

ELEC 243: Electronic Measurement Systems

Spring, 2023

Lecture

Chong Xie
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Lab

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Hours

Class: Tues. & Thurs., 9:25AM - 10:40AM
Labs: Tue./Wed. 3:30PM - 5:59PM
Office Hours: TBD and by appointment

Course Objectives and Learning Outcomes

The course will give students the skills to design, analyze and construct electronic systems to measure, monitor and control physical properties and events. It spans the areas of circuits, signals, systems and digital processing. It is intended for non-ECE majors.

Upon completion, students should be able to:

- ▶ Analyze and simulate basic circuits
- ▶ Understand and apply time and frequency domain concepts
- ▶ Identify and apply various analog and digital filter types
- ▶ Operate electronic lab equipment and tools to measure, test and process electrical signals

Prerequisites

MATH 101 or 105; MATH 102 or 106; PHYS 102 or 112 or 126.

Text

Electrical Engineering: Principles and Application, 7th Ed. A. R. Hambley, 2018
Class Notes and Lab Materials - distributed on ELEC 243 Canvas page

Materials

Lab materials will be supplied by the course.

Lab Manual website: <https://www.ece.rice.edu/~dpr2/elec243/>

Exams and Homework

Dr. Xie will be responsible for the lectures/ homework/ exams. There will be three types of graded material in this course - homework problems, take-home exams, and lab reports. Problem sets will be assigned weekly, and each assignment will typically contain several problems of each type. You are expected to follow the honor code on exams. Collaboration is fine on homework problems, but you must turn in your own work.

Lab sessions

Dr. Woods will be responsible for the laboratory portion of the course. The lab sessions will be held from 3:30-6:00 PM on either Tues or Wed, depending on your section. The schedule will be posted on Canvas. The lab location is FEP 102 (FEP is the building between the power plant and Rice Blvd, sort of near Duncan College). Lab reports will be graded according to guidelines described in your lab sessions. The lab report grade includes attendance and participation in labs; possible pre-calculations/ lab quizzes; and quality of lab reports.

Grading

Homework 30%

Exams (3) 40%

Lab Reports 30%

Homework and exams must be turned in before 5 pm on the date specified. Problems turned in within 24 hours will be accepted with 20% penalty. Beyond that extension, no assignment will be accepted.

Absences

Attendance of lab sessions is mandatory unless otherwise arranged with the instructor(s), and failure to attend a lab without instructor permission will result in a 33% penalty to the student's lab report grade. For example, if one student did not attend a lab and received a score of 95% on the lab report prior to the penalty, then the final score for that student would be $95 - 33 = 62\%$.

Accommodation for Disabilities

If you have a documented disability that may affect academic performance, you should: 1) make sure this documentation is on file with Disability Resource Center (Allen Center, Room 111 / adarice@rice.edu / x5841) to determine the accommodations you need; and 2) meet with the instructor(s) to discuss your accommodation needs.

Rice Honor Code

In this course, all students will be held to the standards of the Rice Honor Code, a code that you pledged to honor when you matriculated at this institution. If you are unfamiliar with the details of this code and how it is administered, you should consult the Honor System Handbook at <http://honor.rice.edu/honor-system-handbook/>. This handbook outlines the University's expectations for the integrity of your academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process.

Syllabus Modifications

Information contained in this syllabus, other than the absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor(s).

Lectures	Topics	Assignments	
Jan. 10 & 12	Introduction to Electrical Engineering Elements of Circuits, Fundamentals of Circuit Analysis		
Jan. 17 & 19	Circuit Analysis Techniques - Resistors, voltage & current sources		HW1
Jan. 24 & 26	Circuit Analysis Techniques - Nodal/Mesh analysis		HW2
Jan. 31 & Feb 2	Circuit Analysis Techniques - Linear systems, superposition, source transformation		HW3
Feb. 7	Review	Spring Recess Feb 9	Exam 1
Feb. 14 & 16	Op Amp Circuit Analysis		HW4
Feb. 21 & 23	Inductance & Capacitance Circuit Analysis - resistors, inductors, & capacitors		HW5
Feb 28 & Mar. 2	Transient Response of Circuits		HW6
Mar. 7 & 9	1st-order RL & RC Circuits	Spring Break Mar 11 - 19	
Mar. 21 & 23	Review, Sinusoids and Phasors		Exam 2
Mar. 28 & 30	Sinusoids and Phasors Impedance		HW7
Apr. 4 & 6	Steady State Analysis of Circuits		HW8
Apr. 11 & 13	Circuit Theorems for AC circuits Frequency Response and Bode Plots		HW9
Apr. 18 & 20	Passive and Active Filter Circuits and Frequency Response Characterization		Exam 3