Instructor: Dr. Vishal M. Patel  
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Office Hours: Mon 1:00-2:00, or by appointment


Prerequisites: ENEE 322 and completion of all lower division courses.

Homework and Projects: There will be approximately ten homework assignments and two MATLAB projects during the semester. They will be collected, graded, and returned to you along with a copy of the solution. Homework is due at the beginning of class on the date indicated. It is important that you do the homework in order to understand the material in the course.

Exams: There will be two exams during the semester and a comprehensive final exam. All exams will be closed book. The exact material to be covered on each exam will be announced about one week before the exam date.

Course Grade:
Homework & Projects: 20%
EXAM 1: 25% Tuesday, March 27, 2012
EXAM 2: 25% Tuesday, May 1, 2012
Final Exam: 30% Wednesday, May 16, 2012 (10:30am-12:30pm)

Academic Honesty: Students are expected to follow university guidelines.

Disabilities: If you have a disability, you should contact Dr. Patel at your earliest convenience.
COURSE OUTLINE

1. Review of signals and LTI systems (Chapter 2)
2. The Z-Transform (Chapter 3)
   - Definition of the Z-Transform
   - The Inverse Z-Transform
   - Useful Transform Relationships
   - Parseval’s Theorem
   - Difference Equations and the Unilateral Z-Transform
3. Uniform Sampling (Chapter 4)
   - The Sampling Theorem
   - Aliasing
   - Reconstruction, Zero Order Hold, and First Order Hold
   - Sampling Band-Pass Signals
   - Multirate Signal Processing
4. Transform analysis of LTI systems (Chapter 5)
   - Transfer Functions for Discrete-Time Systems
   - Sinusoidal Steady-State Frequency Response
   - Structures for Realizing Transfer Functions
   - Stability
5. Filter Design Techniques (Chapter 7)
   - The Bilinear Transformation Method for IIR Filters
   - Fourier Series and Window Function Method for FIR Filters
   - Design of FIR Filters by the McClellan-Parks Remez Algorithm
6. Effects of Quantization and Finite Word Length Arithmetic in Digital Filters
   - A/D Quantization Noise (4.8.2-3)
   - Arithmetic Round-Off Noise (6.9)
   - Quantization of Filter Coefficients (6.8)
7. The discrete Fourier transform (Chapter 8 & 9)
   - Definition of the DFT and the IDFT
   - Useful Transform Relationships
   - Cyclic Convolution and Correlation
   - The Fast Fourier Transform (FFT)
   - Filtering Long Sequences Using the DFT
8. Advanced topics (if time permits)
   - Wavelets
   - Compressive sampling
   - Time-frequency distributions