ECE 2102 – Laboratory for Circuits II
Course Syllabus

University of Texas at El Paso
ECE 2102 – Laboratory for Circuits II
Spring 2024

Course Information

Meeting days and times:
- Monday – 9:00 am – 11:50 am
- Thursday – 9:00 am – 11:50 am
- Friday – 9:00 am - 11:50 am

Room:
- Engineering Building E333

CRN:
- Monday - 27587
- Thursday - 25905
- Friday - 27588

What is this course about? EE 2151 is the laboratory course that complements Circuits II. In the laboratory you will learn how to use measurement equipment like oscilloscopes and multimeters, as well as learn how to program signal generators and DC supplies. You will also learn how to conduct experiments that will help you better understand the behavior of the circuits that we see in class, like DC networks, op-amps, passive and active filters, and more. Finally, you will learn a little bit of technical writing and how to use computer programs like LTspice to simulate circuits.

What can I expect? It is assumed that students in this class have some practice with building circuits on breadboards. 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 – W: 3:00 pm – 5:00 pm
- T – R: 2:00 pm – 4:00 pm
E-mail: jjgutierrez4@utep.edu

Course Materials

• Textbook (Main):
  Fundamentals of Electric Circuits, 7th Edition
  Charles Alexander & Matthew Sadiku
  ISBN: 978-1-26-022640-9

• FREE PDF Textbook (Optional):

Do not feel intimidated if you’ve never been to a professor’s office hours. We are here to help you! You can come alone or with a friend. You can talk about the course, advice for future courses to take, and how things are going outside school. I have an open-door policy, so if I’m in my office, you can come in at any time!
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**Circuit Analysis and Design**
Ulaby, Maharbiz, Furse
Oxford University Press, 2018

- **What should you bring to the lab:**
  - Pen/pencil and paper/notebook for taking notes.
  - Breadboard and Circuit Components
  - Laptop or Mobile Device 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: [https://www.analog.com/en/design-center/design-tools-and-calculators/LTspice-simulator.html](https://www.analog.com/en/design-center/design-tools-and-calculators/LTspice-simulator.html)

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](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 2351 – Circuits II

**Prerequisites**
By Course (with grade of “C” or better):
EE 1105 – Laboratory for EE 1305

**Course Outline**

Topics covered in this laboratory include:

1. Use of laboratory equipment: Multimeter, Oscilloscope, DC Supply, Signal Generator.
4. Introduction to Circuit Simulation with LTSpice.
5. Design of frequency selective filters, passive and active.
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 (10)..................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 for the pre-lab assignment and 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.
7. Every three weeks you will have a make-up week for doing a lab assignment that was due the previous three weeks. For example, you will have a make-up week for assignments 1-3.
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:
  - Use laboratory equipment proficiently, like the oscilloscope, multimeter, signal generator and DC supply.
  - Perform measurements in both steady-state and transient-state, and DC and AC
  - Simulate circuits using software tools like LTspice to validate measurements.
  - Design circuits like op-amps, AC power transfer, first and second order circuits, frequency-selective filters, and integrators and differentiators.

- 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.
Course Calendar

This is a tentative schedule of the course topics, and assignments, subject to change.

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
<th>Assignment Due</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 15-19</td>
<td>No Lab</td>
<td></td>
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<tr>
<td>2</td>
<td>Jan 22-26</td>
<td>1. Introduction to Measurements</td>
<td>Pre-Lab 1, Lab 1</td>
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<tr>
<td>3</td>
<td>Jan 29 – Feb 2</td>
<td>2. Introduction to Computer Aided Design</td>
<td>Pre-Lab 2, Lab 2</td>
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<tr>
<td>4</td>
<td>Feb 5-9</td>
<td>3. Introduction to Lab Equipment</td>
<td>Pre-Lab 3, Lab 3</td>
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<td>5</td>
<td>Feb 12-16</td>
<td>4. Introduction to IC chips: the op-amp</td>
<td>Pre-Lab 4, Lab 4</td>
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<tr>
<td>6</td>
<td>Feb 19-23</td>
<td>4. Introduction to IC chips: the op-amp</td>
<td>Pre-Lab 4, Lab 4</td>
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<tr>
<td>7</td>
<td>Feb 26- Mar 1</td>
<td>Make-Up Week</td>
<td>Make-Up Week</td>
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<tr>
<td>8</td>
<td>Mar 4-8</td>
<td>5. RL and RC circuits: Transient Analysis</td>
<td>Pre-Lab 5, Lab 5</td>
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<td>9</td>
<td>Mar 11-15</td>
<td>SPRING BREAK – NO CLASSES</td>
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<td>10</td>
<td>Mar 18-22</td>
<td>6. RLC circuits: Transient Analysis</td>
<td>Pre-Lab 6, Lab 6</td>
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<td>11</td>
<td>Mar 25-29</td>
<td>7. AC circuits: Steady-State Analysis</td>
<td>Pre-Lab 7, Lab 7</td>
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<tr>
<td>12</td>
<td>Apr 1-5</td>
<td>Make-Up Week</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Apr 8-12</td>
<td>8. AC Circuits: Maximum Power Transfer</td>
<td>Pre-Lab 8, Lab 8</td>
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<tr>
<td>14</td>
<td>Apr 15-19</td>
<td>9. Frequency-Selective Circuits</td>
<td>Pre-Lab 9, Lab 9</td>
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<tr>
<td>15</td>
<td>Apr 22-26</td>
<td>10. Active Filters</td>
<td>Pre-Lab 10, Lab 10</td>
</tr>
<tr>
<td>16</td>
<td>Apr 29-May 2</td>
<td>10. Active Filters</td>
<td>Pre-Lab 10, Lab 10</td>
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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

Did you know? Bloom’s Taxonomy of Learning helps you categorize learning tasks based on their complexity. You should be able to do the lower tasks before moving on to more complex ones near the top. What kind of questions do you have trouble with on homework or exam? Practice what you have trouble with.
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 (e-mail, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. 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/
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)