EE 630 Course Syllabus

Digital Signal Processing

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Office/Phone: 219 Davis Marksbury Building/ (859) 257-8040 (lab: 209 CRMS and 204F Marksbury)
Office hours: 3:00 pm to 4:00 pm Monday (209 CRMS lab), Wednesday (209 CRMS lab) and Friday (209 CRMS lab or 219 Marksbury)
Class Hours and Location: MWF 2pm-2:50pm, Room 267 FPAT.

Class Content and Objective:

The class covers necessary concepts of Digital Signal Processing and gives the student the opportunity to apply and visualize these concepts using computer graphic techniques. Coverage will include Discrete-Time Signals, Z-transforms, discrete-time system modeling, digital filter design, Discrete Fourier Transform, Fast Fourier Transform, sampling theory and Digital Signal Processing implementation. Special emphasis will be given to emulating discrete-time systems using numerical methods. For example, a DSP device operates on discrete-time sequences which are converted to and from continuous time. To model a continuous time system with a computer model, it must be approximated with discrete time samples. Thus, a computer model of a DSP has two levels of sampling, one for the DSP sequences and the other for the continuous time waveforms. This paradigm is relevant to many real world problems. Material will be drawn from chapters 1 through 10 of the text with emphasis on practical application. We expect that this course will help graduate students by giving them the discrete-time theory and experience allowing them to conduct their research and development, beyond just the class room.

Visualization Tasks:

As part of the homework assignments, the students will implement a series of tasks using MATLAB. These tasks are tutorials which typically yield graphical outputs allowing the students to visualize underlying concepts of specific problems. Most tasks will be accumulative in nature although some will be used to clarify concepts found difficult to understand. Other tasks may involve FFT, discrete time filtering, and Z transform concepts.

MATLAB Project:
MATLAB project will consist of real data. Student will use DSP techniques to analyze data and construct a calibrated simulation of the data. More information will be provided as semester passes.

**Grading Policy:**

- Homework: 20%: Once a week, Due one week after assignment, No late homework, drop the lowest 1. At most, one visualization task per homework.
- MATLAB Projects and more difficult visualizations: 40%
  - V4: counts as project of 5%
  - V11: counts as project of 5%
  - Project ST: 5%
  - Project A: 5%
  - Project B: 5%
  - Project C: 5%
  - Project D: 10%

- 40%: teams will be limited to 2 people per team.
- Exam 1: 10% (Date to be announced, closed book, 1 page crib sheet).
- Exam 2: 15% (Date to be announced, open book).
- Exam 3: 15% (Friday before Dead Week, open book).

**Reference:**