

*University of Texas at El Paso*  
**EE 3338 – Electronics I**  
*Fall 2021*

## Course Information

Meeting day and time:	TR, 1:30 pm – 2:50 pm
Room:	BUSN 326
Final Exam:	Thursday, December 9 <sup>th</sup> , 1:00 pm – 3:45 pm
Course designation:	EE 3338 – 002
CRN:	16545
Credit hours:	3
Lecture hours:	3

**Course Description:** Introduction to electronic devices and circuits. Amplifier concepts, diodes, field effect transistor amplifiers, bipolar junction transistor amplifiers.

## Instructor Information

### **Jesus J. Gutierrez, Ph.D.**

Assistant Professor

Office: ENGR A-338  
Office Hours: MWF – 1:00 pm – 3:30 pm or by appointment  
E-mail: [jjgutierrez4@utep.edu](mailto:jjgutierrez4@utep.edu)  
Office Phone #: 915-747-8937

## Course Materials

### • **Textbook (Main):**

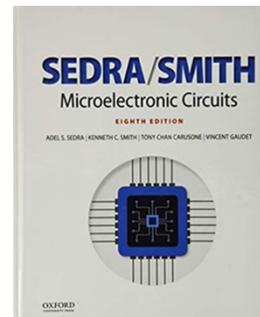
**Microelectronic Circuits, 7<sup>th</sup>, or 8<sup>th</sup> Edition**

A. S. Sedra, K. C. Smith, T. C. Carusone, and V. Gaudet  
Oxford University Press, 2020, 1296 pages

ISBN-10: 0-19-085346-8

ISBN (electronic): 978-0-19085-346-4

Companion Website: [www.oup.com/he/sedra-smith8e](http://www.oup.com/he/sedra-smith8e)



### • **Textbook (Optional):**

**The Art of Electronics, 3<sup>rd</sup> Edition**

Paul Horowitz and Winfield Hill

Cambridge University Press, 2015, 1220 pages

ISBN: 978-0-52-180926-9



- Pen/pencil and paper/notebook for taking notes
- TI-84 scientific calculator or equivalent (no TI-89 or Nspire)
- Computer or laptop with access to the internet
- Access to Multisim and/or LTSpice

Some 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.

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.

Students should maintain a well-organized notebook that archives their syllabus, lecture notes, homework problems, and tests. Students are also encouraged to purchase a USB Drive or use a cloud service like Dropbox or OneDrive to save their digital work.

## Corequisites

- EE 3138 – Lab for EE 3338

## Prerequisites

By Course (with grade of "C" or better):

- EE 2351 – Circuits II

By Topic:

- Knowledge of passive and active circuit components.
- Algebra and some calculus.
- Knowledge of circuit analysis techniques.

## Course Outline

Topics covered in this course include:

1. Signals, Amplifiers and their frequency response, circuit models for amplifiers.
2. Operational Amplifiers, ideal and non-ideal behavior, circuit configurations.
3. Introduction to semiconductors, doping, current flow, the  $pn$  junction.
4. The ideal diode, terminal characteristics and diode models, diode circuits
5. MOS field-effect transistors, physical principles of operation, I-V characteristics
6. Bipolar junction transistors, physical principles of operation, I-V characteristics
7. Transistor amplifiers, principles of operation, circuit models, and biasing.

## Course Outcomes

By the end of the semester, the student will demonstrate the ability to:

- Understand about the basic principles of amplifiers and their frequency response
- Understand the basic principles of semiconductor physics and the  $pn$  junction behavior and characteristics
- Understand about the physical principles of basic electronic devices like diodes, MOSFETs, and transistors, and their current-voltage characteristics.

## **Contribution to Professional Component**

EE 3338 is a junior level core course that builds on topics covered primarily in sophomore lower division required courses.

## **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 of electronic devices.*
- An ability to apply engineering design to produce solutions that meet specified needs:  
*Students use their newly acquired skills to design electronic circuits that meet specified behaviors.*
- Ability to communicate effectively with a range of audiences:  
*Students solve electronics problems and discuss topics with their fellow classmates and the professor.*
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies:  
*Students learn to use software to design and analyze electronic circuits.*

## **Rules and Policies**

### **Grading**

Student achievement in the course objectives will be assessed using a combination of in-class work, homework, quizzes, and exams. All student grades are protected by the Privacy Act of 1974.

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

Homework .....	40%	90% – 100% → <b>A</b>
Weekly Quizzes .....	30%	80% – 89% → <b>B</b>
Midterm Exam .....	15%	70% – 79% → <b>C</b>
Final Exam .....	15%	60% – 69% → <b>D</b>
		0% – 59% → <b>F</b>

For some students, there may be a “gray area” between two-letter grades in the final distribution, so two people getting the same weighted average grade could get different letter grades. If you are in one of these gray areas, whether you get a higher or lower grade depends primarily on two factors: (a) class participation and (b) whether your performance has been improving or declining over time.

### **Weekly Quizzes Policy**

At the end of each Thursday class, with some exceptions, there will be a small quiz covering the material from the previous week. The weekly quizzes will account for 30% of the final grade. The time allotted for the quiz will be no more than 15 minutes. No

notes or other material is allowed other than calculator, pen/pencil, eraser. Formulas will be provided if needed. Your quiz should be your own work. Students suspected of cheating or copying homework will be submitted to the Office of Student Conduct and Conflict Resolution (OSCCR) and will be part of your permanent record at UTEP.

