

**Electrical & Computer Engineering Department
Portland State University**

Spring 2016

Course: ECE 222 Circuit Analysis II
Instructor: R. Tymerski
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Office Hours: For current office hours please check:
<http://www.pdx.edu/ece/faculty-office-hours>

Tutors: TA information is provided in a separate document on the webpage. Also, please make use of my office hours, and the free tutoring available through IEEE. Go to <http://www.pdx.edu/ece/tutoring-resources> for times and location. You can also ask the lab TAs questions about the class but their primary duty is the lab.

Overview: This course continues exploring the techniques of circuit analysis begun in 221. We begin by analyzing the time response of first- and second-order circuits. Secondly, we introduce phasor notation and the concept of complex impedance to analyze the steady-state behavior of circuits driven by sinusoidal sources. Finally, we extend the phasor concept to the more general Laplace transform. Laplace analysis can incorporate both transient and steady-state responses for many signal types. At the conclusion of this course, students will be able to:

- 1) analyze first-order circuits;
- 2) analyze second-order circuits;
- 3) use phasors for steady-state sinusoidal circuit analysis;
- 4) understand the Laplace transform and its importance;
- 5) apply the Laplace transform to circuit analysis;
- 6) use standard laboratory equipment such as a protoboard, multimeter, power supply, function generator, and oscilloscope
- 7) design, analyze, simulate and build tunable resonant circuits

Text: *Electric Circuits*, Nilsson and Riedel, 10th Edition, chapters 7 – 9 and 12 – 13.

Software: The program LTspice will be used extensively in this course for homework assignments as well as in the lab. LTspice is a free program available from Linear Technology at <http://www.linear.com/designtools/software/>. 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.

Mastering Engineering: “ME” is an online homework resource from the textbook publisher. If you did not have 221 last quarter, 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 a day or two so that any registration problems can be sorted out this week.* When you get registered, you will see the ECE 222 course. The course ID is **ECE222Spring16**. There is an Introduction to ME assignment, which is not for credit, but you should work through it just to get used to the system. Please let me know if you have any problems.

Here are a few points concerning using ME:

- You have a limited number of 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.

Homework: Homework generally will be assigned each Tuesday and due on ME the following Tuesday by the beginning of class. Doing the homework is extremely important in this class. The only way to learn the techniques of circuit analysis is by practice! We will go over the problems in class and solutions will be posted on the course webpage. Late homework will not be accepted.

Exams: There will be one midterm, weekly quizzes, and a final. Exams are closed book, with one page (front and back) of notes and formulas and with no worked problems. This note page must be turned in with the exams.

NO make-up exams will be given. If a compelling reason exists why an exam is missed you will need to provide documentation to the instructor.

If you are a student with a documented disability and registered with the Disability Resource Center (DRC), please contact me within the first two weeks of class, and also *email me a few days before each exam to remind me*. DRC can be reached at 725-4150.

Lab: The labs are posted on the course website, i.e. the instructor's web site in the ECE222 section. Although you register for it separately, the lab is an integral part of this course; lab and lecture must be taken concurrently.

Students will need to work with a partner and stay with that partner throughout the term.

If you want to work alone or in a group of three you will need to get permission from the TA *and* from the instructor. The lab is an integral part of the course and it is required that the lab and lecture be taken together. Lab reports will need to be handed in to the Lab TA in a timely fashion.

Academic Honesty: We take academic honesty very seriously. Our department policy is to report all instances of plagiarism or cheating to the university. If you are not sure what constitutes plagiarism, ask and we'll talk about it. Simply put – turn in only your own work or credit the source.

Grading: All grading is done on the curve. Your evaluation will be based on the following:

Homework -----	10%
Midterm -----	20%
Quizzes -----	20%
Final exam -----	30%
Labs. -----	20%

Schedule: The following schedule is tentative and may be adjusted as the course progresses. If you miss class be sure to check for changes in assignments or exams.

<u>Week</u>	<u>Dates</u>	<u>Topic</u>	<u>Reading</u>
1	03/29-03/31	Introduction, 221 Review, First-Order Circuits	7.1 – 7.2
2	04/05-04/07	Step and natural response of First-Order Circuits	7.3 – 7.5, 7.7
3	04/12-04/14	Second-Order Circuits	8.1 – 8.5
4	04/19-04/21	Phasors, sinusoidal steady-state analysis	9.1 – 9.4
5	04/26-04/28	Circuit laws (KCL, KVL) in the frequency domain	9.5 – 9.9
6	05/03-05/05	Introduction to the Laplace transform; Midterm exam	12.1 – 12.2
7	05/10-05/12	Laplace Transform concepts	12.3 – 12.5
8	05/17-05/19	Applying the Laplace Transform	12.6 – 12.9
9	05/24-05/26	Circuit Analysis with the Laplace Transform	13.1 – 13.5
10	05/31-06/02	Convolution, Review	13.6 – 13.7
11	06/07	Final Exam 1730-1920	

Note well the dates and time for the exams:

Quizzes: on average one per week
Midterm: May 05, during class time
Final: June 07, 1730 – 1920