Course Information

Meeting day and time: M-R, 8:30 am – 11:20 am
Room: Engineering Building E333
Course designation: EE 3138-002
CRN: 36251

What is this course about? EE 3138 is the laboratory course that complements Electronics I. In the laboratory you will learn to conduct experiments that allow you to figure out the behavior of the three major electronic devices: diodes, MOSFETs and BJTs. You will also learn how to design, simulate, and build circuits like transistor amplifiers, logic gates, and AC-to-DC converters.

What can I expect? It is assumed that students in this class have some practice with building circuits on breadboards, are able to use measuring instruments like the oscilloscope and multimeter and know how to set up power supplies and function generators. The students are expected to take an active role by completing readings and home assignments before class, coming to class ready to participate with peers and with the professor, and reviewing routinely for assignments and exams. In this course, we have evidence that every student can achieve if they are motivated to be an active learner!

Instructor Information

Jesus J. Gutierrez, Ph.D.
Assistant Professor of Instruction
Office: ENGR A-338
Office Hours: M-R 11:30 am – 1:00 pm
E-mail: jjgutierrez4@utep.edu

Course Materials

- **Textbook (Optional):** Learning the Art of Electronics: A Hands-On Lab Course
  Thomas C. Hayes and Paul Horowitz
  Cambridge University Press, 2016, 1140 pages
  ISBN: 978-0-521-17723-8

- **Textbook (Optional):** The Art of Electronics, 3rd Edition
  Paul Horowitz and Winfield Hill
  Cambridge University Press, 2015, 1120 pages
What should you bring to class everyday:

- Pen/pencil and paper/notebook for taking notes.
- TI-85 scientific calculator or equivalent (no TI-Nspire allowed in exams)
- Laptop with access to the internet.
- Access to LTSpice

Course content will be delivered through Blackboard. Also, important class announcements will be delivered via Blackboard and/or e-mail. Please make sure your UTEP e-mail is working, and you have stable access to the internet.

LTSpice is a free, open-source SPICE simulator software developed by Analog Devices, Inc. that includes a graphical schematic capture interface. To download and install LTSpice, visit:

If a student has no computer with access to the internet, from UTEP’s Technology Support Center has borrowing services for laptops and tablets:
https://www.utep.edu/technologysupport/TSCenter/TSC_EQ_LaptopsTablets.html

UTEP’s Technology Support center also helps for technological needs beyond your scope of troubleshooting, so make sure you contact them if you encounter technical difficulties.

Corequisites

EE 3338 – Electronics I

Prerequisites

By Course (with grade of “C” or better):
EE 2351 – Circuits II

Course Outline

Topics covered in this laboratory include:

1. Measuring Imperfections of the Operational Amplifier, Reading Datasheets.
3. MOSFETs: Measuring Voltage and Current Curve, Switching Applications.
4. BJTs: Common Emitter Amplifier, Transistor-Transistor Logic.
6. Introduction to Logic Circuits, Logic gates using Transistor-Transistor Logic (TTL).
Relationship to (ABET) Program Outcomes

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics:
  *Students use mathematical and engineering concepts in the analysis and design of electronic circuits.*
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
  *Students make use of laboratory instruments to perform measurements, plot data, and predict behavior based on said data to obtain a conclusion.*

Rules and Policies

How is your grade determined?

Student achievement will be assessed by completing the pre-lab assignments and lab assignments, based on a point grade. All grades are protected by the Privacy Act of 1974.

Your course grade will be determined by your weighted performance in the following categories:

1. Lab Assignments (5)..............100%

   90% – 100%    → A
   80% –  89%    → B
   70% –  79%    → C
   60% –  69%    → D
   0% –  59%     → F

What are Lab Assignments?

A Lab Assignment is a document that contains all the information needed that will be applied during the lab session. This includes background information and theory, pre-lab assignment instructions and questions to be completed before the lab, and lab assignment instructions and questions to be completed in the lab.

What is the Procedure for the Lab Assignments?

1. You must read the complete lab assignment and complete the pre-lab assignment questions before coming into the lab.
2. You will turn in the pre-lab assignment to be graded by the lab instructor, and once it is graded and received, you can start the lab assignment.
3. You will complete the tasks outlined in your lab assignment during your lab session by building the circuit, using the equipment, making measurements, and completing the questions.
4. When you finish a deliverable from the lab assignment, call your lab instructor to check out your deliverable in the grade sheet.
5. Once you have checked out all deliverables, finish by answering the questions in the conclusion section.
6. Turn in your completed lab assignment to the instructor to be graded.
What will I achieve after taking this course? - Course Goals

- This course should prepare you to succeed in future Electrical Engineering courses. You will learn how to be an active learner in the lecture hall and how to actively study. Research has shown that students who do readings/assignments before class, actively participate in class, and review notes regularly can and will succeed in this and future courses. This course is designed to equalize your readiness for class, and your effort will pay off as you practice connecting the topics together and gaining confidence in your ability!

