

ECE 3870 001 — Electromagnetics I

Spring 2017 Syllabus

Instructor: Reyhan Baktur

Office/Phone: EL 150/ 797-2955

Email: Reyhan.baktur@usu.edu

Office Hours:

Thursday 1:30-3:30

Course Info: ECE 3870 — Electromagnetics I: Introduction to Electromagnetics

Class Time: 2:30 pm to 3:20 pm MWF

Class Location: Engineering 203

Laboratory Component: Not a Scheduled Lab Class

Anderson Wireless Center in (AWC, EL 255)

You will have chances to tour the Anderson Wireless Center, watch demonstrations and performance experiments.

You may do your lab-related homework in AWC or the instructor will introduce some free online software.

Textbook(s):

Fundamentals of Applied Electromagnetics, F. T. Ulaby, Pearson Education Inc. 2010, 6/E edition

Course Website:

We will make use of Canvas for this class.

Please log on to check if your account is working and let me know if you have difficulty in using it.

All the lectures, HWs, solutions to the in-class examples, template for lab reports, and study guide for exams are posted online.

Teaching Assistants:

TBA

Prerequisites:

ECE 2270, MATH 2210, 2250, PHYS 2220

(The requirements not only mean that you need to have those courses before taking this class, but also mean that you need to review some math and physics in order to learn this class well.)

Objectives:

1. Calculate voltages, currents, and impedances on TEM transmission lines. This will include time domain analysis, frequency domain analysis (standing waves and Smith charts), and power analysis.
2. Calculate electric and magnetic fields from a plane wave impinging on a metallic or dielectric material from either normal or oblique incidence.
3. Design matching systems for transmission lines and plane waves.
4. Calculate the electric and magnetic fields from simple charge and current distributions.
5. Compute electric field induced by varied magnetic field and understand/explain the basics of antenna radiation.
6. Understand a simple link budget for a simple wireless communication system and explain how the environment affects the received power.
7. Identify potentially hazardous electromagnetic environments.

Topics:

Introduction to electromagnetics. Fundamentals of wave propagation, transmission lines, impedance matching, electrostatics, magnetostatics, Maxwell's equations, plane waves in free space, lossy media, and reflections from planar interfaces, wireless communication systems. Electromagnetic safety.

Homework:

Homework will be assigned after every class meeting (yes, this class does need you to work hard, so please plan your time wisely). Homework (from Monday, Wednesday, Friday) are due on the next Monday 2:30 pm (you may turn them in to me before the class starts), and the graded homework will be returned to you on the next Monday morning.

- HW turn in: There will be a Homework drop box in the ECE room in the EL building.
- HW pick up: (1) I can bring the graded HWs to the classroom for you to pick up, (2) You may stop by my office to pick up your graded HWs.
- Policy for late submission: I always give credits as long as you submit your homework. If you submit your homework late, then you may not get the full credit, however, you will still have a decent credit. *So, please try your best to turn homework in.*

Weekly Questions:

Apart from homework, I will give you weekly questions to answer. You can type them, or handwrite them (forms do not matter). It should be turned in at the same time when you turn in your homework.

Exams:

There will be 2 midterm exams and a final exam. Please see the class schedule for the mid-term exams. I will also remind you during the class period.

Final Grades:

Final grades = 20% Midterm 1 + 20% Midterm 2 + 30% final exam + 10% Lab-HW + 15% Homeworks + 5% Weekly Questions.

Extra Credits:

I sometimes provide you opportunities to earn extra credits as the class goes. So, please pay attention to emails I send out about extra credits. Usually it can be attending a graduate research seminar or a conference.

Course Policy:

- You may discuss out-of-class projects and problems with each other, but you must turn in your **own** solutions on assignments.
- Notes are posted on Blackboard Vista and I will send an email to remind you about the new posts. It is important that you check the website for new updates.
- Reasonable neatness is required for handwritten assignments, lab reports, and exams.

Cheating Policy: Just do not try that!***What happens if you cheat?***

- If you are caught cheating on your project, you will get zero point for the first time and you will get an F for the class if you do it for a second time.
- If you are caught cheating on any form of the exam, you will get an F for the class and you will be reported to the department.

Things that constitute cheating

- Copying someone else's code from class. It is ok to work together, but each student should write and comment his/her own code.
- Copying code from textbooks, website, or from former students. You may use reference material to help you to understand, but you have to create your own code and get it working.
- If you let other student use your code, then you are regarded as cheating.

What happens if others cheat?

This could lower your grade. Please tell me or other professors if you see cheating. You may do this anonymously. The ECE department is committed to reducing instances of cheating in our labs and classes.

Attendance:

Attendance is optional except for exams. If you miss a class, see a classmate about any assignments that may have been given and/or check the website. If the instructor is late to class by more than 15 minutes, then students may leave without penalty.

Please note that I will not give make-up exam, unless you have a very solid reason.

Course Accessibility:

In cooperation with the Disability Resource Center, reasonable accommodation will be provided for qualified students with disabilities. Please meet with the instructor during the first week of class to make arrangements. Alternate format print materials (large print, audio, diskette or Braille) will be available through the Disability Resource Center.

Tutoring Center:

The College of Engineering has an Engineering Tutoring Center. Tutoring services are available free of charge to all College of Engineering students. You can find help for any engineering required courses, .i.e. math, chemistry, physics, and all engineering classes. The Tutoring Center is located in ENGR 322 and 324. Hours are Monday through Friday 8:00 AM to 5:00 PM with extended hours on Tuesday and Thursday until 7:00 PM.