UNIVERSITY OF ILLINOIS AT URBANA CHAMPAIGN
Department of Electrical and Computer Engineering

ECE410: Digital Signal Processing I
http://courses.ece.uiuc.edu/ece410
Fall 2009
Information Handout

Lecture Times:

lecture	E	01:00 PM - 01:50 PM	M	room 253 Mechanical Engineering Bldg	Prof. Bresler
lecture	E	01:00 PM - 02:20 PM	WF	room 253 Mechanical Engineering Bldg	Prof. Bresler
lecture	G	03:00 PM - 03:50 PM	M	room 269 Everitt Elec and Comp Engr Lab	Prof. Singer
lecture	G	03:00 PM - 04:20 PM	WF	room 269 Everitt Elec and Comp Engr Lab	Prof. Singer

Instructors:

Prof. Yoram Bresler
Office: 112 CSL
ybresler
Office Hours by appointment

Prof. Andrew Singer
Office: 110 CSL
acsinger
Office Hours by appointment

Teaching Assistants:
The Teaching Assistants for the course are Felice Cheng, Fan Lam, Behzad Sharif and Charles Spuckler. The TAs will hold recitations, in which they will solve problems on the board and/or review course material, as well as office hours, during which they will answer specific questions from students. The schedule for recitations and office hours is given below, and will be updated on the course web page.

Recitation	Office Hours	Location	TA Name
---	M 1:30-3:30	106B8 Eng. Hall 8/24-10/5 257 Evrt 10/7-12/7	Charles Spuckler
M 5:30-6	M 6-7	241 Evrt	Fan Lam
Tue 5-6:00	Tue 6:00-6:30	257 Evrt	Behzad Sharif
---	Thu 5-7	257 Evrt	Felice Cheng
---	F 9-11	104 Talbot Lab	Charles Spuckler
F 3-3:30	F 3:30-4	245 Evrt	Fan Lam

The TA email addresses are: {fcheng3, fanlam1, sharif, spuckler}@illinois.edu .

Text and References:
Class notes will be provided, lecture by lecture for download from the course website. We strongly suggest that you also purchase the *ECE 410 Course Notes*, which will be available for purchase in Everitt Laboratory as supplemental reading material. More information about this and other recommended texts is available on the course web page.

Homework:
There will be approximately 13 problem sets, on a weekly schedule. Problem sets will be available in PDF format on the course web page on Tuesday and will be due in the course drop box in the basement of Everitt Laboratory on the following Tuesday before 7pm. Late homework will not be accepted. In calculation of the final grade, the two bottom homework scores will be dropped to accommodate any and all unforeseen difficulties during the term. As such, there is no need to seek special attention or permission to skip one or two assignments (seeking such permission will indicate that you have not read this course information handout and reflect poorly on you). If you have trouble printing the problem sets, contact a TA for help.

Homework Grading:
Each homework assignment will have one (1) problem that will be graded by the TAs, with the remaining problems graded by you using the carefully prepared homework solutions. It is your responsibility to look over each and every problem on your homework assignment and carefully, and accurately assign a numeric score to each problem ranging from 0 (lowest) to 5 (full score). You will not be told in advance which of the problems will be graded by the TAs. Once you have turned in your homework, one of the problems will be graded and your homework will be returned to you by the following day. It is your responsibility to look over the homework solutions immediately after they become available online on Tuesdays at 7pm to prepare for the bi-weekly quizzes, which will be held on alternate Wednesdays at 8pm.

Quizzes:
There will be 6 quizzes to be held in alternate weeks, starting on Wednesday September 9th, at 8pm. The quiz dates and locations are as follows: (Note that two fall on a Thursday)

Note the day of the Week	Date	Times	Room
Wednesday	9/9/2009	8:00 PM to 9:00 PM	Altgeld Hall 314
Thursday	9/24/2009	8:00 PM to 9:00 PM	Natural History Building 228
Thursday	10/8/2009	8:00 PM to 9:00 PM	Altgeld Hall 314
Wednesday	10/21/2009	8:00 PM to 9:00 PM	Altgeld Hall 314
Wednesday	11/4/2009	8:00 PM to 9:00 PM	Altgeld Hall 314
Wednesday	11/18/2009	8:00 PM to 9:00 PM	Altgeld Hall 314

These quizzes are closed book. These quizzes are mandatory. The lowest quiz grade will be dropped from your total score, so, there is no need to seek guidance from the course staff, should you need to miss a quiz due to illness or travel. If you need to miss more than one quiz (only in this circumstance), please see one of the instructors to make alternate arrangements. We will not make any alternate arrangements for students missing only one quiz, so please do not ask us to do so, as this would reflect poorly on you.

Each quiz will cover the previous 2 homework assignments and will be similar to problems on the homework. These problems should be easy for someone who has done, and understood the previous 2 homework assignments. It is therefore in your best interest to stay on top of your homework, regardless of whether or not you turn it in. Your bottom quiz score will be dropped to facilitate an unavoidable absence from class on quiz day. As these quizzes count toward a significant portion of your grade, and the dates are listed on this sheet, please plan any travel dates accordingly. In order to keep your self-reported homework grades in line with other students' self grading practices, your final homework score, as computed in your final grade, will be adjusted by your performance in your quizzes and final exam in comparison to the rest of the class.

Integrity:
This course will operate under the following honor code: All students are expected to do their own work and turn in their own work for credit. Students may collaborate on homework assignments, but each student must turn in his or her own work that has been worked out independently of any other student. Seeking solutions from prior year handouts or copying of other student's work will not be permitted. By enrolling in this course and submitting homework or exams for grading, each student implicitly accepts this honor code. Each student will accurately and honestly assign grades to their own self-graded problems on their homework.

Exam:
There will be a three-hour final exam at the end of the semester. The exam will be closed book. However, you may bring three 8.5 by 11-inch sheets of *handwritten* notes (both sides) to the exam.

Course Grade:
The final grade in the course will be determined by the following criteria:

Homework (dropping the lowest two):	10%
Bi Weekly Quizzes (dropping the lowest one):	50%
Final Exam:	40%

You will be able to view your recorded scores on the homework, quizzes, and exams, as well as the course statistics and distribution using Illinois Compass.

Course Objectives:
Upon completion of this course, you should be able to:

1. Recognize the terminology that is used in the Digital Signal Processing (DSP) field.
2. Explain the theory and concepts behind the construction of DSP systems.
3. Analyze basic DSP building blocks; including analog-to-digital (A/D) and digital-to-analog (D/A) converters, digital filters, spectrum analyzers, sample rate converters (up-sampling and down-sampling), and the fast Fourier transform (FFT) algorithm.
4. Design and synthesize these building blocks and use them effectively in applications.
5. Evaluate DSP systems and justify choices among alternative designs.
6. Think critically, ask questions, and apply problem-solving techniques.

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Department of Electrical and Computer Engineering
ECE 410: Digital Signal Processing I
Fall 2009 Syllabus

#	Week	Reading	Topics	Quiz	HW Due
1	8/24-8/28	Ch 1	DSP overview; Continuous-time (CT) and discrete-time (DT) signals; Complex numbers		
2	8/31-9/4	Ch 2	Fourier transform (FT); Discrete-time Fourier transform (DTFT); Discrete Fourier transform (DFT)		1
3	9/7-9/11	Ch 3	DFT spectral analysis; Applications of DT signal analysis	Q1	2
4	9/14-9/18	Ch 4	Sampling; Ideal A/D (analog-to-digital) converter		3
5	9/21-9/25	Ch 5	Linear and shift invariant systems; Convolution; Impulse response	Q2	4
6	9/28-10/2	Ch 6	z-transform; Poles and zeros; Inverse z-transform		5
7	10/5-10/9	Ch 7	Convolution via z-transform; Difference equations; System analysis; BIBO stability	Q3	6
8	10/12-10/16	Ch 8	Frequency response; DT processing of CT signals; A/D and D/A converters		7
9	10/19-10/23	Ch 9	Analog frequency response of a digital processor; Applications of DSP systems	Q4	8
10	10/26-10/30	Ch 10	Digital filter structures; FIR and IIR filters; Generalized linear phase		9
11	11/2-11/6	Ch 11	FIR filter design: truncation, windows, min-max, and frequency sampling	Q5	10
12	11/9-11/13	Ch 12	IIR filter design; IIR design via bilinear transformation; Applications of digital filtering		11
13	11/16-11/20	Ch 13	Downsampling and upsampling; Oversampling A/D and D/A; Digital interpolation	Q6	12
14	11/21-11/29	War and Peace	Thanksgiving Break		
15	11/30-12/4	Ch 14	Fast Fourier transform (FFT); Fast convolution		13
16	12/7-12/9	Ch 15	Review; Applications	FINAL	