

EECE-465 Digital Signal Processing

Course Contents

1. Basic Concepts

Classification of signals, Comparison of digital and analog techniques, Applications

2. Discrete Systems

Properties, Difference equations, Convolution, Realization, Digital Filters

3. Sampled-data Signals

Sampling theorem, Aliasing, Digital Spectrum, Sampling frequency, Folding effects

4. Z-transform

Definition, Inverse z-transform, Region of convergence, Properties

5. Input/output Relationships

Transfer function, Frequency response

6. Finite Impulse Response (FIR) Filter Design

Fourier Series, Window Functions, Linear Phase

7. Discrete Fourier Transform (DFT)

DFT, Fast Fourier Transform (FFT), High-speed Convolution

8. Infinite Impulse Response (IIR) Filter Design

Review of analog filter design, Frequency transformation, Impulse-invariant method, Bilinear transformation

9. Error Analysis

Quantization, Fixed-point and Floating-point arithmetic

10. Two-Dimensional Signal Processing