

## **EE 313- Introduction to communications Systems**

Fall 2024-2025

Course Information

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<b>Lecturer</b>	: Mohaned Chraiti, FENS G044, Phone: x7044. (mohaned.chraiti@sabanciuniv.edu)
<b>Teaching Assistants</b>	: Mahir Burak Usta (mahirusta@sabanciuniv.edu)
<b>Textbook</b>	: <i>Modern Digital and Analog Communication Systems, B. P. Lathi Oxford Press, 2010.</i> <i>Digital Introduction to Analog and Digital Communications, S. Haykin and M. Moher, John Wiley&amp; Sons, 2010.</i>
<b>Lecture Hours</b>	: Thursday 11:40-12:30 FENS L063, Friday 12:40-14:30 FASS 1099
<b>Office Hours</b>	: Mohaned Chraiti: Thursday 12:40-13:30 Teaching assistants: In recitations or by appointment.
<b>Course Objectives</b>	: Major objectives of this course are 1) to introduce the students to the world of communication systems 2) to acquire the mathematical tools and theories necessary to analyze and design an analog communication system 3) to build and compare different analog communication systems according to a specific need/purpose 4) to acquire the basics knowledge on probability theory and random processes that are necessary to analyze the performance of analog communication system in the presence of random noise.
<b>Prerequisite</b>	: Signals and Systems (ENS211); Probability and stochastic processes are a great plus
<b>Grading Policy</b>	: Midterm, 35%; Final, 35%; Assignments and Projects 30%. [Note that your overall level of participation in the course will certainly have a consequence.]
<b>Midterm Dates</b>	: Midterm — Week 7 Final — Week 13

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### **Recitations**

Attendance and participation in recitations are necessary for you to do well in the course, and are critical to mastering the materials.

### **Lectures**

It is highly recommended to attend the classes: the lecture notes will be interposed with spaces/blanks that the student will fill in during the lecture in order to balance the content coverage and active learning.

### **Exams**

There will be one midterm and a final. All the exams will be closed-book.

### **Simulink-MATLAB**

We will gradually introduce Simulink/MATLAB as a tool to build and simulate communication systems. Recitations will provide the necessary tutorial and guidance on MATLAB when needed.

### **Assignments**

There will be four assignments and two projects. It is recommended to submit the assignments electronically through SU- Course (exceptions may apply). We encourage students to discuss and collaborate to solve assignments. However, collaborations are not risk/cost-free. The scoring policy may change with the number of collaborators: for a given exercise, a wrong answer will result in -z points, if the question is solved by one student, plus an extra  $-20\%(\#collaborators-1)z$ , in the case of collaboration (right answers come with no penalty). The penalty could go up to the exercise's total score (the latter scoring policy does not apply for the projects). The adopted policy will only encourage fruitful collaborations, given that the right answers come with no penalty. Moreover, it prevents passive

collaboration such as copying a colleague's solution since it comes with a risk of penalty for both. You must write your solutions **independently**, and, at the top of your assignments paper, you must **write the names of the individuals you have collaborated with**. We also encourage discussion with the teaching assistants about the assignment problems during recitations/office hours. We will not accept any late submissions (except for the most compelling reasons), because we believe that the habit of late submissions can make it difficult for the students to keep up with the course and cause them to fall behind.

I may have to revise the course plan according to the countrywide reassessment to be made regarding higher education. This is expected to happen at the beginning of April. The content to be delivered is certain but the method of course delivery, the number and dates of exams, and some other details are subject to change.

### **Make-up Policy**

Only proved health emergencies will be accepted as valid reasons to qualify you for a make-up exam.

### **SUCourse**

We will use SUCourse to distribute assignments and their solutions, and as a communication medium between you and the staff. If you have any problems accessing the course material on SUCourse, please let us know as soon as possible so we can have such problems fixed.

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### **Topics:**

- Course Overview, Introduction to Analog communication systems (Chapter 1)
- Fourier transform and Bandwidth (*Chapter 2*)
- Amplitude Modulation (*Chapter 3*)
- Angle/Frequency (exponential) Modulation (*Chapter 4*)
- Probability, Random Signals and Noise (Chapter 5)
- Analog Communications in the presence of Noise (*Chapter 6*)