

Electronic Circuits 1

EEE 3308C Section 0001-0006

Class Periods: M,W,F | Period 3 (9:35 AM - 10:25 AM)

Location: Online

Academic Term: Spring 2021

Instructor:

Marino Guzman

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786-436-5656

Office Hours: Online M,W,F (10:40 AM – 11:30 AM) or by appointment

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact through the Canvas website

- Lucas Bell, email address, hours TBD
- Shida Yang, email address, hours TBD
- Ian Press, email address, hours TBD

Course Description

Fundamentals of electronic circuits and systems. Laboratory. (4 credits)

Course Pre-Requisites / Co-Requisites

EEL3008 Physics of EE; EEL3112 Circuits 2; if you have not already taken Circuits 2, please reach out to me so that we can decide how to move forward.

Course Objectives

By the end of the course students should be able to:

1. Analyze electronic circuits containing Op-amps, diodes, transistors, and passive components
2. Demonstrate an understanding of the properties of Op-amps, diodes, transistors, and passive components
3. Design useful electronic circuits given a set of specifications and constraints

Materials and Supply Fees

The lab materials must be purchased by each student. The list of materials was provided to each student enrolled in the course, and each student is responsible for purchasing the materials in a timely manner. Failure to complete labs due to lack of materials may impact the laboratory grades earned by the student. For the updated list of material please check the E-learning/Canvass course site, under the files section.

Professional Component (ABET):

State the contribution of the course to meeting the professional components of the ABET-accredited degree. This course consists of 3 credits of Engineering Science and 1 credit Engineering Design;

Relation to Program Outcomes (ABET):

The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Medium
3. An ability to communicate effectively with a range of audiences	

4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	Low
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Medium
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Medium

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

- Microelectronic Circuits
- A. Sedra, K. Smith
- Nov. 14, 2014 7th ed. (preferred) Or Dec. 15, 2009 6th ed. (acceptable)
- ISBN: 9780199339136 (7th ed.) or 9780195323030 (6th ed.)

Other Required Materials

- Digilent Analog Discovery Board 2- The Analog Discovery Board 1 is acceptable but not preferred
- A computer that can run the Digilent Waveforms® software

Course Schedule

Day	Date	Class	Topic	Chapter	HW (assigned)	Lab (assigned)
M	1/11	1	Introductions, course goals, syllabus review	N/A		
W	1/13	2	2 port systems, input and output resistance	1.5	HW1	
F	1/15	3	Input and Output Resistance	1.5		
W	1/20	4	Ideal amplifiers, feedback	2.1		
F	1/22	5	Op-amp circuits (non-inverting, inverting, follower)	2.2,2.3	HW2	Input & Output Resistance
M	1/25	6	Op-amp non-idealities (V _{os} , I _b , Swing, I _{sc})	2.6, 2.8		
W	1/27	7	Op-amp non-idealities (Gain, BW, SR)	2.7,2.8		
F	1/29	8	Op-amp applications (Instrumentation amplifier)	2.4	HW3	Op-amp Non-idealities
M	2/1	9	Op-amp applications (Summer amplifier, DAC)	2.2		
W	2/3	10	Op-amp applications (Integrators, Differentiators)	2.5		
F	2/5	11	Op-amp applications (Filters)	2.7		Op-amp Filters
M	2/8	12	AC-coupled circuits	2.7		
W	2/10	13	Review for Exam 1	1,2		
F	2/12	14	Exam 1	1,2		
M	2/15	15	Design case study 1: Precision weight sensing	1,2	CS1	
W	2/17	16	Introduction to diodes large signal models	4.1,4.2,4.3	HW4	
F	2/19	17	Diodes small signal model	4.3		

M	2/22	18	Diode applications: peak detectors, rectifiers	4.4,4.5,4.6		
W	2/24	19	NMOSFETs, regions of operation	5.1,5.2	HW5a	
F	2/26	20	Finding NMOSFET operating point	5.3,7.4	HW5b	Diode Applications
M	3/1	21	MOSFET small signal parameters	7.1,7.2	HW5c	
W	3/3	22	Transistor amplifier types	7.3		
F	3/5	23	MOSFET amplifiers, degeneration, AC bypassing	7.5		MOSFET Amplifiers
M	3/8	24	PMOSFETs, regions of operation	5.1,5.2		
W	3/10	25	Finding PMOSFET operating point	5.3,7.4		
F	3/12	26	Op-amp building blocks, differential pair	9.1,9.3	HW6a	
M	3/15	27	Current mirrors	8.2,8.6		
W	3/17	28	Amplifiers with active loads	9.5	HW6b	IC Building Blocks
F	3/19	29	Feedback, parasitics, and amplifier non-idealities	9.4,10.4,11.1-2		
M	3/22	30	Design case study 2: 5 transistor op-amp	4,5,7,8,9,10,11	CS2	
W	3/24	31	Review for Exam 2	4,5,7,8,9,10,11		
F	3/26	32	Exam 2	4,5,7,8,9,10,11		
M	3/29	33	Introduction to BJTs, regions of operation	6.1,6.2	HW7a	
W	3/31	34	Finding BJT operating points	6.3,7.4	HW7b	
F	4/2	35	BJT small signal model	7.2	HW7c	Distortion Pedal Circuit
M	4/5	36	BJT amplifiers and non-idealities	7.3		
W	4/7	37	Transistors as switches, sampling circuits	5,14.1,15.4	HW8a	
F	4/9	38	Transistor logic gates	14.2,15.3		Transistor Logic Circuits
M	4/12	39	Comparators, latches, positive feedback	16.1,16.4	HW8b	
W	4/14	40	Schmitt triggers, 555 integrated circuit	18.7		
F	4/16	41	555 circuit applications	18.7		555 Circuit applications
M	4/19	42	Exam 3 Review 1	5,6,7		
W	4/21	43	Exam 3 Review 2	1-11,14,15,16		

Online Course Recording

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Attendance Policy, Class Expectations, and Make-Up Policy

This class will be presented online using Zoom and requires access to a working webcam and stable internet connection. I prefer that students keep their camera on during the class so that I can see you as I would during normal face-to-face classes. Studies show that if we can see each other's faces then we will have more engagement, more student success, and more faculty success. However, this is not a requirement. I understand if on certain days you can't have your camera on due to internet bandwidth limitations, other family members, health issues, or any other reasons.

Excused absences must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (8)	100 each	15%
Design Case Studies (2)	100 each	5%
Labs (8-9)	100 each	20%
Exams (3)	100 each	60%
Total:		100%

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluer.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **[Office of Title IX Compliance](#)**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://care.dso.ufl.edu>.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.