ECE 3304: Discrete Time Signals and Systems

Credit / Contact hours: 3 / 3

Course coordinator: Tanja Karp


Catalog description: An introduction to digital signal processing. Sampling, z-transform, discrete and fast Fourier transforms, flowgraphs, design techniques for digital filters, effects of finite word length, and applications.

Pre-requisite: ECE 1304, ECE 3302

Co-requisite: ECE 3303

Designation: Required for Computer Engineering, elective for Electrical Engineering

Course learning outcomes (CLO’s): Upon completion of this course, students should be able to do the following:
1. Describe and analyze discrete time signals in the time domain and frequency domain.
2. Apply signal processing techniques to analyze discrete time signals and systems.
3. Apply signal processing techniques to design discrete time systems.
4. Solve signal processing problems using MATLAB.
5. Design and apply digital filters.

Assessment of CLO’s: CLO’s 1-3 will be assessed through quizzes, homework assignments, course projects, and exams. CLO’s 4-5 will be assessed through homework assignments and course projects.

Student outcomes addressed: a, e, and k.

Topics covered: Introduction; discrete time signals and systems - 3 hours
Discrete Time Convolution - 3 hours
Review of sampling and reconstruction and discrete time Fourier transform - 3 hours
Z-transform and applications - 6 hours
Transform domain analysis of LTI systems - 6 hours
Finite impulse response digital filter design - 3 hours
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Discrete transforms; DFT, FFT - 6 hours
Application LTI system analysis and design and discrete transforms in MATLAB - 3 hours
Discrete time signal processing applications - 3 hours
Tests and reviews - 3 hours