

# ECE 2100 Circuit Analysis

Syllabus for Summer I, 2009



Lecture: Rm. C-229 @10:30 am MWF

Lab: Rm. B-215

Instructor: Dr. Dean Johnson

Office: Rm. B-228 West Parkview

Email: johnson@wmich.edu

Hours: MWF 9:30 to 10:30 a.m.

## Course Objective

The purpose of this course is to study electric circuits composed of R, L and C elements using methods based on Kirchhoff's laws and network theorems. Also model RL, RC, and RLC filter circuits with 1<sup>st</sup> and 2<sup>nd</sup> order differential equations and perform transient and sinusoidal steady state analysis of such circuits.

## Materials Used in Class:

1. **Text:** C. K. Alexander and M. N. O. Sadiku, Fundamentals of Electric Circuits, 4<sup>th</sup> ed., McGraw-Hill, Boston, 2008 (ISBN 0-07-352955-9).
2. **On-line homework registration** for textbook: [www.aris.mhhe.com](http://www.aris.mhhe.com) (Select the textbook author above from the "Engineering" subject.) There is a \$15 fee required. During registration, indicate that you don't have a registration code. Create a password, and enter the following section code: **4E9-D4-3B8**
3. **Lab notebook** (permanent bound --spiral or hardbound), pages lined with square grid; alternating white and yellow or blue paper (yellow/blue paper used for copies to be turned in to the lab instructors).
4. **Resi-Pro Model 61-312 Digital Multimeter**, available from ECE office. Alternatively: **Sears Craftsman 82139 Multimeter**.
5. **Linear Technology, LTspice/SwitcherCAD<sup>TM</sup> III**, available at no cost at <http://www.linear.com/designtools/software/>. This software will be used to simulate circuits and is available in the CAE center and in the ECE 2100 laboratory.
6. **Safety goggles**. No admittance to the lab w/o goggles. See ECE office.

**Exams:** There will be three hourly exams, The 1<sup>st</sup> exam will be before Memorial day. The 2<sup>nd</sup> exam will be after Memorial day. A 3<sup>rd</sup> final exam will be held on the last day of class, June 24. The 3<sup>rd</sup> exam will be comprehensive over all course material. Students are *required* to attend all exams as announced; failure to do so will in a zero score for any examination not attended (if an emergency arises, you must email the instructor *before* any examination)

**Lab work:** 12 experiments. Most laboratory experiments require prelab work in the form of written calculations in your lab notebook or computer simulations. If you don't show up for a lab, you forfeit the points associated with the entire lab that week, and generally cannot later make up the lab. Exceptions will be made only for those individuals who contact their lab instructor *before* the lab, giving an adequate reason why they cannot attend that day. Contact your lab instructor at his/her office hours for help with lab calculations. Note: you must also achieve a passing grade in the lab in order to pass the entire course.

**Homework:** (See point 2 above). HW problems are submitted on-line and change each time they are viewed. May be done more than once to improve score, until due date. Start early to earn best scores.

**Grading:** Grades will be determined on the basis of the following guaranteed grade scale:

|            |      |          |    |
|------------|------|----------|----|
| Exam I     | 20%  | 93 - 100 | A  |
| Exam II    | 20%  | 87 - 92  | BA |
| Homework   | 10%  | 80 - 86  | B  |
| Lab Work   | 25%  | 74 - 79  | CB |
| Final Exam | 25%  | 68 - 73  | C  |
|            | 100% | 63 - 67  | DC |
|            |      | 58 - 62  | D  |
|            |      | 0 - 57   | E  |

**WMU Honesty Policy:** Attempting to obtain credit for work (lab, hw, exams) done by somebody else is illegal and punishable in this class. You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate (pp. 274-276) [Graduate (pp.25-27)] Catalog that pertain to Academic Honesty. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse.

## GENERAL COURSE OUTLINE, ECE 2100 SUMMER 2009 (Tentative: May be adjusted)

| Week                     | Lecture/Lab Topic  | Reading      |
|--------------------------|--|--------------|
| <b>May</b>               |  |              |
| 4 6 8<br>45<br>67        | Circuit Concepts and Laws<br><a href="#">Safety &amp; Rules</a> & <a href="#">Notebooks</a><br><a href="#">Ohm's Law</a> | Chapters 1,2 |
| 11 13 15<br>1112<br>1314 | Circuit Analysis with R's<br><a href="#">Series and Parallel Circuits</a><br><a href="#">Basic DC Meter Design</a>       | Chapter 3    |
| 18 20 22<br>1819<br>2021 | Circuit Theorems<br><a href="#">Nodal and Mesh Analysis</a><br><a href="#">Superposition &amp; Thevenin's</a>            | Chapter 4    |
| 27 29                    | Op-Amps  | Chapter 5    |

|                          |   |               |
|--------------------------|---|---------------|
| <b>June</b>              |   |               |
| 1 3 5<br>12<br>34        | L and C's, 1 <sup>st</sup> Order Circuits<br><a href="#">Op-Amp Circuits</a><br><a href="#">Waveforms &amp; Oscilloscopes</a> | Chapters 6,7  |
| 8 10 12<br>89<br>1011    | 2 <sup>nd</sup> Order Circuits<br><a href="#">RC Circuit Step Response</a><br><a href="#">RLC Circuit Step Response</a>       | Chapter 8     |
| 15 17 19<br>1516<br>1718 | Sinusoids, Phasors & Analysis<br><a href="#">Circuit Element AC Response</a><br><a href="#">RC Filter Frequency Response</a>  | Chapters 9,10 |
| 22 24<br>2223            | AC Power<br><a href="#">AC Power and PFC</a>  | Chapter 11    |