needs to complete at most the final exam.

Makeup Exam and Makeup Policy: Makeup exams will only be allowed in the event of a documented emergency or a physician certified illness. In all such cases, you must contact your Prof. Hassoun ASAP.
**Students with Disability:** If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TDD only). Once you have your accommodations in place, I will be glad to meet with you privately during my office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

**Cheating and Penalty for Cheating:** Cheating is defined by the University as “intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information, or assistance in any academic exercise.” This includes any group efforts on assignments or exams unless specifically approved by the professor for that assignment or exam. Evidence of fabrication or plagiarism, as defined by the University in its brochure “Academic Integrity,” will also result in downgrading for the course. Students who cheat on any assignment or during any examination will be assigned a failing grade for the course.