EEE4306 Electronic Circuits
Tentative Syllabus
Spring 2021

			Lecture		7th Edition
	M	11	1	Amplifiers intro, design-oriented analysis	
Jan	W	13	2	Review MOSFET/BJT regions of operation	
	F	15	3	Review MOSFET/BJT amplifiers	
	M	18		**MLK Day -- No class**	
	W	20	4	Active loads, PMOS	
	F	22	5	More FET amplifiers	
	M	25	6	Current mirrors, current amplifiers	
	W	27	7	Feedback intro, loop gain, ideal gain	
	F	29	8	Loop gain	
	M	1	9	More FB, op amp applications	
	W	3	10	Series, shunt resistances	
	F	5		**Test 1**	
	M	8	11	Diff pair active load	
	W	10	12	Op amp circuits, diff pair, comparator	
	F	12	13	Vos, CM range	
	M	15	14	Time-constant analysis	
	W	17	15	Frequency repsonse, GBW	
Feb	F	19	16	Phase margin, compensation	
	M	22	17	2-stage op amp, DC	
	W	24	18	2-stage op amp transient, slew rate	
	F	26	19	PSRR, CMRR	
	M	1	20	Input-referred errors, noise	
	W	3	21	Noise optimization	
	F	5		**Test 2**	
	M	8	22	Output stages	
	W	10	23	Power amplifiers	
Mar	F	12	24	Power supplies, regulators	
	M	15	25	Power amplifiers	
	W	17	26	Filters	
	F	19	27	Parallel and series resonance	
	M	22	28	Second-order filters, universal filter	
	W	24	29	Sinewave oscillators	
	F	26	30	Relaxation oscillators	
	M	29	31	Comparators, Schmitt trigger	
	W	31	32	CMOS logic	
	F	2		**Test 3**	
	M	6	33	Electronics history, vacuum tubes	
	W	8	34	Tuned RF amps	
	F	10	35	Transformer coupling	
Apr	M	13	36	Colpitts, crystal oscillators	
	W	15	37	Superheterodyne, mixer	
	F	17	38	Phase-locked loop	
	M	20	39	Review for final	
		29		**Final Exam 10 - 12**	

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EEE4306 Electronic Circuits 2

Spring 2021

Description: Principles and applications of analog and digital electronics
Prerequisites: EEL3308C Electronic Circuits 1, EEL3112 Circuits 2
Class times: MWF 7th period (1:55 PM – 2:45 PM)   **Online (Zoom)**
Professor: Robert Fox (fox@ece.ufl.edu) NEB 537
Fox's office hours: Contact me any time to set up a call or Zoom meeting

Course Topics (typical)

· Review of transistor models, regions of operation, biasing, amplifier analysis (7 lectures)

· Frequency response (4 lectures)

· Feedback analysis (5 lectures)

· Op amp circuits, specifications, noise, compensation, stability (8 lectures)

· Power amplifiers (2 lectures)

· Op amp applications, filters, oscillators (5 lectures)

· RF electronics, tuned amplifiers (7 lectures)

Course Organization: Each major topic will include homework assignments emphasizing analysis and design. Three tests plus a final exam.
Text: A. Sedra and K. Smith, *Microelectronic Circuits*, 7th Ed., Oxford University Press.
Recommended: *The Art of Electronics*, Horowitz and Hill
Software: LTSpice: http://www.linear.com/designtools/software/#LTspice
Grading:

HW:	15% (drop lowest one)
Tests: 3 @ 20% each:	60%
Final exam:	25%

· Final exam: Thursday April 29, 10 AM – 12 AM

Course Themes:

· Feedback

· Practical electronics: How do you create circuits to do useful things?

· Design-oriented analysis

There is no lab, but we might build a few circuits and test them using DAD/NAD boards.

Digilent Boards/National Instruments boards.

· I also recommend the Analog Parts Kit

Tests: Closed-book, with formula sheets online during regular class period using HonorLock.

Homework: ~ 1 or 2 per week

· Usually due the 2nd class after the assignment, where solutions will be discussed

· Goals are to illustrate and reinforce lecture topics and to provide practice for quizzes

· Lowest score will be dropped

· It's OK to work in groups or to get tips from other students, you must push your own calculator buttons and the work you turn in must be your own.

· You won't learn as much from the homework if you depend on somebody else to tell you how to do it.

· Homework is usually assigned at the end of a lecture and is almost always due just before the start of the next class meeting.

· I go over the homework solutions at the start of the next class, while it's fresh in your mind.

· Turn in homework electronically in Canvas as .pdf, .doc, .xls, or .asc.

· Late homework may be accepted at the instructor's discretion, typically for reduced credit.

· Turning in homework late based on my published solutions would be cheating.

Attendance:

This class will be presented online using Zoom and requires access to a working web cam 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.

· Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Appropriate documentation may be required. See https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

· You are responsible for everything in the lecture unless I tell you otherwise.

· If you need to miss class, be sure to see me to find out what you missed.

· Handouts: I put as much as possible in the notes, but the lectures usually cover more

· Textbook: Supplements lecture; follow by topic; syllabus may include some pointers to topics

· Problems: Work as many as you can find: the best possible quiz preparation.

· Supplementary problems: Sometimes we can help find more; try assigning yourself design problems and look at other books.

SPICE assignments

· LTSpice; download from http://www.linear.com/designtools/software/.

· To help debugging SPICE runs, I need print-outs of input and output files, a schematic with labeled node numbers, .OP (Bias Point Detail) information, .OPTIONs, .MODELs, etc.

· If you turn in .asc files, make sure all needed files are included.

Academic 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 (http://www.dso.ufl.edu/sccr/process/student-conduct-honor- 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.

· You are expected to do your own work.

· You are expected to report any violations of the Honor Code that you become aware of.

· It is a violation of the Honor Code to turn in solutions to homeworks or tests copied from other students or from published handouts or solutions.

· You are welcome to work with other students on homeworks and lab reports. However, once you understand the method of solution you should work through the calculations yourself.

How to study for this course

The best way to learn how to analyze circuits and to prepare for tests is to *practice*. There are at least two sets of skills that you must master. One is figuring out how to approach an unfamiliar circuit or problem; the other is how to work through the solution to the problem or the analysis. If you always get help with setting up the problem, or just watch someone else solve the problem, you do not get any practice at all. To learn this material and to do well in the course, you must work problems and analyze circuits by yourself.

Make-Up Opportunities: It is very hard for me to make you a customized exam. If you have a University-approved excuse and arrange for it in advance, or in an emergency, a make-up exam will be allowed.

Professional Component (ABET):

This course consists of 1.5 credits of Engineering Design and 1.5 credits of Engineering Science

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.	High
2. An ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs.	High
3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	Medium
4. An ability to communicate effectively with a range of audiences	Medium
5. 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.	Low
6. An ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.	Medium
7. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty	Low

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.

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.aa.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.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

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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.