Fall 2021
Signal and System Analysis
Course Concepts

At the conclusion of this class the students are expected to be able to:

- Describe continuous and discrete **signals** in the time and frequency domains
- Describe continuous and discrete **systems** in the time and frequency domains
- Classify signals as power or energy signal
- Classify systems as linear/non-linear, time-invariant/time-varying, caual/non-causal
- Understand and be able to use the special functions, including impulse, step, and pulse functions
- Perform continuous and discrete time convolution
- Determine the time and frequency characteristics of systems
- Determine the stability of systems
- Represent of periodic signals using Fourier series and construct spectral plots
- Use Parsaval's theorem for periodic signals to determine signal power
- Use Parsaval's theorem for aperiodic signals to determine signal energy
- Determine the response of linear time-invariant systems to periodic input
- Understand the criteria for distortionless transmission
- Represent aperiodic signals using the Fourier transform
- Understand the properties of the Fourier transform
- Understand the concept of bandwidth and the signal duration/bandwidth relationship
- Represent systems in the frequency domain using the transfer function
- Determine the system output given its input.
- Understand the characteristics of ideal filters
- Understand the Sampling Theorem and its application
- Understand the Discrete Fourier Transform (DFT) and its parameters and properties, including spectral leakage and windowing.
- Understand how to use the DFT to perform linear convolution
- Represent discrete signals and systems using the z-transform
- Understand Digital Filters and Transfer Functions for Discrete Systems.
- Model basic feedback control system and design for stability.
- Determine appropriate tools to apply to signals and systems problems.