

# EEL 3111C: CIRCUITS 1

<http://mil.ufl.edu/3111/>

## INSTRUCTOR

Dr. Eric M. Schwartz MAEB 321 392-2541 [ems@mil.ufl.edu](mailto:ems@mil.ufl.edu) Office Hours: [Mon 2:00-3:30pm](#), [Wed 3-4pm](#), [Thur 1-1:40pm](#)

## LECTURES

Tues & Thur, 2<sup>nd</sup> – 3<sup>rd</sup> (9:30am-12:15pm, NEB 101) with Dr. Schwartz

## LAB SECTIONS (NEB 250)

<del>7658 T 5-10pm (OO)</del>	7660 W 5-8pm (OO)	7657 <del>F</del> R 12:30-3:30pm (OO)	7129 R 5-8pm (OO)
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## REQUIRED TEXTBOOK (Share, Borrow, Buy, or Rent one of the below. See website for more info)

James W. Nilsson and Susan Riedel, *Electric Circuits*, 9<sup>th</sup> Edition, 2011, Prentice Hall, Boston. ISBN-10: 0-13-611499-7, ISBN-13: 978-0-13-611499-4. <http://www.pearsonhighered.com/product?ISBN=0136114997>

## PRE- OR CO-REQUISITES

Pre: PHY 2049 (Physics with Calc 2), MAC 2313 (Analytic Geometry & Calc 3); Co: MAP 2302 (Differential Equations)

## REFERENCES

- Many authors & editions: *Schaum's ... Electric Circuits*.
- Many other electronic circuit analysis textbooks are available at the Marston Science Library for checkout.

## COURSE OBJECTIVES (ABET: 4 credits of Engineering Design) [Lab fee: \$33.16]

To obtain proficiency in the basic analysis techniques for both DC and AC electric circuits and to become skilled in the use of a (Spice) circuit analysis program. (*ABET: The topics in this course are part of the fundamental theory of electrical engineering and provide depth in the analysis, design, and implementation skills in those areas of electrical engineering needed to solve problems in the domain of electrical engineering.*)

## TA OFFICE HOURS

You may go to any TA available (in NEB 250), not just the one teaching your lab section. The instructor will hold office hours (posted above and on our web page) or by appointment. You are encouraged to use e-mail to communicate with the instructor and TAs.

TA name	Ode Ojowu
office hours	Tues 5-6:30pm; Wed 3-5pm; Thur 3:30-5pm
e-mail	<a href="mailto:ojowu.ode@gmail.com">ojowu.ode@gmail.com</a>

## CLASS WEB SITE (<http://mil.ufl.edu/3111/>)

Various information including the following may be posted on our class web site: periodic postings of the class grade book (without names), class examples, homework assignments, lab assignments and handouts, previous semester exams, class notes (available for a limited time only—get them while you can), and other helpful information. Selected class materials will also be available on our class web site.

## CLASS ATTENDANCE AND BEHAVIOR

Class attendance is not mandatory, but all classes are important. Missing a class may be hazardous to your grade. There will be pop (unannounced) quizzes and possibly schedule quizzes. A missed quiz cannot be made up. (See *Course Requirements* below for policy on missed quizzes.) If you miss a class, **you** are responsible to find out what occurred in that class, e.g., a homework or reading assignment or an exam date changed. Please arrive to class on time (especially if homework is due).

Turn off all cell phones, beepers, laptop sound effects, and other noise making devices **before entering** our classroom. If a noise-making device goes off during class, I reserve the right to **lower your course grade**. If a noise-making device goes off during an exam, you will lose a significant number of points on this exam.

## EXAM

All exams will be given in class. The dates of the exams will probably be as shown, but I reserve the right to change these dates if necessary.

Suggestions for maximizing your exam results:

- Arrive on time.
- Bring at least two sharp pencils with erasers.

