EE 215: Introduction of Electrical Engineering

Course Overview

EE 215, Fundamentals of Electrical Engineering, is a first course in the theory of circuit analysis which is a fundamental skill required by all Electrical Engineers. Students learn the "alphabet" of circuits, including wires, resistors, capacitors, inductors, independent and dependent voltage and current sources, and operational amplifiers. This course is essential preparation for anyone needing more than a surface understanding of electrical circuits, and the gateway to advanced electrical engineering courses.

Objectives:

1. Identify linear systems and represent those systems in schematic form
2. Apply Kirchhoff's current and voltage laws and Ohm's law to circuit problems
3. Simplify circuits using series and parallel equivalents and using thévenin and Norton equivalents
4. Perform node and loop analyses and set these up in standard matrix format
5. Identify and model first and second order electric systems involving capacitors and inductors
6. Predict the transient behavior of first and second order circuits

Prerequisites

Prerequisites: PHYS 122 and either MATH 126, MATH 129, or MATH 136.

Prerequisites (by topic): Physics of electricity and magnetism, Algebra, trignonometry, integral and differential calculus, first and second order linear differential equations.

Course Calendar:

Week	Lesson	Chapter Reading	Homework	Labs
1	Orientation / Lab Introduction / Circuit Basics	1,2		
2	KCL, KVL, Series, Parallel	2,3	Homework #1	Lab#1
3	Nodal Analysis	4	Homework #2	Lab#2
4	Mesh Analysis	4	Homework #3	Lab#2
5	Superposition Thévenin Equivalents	4	Homework #4	Lab#3

6	Midterm			Lab#3
7	Operational Amplifiers (OpAmps)	5		Lab#4
8	L, C and First Order Circuits	6	Homework #5	Lab#4
9	First Order Circuits and Second Order Circuits	7	Homework #6	Lab#5
10	Second Order Circuits	8	Homework #7	Lab#5
11	Study Week / Final Exam			

Required Materials

- Course text: Nilsson and Riedel, Electric Circuits, 9th Edition. Prentice Hall, 2010.
- Lab Kits

Grading:

Segment	Weighting
Homeworks	20% (the lowest will be dropped)
Laboratory Reports	20% (5 total, 4% each)
Midterm	30%
Final Exam	30%
	Total: 100%

Homework Assignment:

See Calendar for Homework Assignments. You are encourage to work other students and in groups, but each student is required to submit their own work for all assignments. Assignments should be neat, but not necessarily typed. It will typically consist of five to ten problems, often with multiple parts. Each problem is weighted equally unless otherwise indicated on the assignment.

Submit your work according to the assignment submission guidelines provided by your instructor.

Laboratory Work:

This course has laboratories that can be performed anywhere using inexpensive electronics parts. There is no scheduled time and place for labs. You can do them any time you want between receiving the assignment and the due date, and any place you find convenient.

Performing the labs involves obtaining the necessary components, putting together circuits on a breadboard, taking measurements with the instrument, doing some calculations with your measurements and writing up the results. Extensive written lab reports are not required, nor are a lab notebook. Most lab results can be written on one sheet of paper.

Examination:

There will be two-hour midterm examination in week 6 and two-hour final examination during final exam week. The midterm exam will cover material up to the end of week 5. Note that the nature of the material means that concepts covered by the midterm will be needed to solve problems on the final.

The exams will typically have three to five questions similar to, but not identical with, the homework problems.

All examinations are two hour long, closed book, one-page of notes allowed. No programmable calculators or calculators holding textual information are permitted. Complex formulas (such as trigonometric identities) necessary for the solution of problems will be provided with the exam. The nature of the examination questions will be similar to homework questions.

To take your exam, please refer to the directions provide by your instructor.

Academic Integrity

Every member of the class is expected to conform to the highest standards of academic integrity. The following statements set forth these standards as I understand them to apply to the EE 215 class:

- Because your homework has a bearing on your grade, it must be your original work. You may compare homework answers and discuss problem solving methods with other students in the class, but the final result — the work you hand in — must consist of work that you and you only, have performed. When you write out the answers to be handed in, if you are copying from anything that you yourself have not generated, then that is cheating.
- Laboratory results must be your individual work. Copying measurements made by another person is cheating. So is letting someone copy your measurements.
- Examinations must be your individual original work. No discussion of any kind is allowed among students while taking an examination.
- Copying homework done by someone else outside the group, or copying old homework or the answer key, copying the work of anyone else on examinations, the use of unauthorized notes or other unauthorized aids during examinations, and knowingly permitting your work to be copied by other students are all examples of cheating. (A student who says "Can I copy your work so I can see how to do problem 1?" is setting both of you up for a very unpleasant experience. I recommend replying "OK, AFTER the due date — not before.") During an examination, you may ask the instructor questions if

you do not understand some aspect of a problem statement, or if you are unclear about what is required. Please try not to ask questions about your answer, such as "Am I doing this the right way?" or "How do I do problem 1?" (You laugh, but some people actually ask questions like this during exams, and get upset when they get a look of annoyance rather than an answer.)

- If you cheat, you cheat yourself of the opportunity to learn the material, and you cheat your classmates — all of your classmates — out of grades they have earned. If you let someone else copy your work, you are allowing them to devalue your grade and that of your fellow students. Cheating is a bad way to embark on a career in engineering. Cheaters make bad engineers, and you should be a good one. You can help by not tolerating cheating by your fellow students. The TAs and I will monitor for cheating and I will resolve all cheating cases in accordance with College of Engineering and University policy. About the worst thing that could happen is writing up someone who is not actually cheating. Please help avoid this by avoiding even the appearance of possible cheating. Cheating can result in failure of the course and/or eventual expulsion from the University.

Basic Computer Requirements:

- You should have basic computer literacy before entering the course.
- You should know how to create and edit a text file, and how to save and find files in a directory tree.
- You should be able to install and use software on your own computer.
- You should be able to use command line interaction using the computer keyboard, for example at the DOS prompt in a DOS Window or at a shell prompt on a UNIX-like system.
- You should be familiar with the use of a graphics interface such as a recent version of Microsoft Windows or the X window system in a UNIX-like system.
- You should know what it means to click or double click, and how to drag and drop.
- You must have access to the Internet and have an e-mail account. These are required for the course. Of course, this implies that you are also familiar with the use of a recent version of an Internet browser such as Netscape or Internet Explorer.
- You should know how to search the Web for information, and how to download and save files from the Internet.