

**Instructor:** John Moya <jmoya@utep.edu>

**TA:** Michael Mikhael <mmikhael@miners.utep.edu>

### Course Description:

Applied lab portion of EE3338. Material includes advanced circuit analysis, Diodes, Op Amps and MOS transistors.

### TA and Instructor Hours:

	T	W	Th	F
Checkouts (TA)	10:30 – 1:20	10:30 – 1:20		10:30 – 1:20
Checkouts (Dr Moya)		1:20 – 3:30		1:20 – 3
Checkouts (TA)				3 – 5:50
Possible Open lab (TA)	3 – 5:50		3 – 5:50	

### Course Materials:

Lab assignments will be handed-out the week or so before they are to be worked on. A bounded notebook (i.e. a composition notebook) is required for this lab.



### Course Goals:

Students who successfully complete this course are expected to:

- ✓ Demonstrate competence using common EE measurement instruments, such as oscilloscopes, for the measurement of capacitors, current, voltage, etc.
- ✓ Understand basic techniques for analyzing data.
- ✓ Understand basic concepts for designing circuits including components such as Diodes, Op Amps, and transistors.
- ✓ Demonstrate competence in written technical communications.

### Course Rules and Regulations:

1. **Absences:** It is imperative that students make every effort to attend and keep up with lab. Makeups will be very difficult, not guaranteed and may be impossible. Students who miss a laboratory may show a valid excuse, medical or otherwise, in writing to the class instructor, for consideration. In general, a maximum of one lab may be considered for makeup. **STUDENTS WHO MISS MORE THAN 30% OF LABS SHOULD EXPECT A FAILING GRADE.**
2. **Labwork: No Late Work Is Acceptable.** Prelab must be completed before students start the lab. Prelab work may be checked at lab. Follow the lab report format as concerns entering prelab results into your lab notebook. The only acceptable format for the rest of the lab report in your notebook is that given in the laboratory report handout. Lab reports should be completed by end of lab unless otherwise noted. Lab grading will be done in Blackboard using the following scale:

- 1: Lab work completed, good lab results, prelab completed, lab report format followed, checkout questions answered, etc.  
0: Requirements in 1 not completed.

Grades will be determined based on percentage of total points earned using a standard 100% to 0% grading scale (100% to 90% is an A, <90% to 80% is B, etc.). A passing grade (at least a C) will require approximately 70% of labs to be completed. If 8 labs are presented, this means that 6 must be finished to pass.

**3. Accommodation under the ADA:**

If you feel you may have a disability that requires accommodation, contact the Center for Accommodations and Support Services at 747-5148, go to room 106E Union, or e-mail [cass@utep.edu](mailto:cass@utep.edu).

- 4. Academic Conduct.** Academic dishonesty will not be tolerated. Discussions are allowed, but you must submit ONLY your work. It is the official policy of the university that all suspected cases or acts of alleged scholastic dishonesty must be referred to the Dean of Students for investigation and appropriate disposition. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination, doing a lab, etc. for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

Dean of Students link:

<http://studentaffairs.utep.edu/Default.aspx?tabid=4333>

**5. Lab Summary**

**Lab 1: Sinusoidal Steady State Response of Passive Circuits**

**Topics:** Transfer functions, frequency response, Bode plots, filter characteristics, inductor and capacitor measurement techniques, 10% to 90% rise/fall time, voltage division, KVL, measuring circuit properties and LT Spice simulation.

Work week: Sept 7 – Sept 11

Checkout week: Sept 14 – Sept 18

**Lab 2: A Basic Op Amp Circuit and its Properties**

**Topics:** 741 datasheet, Op Amp circuit properties (measurement of input and output resistance, open and closed loop gain, output voltage and current saturation), resistance measurements with multimeter

Work week: Sept 14 – Sept 18

Checkout week: Sept 21 – Sept 25

Lab 3: **Op Amp Integrator, Differentiator and 1<sup>st</sup> Order Filter Circuits**

