ORT Braude College
Department of Electrical and Electronic Engineering

31430 – Discrete Systems and Networks

Lecturers: Dr. Evgeny Gershikov
Credits: 2.5 points
Hours: 2 lecture, 1 tutorial
Grade Composition: 85% – final exam, 15% – home assignments

Prerequisites: 11009 Fourier Series and Integral Transforms

Course Description:

This course is a first course about discrete time signals and systems. It introduces basic terms and properties of digital signals and delves into digital system characterization and analysis. Difference equations are taught in the course as well as the Z transform and the Discrete Time Fourier Transform.

Course Content:

1. Introduction, representation and properties of discrete signals, special signals
2. Acquiring discrete signals by sampling, aliasing
3. Discrete systems – characterization and representation
4. Discrete LTI systems – properties and analysis
5. Discrete time convolution and its use to find an LTI system response
6. LTI system impulse and step response, stability of a discrete LTI system
7. Using difference equations to describe LTI systems, solving these equations
8. Cross-correlation and auto-correlation of signals
9. The Z transform and its properties, known Z transforms
10. Analysis of discrete LTI systems in Z domain
11. The Discrete Time Fourier Transform (DTFT)
12. Filling the gaps

Bibliography:

1. Proakis J. G. & Manolakis D. G., “Introduction to Digital Signal Processing”, Macmillian Publishing Company.
2. Oppenheim A. V. & Willsky A. S., “Signals and Systems”, Prentice Hall.

Learning Outcomes:

Learning and understanding fundamental issues in the characterization, representation and analysis of discrete signals and systems.

* Discrete signals as considered in this course are digital signals with continuous amplitude (no quantization).

Consultation hours:

Wednesday 13:50-14:40 in EM301 Aleph (please notify by email before coming).

Last Update: August 2019.