Arizona State University
EEE 334

Course Description: Design of analog and digital circuits. Operational Amplifiers, Diodes/BJTs/MOSFETS. Digital and analog circuit building blocks. Fundamentals of mixed signal circuits.

Prerequisites and Requirements: Fulton ECEE, SEMTE, BHSE undergraduate student or Computer Systems Engineering or Computer Systems Engineering (Information Assurance) student; EEE 202 OR Visiting University Student

Time and place:

Zoom https://asu.zoom.us/j/6821683308, Tuesday as assigned in MyASU (AZ time)

Scheduled room for hybrid students and Zoom for online students Thursday as assigned in MyASU

Textbook: Microelectronic Circuits, 8th Ed. Oxford University Press, 2019, by Adel S. Sedra, Kenneth C. Smith, Tony C. Carusone, and Vincent Gaudet.

Instructor Information:
OL Hartin, Ph.D.
GWC Room 340
olhartin@asu.edu

Zoom Room Link: https://asu.zoom.us/j/6821683308

Office Hours:

To be assigned Typically Tuesday and Thursday after class
(or by appointment)

Teaching Assistants: Laboratory

To be assigned

Teaching Assistants: Lecture (Homework, Lecture, Exam, Quiz)

Graduate Lecture TA:

To be assigned

Undergraduate Lecture TAs

UGTA's will answer questions about the lectures, homeworks, exams, and quizzes.

To be assigned

TA Schedule:

Not yet available

Graders:

Please do not contact the graders with homework or lab questions. Please use Slack for lab, homework, lecture, and exam questions.

Announcements: All important announcements and course information will be posted on the Slack or Canvas site.

Course objectives: The class will cover the following topics:

1. Amplifiers, Op Amps
2. Diodes and diode circuits
3. MOS devices
4. Current mirrors and active load circuits
5. CMOS digital circuits

Learning Outcomes:

1. Apply electric network theory to semiconductor circuits containing diodes, transistors, operational amplifiers, and digital logic gates.
2. Distinguish DC bias from small-signal analysis.
3. Analyze basic diode circuits.
4. Understand basic analog MOS and BJT circuits.
5. Understand topology and operation of CMOS digital gates.
6. Understand topology, operation and applications of current mirrors and active load circuits

Homeworks: Homeworks will be assigned each week during the semester (total of 8). They will generally due on Tuesday and must be uploaded onto CANVAS by 11:59PM.

We will not accept hardcopies turned in class or emailed copies. Please contact the lecture grader (see email above) if you have questions about uploading files.

The assignments will be posted on CANVAS. Answers to the homeworks will be provided by the grader, but keep in mind, there may be a lag before the grader can finish grading. *If you submit the homework after the due date but before the solution is posted, there may be no penalty, but if you submit after there solution is posted, for any reason, there is a 75% penalty, that is you only get 25% credit. There are no exceptions.*

NOTE: Do your own work, these are individual homeworks not group exercises.

Laboratory:

What you need for the lab

Online and In-Person Students need the ADK3 Discovery Kit, and a multimeter

ADK3: https://www.bkstr.com/arizonastatestore/search/keyword/analog-discovery

Here's a link for the Digital Multimeter:

https://www.bkstr.com/arizonastatestore/product/digital-multimeter--fse-100--sun-devil-custom--732372-1

In-person students can borrow kits from the lab, we will send out information on doing this at the start of class.

There are 5-6 labs

This class has 6 Labs worth a total of 200 points. Lab 1 is worth 25 points and Labs 2-6 are each worth 35 points. You must complete all labs in order to receive credit.

Exams and Quizzes: (there are no makeups)

Exams and quizzes are in Honorlock. There is some time flexibility in each exam time

YOU will have one attempt for each quiz/exam. You cannot have a cheat sheet, one will be provided. You will bring only blank paper a pencil and calculator into the quiz. Show your work for all numerical answers, circle all answers.

All exams/quizzes are comprehensive and may contain questions up to the point in the course where they are given.

Exams: There will be two exams, a Midterm and Final. Exams will be online using Honorlock. Please see the Honorlock practice overview module and practice test for more information on the system. You will have the following time limits after the exam is first accessed:
Midterm: 75 minutes.

Final Exam: 115 minutes.

***NOTE ON CHEATING*: All cheating is reported to the dean, sharing information on the exams in any way or not following rules of the exams will be reported as cheating, the minimum consequence is a zero on the exam**

Quizzes – There will be six quizzes given through the course. These will be taken online in Canvas.

Grading

Component	% of grade
Midterm	20%
Quizzes	15% - there are 6 quizzes
Laboratory	25% - there are 6 labs
Homework	15% - there are 8 homeworks
Final Examination	25%

The course letter grade will be assigned according to your overall numerical score. Do not plan on or assume a curve. Opportunities for extra credit may be provided to boost your score.

The grading scheme is

Letter Grade	**Numerical Score**
A+	>=97%
A	93-96%
A-	90-92%
B+	87=89%
B	83-86%
B-	80-82%
C+	77-79%
C	70-76%
D	60-69%
E	<60%

These thresholds may be pulled *down* at the instructor's discretion.