**Topics:** Integrators, Differentiators, Lowpass and Highpass filters

Work week: Sept 21 – Sept 25

Checkout week: Sept 28 – Oct 2

Lab 4: **Non-Ideal, Non-DC Op Amp Characteristics**

**Topics:** LM741 Datasheet, open-loop gain, slew rate, unity-gain frequency, cutoff frequency

Work week: Sept 28 – Oct 2

Checkout week: Oct 5 – Oct 9

Checkout Catchup Week: Oct 12 – Oct 16

## Rules for a Lab Notebook

For legal reasons, such as seeking a patent, engineers need to keep a proper lab notebook. This notebook should be a bounded notebook (e.g., a composition book) that does not have pages that can be removed or added easily. (**Thus, three-ring binders and spiral notebooks are not appropriate for this purpose.**) Also, in keeping with the latter idea, gluing and/or stapling anything into the notebook is not allowed. However, if necessary, items may at times be taped into the notebook. In such cases, the tape-paper edge should be initialed to show that the item could not be easily removed and replaced. Taping should never be done if something can be easily written.

The records in an engineer's notebook are legal documents, and as would be expected for such documents, certain rules are utilized. For instance, when possible, all entries in the notebook should be made with nonerasable ink directly into the notebook. These entries may be handwritten or printed, but must be legible. When mistakes occur, these should not be blacked-out or ripped out. Mistakes are crossed-out with one line (~~a mistake~~). An assumed mistake may later be found to not be a mistake at all and may be important. An engineer (patent attorney, manager, etc.) may need to be able to read what was thought to be a mistake. Also, not erasing and not using pencils is very important in a court action. An engineer should be able to show that changes in the notebook were not easily made at a later date. In general, all entries must be permanent and legible.

Beyond the above techniques for entering data, an engineer must also number, date and initial each entry page in the notebook. Another person should periodically review the notebook and then initial and date each reviewed page as well. For convenience in referencing, a table of contents should also be maintained for the notebook and several pages at the beginning of the notebook should be saved for this purpose.

Examples of the latter page formats for this lab can be seen below. Note that the lab report format contains a title, a summary, and then data (in this case your prelab and lab work). Conclusions are optional, but when included contain a summary of important observation. Make sure to read the notes on the lab report format example, especially on the left page.

<i>Table of Contents</i>	
<i>Lab Title</i>	<i>Page</i>
<i>Lab 1: Engineering Notebooks</i>	<i>2</i>
<i>Lab 2: One Hot Discovery</i>	<i>10</i>

<p>1</p> <p><i>Write only on the right page to start. You can then add extra notes or things that you left out on the left page as needed.</i></p> <p>Do not type the whole lab report or the prelab up on a computer and then attach it to your notebook. You can temporarily record answers on a sheet of paper and then transfer them to the notebook. Only tape in what is absolutely necessary, i.e. something that would take a long time to transfer or that could not be transferred via writing to the notebook (a detailed picture printout, a photo, a data plot or similar). When taping in data, the edge where the tape and notebook page meet would normally be initialed to show that the added material was not removed and replaced later. These steps with taped material are important for legal reasons.</p>	<p>9/4/2007 JAM <span style="float: right;">2</span></p> <p><i>Lab Title (e.g., Lab 1: Engineering Notebooks)</i></p> <p><b>Summary</b>  <i>In this section, briefly and in your own words, state what you are to do in the lab.</i></p> <p><b>Prelab</b>  <i>In this section, record prelab data and answer prelab questions. <b>If you must attach a data sheet, photo, etc. to your notebook, use tape. Do not staple or glue pages.</b></i></p> <p><b>Lab Work</b>  <i>Record lab results.</i></p> <p><b>Conclusions/Summary</b>  <i>Only record conclusions if there is a profound statement to be made. For instance, "I just discovered how to turn water into transistors." Or "The new resistance that will reduce the electrocution problem is 500 ohms."</i></p>
---	---

<p>3</p>	<p>9/4/2007 JAM <span style="float: right;">4</span></p> <div style="text-align: center;"> <p>The diagram consists of a rectangular border. At each of the four corners, the word "JAM" is written in a large, stylized, cursive font. In the center of the rectangle, the word "Picture" is written in a smaller, plain font.</p> </div>
----------	---

**A lab notebook is not useful unless the author can be identified.** For this lab, make sure to list information like your name, phone number, e-mail address, class (EE3138), and lab meeting time on the notebook cover.