

EEC 130A Introductory Electromagnetics

Winter 2013

Updated: Jan. 7th, 2012

Lecture Time: Tuesday and Thursday: 4:10–6:00 pm

Location: Surge3 1309

Course Website: SmartSite

Instructors: Dr. Xiaoguang “Leo” Liu
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Office hours: Tuesday: 8:00–10:00 pm in 3169 Kemper Hall
Wednesday: 4:00–5:00 pm in 3169 Kemper Hall
By appointment

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Office hours: TBA

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Official Course Description:

<http://www.ece.ucdavis.edu/courses/undergraduate/eec130a.html>

*Students are encouraged to ask questions in class, discuss session and office hours. Please do not contact me through email unless absolutely necessary. Due to the high volume of emails I get everyday, I can not guarantee a timely response.

Textbook and Class Notes:

Primary textbook: “*Fundamentals of Applied Electromagnetics*,” 6th Ed., by F. T. Ulaby, E. Michielssen, U. Ravaioli, Pearson Prentice Hall, 2010.

The instructor will provide his own class notes to assist your learning. The notes will be made available on SmartSite. You need to understand, however, that our notes are not written as a textbook and absolutely DO NOT substitute for your class attendance.

Electromagnetics is a fascinating and very broad subject. No single textbook is perfect. You are therefore encouraged to study other textbooks if you wish. Here is a helpful list:

1. “*Field and Wave Electromagnetics*,” by D.K. Cheng. A classic undergraduate text that many graduate students use for reviewing basic electromagnetic concepts.
2. “*Elements of Electromagnetics*,” by N.O. Sadiku. Another classic that also serves you well as a reference even after the class.
3. “*The Schaum’s Outlines on Electromagnetics*” by J.A. Edminister is also a good companion because of its numerous solved examples and problems.

Grading:

Your final grade will be based on the scores you earn on the homeworks and exams. The allocation of the scores is as follows.

Homework:	20%
Mid-term Exam 1:	30%
Mid-term Exam 2:	20%
Final Exam:	30%

A tentative percentage grade to letter grade conversion table is as follows

A+	A	A-	B+	B	B-	C	D	F
97–100	93–96	90–92	87–89	83–86	80–82	70–79	60–69	0–59

This course covers a lot of material and it is really important to keep up with the class. The best way to fail this class is to allow yourself to get behind. Our best advice, is therefore, DO NOT ALLOW YOURSELF TO GET BEHIND!

If you notice that this starts happening, please ask for help: Talk to your instructor or your TA. You need to catch up as soon as possible. Study harder, come to office hours more and ask for help quickly!

Homework:

Homework will be assigned weekly. Normally they will be assigned on Tuesday and due the following Tuesday. Homework is to be turned in to the appropriate dropbox located in 2131 Kemper Hall by ~~12 pm~~ 3:30 pm on the due date. Late homework will NOT be accepted. Please prepare your solutions in a legible and organized manner. Solutions to the homework assignments will be posted on the course web page after the homework is due.

Homework assignments are designed to help you progress with the course. Please make sure that you spend time on working the homework problems. Getting solutions from the internet will eventually hurt yourself.

Working in groups on homework assignments can be a very effective way to learn the course material. If you choose to work in groups, we ask you do the following:

1. Make sure the solution you submit is your own!
2. Write the names of all individuals with whom you worked at the top of your assignment. Limit the group size less than 4.

You will receive zero credit for the entire assignment if your solution appears to be a copy of another student's work.

Exams:

There will be two mid-term exams and a final exam for this course. Location and time will be announced later in the quarter.

You will be provided with a formula sheet during the quizzes and the final exam. An advance copy of this sheet will be available on the course website.

If you have to miss an exam, you will be given the opportunity of taking a make-up exam with a 15% score reduction, which means that your score will be $0.85 \times \text{your actual point score}$. Note also that the problems on the make-up exam will be different and will cover additional lecture materials between the original exam and the make-up exam.

Regrade Policy:

If you believe there is an error in grading of a homework or an exam, a request for a regrade must be filed with your instructor within one week after the homework or the exam has been returned. No such requests will be honored after the one-week deadline has passed. For the final exam, the regrade request must be filed with your instructor within three days.

If you feel a regrade is appropriate, DO NOT mark on the original homework or exam! Do it on a photocopy if it is absolutely necessary. We will keep a photocopy of all exams.

Academic Honesty:

We expect every member of the UC Davis community to practice honorable and ethical behavior both inside and outside the classroom. Any actions which might unfairly improve your score on exams or homework will be considered cheating and will not be tolerated. Some examples of this type of behavior are:

1. Submitting homework solutions which are not your own. While we encourage you to work together, your work should not be a copy of your partner's.
2. Sharing results or notes during exams.
3. Using notes (hardcopy or electronic) during exams.
4. Continuing work on your exam after we have called for papers.

5. Requesting a regrade on an exam that has been altered.

Cheating on homework or exams will result in a zero for the assignment or exam—as a minimum—and could result in a failing grade for the course, at the discretion of your instructor. In addition, each case will be referred to the Office of Student Judicial Affairs[†].

Students with Documented Disability:

Students with disabilities must be registered with the Student Disability Center [‡]before classroom accommodations can be provided. If you are eligible for academic accommodations because you have a documented disability that will impact your work in this class, please schedule an appointment with your instructor as soon as possible to discuss your needs.

Campus Emergency

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised quarter calendar or other circumstances beyond the instructors control. In such cases, information about changes in this course will be broadcasted through SmartSite.

Course Schedule

Table 1 provides a tentative schedule for this course.

Acknowledgement

Part of this syllabus is adapted from Prof. Dimitrios Peroulis's EE311 (Purdue) syllabus and Prof. Anh-Vu Pham's EEC 130A (UCDavis) syllabus, available at the following urls:

<https://sites.google.com/site/peroulisteam/teaching>

<http://www.ece.ucdavis.edu/mml/courses/EEEC130A.pdf>

[†]Student Judicial Affairs, <http://sja.ucdavis.edu/>

[‡]Student Disability Center, <http://sdc.ucdavis.edu/>

Table 1: Course Schedule

Topic	Lecture No.
Introduction	
Review of phasors and traveling waves	1
Transmission lines	2–7
Transmission line equations	
Current and voltage waves	
Characteristic impedance	
Reflection at unmatched loads	
Standing wave ratio & input impedance	
Matching	
Smith chart	
Time domain description	
Electrostatics	8–11
Charge and current distribution	
Coulomb's Law	
Gauss's Law	
Electric scalar potential	
Electrical properties of materials	
Conductors and dielectrics	
Electric boundary conditions	
Capacitance	
Magnetostatics	12–15
Biot-Savart Law, magnetic flux density	
Stokes theorem, Ampere's Law	
Magnetic boundary conditions	
Inductance	
Maxwell Equations	16–19
Plane waves	
Polarization	
Poynting's Vector, Power flow	
Plane wave reflections	
Revisiting the transmission line	