

## University of Texas at El Paso

### EE 2151: Lab for EE 2351 Electric Circuits II

FALL 2017

**Instructor:** Eric Galvan

**Office Location:** E325

**Email:** egalvan4@miners.utep.edu

Email anytime.

**Office Hours:** 11:00 am – 1:00 pm, Friday.

**Lab Day/Time:** Monday 10:30 am – 1:20 pm

Tuesday 7:30 am – 10:20 am

Friday 1:30 pm – 4:20 pm

**Laboratory Room:** E333

**Prerequisites:** EE 1105 or EE 1110 with a grade of "C" or better.

**Laboratory Description:** Use of oscilloscopes, function generators, and power supplies to test and study electrical networks and their behavior. Technical writing and computer aided circuit analysis and design.

#### **Laboratory Requirements:**

- **Composition Notebook (Lab Log):**
  - Name on front cover
  - Table of contents on the first page
  - Number all pages. Write numbers on the bottom right hand side of the page.
  - All labs must be in this order: Prelab -> Lab Assignment/Data Collection -> Conclusion/Lab Report (Report and answer questions if any)
- **Prelab:**
  - Have it ready to turn in at the beginning of lab hours.
  - All prelabs must be turned in individually.
  - All prelabs must be done on your lab logs.
- **Grading Labs:** I will grade the lab logs and prelab during lab hours.

- **Work:** Can be done in groups of two but everyone must have their own individual log and work done.
- **Lab Data:** Please attach all of your lab data onto your logs. Lab data may be print outs of your simulations or pictures of your data (i.e. Circuit Boards, Measurements, etc.).
- **Reports:**
  - Must be done on your logs.
  - Please write legibly or type out your conclusion.
  - Answer all questions (if any).
  - At least 1 paragraph discussing expected/calculated data vs. experimental data.
  - Compare measurements and explain how you arrived at those results.
  - Write any interesting details about any problems you might have encountered during your lab.

### **Food and Drink Policy**

There is a No Food and Drink policy in the lab. Students who bring food and/or drinks into the lab will be asked to leave.

### **Evaluation and Grading**

Grading will be based upon a weighted average of quizzes and lab work (lab exercises and reports). Unannounced quizzes may be given at the beginning or during any class. No make up will be given for missed quizzes. Make up of missed labs will only be allowed for students with medical reason that prevents their attendance (written notification from doctor required), military duties (notification to be provided in advance) and for other compassionate reasons. Business related activities, car problems, and over sleeping are not considered compassionate reasons. Each lab exercise will be evaluated in the following manner: **Prelab 20%, lab work 50%, and report 30%.**

<b>Evaluation</b>	
Lab work and reports	80% of final mark
Quizzes	20% of final mark

Letter grades will be assigned according to the following scale:

<b>Grading</b>	
<b>A</b>	100-90%
<b>B</b>	89-80%
<b>C</b>	79-70%
<b>D</b>	69-60%
<b>F</b>	59-0%

## Attendance

Class attendance is mandatory and will be monitored. It is the student's responsibility to sign the attendance sheet provided by the instructor for each class. Absence in more than 2 classes for any reasons will result in being dropped from the class with F. Drops with W only with proper justification.

## Proposed Outline for EE 2151: Lab for EE 2351 Electric Circuits II

By: Eric Galvan

(Content subject to change)

1. **LAB EXERCISE 1: Introduction of Simulation Software Using Multisim.**
  - 1.1 Students will perform node voltage and mesh current analysis on a Wheatstone Bridge Circuit.
  - 1.2 Students will simulate the Wheatstone Bridge circuit on Multisim.
2. **LAB EXERCISE 2: Introduction to Basic Circuits on Breadboard**
  - 2.1 Students will build the Wheatstone Bridge circuit from their prelab on the breadboard.
  - 2.2 Students will measure voltage, current, and power using the multimeters from lab.
3. **LAB EXERCISE 3: Introduction to Oscilloscopes and Function Generators**
  - 3.1 Students will receive training on the use of basic electronic test equipment such as oscilloscopes and function generators.
  - 3.2 Students will use the Function Generator to generate waveforms with specific shapes and voltages.
  - 3.3 Students will measure and verify the signal parameters using the Oscilloscope.
4. **LAB EXERCISE 4: Analysis of Op-Amps.**
  - 4.1 Students will use Oscilloscope and Function Generator to analyze basic Op-Amp function.
  - 4.2 Students will determine the gain, cut-off frequency, and saturation of the selected Op-Amps.
5. **LAB EXERCISE 5: Sinusoidal Steady State Analysis**
  - 5.1 Students will analyze, simulate, and construct two separate RLC circuits with a sinusoidal source.
6. **LAB EXERCISE 6: Steady State Power Analysis**
  - 6.1 Students will analyze, simulate, and build an RL circuit with average and complex power.
7. **LAB EXERCISE 7: Natural Response of RC and RL Circuits**

