

COURSE SYLLABUS
ECE 311 Electromagnetics I
Autumn Quarter 2008

Instructor: Prof. Joel T. Johnson
Office Hours: MWF 9:30-10:18, 11:30-12, DL 452, 292-1606 (otherwise ElectroSci Lab 292-1593)
Text: Ulaby, Fundamentals of Applied Electromagnetics, Prentice Hall (2001, 2004, or 2007 versions)
References: Cheng, Field and Wave Electromagnetics, second edition
Haus and Melcher, Electromagnetic Fields and Energy, Prentice Hall
Email: johnson@ece.osu.edu
Course webpage: <http://www.ece.osu.edu/~johnson/311/ece311.html>

Subject Matter:

In ECE 311, we will develop a better understanding of the underlying physics of electric circuits, including properties of resistors, capacitors, inductors, and even wires! We'll also build a foundation for the electrodynamic wave theory to be studied in ECE 312 and beyond. The first half of the course will be concerned with transmission lines (wires); the latter half will concentrate on electrostatics (capacitors, resistors) and magnetostatics (inductors).

Prerequisites:

It is assumed that you have completed courses in both DC ("static") and AC ("quasi-static") circuits, have some experience with vector calculus (although we'll spend some time reviewing this), and have had some previous exposure to electromagnetism as in Physics 132. It might be a good idea to spend time reviewing this material if it has faded from memory, and a good calculus text may be useful as well.

Grading:

Grades for the course will be based upon two in-class midterm examinations, a final exam, homework, and class participation. Weights are assigned as follows:

2 Midterms	26% each	=52 %
Final exam		=26 %
Homework/Participation		=22 %

Refer to the course calendar on the other side of this page for exam and homework dates. Make-up examinations will be given only in the case of an emergency. All exams will be open book/notes, and will follow the Honor code.

Homework:

There will be eight problem sets assigned, due one week later; problem sets will be available via the course web page. Late homework will not be accepted, but the lowest homework score for the entire term will be dropped when computing the homework/participation grade. Working in groups on the problem sets is permitted, but each student should prepare his/her own version to hand in. All students are encouraged to attempt homeworks on their own, as there is a strong correlation between homework effort and exam performance. Solutions will be made available via the course web page.

Class Participation:

The assigned homework/participation grade will be computed as the average of 7 homework scores and a class participation grade assigned by the instructor. The grade will be assigned based on attendance and participation in class.

Other:

I am very interested in your opinions on the course pace, content, and difficulty. Please feel free to stop by during office hours or other times to let me know your thoughts on the course. Questions in class are also strongly encouraged, as they give the entire class direct feedback on the issues being addressed at that time.

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Mon	Wed	Fri
Sep 22	24 PS1 out Introduction, Course overview - Secs 1.1-1.2	26 Transmission lines Secs 2.1-2.2
29 Review phasors Sec 1.5	Oct 1 Line equations and solutions Secs 2.3-2.5.0	3 PS1 in, 2 out Wave behavior Secs 1.3-1.4
6 Types of lines Sec 2.2	8 Terminated lines Sec 2.5.1	10 PS2 in, 3 out Terminated lines Sec 2.5.2
13 Impedance on lines Sec 2.6-2.7	15 Power on lines, Smith chart Secs 2.8-2.9.2	17 PS3 in Smith chart Sec 2.9.3-2.9.4
20 Exam #1	22 PS4 out Impedance matching Sec 2.10	24 Impedance matching design, Sec 2.10
27 Transients on lines Sec 2.11-2.11.1	29 PS4 in, 5 out Transients #2 Sec 2.11.2	31 Vectors, vector functions Sec 3.1
Nov 3 Coordinate systems Secs 3.2-3.3	5 PS5 in, 6 out Vector integrals, gradient Sec 3.4, notes	7 Coulomb's law, electrostat- ics, Secs 4.2-4.3.1
10 Gauss' Law Sec. 4.4	12 PS6 in Review	14 Exam #2
17 PS7 out Gauss' Law #2	19 Divergence, electric potential, Secs 3.5, 4.5	21 Electric potential, curl Secs 3.6, 4.5
24 PS7 in, 8 out Conductors 4.7, 4.9.1	26 Dielectrics, boundary conds., Sec 4.8-4.9	28 Thanksgiving holiday No class
Dec 1 Capacitance Sec 4.10-4.11	3 Imperfect conductors and currents, Sec 4.7	5 PS8 in Review
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