

ECEN 444 Digital Signal Processing

Prof. Jim Ji, 2008 Spring

Instructor: Jim Ji , 236B WERC; (979) 458-1468; jimji@tamu.edu (Lab office at Magnetic Resonance Systems Lab: USB 109 (old TI building). (979) 458-4521; See lab on map here: <http://www.ece.tamu.edu/~mrs1/maps.htm>.)

TA: Yinan Liu; yiandle@neo.tamu.edu;

Office Hours:

TA: Wed 10:00-11:00am, WERC 235/236 (to be confirmed)
Fri 4:00-5:00pm, computer lab (to be determined), for Matlab and homework help
Instructor: Wed 10:00-11:00am, Fri 8:40-9:00am; or by appointment.

You're welcome to stop by my offices. On Tuesday and Thursday, I'll be at MRSL most of the time. You may email TA and me questions about homework or lectures. If it becomes necessary, I'll address them in class.

Textbook:

Digital Signal Processing: Principles, Algorithms, and Applications by John G. Proakis and Dimitris G. Manolakis, 4th Edition, Prentice-Hall.

URL:

<http://www.ece.tamu.edu/~jimji/ELEN444/> Gradebook and classnotes will be linked to elearning.tamu.edu. There will be a short demo to show how to use elearning in the first class.

Matlab will be used throughout the semester in homework and projects. Get yourself familiar with the Matlab earlier. You can find a introductory material from here:

http://www.mathworks.com/access/helpdesk/help/pdf_doc/matlab/getstart.pdf

Lectures:

Section 501: MWF 09:10AM-10:00AM ZACH 223B

Section 502: MWF 03:00PM-03:50PM ZACH 223B

Honor Section: Same as above

The honor students will need to work on additional homework, which are due at the same time as the normal weekly homework. The honor students must complete three additional Matlab projects from a library of 5 projects. These projects must be finished before the final exam and be turned in a week before the final.

You are expected to attend all lectures. Your commitment of time and energy is fundamental to excellence in this course. Absence with a good reason should be discussed with the instructor for permission before the class.

Course Objectives:

This introduction course is focused on the basic analysis and design of linear shift-invariant discrete-time systems. You will learn the properties of digital signals and systems, Z-transform and discrete Fourier transform, spectrum analysis, and how to design digital filters to manipulate signals in the time and frequency domains.

Prerequisite:

ELEN 314, or equivalent course on continuous-time signal and system analysis.

Homework and Projects:

The HW will be assigned approximately each week on Monday, which will typically be due on the next Monday and must be handed in at the beginning of the class. Grades and solutions will be posted on elearning.tamu.edu. The late homework carries 3% per hour penalty. ***No late homework will be accepted after the solution has been posted, except those covered under the University Policies on Excused Absences.*** The lowest HW score will be dropped in the end, so missed homework will not be made up.

There will be 5 miniprojects throughout the semester (8 for honor students). There will also be a final project for all students.

Test (tentative):

There will be a midterm and a final:

Test 1: Thursday, March 6, 6-8 pm,

Test 2: Thursday, April 24, 6-8pm

The tests are closed book but you may bring a two-side 8.5 by 11-inch note to test 1 and two sheets of notes to the second test.

There will also be in-class quizzes almost every week. The lowest quiz score will be dropped. So missed quiz will not be made up. If you have a university-approved reason for missing an exam or quiz, your average exam/quiz score will be used to make up for the missed exam.

Grading:

The final grade will be determined from the weightings

Tests	= 35% (midterm 15%; final 20%)
Quiz	= 10%
HW	= 30%
Matlab Projects	= 25%

Guaranteed: 90-100 A, 80-89 B, 70-79 C, 60-69 D, Below 60 F. Any curve will lower these ranges.

Topics:

- Overview of DSP (1)
- Signals, systems, and frequency domain analysis (2)
- Fourier series and Fourier transform (3)
- Sampling of continuous-time signals and sampling theorem (2)
- Discrete-time systems: difference equation and properties (4)
- Z-transform and transfer function (1)

- Frequency response of discrete-time systems (4)
- DFT (Discrete Fourier Transform) and FFT (Fast Fourier Transform) (2)
- Basic filter structure and theory (2)
- IIR (Infinite Impulse Response) filter design (3)
- FIR (Finite Impulse Response) filter design (4)
- Multirate signal processing (3)
- Introduction to Wavelets (1)
- Two-dimensional signal processing (1)
- A/D, D/A and hardware implementation (2)
- Applications of DSP (1)
- Course reviews (2)
- Tests (2)

Classroom Behavior: Please be courtesy to your classmates and instructor. Setting your cellphone and beeper to mute mode is required in class.

Students Needing Support Services:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room 126 of the Koldus Building, or call 845-1637.