- This course will help you in learning how to learn. How do you know you are learning? When you make mistakes, you identify what you don’t know. Making mistakes is the key to learning. Recognizing knowledge gaps and asking questions is key to learning. It is best to make mistakes in homework and assignments when the stakes are low, so you are successful on higher stakes assignments.

- This course will provide you with the introductory concepts and skills to conduct experiments, perform measurements, and draw conclusions. At the end of the semester, you will:
  - Characterize the non-ideal properties of integrated chips like op-amps by measuring their offset currents and voltages.
  - Understand the principles of non-linear devices like diodes, MOSFETs, and BJTs by setting up an experiment that highlights the voltage-current behavior.
  - Design amplifier circuits like the common emitter, build the circuit using approximate component values, and compare the circuit results to the calculations.
  - Understand the different applications and roles that electronic devices have in digital systems by building a logic inverter and measure their input-output voltage.

- This course should excite you about circuits and electrical engineering in general. Throughout the semester I hope you ask yourself and me, why is this relevant to me? Some lessons will be more obvious as they relate to everyday devices and applications. I hope that the content we learn in this semester will cause you to ask more questions, and even leave you with more questions than answers! If I get you to read some circuits and electrical engineering material other than the book on your own, share it with me! I will be a happy professor.

How successful students have done well in this course? They always read the textbook and pay attention to what they are reading and reflect on what they are unsure about. They complete their homework on time with plenty of time to make mistakes and ask questions. They value taking notes and doing assignments as valuable tools to learn. They attend each class and come prepared. They are brave and vulnerable, meaning that they are willing to make mistakes, take the chance of drawing a circuit or a solution wrong, and attempt to answer the question by themselves before checking in with a peer. They review on their own every question to see if they could teach it to someone else. Successful students don’t just get the right answer and move on, they are able to explain how they arrive at that answer.
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 is the basis for departmental and institutional quality. All students within the Department are expected to observe appropriate standards of conduct.

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 for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

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.

You can also refer to the IEEE website for information on our code of ethics: http://www.ieee.org/about/corporate/governance/p7-8.html

American Disabilities Act

The University is committed to providing services, equipment, and accommodations to individuals with documented disabilities to provide them with equal opportunities to participate in programs, services, and activities in compliance with Sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990, and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. 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, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Discrimination Statement

I do not discriminate, nor will I allow discrimination, on the basis of race, color, national origin, sex, religion, age, disability, genetic information, veteran’s status, sexual orientation, or gender...
identity. Members of the UTEP community are protected from discrimination and harassment by the State and Federal Laws.

**University Resources**

**Technology Resources**

- **UTEP Technology Support:** Students experiencing technological issues or challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. [www.utep.edu/technologysupport](http://www.utep.edu/technologysupport)
- **UTEP Engineering Technology Center (ETC):** Provides laptop and computer repair services for engineering students, as well as service requests for software. [www.utep.edu/engineering/etc/](http://www.utep.edu/engineering/etc/)

**Academic Resources**

- **UTEP Library:** Access to a wide range of resources including online, full-text access to thousands of journals and e-Books, plus reference services and librarian assistance for enrolled students. [www.utep.edu/library/](http://www.utep.edu/library/)
- **Math Resource Center for Students (MaRCS):** Ask a tutor for help (including remotely) and explore available math resources like formula sheets, tables, and videos. [www.utep.edu/science/math/marcs](http://www.utep.edu/science/math/marcs)
- **Advancement Center for Engineering Students (ACES):** Students serving other students. Hybrid tutors provide tutoring for a wide range of topics including engineering, math and science, and also manages room reservations. [www.utep.edu/engineering/student-resources/student-resources-aces.html](http://www.utep.edu/engineering/student-resources/student-resources-aces.html)

**Individual/Well-Being Services**

- **YWCA Early Learning Academy:** Conveniently located on campus to serve the, YWCA’s Early Learning Academy is the best childcare solution for UTEP students, faculty, and staff. [https://www.utep.edu/student-affairs/early-learning-academy/](https://www.utep.edu/student-affairs/early-learning-academy/)
- **Military Student Success Center:** Assists personnel in any branch of service to reach their educational goals. [www.utep.edu/student-affairs/mssc/](http://www.utep.edu/student-affairs/mssc/)
- **Center for Accommodations and Support Services (CASS):** Assists students with ADA-related accommodations, for coursework, housing, and internships. [www.utep.edu/student-affairs/cass](http://www.utep.edu/student-affairs/cass)
- **Counseling and Psychological Services:** Provides a variety of counseling services including individual, couples, and group sessions, as well as career and disability assessments. [www.utep.edu/student-affairs/counsel](http://www.utep.edu/student-affairs/counsel)