## Exam Schedule

#	Date	Time	Location
1	<del>Thur, 2 June</del> Tues, 7 June	9:30 am	In Class
2	<del>Tues, 5 July</del> Thur, 7 July	9:30 am	In Class
3	<del>Tues, 26 Jul</del> Thur, 28 July	9:30 am	In Class
4	Thur, 4 Aug	9:30 am	In Class

- Be sure that your calculator is operating properly with enough power for the entire exam period.
- Turn off calculator beeps and other sounds **before** the exam. These sounds are distracting to other students.
- Read the instructions and questions carefully. Failure to understand a problem often results in a wrong answer!
- Partial credit is **rarely** given on exams in EEL 3111.
  - For full credit, you **must** show **all** work in the spaces provided. Your solution must be neat, logically presented and complete.
  - Limits are necessary on all integrals as are the integration variables, e.g.,  $dt$  or  $d\omega$ , etc.
  - Units **must** be included with the answers. Time ranges, if applicable, **must** also be included with the answers.
  - Quantities on opposite sides of an equal sign **must** truly be equal.
  - Considerable points are deducted for errors whether due to carelessness or ignorance. [If a plane crashes due to a circuit failure, do we care if it was due to a careless error or ignorance?]
  - Points may be deducted for sloppy presentation or if difficult to grade for some other reason.
  - See also **EXAM RE-GRADE POLICY** below.

### CALCULATOR

You will need a calculator that can convert between polar and rectangular forms of complex numbers and operate directly with complex numbers. The calculator should also solve simultaneous equations, in matrix form, with complex matrix elements. You will need this calculator for homework, and possibly quizzes and exams. Popular calculators include: Texas Instruments TI-89 ~\$150, TI-86 (used for ~\$50), HP-50G ~\$150.

### Lab Kits

During your first lab, you will be given a parts kit that includes the following: a myDAQ (a measurement and control device), a breadboard, a wire kit, miscellaneous circuit elements, and a DVD with myDAQ software, ELVIS software, and MultiSim.

### COURSE REQUIREMENTS (IMPORTANT!!!)

- Perform all laboratory experiments. A grade of 65% or better in Lab is **required** in order to obtain a passing grade. Your lowest lab will be dropped. But use this drop wisely, i.e., do **not** just skip a lab since all labs are important and your next missed lab may be unavoidable. If you need to miss a single lab, it's ok; you can **not** make up the missed lab. (You should do this lab on your own.) **If you have a valid reason for missing this lab, get documentation for your first missed lab and hold on to it.** If you miss a **second** lab, you must show the **professor** (not the TA) **written documentation for BOTH your first and your second missed labs.** This documentation should be official and from a doctor, judge, etc., so that a make-up can be arranged. You must notify the professor **prior** to your scheduled second missed lab or **as soon as possible after** your second missed lab.
  - Labs **must** be done at scheduled times.
  - An average lab grade of **65% or higher** is required to be **eligible** to **pass** the class!
- 1. Do all homework assignments and turn them in **within the first 3 minutes of class.**
  - **Late homework will not be accepted.**
- 2. A quiz can happen at any time, during any class, i.e., quizzes are generally not announced ahead of time. You should therefore not miss class.
  - **Missed quizzes cannot be made up.**
  - **The same policy for missed labs (as described above) applies to missed quizzes.**
- 3. Take **4** during-term exams. Some students may be exempt from exam 4.
  - **No makeup exams will be given except for a medically documented incapacity or family emergency. If possible, you must receive advance permission from me to miss an exam.**

### STUDENTS WITH DISABILITIES

Students requesting classroom, laboratory or exam accommodations must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation.

### UF COUNSELING SERVICES

Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
- SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

### STUDENT PRIVACY (more on last page)

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. Please see the last page of this document form more information.

### SOFTWARE USE

All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### HOMEWORK AND EXAM SOLUTIONS

Solutions to homework will be made available on our class web site. Practice exams (some with solutions) may also be posted. Current exam solutions will be discussed in class immediately after the exams are returned (hopefully at the class following the exam). Exam solutions will **not** posted on our web site.

