Syllabus
ECE 4330 Linear Networks and System Analysis
Winter 2012

General Information

Course Number ECE 4330
Title Linear Networks and System Analysis
Credits 4 (Lecture)
WSU Catalog Description Prereq.: ECE 3330
Instructor Ivan Avrutsky, Associate Professor
Office Hours 9:30 a.m. – 10:30 a.m. Wednesdays
Office Location Rm. # 3142, Engineering Building, Tel.: (313) 577-4801
Phone (313) 577 4801
E-mail ivan.avrutsky@wayne.edu
Course Meeting Time 10:40am - 12:30pm, Mondays and Wednesdays, 1/9/12 – 5/1/12
Course Meeting Location 0256 Manoogian
Important dates January 7: Open registration ends; January 14: Late registration ends; Mar 24: Last day to withdraw

Course Summary

Goals To develop ability to analyze linear systems and signals
Learning Objective To develop critical understanding of mathematical methods to analyze linear systems and signals
Recommended References Not required
Prerequisites by Topic None
Corequisites by Topic None
Topics
1. Math Background Review (Chapter B)
2. Introduction: Signals and Systems (Chapter 1)
3. Time-Domain Analysis: Continuous-Time Systems (Chapter 2)
4. Time-Domain Analysis: Discrete-Time Systems (Chapter 3)
5. Continuous-Time Signal Analysis: The Laplace Transform (Chapter 4)
6. Discrete-Time Systems: The z-Transform (Chapter 5)
7. Continuous-Time Signal Analysis: The Fourier Series (Chapter 6)
8. Continuous-Time Signal Analysis: The Fourier Transform (Chapter 7)
9. Sampling (Chapters 8)
10. Discrete-Time Systems: Fourier Analysis (Chapter 9)
11. State-space Analysis (Chapter 10)
Course Structure  See list of topics above. Chapters covered include B (Background) through 10. The course emphasis is on analytical methods (‘pen-and-paper’). MATLAB examples provided including symbolic calculations and numerical tools related to analysis of linear systems.

Homework/Project Format  10 short MATLAB projects (one per Chapter), due in a week after Chapter is studied in a class

Computer Resources  MATLAB. Available at the Engineering PC Lab, Rm.# 2335

Laboratory Resources  MATLAB. Available at the Engineering PC Lab, Rm.# 2335

Lecture Notes  Provided on the web site of Dr. Avrutsky

Schedule of Lectures  Provided on the web site of Dr. Avrutsky

Schedule of Quizzes/Exams  Provided on the web site of Dr. Avrutsky

**Grading**

Grading Weights  Homework 1% × 10 = 10%  
Quizzes 15% × 2 = 30%  
Mid-Term 30%  
Final 30%

Grading Scale  A = 90–100, A– = 85–89  
B– = 70–74, B = 75–79, B+ = 80–84  
C– = 55–59, C = 60–64, C+ = 65–69  
D = 40–54  
F = 0–39

Attendance  Students are expected to attend all classes. Attendance does not affect the final grade. Missing a class will not be considered as an excuse for low performance on a test.

Examination policy  All quizzes and exams are open books, open notes, but no computers. No make-up examination will be allowed. Schedule of the quizzes and exams is announced before the course starts. One quiz missed for a legitimate reason may be waved with appropriate adjustment of the grading scale.

Incomplete Grade Policy  Incomplete grade can only be assigned if:
1. A student is passing the class based on the other material that has been submitted.
2. The work can be completed without attending the class in a future semester.

**Outcome Coverage:**

(a) *An ability to apply math, science and engineering knowledge.* The learning in this course will require direct application of mathematical, scientific, and engineering knowledge. The learning requires performing computations involving solving linear differential equations, both homogeneous and inhomogeneous, in the time-domain and in the frequency domain using the Fourier transform, the Laplace transform, and the Z-transform.

(b) *An ability to apply complex variables in the analysis of linear circuits and systems.* Complex variables are used extensively throughout the course.

(c) *An ability to design and conduct experiments, as well as to analyze and interpret data.* The MATLAB assignments are designed to provide students with experience of analyzing and interpreting data.

(d) *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, and sustainability.* The student will learn to be aware of hardware implementation cost and system performance specification constraints. This outcome is a minor component of the course, though.

(e) *Identify, formulate and solve engineering problems.* The student will learn how to identify, formulate, and solve problems associated with analysis of linear systems and signals.

(f) *The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.* The student taking the course will realize the broad applicability of the concept of linear systems and signals to solving real world problems with positive economic and societal consequences.

**Students with Disabilities**

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
Academic Honesty

It is the responsibility of each student to adhere to the principles of academic integrity. Academic integrity means that a student is honest with him/herself, fellow students, instructors, and the University in matters concerning his or her educational endeavors. Thus, a student should not falsely claim the work of another as his/her own, or misrepresent him/herself so that the measures of his/her academic performance do not reflect his/her own work or personal knowledge. Cheating will not be tolerated. Cheating includes (but is not limited to) any communication (written or oral, active or passive) during examinations and sharing of work, such as using the same models or computer programs or copying work. All homework and projects must be an individual effort unless specifically noted. The highest penalty for cheating is failing grade for the course.

Prepared by

Ivan Avrutsky, Associate Professor of Electrical and Computer Engineering
Date prepared: January 3, 2012
Last Revised: April 3, 2012