## Homework Policy

- Homework is an integral part of the course. It is crucial that you promptly and effectively do all your homework, as it will be very useful for your learning and preparing for the tests.
- Your homework must be your own work. Students suspected of cheating or copying homework will be submitted to the Office of Student Conduct and Conflict Resolution (OSCCR) and will be part of your permanent record at UTEP.

### ~ Missed Homework ~

- There will be a due date for each homework assignment. If for some reason you cannot finish the homework on the due date, the grade will be reduced proportionately to the days passed after the due date (10% off for each day passed)

## Exam Policy

- There will be one midterm and one final exam, each accounting for 15% of the grade.
- Duration of the midterm exam will be one hour and twenty minutes.
- Duration of the exam will be two hours and forty-five minutes.
- You will only be allowed to have the materials that are required for the test (calculator, pen or pencil, eraser, one cheat sheet of your own handwriting with your name and UTEP ID clearly written on both sides of the paper).
- Full work must be shown for full credit. Work must be neat and well organized.
- The final answer must be boxed and given proper units.
- **Your exam should be your own work. Students suspected of cheating will be submitted to the Office of Student Conduct and Conflict Resolution and will remain part of your permanent record at UTEP.**
- The tentative schedule for the exams is shown in the chart below, subject to change:

Date	Exam
Thursday, October 21	Midterm
Thursday, December 9	Final

### ~ Missed Exams ~

A missed exam can be made-up IF AND ONLY IF:

- (1) the reason for missing the exam is beyond the student's control, e.g., such as a medical excuse, jury duty, death in the family or automobile accident, or
- (2) prior consent is obtained from the professor for missing the exam based on a non-frivolous reason, e.g., such as a job interview, conference, or out-of-town job-related travel. In either case, the student must submit a written and signed statement describing the reasons for missing the exam, with appropriate documentation, and petition for a makeup exam. Medical excuses require a note from the doctor. **A missed exam will carry zero grade if these conditions are not met.**

## **Attendance Policy**

Students are required to attend class and to show up to lectures on time. The course instructor reserves the right to turn away late comers and to withdraw students from the course that are repeatedly absent. Students missing more than two lectures should seriously reflect on their commitment to this course, as missing classes is highly correlated with poor performance. Students absent from lecture are still held responsible for all information discussed, homework assigned, and exams administered during that missed lecture.

## **Class Etiquette**

The following items are expected from you as part of being a student in the class:

- Ask questions! Despite how “silly” or “dumb” you may think your question is, it is very likely that other students have the same question. Confusion on even small details in course material can cause bigger problems and hold you back. If you are truly embarrassed by your question, send me an anonymous e-mail. I promise I will respond!
- Respond honestly to polls and provide real-time feedback to instructor about the course. This will contribute greatly to the quality of the course and your success in it.
- Visit the course instructor during office hours, or by appointment, if needed.
- Treat e-mail correspondence as a professional exchange of information.
- Turn off cell phones, pagers, or anything else that may distract the class.
- Take notes during class and read the assigned sections of the book.
- Bring all of your course materials (textbook, notebook, pens/pencils, paper, calculator) to every class.
- Show proper etiquette during class. Do not talk, make excessive noise, or otherwise distract the class. You will be asked to leave and it will affect your grade.

## **Course Calendar**

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

<b>Week</b>	<b>Dates</b>	<b>Topic</b>	<b>Assignments</b>	<b>No classes</b>
1	Aug 24-26	1. Signals and Amplifiers	-	
2	Aug 31-Sept 2	1. Signals and Amplifiers	-	
3	Sept 7-9	2. Operational Amplifiers	HW 1, Quiz 1	Sept 6
4	Sept 14-16	2. Operational Amplifiers	HW 2, Quiz 2	
5	Sept 21-23	3. Semiconductors	HW 3, Quiz 3	
6	Sept 28-30	3. Semiconductors	HW 4, Quiz 4	
7	Oct 5-7	4. Diodes	-	
8	Oct 12-14	4. Diodes	HW 5, Quiz 5	

9	Oct 19-21	5. MOS Field-Effect Transistors (MOSFETs)	Midterm Thursday Oct. 21	
10	Oct 26-28	5. MOS Field-Effect Transistors (MOSFETs)	HW 6, Quiz 6	
11	Nov 2-4	6. Bipolar Junction Transistors (BJTs)	HW 7, Quiz 7	
12	Nov 9-11	6. Bipolar Junction Transistors (BJTs)	HW 8, Quiz 8	
13	Nov 16-18	7. Transistor Amplifiers	HW 9, Quiz 9	
14	Nov 23-25	7. Transistor Amplifiers	-	Nov. 25-26
15	Nov 30-Dec 2	7. Transistor Amplifiers	HW 10, Quiz 10	Dec. 3

## 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](mailto: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](http://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.

## COVID-19 Statement/Precautions

Due to the ongoing global situation, please stay home if you (1) have been diagnosed with COVID-19, or (2) are experiencing COVID-like symptoms. If you are feeling unwell, let me know as soon as possible, and alternative instruction will be provided. The Student Health Center, located in the Union Building East, is equipped to provide COVID-19 testing.

The Centers for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. The vaccine is widely available in the El Paso area, and will be available at no charge on campus during the first week on classes. For more information about local rates, testing, and vaccinations, please visit [www.epstrong.org](http://www.epstrong.org)

## University Resources

UTEP provides a wide variety of student services and support:

### **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](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**

- 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)