All grades are **non-negotiable one week** after the grade is posted. Please don't come to me after the final grades have been posted with a hard-luck story.

### COURSE GRADE DETERMINATION

Midterm Exams (3@16%)	48%	
Laboratory	20%*	(Lab values vary, i.e. it could count as 1/3 a lab, a single lab, a double lab, etc.)
Homework/Quizzes	12%	(5-20 homework, 0-20 quizzes)
<u>Last Exam</u>	<u>20%</u>	
Total	100%	

- \* The last exam **MAY be optional** to those who meet several requirements. To be eligible to skip the last exam, you must have a homework/quiz and lab average above 80%. You must also have grades of no less than 75% on **each** of the other exams. Additional requirements will be given during the last week of class. Only top students will have this option.
  - \* **A homework/quiz average of less than 60% will result in a 1/3 letter grades reduction.**
  - \* **A homework/quiz average of less than 40% will result in a 2/3 letter grades reduction.**
  - \* **A homework/quiz average of less than 20% will result in a full letter grades reduction.**
- \* Perform all laboratory experiments. A grade of 65% or better in Lab is **required** in order to obtain a passing grade. Your lowest lab will be dropped. But use this drop wisely, i.e., do **not** just skip a lab since all labs are important and your next missed lab may be unavoidable. If you need to miss a single lab, it's ok; you can **not** make up the missed lab. (You should do this lab on your own.) **If you have a valid reason for missing this lab, get documentation for your first missed lab and hold on to it.** If you miss a **second** lab, you must show the **professor** (not the TA) **written documentation for BOTH your first and your second missed labs.** This documentation should be official and from a doctor, judge, etc., so that a make-up can be arranged. You must notify the professor **prior** to your scheduled second missed lab or **as soon as possible after** your second missed lab.

Note: All grading percentages are subject to change at professor's discretion. Students will be notified of any changes.

### GRADING POLICY

UF grades are often distributed according to the following **rough** distribution:

A: 10%      B: 35%      C: 45%      D&E: 10%

This usually works out to mean that if you make class average you will earn close to a "C+" or "B-". If you score 10 percent above the class average, you will probably earn a "B." If you score 20 percent above class average, you will probably earn an "A." **This is not a contract on grading.** Rather, this information serves to provide you a rough understanding of your academic standing at any time during the semester. Grades are periodically posted on the class web site. **It is your responsibility to check your grades regularly** since mistakes often happen when dealing with a large number of students and TAs. **All grades are final one week after posting.** After curving exams as needed, course grades are assigned using the 70 (C), 80 (B), and 90 (A) cuts.  $[86.\bar{6} \rightarrow 89.\bar{9}$  (A-),  $83.\bar{3} \rightarrow 86.\bar{6}$  (B+)]

All grades are **non-negotiable one week** after the grade is posted. Please don't come to me after the final grades have been posted with a hard-luck story.

The UF grading policies for assigning grade points can be found on the following undergraduate catalog web page: <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>.

Part of your grade on exams, labs, homework, quizzes, etc. is based not only on solving the problem you are presented with, but the manner in which you solve it. For example, there is a difference between two designs that meet the given specifications, but one is an elegant, modular 3-element solution, while the other is an obfuscated 5-element design that also meets the specifications but would be difficult to extend later. Just as your future employer would value the latter design less than the first, so will I in grading your assignments.

### HOMEWORK GRADING

We may not collect homework this semester. If we do collect homework, then homework is due in the classroom at the **start** of any of our class periods. When homework is returned, students should compare their solutions to the posted solutions since homework grading is only cursory. **Late homework will not be accepted.**

### IN-CLASS QUIZ GRADING

In-class quizzes will cover material previously covered in assigned readings, homework, class or lab. Quizzes may happen during any class; they are not generally announced beforehand. **Missed quizzes can not be made up, but your lowest quiz (or homework) is dropped. Therefore, missing a single quiz will not hurt your grade.** See the Course Requirements above for the policy for missed quizzes.

