

Sabancı University
Faculty of Engineering and Natural Sciences

ENS 211 - SIGNALS

Fall 2022-2023 Course
Information

Lecturer	: Mohaned Chraiti, FENS G044, Phone: x7044. (mohaned.chraiti@sabanciuniv.edu)
Teaching Assistants	: Ömer Rasim Kınacı (kinaciomer@sabanciuniv.edu) Mahir Burak Usta (Student) (mahirusta@sabanciuniv.edu) İdil Bensus Çılbır (Student) (idil.cilbir@sabanciuniv.edu) Rümeysa Işıldak (Student) (rumeysa.isildak@sabanciuniv.edu) Damla Sarıçelik (Student) (damlasaricelik@sabanciuniv.edu) Semih Zaman (Student) (semihzaman@sabanciuniv.edu)
Textbook	: <i>Signal Processing First</i> , James H. McClellan, Ronald W. Schafer, Mark A. Yoder, Pearson Education, 2003. <i>Signals & Systems</i> , Alan V. Oppenheim, Alan S. Willsky, and Hamid, Nawab, Prentice Hall, 1997.
Lecture Hours	: Monday 11:40-13:40, Wednesday 11:40-12:30
Office Hours	: Mohaned Chraiti: Wednesday 12:40-13:30 Teaching assistants: In recitations or appointment by e-mail.
Course Objectives	: Major objectives of this course are 1) to provide a broad introduction to signals and systems which is one of the best starting points for the study of electrical engineering, and computer science and 2) to introduce the use of mathematics as an appropriate language for thinking about engineering problems broadly and for describing and understanding signals and systems in particular.
Prerequisite	: MATH 101
Grading Policy	: Midterm, 30%; Final, 30%; Assignments, 40%. [Note that your attendance in lectures/recitations and your overall level of participation in the course will certainly have a consequence.]
Midterm Dates	: Midterm — Week 7 Final — Week 13

Recitations

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

Exams

There will be one midterm and a final. All the exams will be closed-book, but you will be allowed to bring notes on Trig Table, and Fourier/Z-transform table for basic/common functions.

MATLAB

We will gradually introduce MATLAB as a tool for seeing/hearing/plotting some of the signals we will learn about in class as well as for performing various computations and transformations on signals. Recitations will provide the necessary tutorial and guidance on MATLAB when needed.

Assignments

There will be six assignments. 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 3rd and 6th assignments). 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.

Make-up Policy

Only health or other personal 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.

Topics and (Rough) Weekly Schedule:

- Course Overview, Basics of signals (*Chapter 1*) [**W1**]
- Sinusoids, Complex Exponentials, Phasors (*Chapter 2*) [**W2**]
- Spectrum Representation (*Chapter 3*) [**W3-W4**]
- Introduction to Systems, LTI systems, Impulse response, Convolution (*Chapter 4*) [**W5 -W6**]
- MIDTERM [**W7**]
- Laplace Transform, continuous signals convolution (*Chapter 5*) [**W8-W9**]
- Z-Transform, discrete signals convolution (*Chapter 6*) [**W10-W11**]
- Continuous-time Fourier Transform (*Chapter 7*) [**W12-W13**]
- FINAL EXAM