ELECTRICAL & COMPUTER ENGINEERING DEPARTMENT
PORTLAND STATE UNIVERSITY
FALL 2013

Course: ECE 221 Electric Circuits

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Office Hours: MW 2:30 – 3:30 pm, TR 10:30 – 11:30 am. I will be glad to meet with you other times by appointment.

Overview: This course is an introduction to dc electric circuit analysis. Sound exciting? Well, it should – this is the foundation of everything we do in EE. The concepts and techniques you learn in this class will be used in every EE class that follows. We cover basic analysis of resistive circuits using Ohm's and Kirchoff's laws, then learn simplifying techniques such as series and parallel resistance. The important circuit analysis concepts of node and loop analysis, superposition and equivalent circuits are emphasized. Lastly, we introduce inductors, capacitors and ideal op amps.

Course outcomes – by the end of this quarter, you should be able to:

1) analyze (i.e., solve for current, voltage and power) resistive circuits using basic laws;

2) perform node and loop analysis, including determining which method is most efficient for a given circuit;

3) apply the circuit theorems of superposition and equivalent circuits, including an understanding of when these methods are used;

4) analyze circuits containing ideal operational amplifiers;

5) solve problems illustrating the i-v behavior of inductors and capacitors.

Text: Electric Circuits, Nilsson and Riedel, 9th Ed. (either hard copy or e-book)

Tutoring: The lecture TA is Tejas Tapsale (tejas@pdx.edu). He will be helping out in class, holding office hours (these will be posted on D2L), and will be available for one-on-one or small group tutoring. There is also free tutoring available from the IEEE student section in the Circuit Lounge (bottom of the stairs in FAB.) Go to http://www.ieee.pdx.edu/ for more information. And you're also encouraged to come to my office hours! Please don't be afraid to ask – these resources are here for you to get help on homework problems and answers to questions we don't have time for in class.

Online Resources - D2L: Course information including lecture notes, occasional handouts, homework solutions, exam reviews and grades will be on D2L (http://d2l.pdx.edu/.) If you are new to D2L, go to http://psuonline.pdx.edu/ to get started. You will need an Odin account, and you should be automatically added to the D2L course when you register for this class.

The lecture notes were written by another instructor and I may not follow them exactly, but they are an excellent resource and you are highly encouraged to print them out and bring them to class to reduce note-taking.

Online Resources – MasteringEngineering and Homework: MasteringEngineering (ME) is a resource provided by the textbook publisher and requires that you purchase an access code. This textbook and the access code are used for all of 221/2/3. You need to register on ME at

www.masteringengineering.com using the access code that comes with the new textbook or that you purchase separately. *Please do this within the next couple days so that any registration problems can be sorted out this week.* When you get registered, you will see the ECE 221 course. The course ID is **ECE221F13**. There is an Introduction to ME assignment there already which you should work through to get used to the system. Later assignments will be posted as they are ready. Please let me know if you have any problems!

ME is designed to help you learn the material and do the homework problems. There are interactive and video tutorials, homework hints and immediate feedback on whether your answer is correct. This is the third year we are using ME for this class. There are some quirks which can lead to some frustration, but the majority of students have recommended using it again. Here are some lessons learned:

- Problems on ME usually have different numbers than those in the book.

- You have 10 attempts to enter the correct answer; don't burn through them all just trying things randomly! If you are stuck, get help before your attempts are used up.

- It is possible there is an error in the solution on ME, but it is far more likely you've made an error. If you really think the solution is wrong, let me know, but check your work carefully first.

- Be careful of rounding errors in repeated calculations; you can round off your *solution,* but carry more decimal places through the calculations.

- Be careful of specific directions. ME often asks for answers in specific units or format.

Homework will generally be assigned each Wednesday and due the following Wednesday by the beginning of class. You will do most of the homework on ME, though some, particularly LTSpice simulations, may be submitted in class. Solutions will be posted after assignments are turned in. Late homework will not be accepted without a good reason.

Doing the homework is extremely important in this class - *the only way to learn the techniques of circuit analysis is by practice!* Doing the homework will help you to keep up with the class (you *don't* want to be trying to learn this material the night before the midterm!) and to be prepared for the types of problems you will see on the exams.

Online Resources – Recorded Lectures: This class is recorded and the video is available on echo360.pdx.edu. A direct link to the lectures will be posted on D2L when I get it. The recorded lectures are a useful resource if you need to miss class, but I hope you will attend class in person the majority of the time. You lose the opportunity to ask questions, work in groups and get real-time help if you don't come, and the experience of the whole class suffers.

Software: The program LTSpice will be introduced in this course and used in homework assignments as well as in the lab. LTSpice is also called SwitcherCad III. It is a free program available from Linear Technology at http://www.linear.com/company/software.jsp. You can easily download it to your own computer. There is not a lot of documentation available from LT itself, but there is a lot of other web support. There is a Yahoo group for LTSpice at http://groups.yahoo.com/group/LTspice/. They have many files for download, including several tutorials and an extensive (290+ page) manual.

MATLAB (www.mathworks.com) will also be used, though primarily in the lab. More information on MATLAB is in Lab 2 and on LTSpice in Lab 4.

Also, if you don't have one yet, now is a good time to invest in a good scientific calculator. You will need one that solves linear simultaneous equations for this class, and equations with complex numbers in ECE 222.

Lab: Information on labs is in the lab syllabus. Although you register for them separately, the lab is an integral part of this course and it is required that the lab and lecture be taken together. You will get the same grade for both with the lab being 20% of the total grade.

Exams: Exams are closed book, with one formula sheet allowed. The sheet can contain formulas only, no worked examples, and will be turned in with the exam. If you have to miss an exam you must discuss it with me beforehand if at all possible; make-ups will only be given for compelling reasons.

If you are a student with a documented disability and registered with the Disability Resource Center (DRC), please contact me well before the first midterm to make appropriate accommodations. DRC can be reached at 725-4150.

Grading: If the class average is > 80%, grading is done by standard percentages, i.e. 90 and above = A, 80 - 89 = B, 70 - 79 = C, etc. If the class average is < 80%, a standard curve is used. Plus and minus grades are used for borderline cases at the instructor's discretion. Your evaluation will be based as follows:

> Homework ---------- 10%
> 2 Midterms --------- 40%
> Final exam ---------- 30%
> Lab ------------------- 20%

Academic Honesty: We take academic honesty very seriously. Our department policy is to report all instances of plagiarism or cheating to the university. See http://www.pdx.edu/ece/ece-academic-honesty for a detailed description of procedures and penalties.

Schedule: The following schedule is subject to change; if you miss class check D2L to verify exam dates.

Week	Dates	Topics	Chapters
1	9/30-10/4	Introduction, Circuit Variables	1
2	10/7-11	Elements and Basic Laws	2
3	10/14-18	Resistive Circuits	3
4	10/21-25	Catch-up, Review, **Midterm 10/25**	
5	10/28-11/1	Node and Mesh Analysis	4.1 – 4.8
6	11/4-8	Operational Amplifiers (lab project)	5
7	11/11-15	**Holiday 11/11,** More Analysis Techniques	4.9 – 4.13
8	11/18-22	Catch-up, Review, **Midterm 11/22**	
9	11/25-29	Capacitors and Inductors, **Holiday 11/29**	6
10	12/2-6	Catch-up, Review	
	Mon. 12/9	**Final Exam 12:30 pm**	

More detailed information will be given as we go along as to which specific sections should be _read_ (read slowly and carefully, work through examples problems yourself, make notes and bring questions to class,) which should be _skimmed_ (read quickly to get the main ideas, don't worry about the details or working through the examples) and which can be skipped.