

CRN 22000:

Class Time: Monday, 09:30-12:20

Location: EHB 5102

Signals and Systems for CE BLG 354E

2016 - 2017 Spring Term

General Info

► Instructor:

CRN 22000: Assoc. Prof. Dr. Gözde ÜNAL

Class Location: **5 I 02**

Office: EEB- 5309

Email: gozde.unal@itu.edu.tr



General Info

► **Course Assistants:**

-- Enes Albay

Email: @itu.edu.tr

Office: Bilgisayar Lab-3

Office Hour: TBA



General Info

▶ **Prerequisites:**

- Basic Linear Algebra Knowledge.
- Basic Calculus Knowledge.
- Basic Programming Skills.



General Info

- ▶ **Textbook:**

- ▶ “*Signal Processing First*” by James H. McClellan, Ronald W. Schafer, Mark A. Yoder, Prentice Hall, 2003.

- “Signals and Systems”, Oppenheim and Wilsky, Pearson.

- ▶ **Software tool:**

MATLAB

- ▶ **Additional Sources:**

- ▶ -- Course Slides

- MIT Open Courseware : Signals and Systems Course materials



General Info

► **Grading Policy:**

5 Homeworks $\rightarrow 4 \times 5 = 20 \%$

Attendance Quizzes Every Week $\rightarrow 1 \times 10 = 10 \%$
(lowest 2 out of 12 will be deleted)

1 Midterm $\rightarrow 1 \times 30 = 30 \%$

1 Final $\rightarrow 40 \%$

VF Conditions (Final Exam Conditions) \rightarrow

* 70% Attendance to Lectures (through the Quizzes attendance is taken at TopHat System.)

* At least 3 Homeworks submitted. A homework is counted as submitted when it receives a minimum grade: 25/100

* $(0.3 * MT + 0.2 * HWs \text{ (First 3 HWs)} + 0.1 * \text{Quizzes}) > 20/100$

Cheating attempts: Disciplinary Action will be taken.



Interactive Teaching Platform: Top Hat will be used throughout the course

► **Prerequisites:**

- <https://tophat.com/>

- You need to register for an account:

You will receive an email in the following
daya. Please, follow a link you receive by ITU email

Syllabus

Week	Content
06.02.2017	Introduction, Sinusoids, Complex Exponential
13.02.2017	Phasors, Spectrum Representation
20.02.2017	Fourier Series-1
27.02.2017	Fourier Series-2
06.03.2017	LTI systems, FIR Filters
13.03.2017	Convolution
20.03.2017	Recitation
27.03.2017	SPRING BREAK
03.04.2017	Frequency Response of FIR Filters
10.04.2017	MIDTERM EXAM
17.04.2017	Continuous-time Signals and systems
24.04.2017	Impulse response/ Frequency response of CT systems
01.05.2017	Continuous time Fourier Transform(CTFT) and DFT
08.05.2017	FT Applications: Modulation
15.05.2017	FT Applications: Sampling

Learning Outcomes

- ▶ **1. Describe a periodic signal in time domain by defining its properties such as the fundamental period and fundamental frequency**
- ▶ **2. Define a periodic signal as a sum of sinusoids or complex exponentials, i.e. create Fourier series representation of a periodic signal through both Fourier synthesis and analysis equations**
- ▶ **3. Construct the spectrum representation of a periodic signal**
- ▶ **4. Identify Finite Impulse Response systems, Linear Time Invariant Systems, and their properties**
- ▶ **5. Define the impulse response of an LTI system both in continuous time and discrete-time, and system properties such as stability and causality**
- ▶ **6. Define the frequency response of an LTI system and its properties**
- ▶ **7. Construct forward and inverse Fourier Transform of both periodic and non-periodic continuous-time signals**
- ▶ **8. Describe ideal frequency selective filters (low-pass, high-pass, band-pass) in frequency domain**
- ▶ **9. Perform frequency filtering over the spectrum of a signal**
- ▶ **10. Describe Sampling Theorem and conversion between continuous time and discrete-time domains**
- ▶ **11. Describe principles of an Amplitude Modulation and Demodulation System**
- ▶ **12. Implement the above concepts in a programming environment (MATLAB)**

