ECE 351C Electronic Circuits

C E Chavez Rm 111, MonWedFri 10:00pm – 10:50pm

Description of Course

ECE 351C focuses on the analysis and design of microelectronic circuits. You will learn about diodes and diode circuits, operational amplifiers, MOS and Bipolar transistor circuits, digital and analog circuits, small signal models and the use of PSPICE to simulate your circuit performance. During the lab you will learn how to breadboard microelectronic circuits and use electronic test equipment for measurement and analysis.

Course Prerequisites

Prerequisites include ECE 320A.

Instructor and Contact Information

Instructor:	Dr. Dale Hetherington	
Office:	ECE 556F	e-mail dalehetherington@email.arizona.edu
Office Hours:	MonWed 9:00 am– 10:45 am, TuThur 12:00 pm– 1:45 pm	
Tas	Jude Coompson	email: jcoompson@email.arizona.edu
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Web online info: All information will be posted on the D2L site: ECE351C SP20. There is a separate D2L site for the ECE351C Lab.

Course Format and Teaching Methods

The format of the course includes both lecture and lab with an emphasis on active small-group problem solving. Problems will be practical and include design aspects and measurement issues. I will also spend time during the lectures to cover prep work for the lab assignments since labwork will be a very important part of your grade and learning experience.

Course Objectives and Expected Learning Outcomes

Objective is for the student will gain the practical knowledge of design and analysis of microelectronic circuits, both analog and digital. Emphasis will be placed on transistor circuits as these are the basic building blocks for integrated circuits.

The student will setup breadboard transistor circuits in the lab and effectively use lab test equipment such as power supplies, function generators, oscilloscope and multimeters to design, analyze and troubleshoot circuits. By the end of this course, the student will be able to:

1. Design and analyze simple circuits involving diodes and transistors both analytically (by hand) to meet given specifications, and to verify and evaluate such designs using a computer simulation program, such as PSPICE.

2. Design and analyze simple circuits involving diodes, such as clippers and rectifiers.

3. Design and analyze simple linear amplifier circuits using bipolar junction transistors.

4. Design and analyze simple linear amplifier circuits using MOS transistors.

5. Design and analyze simple logic circuits using either BJTs or MOSFETs.

Absence and Class Participation Policy

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at http://catalog.arizona.edu/2015-16/policies/classatten.htm

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable: http://policy.arizona.edu/human-resources/religious-accommodation-policy.

Absences preapproved by the UA Dean of Students (or dean's designee) will be honored. See http://uhap.web.arizona.edu/policy/appointed-personnel/7.04.02

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Students who miss class due to illness or emergency are required to bring documentation from their health-care provider or other relevant, professional third parties. Failure to submit third-party documentation will result in unexcused absences.

If you miss any of the lectures you are still responsible for all of the material presented.

Makeup Policy for Students Who Register Late

Students who register after the first class meeting up to three weeks into the class may make up missed some assignments/quizzes. Makeup exams will NOT be given except in the most extreme cases.

Course Communications

All information will be posted on D2L

Required Texts or Readings

Sedra, Adel S., and Smith, Kenneth C. Microelectronic Circuits. 7th ed., Oxford Univ. Press, 2015.

Required or Special Materials

PSPICE – See D2L Notes on how to download PSPICE Designer Lite. PSPICE will be used as part of your lab assignments. We will cover the use of PSPICE during some of the lectures.

Additional Text for Reference

Horowitz, Paul, and Hill, Winfield. The Art of Electronics. 3rd ed. Cambridge University Press, 2015.

Assignments and Examinations: Schedule/Due Dates

Homework sets will be assigned during the semester, but they will not be graded. Answers to assigned problems will be covered in class and made available on D2L. There will be three in-class exams and one final exam.

Exam #1 (Op Amps and Diodes)

Exam #2 (Diode Circuits and Bipolar Transistors)

Exam #3 (Bipolar and MOS Transistor Amplifiers)

Final Examination

Final Exam 8 May 2020 10:30 am – 12:30 pm

The date and time of the final exam, along with links to the Final Exam Regulations, https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information, and Final Exam Schedule, http://www.registrar.arizona.edu/schedules/finals.htm

Lab Activities and Lab Reports

There will be 5 labs during the semester including one replacement lab. Your overall lab grade will be based on your top 5 lab scores. A guideline lab report format will be provided on D2L. Lab reports are due before the beginning of next lab and should be submitted on D2L. Late reports will reduce by 10 pts per day after the due date. You should communicate with your TA for any issues about due dates. If the lab circuit is not working properly and detailed troubleshooting is required, you may need to schedule additional time with the TA.

Lab 1: Introduction to Electronics Labs

Lab 2: Op Amp

Lab 3: Diode Rectifiers

Lab 4: Bipolar Junction Transistor Amplifier Circuits

Lab 5: Bipolar Junction Transistor Amplifier Configurations

Lab 6: MOS Transistor Amplifiers. (Optional - Replacement Lab for your lowest lab grade)

Grading Scale and Policies

Grading will follow conventional 90% or above A, 80% or above B, 70% or above C, etc.

Grading will be based on the following percentages:

Exam #1	16.7%
Exam #2	16.7%
Exam #3	16.7%
Final Exam	20%
Labs (5 Total)	30%

Dispute of Grade If a lab assignment or exam has been graded incorrectly, it is the responsibility of the student to report this to the instructor no later than two weeks from the date the grade is received. The date the grade is received for D2L graded assignments is the date the grade is posted.

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at

http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete and http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal , respectively.

Honors Credit

Students wishing to contract this course for Honors Credit should email me to set up an appointment to discuss the terms of the contract. Information on Honors Contracts can be found at https://www.honors.arizona.edu/honors-contracts.

Scheduled Topics/Activities

Details of ECE 351C lecture topics and lab schedule will be posted in D2L.

Bibliography

Recommended readings will be listed in D2L

Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each

other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students who prefer to use electronic devices for note-taking during lecture should use one side of the classroom.

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Accessibility and Accommodations

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit http://drc.arizona.edu.

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity.

The University Libraries have some excellent tips for avoiding plagiarism, available at http://www.library.arizona.edu/help/tutorials/plagiarism/index.html.

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

UA Nondiscrimination and Anti-harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Additional Resources for Students

UA Academic policies and procedures are available at http://catalog.arizona.edu/policies

Student Assistance and Advocacy information is available at http://deanofstudents.arizona.edu/student-assistance/students/student-assistance

Confidentiality of Student Records

https://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa

Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.