Bogazici University
Department of Computer Engineering

CMPE 362 Introduction to Signals for Computer Engineers

(Spring 2020)

Introduction to discrete and continuous time signals and systems with computer engineering applications. Time-domain signal representations, impulse response of linear time-invariant systems; convolution. Fourier series. Spectrum representation of signals. Fourier transform. Digital signals and sampling. Reconstruction. Filtering. Z-transform representation. Discrete Fourier transform. Algorithms for signal processing. Floating point and quantization errors. Exercises with applications in audio and image processing.

Prerequisites: MATH 202

Course Objectives: As part of this course, students will:
1. understand mathematical representation of discrete-time and continuous-time signals.
2. understand signal processing and characterization techniques, such as filtering, frequency response
3. Gain laboratory experience in computer-based signal processing.

Textbook: McClellan, Shafer, and Yoder, *Signal Processing First*, Prentice Hall, 2003.
MATLAB: http://www.mathworks.com/help/pdf_doc/matlab/getstart.pdf
Read: A. V. Openheim, A. S. Willsky, Signals and Systems (2ed), Prentice Hall 1996

Instructor: Fatih.Alagoz@boun.edu.tr;
Teaching Assistants: ???? @boun.edu.tr (TBD)
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Lectures and Problem Sessions (PS)
Wednesday 1500-1650
Thursdays 1400-1450
PS hrs: TBD

Topics:
- Introduction
- Signal processing applications in computer engineering
- Basics of continuous-time and discrete-time signals and systems.
- Floating point representation, quantization errors
- Linear time-invariant systems; Convolution.
- Fourier Series representation of continuous-time and discrete-time Periodic signals; properties of Fourier series; filtering concepts.
- The continuous time Fourier transform and its properties
- The Fourier transform for periodic signals.
- Sampling and discretization of continuous-time signals.
- The z-transform and its properties
- Analysis of discrete-time systems using z-transform
- The discrete-time Fourier transform and its properties
- Algorithms for signal and image processing
- Applications

Grading Policy (tentative):
30-35 % Midterm, 15 April 2019 (WW 78)
30-35 % Projects, Homeworks, Pop quizzes
30-35 % Final exam (TBD)

Prepared by: Prof. Dr. Fatih Alagoz

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