

EEL 4656 Analysis of Linear Systems

Credits: 3

Text book, title, author, and year: *Continuous and Discrete Signals and Systems*, by Samir Soliman and Mandyam Srinath, 2nd edition

Supplemental materials: supplemental notes

Specific course information

- a. **Catalog description:** The course objective is to familiarize students with the basic aspects of continuous- and discrete-time linear systems, including the mathematical representation of signals and linear, time-invariant systems.
- b. **Prerequisites or Corequisites:** EEL 3112 (Circuits 2)
- c. **Required, elective, or selected elective:** Required

Specific goals for the course

Specific outcomes of instruction: Important topics for which students will be expected to demonstrate their knowledge on exams include an understanding of 1-D functions, the superposition principle, the impulse response, convolution, delta functions, the Fourier transform and its application to signal spectral analysis and transfer functions, discrete-time systems, the z-transform, and the discrete-time Fourier transform. These outcomes relate primarily to ABET objectives A (ability to apply mathematics, science and engineering principles) and E (ability to identify, formulate and solve engineering problems).

Brief list of topics to be covered:

- Signal representation & systems
- Special standard functions (e.g., step, rectangle, triangle; sine & cosine)
- Linear time-invariant (LTI) systems
- Convolution for causal systems
- Properties of LTI systems
- The delta function and sampling/replication comb
- Sampling: conversion of continuous-time to discrete-time functions
- Replication & periodic functions
- The Fourier transform
- The Laplace transform
- Discrete-time signals and systems
- The discrete-time Fourier transform (DFT)
- The Z-transform
- Applications