### DROPPING AND BRIGHT FUTURES

Several new policies were implemented with Bright Futures in Fall 2009. Students must **refund** the cost of any dropped or withdrawn Bright Futures funded course. Full-time students must earn 24 semester hours per academic year. If you drop a course, you still must earn 24 semester hours per academic year in order to continue with Bright Futures funding. For more information, please contact the UF Student Financial Affairs office (<http://www.sfa.ufl.edu/programs/brightfutures.html>, phone: 352-392-1275).

### MULTIMEDIA CLASS/AUDIENCE NOTES

Audience notes are normally available from the class web site every week or so for the subsequent week or more of classes. The notes consist of pdf versions of the class PowerPoint slides with some space for note taking. These notes are not required but are **highly** recommended. Check the class web site for information on exactly when the notes are available.

**For optimal performance**, read the notes and examples for a class **before** that class and bring the **printed class notes and examples** to class to augment the printed material with your own notes. Notes will be removed shortly after they are covered in class.

### EXAM RE-GRADE POLICY

If you believe an error has been made on an exam score you must make a **written** request to the instructor explaining where the misgrading or error occurred. This request must be submitted **immediately at the end of the class in which the exam is returned**. If you do resubmit an exam, however, the instructor reserves the right to scrutinize and grade the **entire** exam more closely. This definitely places your current score at risk. Consequently, it is not advisable to resubmit an exam for correction unless a blatant error, such as a miscalculation of total points, has been made. You **must** make it clear what writing you added to the exam (by clear indication, e.g., use a different color pen or pencil) after it was returned to you.

### ACADEMIC HONESTY

All students admitted to the University of Florida have signed a statement of academic honesty committing them to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action.

This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others.

### CHEATING

**CHEATING WILL NOT BE TOLERATED.** We will actively search for cheaters. If you are caught, there will be no negotiations. You will fail the course and get reported to the honor court. There are **no excuses and no exceptions**. You may talk to other students about homework and lab assignments, but the final work **must** be your own. If you are caught cheating on **any** assignment (homework, lab, quiz or exam), the **smallest** penalty possible is failure of the course. During a recent semester many students were caught with partly copied lab assignments. If this happens this semester, all of the guilty students will earn an "E" in the course. A meeting with the instructor will determine **additional penalties**, none of which are desirable or pleasant (*i.e.*, cheating in this course will result in a failing grade in the course, initiation of honor court charges, and possibly expulsion from the university). If you know someone is cheating, **it is your responsibility to report it**. We have and will continue to prosecute cheaters by turning them over to the office of Student Judicial Affairs. For more information about cheating, see the URLs: <http://www.dso.ufl.edu/judicial/>. For the copy of the UF Honor Code and consequences of academic dishonesty, please refer to <http://www.dso.ufl.edu/sccr/honorcodes/honorcode.php>.

### WORKING TOGETHER

You are encouraged to work with other students on **homework** assignments, but in a professional manner.

**You must do independent work on labs.** Although you may **consult** with other students, TAs, or Professors, you **must** do independent work. Consulting means "**seeking opinions or advice**" **not** getting working programs or designs, understanding them, and then modifying them to make them your own. The latter constitutes cheating (see above section). Working side-by-side to construct a program or design in a group constitutes cheating. (Solving labs are good practice for solving quizzes and exams, which are also **not** group activities.)

