EEL 3580 – Introduction to Wireless Communication Systems
Department of Electrical & Computer Engineering
Florida International University
Spring 2026

Classroom	:	EC 2840
Class Time	:	TuTh 12:30pm – 1:45pm
Faculty	:	Dr. Stavros Georgakopoulos
Office Hours	:	TuTh 2:00pm – 3:00 pm
Office	:	EC 3173
Phone	:	305-348-1262
Email	:	georgako@fiu.edu
Prerequisite	:	EEL 3110C Circuit Analysis and Lab

Textbook : An Introduction to Analog and Digital Communications 2nd Edition, by Simon Haykin and Michael Moher, 2006
ISBN: 978-0-471-43222-7

Reference Textbooks :

1. Antenna Theory, 4th Edition: Analysis and Design
   C. A. Balanis
   Wiley, 2016
   ISBN: 978-1-118-64206-1

2. Microwave Engineering 4e
   David M. Pozar
   Wiley, 2011
   ISBN: 978-0-470-63155-3

Course Description

The goal of this course is to explain the fundamental blocks of wireless communication systems using software-defined radio toolkits, state-of-the-art design software, and hands-on learning approaches.

Student Learning Outcomes/Objectives

Upon completing this course, students will be able to:

1. Explain the fundamental principles of communication systems.
2. Describe the fundamental principles of wireless communication systems.
3. Apply practical design principles to create wireless communication systems.
4. Analyze and design wireless communication systems, antennas, and transmission lines using state-of-the-art simulation software.

5. Integrate various components of wireless communication systems in a design project.

Topics Covered

1. Signals
2. Communication systems overview
3. Filters and Mixers
4. Modulation and demodulation
5. Transmission lines
6. Wireless links and propagation
7. Antennas
8. Transceivers
9. Sampling
10. Digital systems
11. Software-defined radio

Relationship of course to program objectives

In this course, the student will have to show:

1. an ability to apply knowledge of mathematics, science, and engineering,
2. an ability to identify, formulate, and solve engineering problems,
3. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Grading Scheme

Homework	**50%**
Quizzes	**30%**
Final Project	**20%**
Total	**100%**

Tentative Grading Scale

A	**100-95**	**B+**	**87-89**	**C+**	**77-79**	**D**	**60-69**	**F**	**0-59**
A-	**90-94**	**B**	**83-86**	**C**	**70-76**				
		B-	**80-82**						

University's Code of Academic Integrity

Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational Mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will

be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook.
More information can be found at http://academic.fiu.edu/academic_misconduct.html

Department Regulations Concerning Incomplete Grades

To qualify for an Incomplete, a student:

1. Must contact (e.g., phone, email, etc.) the instructor or secretary before or during missed portion of class.
2. Must be passing the course prior to that part of the course that is not completed
3. Must make up the incomplete work through the instructor of the course
4. Must see the Instructor. All missed work must be finished before last two weeks of the following term.

University policies on sexual harassment, and religious holidays, and information on services for students with disabilities

Please visit the following websites:
http://academic.fiu.edu/
http://drc.fiu.edu

Course Policies:

- **Academic Misconduct:** Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and to honestly demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Student Conduct and Honor Code procedures and sanctions as outlined in the FIU Regulation 2501 and the Student Handbook.
- **Deadlines:** Assignments are due on the date and time specified.
- **Late Homework:** Late homework will not be accepted.
- Students are encouraged to ask questions and to discuss course topics with the instructor and with each other.
- **Any work submitted should display the student's name and should be signed, as the students' own work, and that no unauthorized help was obtained.**
- Cell phones, communicators, MP3 players, headsets are not allowed to be used in the class.
- Students **SHOULD NOT** send any assignments, homework or projects by email.
- Attendance is required. Students are required to attend every lecture. Students are fully responsible for all materials covered in class.
- The professor reserves the right to change course materials or dates at any time during the semester.

- The professor reserves the right to change or modify the syllabus at any time during the semester.
- The services of Turnitin.com might be used.
- The services of Honorlock might be used. The minimum requirements and the details of Honolock are described at https://fiuhelp.force.com/canvas/s/article/Honorlock-students
- Students are encouraged to actively participate in class by asking questions, answering instructor's questions and interact with your peers as directed by the instructor. Because this course works like a system students' active contribution and participation are essential for the success of the course.
- Students should not disturb and disrupt the class by talking to each other, using the classroom computers, typing on the keyboards, and engage in other activities that do not relate to the class.
- No food or drinks are allowed in classroom.

Exam policy

1. Make sure to complete the assigned homework. This will help you prepare for exams and quizzes.
2. All exams and quizzes are closed book and closed notes unless otherwise indicated.
3. Supply your own paper for all tests.
4. Use of any electronic device with keyboard is prohibited. This also applies to cellphones with messaging system. If certain electronic devices are allowed this will be specified in the requirements for each exam.
5. No discussion is permitted during the exams.
6. No communication with other people is permitted during the exams.
7. Instructor is not compelled to give credit for something he cannot read or follow logically.
8. Cheating is considered as a serious offense (see academic misconduct policy above).
9. Quizzes will be taken using electronic platforms such as but not limited to Zoom, Canvas and Honorlock.

Class Schedule*

Week	Topic	Assignment
Week-1	**Introduction to Communication Systems**	
Week-2	**Signals** • Amplitude • Frequency • Phase • Noise • Introduction to GNU radio	Homework 1
Week-3	**Signals** • Fourier Transform • Bandwidth	

Week-4	**Communication Systems Fundamental Blocks** • Filters • Amplifiers • Oscillators	Homework 2
Week-5	**Communication Systems Fundamental Blocks** • Mixers • Up-conversion • Down-conversion	Quiz 1
Week-6	**Modulation and Demodulation** • Amplitude modulation (AM) • Frequency modulation (FM)	Homework 3
Week-7	**Transmission Lines** • Transmission line theory	
Week-8	**Transmission Lines** • Waveguides • Coaxial cables • Printed circuits • Optical Fibers • Full-wave software	Homework 4
Week-9	**Antennas** • Fundamentals • Directivity and Gain • Reflection coefficient • Radiation pattern • Efficiency	Quiz 2
Week-10	**Antennas** • Antenna types • Full-wave software	Homework 5
Week-11	**Link Budget** • Friis Equation • Wireless links analysis	Homework 6
Week-12	**Sampling** • Sampling theory • Reconstruction filter	Homework 7 Quiz 3
Week-13	**Digital Communications** • PCM system	Homework 8
Week-14	**Digital Communications** PCM system	Homework 9
Week-15	**Applications of Wireless Communication Systems**	Quiz 4
Week-16	**Finals Week**	Final Project

*The professor reserves the right to change or modify the topics and assignments (and their corresponding dates) in this class schedule at any time during the semester.