- 7.1 Students will analyze, simulate, and build RC/RL circuits to gain a full understanding of their nature.
- 7.2 Students will learn about the time constant  $\tau$  and the transient response of capacitors and inductors.
- 8. LAB EXERCISE 8: Transient Response of Second Order RLC Circuits**
- 8.1 Students will analyze, simulate, and build RLC circuits to gain a full understanding of their nature.
- 8.2 Students will explore the 3 types of responses by building the circuits.
- 8.3 Students will identify the parameters that determine the type of response.
- 9. LAB EXERCISE 9: Frequency Response and Filters**
- 9.1 Students will experimentally investigate the magnitude and phase frequency response of several circuits, and applications of these circuits.
- 10. LAB EXERCISE 10: Filters and Transfer Functions**
- 10.1 Students will design and implement a 3-way audio crossover.
- 11. LAB EXERCISE 11: Make Up Lab**
- 11.1 Students have the opportunity to make up an unfinished lab.

**EE 2151 Lab for EE 2351 – Electric Circuits II - Timetable – Fall 2017**

Day, Date	Lab Topic(s)	Lab Assignment
Week – 2	1. Introduction of Simulation Software Using Multisim.	- Perform node voltage and mesh current analysis on a Wheatstone Bridge Circuit. - Simulate the Wheatstone Bridge circuit using Multisim.
Week – 3	2. Introduction to Basic Circuits on Breadboard	- Build the Wheatstone Bridge circuit from lab 1 on the breadboard. - Measure voltage, current, and power using the multimeters.
Week – 4	3. Introduction to Oscilloscopes and Function Generators	- Training on the use of basic electronic test equipment such as oscilloscopes and function generators.
Week – 5	4. Analysis of Op-Amps.	- Use Oscilloscope and Function Generator to analyze basic Op-Amp operation. - Determine the gain and saturation of the selected Op-Amps.
Week – 6	5. Sinusoidal Steady State Analysis	Analyze, simulate, and construct two separate RLC circuits with a sinusoidal source.
Week – 7	6. Steady State Power Analysis	- Analyze, simulate, and build an RL circuit with average and complex power.
Week – 8	7. Natural Response of RC and RL Circuits	- Analyze, simulate, and build RC/RL circuits to gain a full understanding of their nature.
Week – 9	8. Transient Response of Second Order RLC Circuits	- Analyze, simulate, and build RLC circuits to gain a full understanding of their nature.

Week – 10	<b>9. Frequency Response and Filters</b>	- Experimentally investigate the magnitude and phase frequency response of several circuits, and applications of these circuits.
Week – 11	<b>10. Filters and Transfer Functions</b>	- Design and implement a 3-way audio crossover.
Week – 12		
Week – 13	<b>11. Make Up Lab</b>	- Opportunity to make up any unfinished lab.

## INSTITUTIONAL POLICIES

### Academic Dishonesty

As an entity of The University of Texas at El Paso, the Department of Electrical and Computer Engineering is committed to the development of its students and to the promotion of personal integrity and self-responsibility. The assumption that a student's work is a fair representation of the student's ability to perform forms the basis for departmental and institutional quality. All students within the department are expected to observe appropriate standards of conduct. Acts of scholastic dishonesty such as cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in the whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts will not be tolerated. Any case involving academic dishonesty will be referred to the Office of the Dean of Students. The Dean will assign a Student Judicial Affairs Coordinator who will investigate the charge and alert the student as to its disposition. Consequences of academic dishonesty may be as severe as dismissal from the University. See the Office of the Dean of Students' homepage (Office of Student Life) at <http://studentaffairs.utep.edu/dos> for more information.

### American Disabilities Act

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, or by email to [cass@utep.edu](mailto:cass@utep.edu), or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at <http://sa.utep.edu/cass/>

### Discrimination

The University of Texas at El Paso does not discriminate, on the basis of age, gender, color, ethnicity, national origin, religion, disability, or sexual orientation. Members of the UTEP community are protected from discrimination and harassment by State and Federal Laws.

I acknowledge that I have received the syllabus for EE 2151 (Lab for EE 2351 Electric Circuits II) for the Fall 2017 semester and that I understand all its contents, i.e., attendance, evaluation and grading, policies, and other requirements of the course.

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Student's printed name

Signature

Date