

Sabancı University  
Faculty of Engineering and Natural Sciences

**ENS 211 - SIGNALS**

Fall 2021-2022 (Online)  
Course Information

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<b>Lecturer</b>	: Hüseyin Özkan, FENS 1107, Phone: x9594. (hozkan@sabanciuniv.edu)
<b>Teaching Assistants</b>	: Ali Enver Bilecen (Coordinating TA) (bilecen@sabanciuniv.edu), Osman Berke Güney (osmanberke@sabanciuniv.edu), Rümeysa Işıldak (rumeysa.isildak@sabanciuniv.edu), İdil Bensu Çılbır(idil.cilbir@sabanciuniv.edu), Erkut Gürol(erkutgurol@sabanciuniv.edu).
<b>Textbook</b>	: <i>Signal Processing First</i> , James H. McClellan, Ronald W. Schafer, Mark A. Yoder, Pearson Education, 2003.
<b>Lecture Hours</b>	: Monday 11:40-13:30, Wednesday 11:40-12:30
<b>Recitation Hours</b>	: Wednesday 16:40-18:30 – Section A, Ali Enver Bilecen, Thursday 16:40-18:30 – Section B, Osman Berke Güney, Friday 14:40-16:30 – Section C, Rümeysa Işıldak, Friday 16:40-18:30 – Section D, İdil Bensu Çılbır.
<b>Office Hours</b>	: Hüseyin Özkan: Wednesday 12:40-13:30 Ali Enver Bilecen: In recitations or appointment by e-mail, Osman Berke Güney: In recitations or appointment by e-mail, Rümeysa Işıldak: In recitations or appointment by e-mail, İdil Bensu Çılbır: In recitations or appointment by e-mail, Erkut Gürol: Appointment by e-mail.
<b>Course Objectives</b>	: 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, computer science, and mechatronics, 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.
<b>Prerequisite</b>	: MATH 101
<b>Grading Policy</b>	: Midterm 1, 25%; Midterm 2, 25%; Final, 35%; Assignments, 15%. [Note that your attendance in lectures/recitations and your overall level of participation in the course will certainly have a consequence, particularly if your preliminary grade falls near a borderline.]
<b>Midterm Dates</b>	: Midterm 1 — Week 7 Midterm 2 — Week 12 Final — Week 15

### **Recitations**

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

### **Exams**

There will be two midterms and a final. All the exams will be closed-book, but you will be allowed to bring one page (double-sided) of notes for each exam. Notes must be in your own handwriting.

### **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 5 or 6 assignments. All assignments will be submitted electronically through SUCourse. It is OK to have some moderate collaboration on the assignments with your classmates. However you must write your solutions **independently**, and all participants must be involved in all aspects of the joint work (hence you cannot just work on part of the assignments or part of a problem in the assignments and copy your friend's solution for another part). In addition, at the top of your assignments paper, you must write the names of the individuals you have collaborated with, and specify which problems you have collaborated on. We also encourage discussion with the staff about the assignment problems during recitations/office hours. We will not accept any late submission (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. We will make solutions available soon after you submit your solutions. Please make sure to compare the solutions and your answers soon after the solutions are available, and do not wait until the night before an exam!

### **Make-up Policy**

There will only be one make-up exam at the end of the semester. 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, Introduction (*Chapter 1*), Sinusoids, Complex Numbers (*Chapter 2*) [**W1**]
- Complex Exponentials, Phasors (*Chapter 2*), Spectrum Representation (*Chapter 3*) [**W2 - W3**]
- Fourier Series (*Chapter 3*) [**W3 - W4**]
- FIR Filters, LTI Systems, Convolution (*Chapter 5*) [**W5 - W6**]
- MIDTERM 1 [**W7**]
- Frequency Response of FIR Filters (*Chapter 6*) [**W7 - W8**]
- Continuous-time Signals and Systems, Impulse Response, Convolution (*Chapter 9*) [**W8 - W9**]
- Frequency Response of Continuous-time LTI Systems (*Chapter 10*) [**W10 - W11**]
- Continuous-time Fourier Transform (*Chapter 11*) [**W11 - W12**]
- MIDTERM 2 [**W12**]
- Filtering, Modulation, and Sampling (*Chapter 12*) [**W13 - W14**]
- FINAL EXAM