

**EE 373**  
**Signals and Systems**

**Prerequisites:** MATH 202, EE 201

**Textbook:** A. V. Oppenheim, A. S. Willsky, with S. H. Nawab, *Signals and Systems*, Prentice-Hall, 2nd Edition, 1997.

**Instructor:** Burak Acar (acarbu@boun.edu.tr)

**Teaching Assistant:** Bayram Akdeniz

**Webpage:** www.vavlab.ee.boun.edu.tr -> Courses -> EE373

**Hours:** Monday 15:00-16:00 (PS) TESLA

Tuesday 09:00-11:00 TESLA

Thursday 09:00-11:00 TESLA

**Grading:**

Assignments : Not graded

Pop quizzes: 15 %

2 midterms (in-class) : 25 % each

Midterm 1: 19.10.17

Midterm 2: 23.11.17

Final Exam (in-class) : 35 %

You are required to earn **minimum 20 pnts** from the midterms and the quizzes **to qualify for the final exam**. Exam date will be announced by the registrar's office

The course is designed to familiarize students with the techniques for analyzing and synthesizing continuous-time as well as discrete-time systems. Time domain and frequency domain signal analysis tools will be studied, and the subjects of filtering and modulation will be introduced as signal processing techniques both in continuous-time and discrete-time.

**Program:** 18.09.2017 – 15.12.2015

**1. Signals and Systems (Ch 1) :** 2 days

- a) Continuous-time and discrete-time signals
- b) Special signals
- c) Continuous-time and discrete-time systems
- d) Basic system properties

**2. Linear time-invariant (LTI) systems (Ch 2):** 2 days

- a) Discrete-time LTI signals: The convolution sum
- b) Continuous-time LTI signals: The convolution integral
- c) Properties of LTI systems
- d) Systems described by differential and difference equations

**3. Fourier Series rep. of CT and DT periodic signals (Ch 3):** 4 days

- a) Response of LTI systems to complex exponentials
- b) Fourier Series representation of continuous-time periodic signals
- c) Properties & Convergence of continuous-time Fourier Series
- d) Fourier Series representation of discrete-time periodic signals
- e) Properties & Convergence of discrete-time Fourier Series

f) Filtering concepts

→ MIDTERM 1 on 19.10.17 at class time

**4. The continuous time Fourier transform – CTFT (Ch 4): 3 days**

- a) Representation of aperiodic signals
- b) Fourier transform for periodic signals
- c) Properties of continuous-time Fourier Transform

**5. The discrete-time Fourier transform – DTFT (Ch 5) : 3 days**

- a) Representation of aperiodic signals: the discrete-time Fourier transform
- b) The Fourier transform of periodic signals
- c) Properties of the discrete-time Fourier transform

**8. Sampling (Ch 7): 4 days**

- a) The Sampling Theorem
- b) Reconstruction of continuous time signals from its samples and aliasing:  
Interpolation formula
- c) Discrete-time processing of continuous-time signals
- d) Sampling of discrete-time signals: Interpolation and decimation

→ MIDTERM 2 on 23.11.2017 at class time

**9. The Laplace Transform (Ch 9): 2 days**

**10. The z-transform (Ch 10): 3 days**

- a) The z-transform and its properties
- b) Region of convergence
- c) Inverse z-transform
- d) Analysis of discrete-time systems using z-transform

**11. Overview: 1 day**

### **Cheating and Plagiarism**

Cheating and plagiarism will be treated without tolerance whenever found. Students may discuss assignments/projects with each other but, for grading, must hand in their individual version which means that each student writes down *his/her version with his/her own expressions*.