

EEE 5502 Digital Processing of Signals

Credits: 3 credits

Textbook, title, author, and year: Discrete-Time Signal Processing by A. V. Oppenheim, R. W. Schaffer, Prentice Hall.

ISBN-10: 0131988425, ISBN-13: 9780131988422

Reference materials: Instructor's notes which will be provided on Blackboard

Specific course information

Catalog description:

An analysis of discrete signals and systems, difference calculus, sampling theory, Z-transform and the discrete Fourier transform, digital filter synthesis and implementation, and fast Fourier transform algorithms

Prerequisites: Graduate Standing or permission of instructor

Specific goals for the course:

- To provide students with the fundamental theory and up-to-date information in digital signal processing. This course is based on fundamentals covered in the Analysis of Linear Systems (EEL 4656) and should be followed with advanced level DSP courses.
- In this course students are expected to code in MATLAB at a level where they can use programming to verify and demonstrate algorithms used in signal processing.
- Students needing a refresher in DSP may consult sites such as <http://www.dspguide.com/>
- The student will be able to understand the basics of signal processing: filtering, spectrograms, statistical estimation
- The student will develop computer programming skills for data processing
- The student will learn how to match signal processing techniques with the type of signal and the kind of information sought from the signal
- The student will be able to effectively communicate by writing 3 reports

Brief list of topics to be covered:

1. Linear Discrete time systems: input/output relationships
2. The z-transform, the discrete time Fourier transform, sampling theorem
3. Filters and filtering, selective frequency operations.
4. Filter design techniques
5. Random signals and spectral estimation
6. Non-stationary signals, short-time Fourier transforms and spectrograms
7. Multirate systems
8. Linear prediction and all-pole modeling