### LABORATORY GRADING

**You will not be admitted to the lab without a pre-lab**, *i.e.*, answers to questions, and printouts of **ALL** your circuit diagrams and simulations. All of these and the associated computer files must be emailed to 311luf@gmail.com **BEFORE** the start of your lab. **Proper subject headings are required**. The subject should have the following information: First Last

Section# Lab#, with each field separated by a single space. For example, Tim Tebow 1515 LAB1, is a possible subject line. There should be **NO OTHER characters**, in the subject.. Each circuit diagram, must have your name (computer) printed at the top. **ALL** simulations should be clearly annotated. Grading emphasis will be placed upon your producing well documented, well structured design circuitry that realizes the functional requirements specified by the lab handout and the lab instructor. The remaining portion of your grade will result from observations by your lab instructor on such matters as your understanding of the lab, your lab techniques, your pre-lab preparation, your lab results and your cooperation and compliance with the rules. Having your design perform properly does **not** guarantee a grade of 100, but makes a 100 grade **possible**. Lab designs and/or software that are similar and/or identical to other student's work constitute cheating (see above) and will be given a grade of 0 and reported to the professor for further discipline (and may result in failing the course, honor court charges, or expulsion). There will be a quiz at the beginning of most labs. If you are late for a lab, you will get a zero for the quiz.

#### **RULES OF CONDUCT IN THE LABORATORY**

1. No food, drinks or smoking in the lab.
2. Students work **individually** on each lab project.
3. It is the student's responsibility to return all equipment and clean her/his work area before leaving the lab.
4. Students must attend labs during their assigned time. If you cannot attend your normal lab, this lab will be your single (free) dropped lab.
5. Students must come prepared to the Lab. ***No student will be admitted to the lab without the pre-lab work in hand.*** Your files, if any, must be submitted by email **BEFORE** the start of your lab.
6. You must show up within 30 minutes of the lab starting time for check-in or you will not be admitted. If you are late, you may miss a lab quiz and thus get a zero for the quiz.
7. Labs are precisely 3 hours long. You will be given no extra time.

#### **LABORATORY ATTENDANCE**

Laboratory attendance during scheduled times is mandatory. **Documented** personal or family emergency will be accepted as an excuse for absence for a **second** missed lab if documentation for a first missed lab is also provided. In such cases, consult your **instructor** (**not** your TA) about a make-up lab **as soon as possible**. See **Course Requirements** for more details. Students should make serious attempts on **all** labs. Grades less than 50% may be interpreted as not a serious attempt and may be scaled to 0.

You will **not** officially makeup your first missed lab. You should do this missed lab at home (or, if necessary, during a TA office hour) to be sure you understand the required material.

If you cannot finish the lab during the allotted time, you will lose at least 10% to 30% off your final score. You are expected to finish the labs on time.

### LABORATORY TOPICS

Lab Number	Start Date	Topic
0	Tues, 17 May	
1	Tues, 24 May	
2	Tues, 31 June	
3	Tues, 7 June	
4	Tues, 14 June	
5	Tues, 28 June	
6	Wed, 6 July	
7	Wed, 13 July	
8	Wed, 20 July	
9	Wed, 27 July	

### EEL 3111 Schedule: Summer Semester, 2011 (Part 1 of 2)

WEEK/DAY	DATE	LAB #	Lecture #	Tentative Weekly Topics / Comments
1	M	9-May		Introduction to EEL 3111 Definitions, Voltage, Current, Passive-Sign Convention (PSC) Kirchhoff's Laws
1	Tu	10-May	1	
1	W	11-May		
1	Th	12-May	2	
1	F	13-May		
2	M	16-May		Single-Mesh Circuit Analysis Two-Node Circuit Analysis, Resistor Combinations $\Delta$ -Y Resistor Transformations
2	Tu	17-May	0	
2	W	18-May	0	
2	Th	19-May	4	
2	F	20-May		
3	M	23-May		Dependent Sources MultiSim and PSpice Nodal Analysis, Mesh Analysis More Nodal and Mesh Analysis Examples Superposition, Source Transformation
3	Tu	24-May	+	
3	W	25-May	1	
3	Th	26-May	1	
3	F	27-May		
4	M	30-May		<b>Holiday: Memorial Day</b> Thévenin's Theorem, Norton's Theorem Max Power Transfer and Examples; Review <del>EXAM 1: in class</del>
4	Tu	31-May	7	
4	W	1-Jun	2	
4	Th	2-Jun	8	
4	F	3-Jun		
5	M	6-Jun		<del>EXAM 1: in class</del> Ideal Operational Amplifiers (Op Amps) Op Amp and Cascaded Op Amp Examples Capacitance and Inductance, Circuits with Switches
5	Tu	7-Jun	9	
5	W	8-Jun	3	
5	Th	9-Jun	10	
5	F	10-Jun		
6	M	13-Jun		RL & RC Circuit Analysis, Transient Analysis RL & RC Transient Analysis, Time Constants, Examples
6	Tu	14-Jun	4	
6	W	15-Jun	4	
6	Th	16-Jun	12	
6	F	17-Jun		
M-F	20-Jun – 24-Jun		No Class	<b>Summer Break</b>

