Syllabus

ECE 410: Principles of Discrete Time Signal Processing
Department of Electrical and Computer Engineering
George Mason University
Fall 2008

Instructor: Dr. Joseph L. Hibey
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Office Hours: Tuesday 1:00-2:00 pm
Thursday 1:00-2:00 pm


Homework: Assigned approximately every week and due the following week. Working in small groups is encouraged. Will comprise a maximum of 20% of final grade, where the actual percentage will be weighted by performance on two in class exams.

Projects: Computer projects in MATLAB will be required.

Exams: One midterm exam and one final exam will be administered in class. Each is closed-book, closed-notes. Students unable to attend on the announced date because of illness, business travel, or an emergency, must notify instructor before the test and provide written justification (such as a doctor’s note, a copy of travel documents, etc.).

Grading: Homework: 20%
Projects 20%
Midterm exam: 30%
Final exam: 30%

Tentative Class Schedule
Week 1: Signals and signal processing; digital vs. analog circuits

Week 2: Discrete-time signals and systems in time domain; periodic, aperiodic, energy, and power signals

Week 3: Typical sequences: impulse, step, sinusoids; sampling processes

Week 4: Discrete-time systems; LTI; causality; BIBO stability; convolution; interconnected systems; impulse response

Week 5: Finite–dimensional LTI systems; complementary and particular solutions; zero-input and zero-state response; roots of characteristic equation and stability

Week 6: Discrete-time Fourier transform; inverse discrete-time Fourier transform; convergence issues; frequency response; digital filters; phase and group delay

Week 7: Digital processing of continuous-time signals; aliasing; sampling theorem; analog lowpass filter design

Week 8: Discrete Fourier transform; finite-length sequences; circular convolution

Week 9: z-Transform; ROC; causality; inverse z-transform

Week 10: Midterm exam

Week 11: Transfer function; frequency response; ideal filters; zero phase and linear phase; FIR transfer functions

Week 12: Simple digital filters: lowpass, highpass; IIR filters; stability

Week 13: Minimum phase and maximum phase transfer functions; complementary transfer functions

Week 14: Digital filter structure; digital filter design

Final Exam