

RF Circuits and Systems

EEE 6374 Section CAMP/ 1FE2/ 2FED

Class Periods: MWF | Period 9 (4:05 PM - 4:55 PM)

Location: Zoom

Academic Term: Fall 2020

Instructor:

Jenshan Lin

jenshan@ufl.edu

352-392-4929

Office Hours: MW 5:00 PM – 6:00 PM (after the class) using Zoom, or schedule by individual request.

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact through the Canvas website

- N/A

Course Description

EEE 6374 RF Circuits and Systems, 3 Credits

Grading Scheme: Letter Grade

Requirements for RF integrated circuits. Design and implementation. Interdependence of RF circuit performance with devices, parasitics, packages, and process technology.

Course Pre-Requisites / Co-Requisites

EEE 5322 or equivalent courses, or with instructor permission.

Course Objectives

The objective is to let students learn how the wireless system standards evolved, how to design a transceiver satisfying system specifications, how the spectrum regulations affect the wireless technology development, and what to expect in the future of wireless technologies and applications. These objectives will be accomplished through lectures and discussions, homework assignments, and a final project.

Materials and Supply Fees

N/A

Required Textbooks and Software

No textbook requirement. Lecture notes developed by the instructor will be distributed to students enrolled in this course.

Recommended Materials

Various materials (published books, papers, documents, etc.) for additional reading will be recommended. Most of them are available online.

Course Schedule

Week 1:	Definition of RF and various frequency bands, FCC and other regulations, Future trend
Week 2:	(M: Holiday) RF safety and regulations, Myth of RF radiation hazard, Quiz #1
Week 3:	Antennas and antenna arrays, RF propagation and channel characteristics
Week 4:	Radar and applications, Quiz #2
Week 5:	(F: Holiday) Evolution of wireless standards I – licensed operation, Digital modulation
Week 6:	Evolution of wireless standards II – unlicensed operation, Exam #1
Week 7:	RF system-level specifications
Week 8:	Noise in RF circuits, Antenna noise temperature
Week 9:	Linearity in RF circuits, Quiz #3
Week 10:	RF transceiver architectures overall, Transmitter architectures

- Week 11: (W: Holiday) Receiver architectures
- Week 12: RF circuit-level specifications and case study
- Week 13: (W-F: Holidays) Exam #2
- Week 14: RFIC technologies, packaging, system integration, and emerging application
- Week 15: Project

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 in compliance with university policies in the Graduate Catalog (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>) and require appropriate documentation.

Evaluation of Grades

****Assessment Guidance from the ECE Graduate Committee:** Course evaluation components should include:

1. At least one component that individually evaluates each student’s understanding of course material and ability to apply concepts.
2. At least one evaluation activity that takes place in class.
3. When a project is involved, evaluation rubrics should be explicitly stated.
4. When team work is expected, individual student contribution verification method should be explicitly stated.

If an in-class exam is administered then 1 and 2 are fulfilled. In the case of a project, a project report that is graded per the stated evaluation rubrics and states which work was done by each student in the project team will address both 3 and 4.

Assignment	Total Points	Percentage of Final Grade
Homework Sets (6)	100 each	30%
Quizzes (3)	100 each	15%
Exams (2)	100 each	50%
Project	100	5%
		100%

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
90.0 - 100.0	A	4.00
86.7 - 89.9	A-	3.67
83.3 - 86.7	B+	3.33
80.0 - 83.3	B	3.00
76.7 - 79.9	B-	2.67
73.3 - 76.7	C+	2.33
70.0 - 73.3	C	2.00
66.7 - 69.9	C-	1.67
63.3 - 66.7	D+	1.33
60.0 - 63.3	D	1.00
50.0 - 60.0	D-	0.67
0 - 49.9	E	0.00

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

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.bluera.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>.