**SYLLABUS**

Revision 4

**EEL 3111 Schedule: Summer Semester, 2011 (Part 2 of 2)**

WEEK/DAY	DATE	LAB #	Lecture #	Tentative Weekly Topics / Comments
M-F	20-Jun – 24-Jun		No Class	<b>Summer Break</b>
7 M	27-Jun			Transient Response in PSpice, Transient Analysis Unit Step Function, Pulse Response Review
7 Tu	28-Jun	5	13	
7 W	29-Jun	5		
7 Th	30-Jun	5	14	
7 F	1-Jul			
8 M	4-Jul		No class	<b>Holiday: Independence Day</b>
8 Tu	5-Jul	<del>No lab</del>	15	<b>EXAM 2:</b> in class
8 W	6-Jul	6		Complex Numbers, Sinusoids, Phasors
8 Th	7-Jul	6	16	Phasors Relationships, Impedance and Admittance
8 F	8-Jul			Network Functions, Poles, Zeros, Decibels
9 M	11-Jul			
9 Tu	12-Jul	6	17	
9 W	13-Jul	7		
9 Th	14-Jul	7	18	
9 F	15-Jul			
10 M	18-Jul			AC Circuit Analysis Bode Magnitude & Phase Plot (Line Approximations) Average Power Maximum Power Transfer, RMS Value, Power Factor
10 Tu	19-Jul	7	19	
10 W	20-Jul	8		
10 Th	21-Jul	8	20	
10 F	22-Jul			
11 M	25-Jul			Complex Power, Power Factor Correction, Review <b>EXAM 3:</b> in class  <b>DROP DEADLINE</b>
11 Tu	26-Jul	8	21	
11 W	27-Jul	9		
11 Th	28-Jul	9	22	
11 F	29-Jul			
12 M	1-Aug			Power Measurement  <b>EXAM 4:</b> in class
12 Tu	2-Aug	9	23	
12 W	3-Aug			
12 Th	4-Aug		24	
12 F	5-Aug			

**Please print this page and submit it during our first class!**

**STUDENT PRIVACY**

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. Because of these laws (which we are now under strict instructions to enforce), assignments must not have your name on them or they must be returned individually. Exams will be returned individually (as I call each of your names). To do this for homework and quizzes (that have grade of 0, 1, or 2 in this course) would take too long. If you give expressed, written permission, these rules can be waved. If not, you can retrieve that assignment from my office within 1 week of the date I return it in class; after that, the assignment will be destroyed (shredded). Please sign the note at the end of this syllabus and indicate if you waive or do not waive your privacy.

Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_

**Desired** E-mail (not necessarily UF): \_\_\_\_\_ (please **print** clearly)

Password: \_\_\_\_\_ (up to 10-digit, is used to retrieve grade information; please **print** clearly)

Your password must be **10** alphanumeric **digits or less**. Please write down this password, email it to yourself and **save this email**.

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I **WAIVE / DO NOT WAIVE** my right to privacy. By waiving my privacy rights, I am allowing Dr. Eric M. Schwartz and the EEL 3111 teaching assistants to return graded homework, quizzes, and lab assignments (but **NOT** exams) in any way they see fit.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Please print this page and submit it during our first class!**