Submitting Assignments:

All assignments, unless otherwise announced, MUST be submitted to the designated area of Canvas. Do not submit an assignment via email.

Homeworks and Exams: Late homeworks and missed examinations will not be accepted unless proper documentation of illness or emergency is provided.

Laboratory Reports: Penalty for the late submission by a day is 20%, by 2 days is 50% and no late submission beyond that date (100% deduction in the lab score). Please contact the TAs (see contact information above) if you have questions.

Accommodations will be made for religious observances provided that students notify the instructor at the beginning of the semester concerning those dates. Students who expect to miss class due to officially university-sanctioned activities should inform the instructor early in the semester. Alternative arrangements will generally be made for any examinations and other graded in-class work affected by absences, including illness.

Assignment due dates follow Arizona Standard time. Click the following link to access the Time Converter (Links to an external site.) to ensure you account for the difference in Time Zones. Note: Arizona does not observe daylight savings time.

Late or Missed Assignments:

Notify the instructor **before** an assignment is due if an urgent situation arises and you are unable to submit the assignment on time.

Follow the appropriate University policies to request an accommodation for religious practices or to accommodate a missed assignment due to University-sanctioned activities.

Technology Requirements

This course requires the following technologies:

- Web browsers (Chrome, Mozilla Firefox, or Safari)
- Adobe Acrobat Reader (free)
- Adobe Flash Player (free)
- Webcam, microphone, headset/earbuds, and speaker
- Microsoft Office (Microsoft 365 is free for all currently-enrolled ASU students)
- Reliable broadband internet connection (DSL or cable) to stream videos.

You may need an internet connection that can effectively stream live broadcasts and/or pre-recorded lectures. It is recommended that your internet download speed is at least 5.0 mbps. You can use this tool to test your current connection.

Student Success

To be successful:

- check the course daily
- read announcements
- read and respond to course email messages as needed
- complete assignments by the due dates specified
- communicate regularly with your instructor and peers
- create a study and/or assignment schedule to stay on track
- access ASU Student Resources

Communicating With the Instructor

Slack

Slack online gathering place tool will be made available for students to communicate with the instructors, TAs, graders, and other students

Email

ASU email is an official means of communication among students, faculty, and staff. Students are expected to read and act upon email in a timely fashion. Students bear the responsibility of missed messages and should check their ASU-assigned email regularly.

Additional Course Comments and Policies

Course Philosophy: It is very important that you closely read all the material assigned, preferably before the class, and be prepared to ask questions about the material when you are stumped. Indeed I certainly subscribe to the philosophy that "there are no bad questions," so don't be shy. Note, however, it is sometimes more beneficial if you try to answer the question yourself before asking it aloud, but if you are lost, by all means ask and I will do my best to answer

Class Behavior:

During live sessions: While in the Zoom room lecture, you may have yourself unmuted, but please mute yourself if you there is loud background noise (you know the drill). The use of recording devices by students is not permitted during class.

Syllabus Disclaimer

The syllabus is a statement of intent and serves as an implicit agreement between the instructor and the student. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. Remember to check your ASU email and the course site often.

Academic Integrity

Academic honesty is expected of all students in all examinations, papers, and laboratory work, academic transactions and records. The possible sanctions include, but are not limited to, appropriate grade penalties, course failure (indicated on the transcript as a grade of E), course failure due to academic dishonesty (indicated on the transcript as a grade of XE), loss of registration privileges, disqualification and dismissal. For more information, see http://provost.asu.edu/academicintegrity

Disability Resources

Students who feel they will need disability accommodations in this class but have not registered with the Disability Resource Center (DRC) should contact DRC immediately. The DRC Tempe

office is located on the first floor of the Matthews Center Building. DRC staff can also be reached at: (480) 965-1234 (V) or (480) 965-9000 (TTY). For additional information, visit: www.asu.edu/studentaffairs/ed/drc.

Policy Against Threatening Behavior

All incidents and allegations of violent or threatening conduct by an ASU student (whether on-or off campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students. **This includes not wearing a mask and not following social distancing measures for on-campus students.** If either office determines that the behavior poses or has posed a serious threat to personal safety or to the welfare of the campus, the student will not be permitted to return to campus or reside in any ASU residence hall until an appropriate threat assessment has been completed and, if necessary, conditions for return are imposed. ASU PD, the Office of the Dean of Students, and other appropriate offices will coordinate the assessment in light of the relevant circumstances. For more information please visit https://eoss.asu.edu/dos/srr/PoliciesAndProcedures and https://eoss.asu.edu/dos/safety/ThreateningBehavior.

Reporting Title IX Violations

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at https://sexualviolenceprevention.asu.edu/faqs.

Policy on Sexual Discrimination

Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, https://eoss.asu.edu/counseling, is available if you wish discuss any concerns confidentially and privately.

Copyrighted Materials

Students must refrain from uploading to any course shell, discussion board, or website used by the course instructor or other course forum, material that is not the student's original work, unless the students first comply with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement.