Course Information

Instructors:	Chandra Radhakrishnan	Peter Kairouz
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Office Hours:	T: 10:00 AM - 12:00 PM	R: 10:00 AM - 12:00 PM
Office:	120 CSL	119 CSL

Lectures:	MTWRF, 8:30 AM - 9:50 AM Everitt Lab 241
Recitation Session:	R, 5:00 PM - 6:00 PM EH 106B6
Web:	`http://courses.engr.illinois.edu/ece310/`

Textbooks

- Required: D. Munson and A. Singer, ECE 310 Course Notes.
- Optional: Oppenheim and Schafer, Discrete-Time Signal Processing, Prentice Hall, 3rd Ed., 2009.

Prerequisites

- ECE 210 (Analog Signal Processing) or consent of instructor.

Course Philosophy

Upon completion of this course, you should be able to recognize the terminology that is used in the Digital Signal Processing (DSP) field, explain the theory and concepts behind the construction of DSP systems, and 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. This course should give you the necessary tools to design and synthesize these building blocks and use them effectively in applications and evaluate DSP systems and justify choices among alternative designs. The requirement from you, however, is to think critically, ask questions, and apply problem-solving techniques.

Grading

Midterm Exams (2)	40%
Homework (8)	20%
Final Exam	40%
Total	100%

- Late assignments will reduce the grade by 20% per day
- There will be two midterm exams. The exam dates and locations are tentatively scheduled as follows: Wednesday, July 6, 2011 and Wednesday, July 27, 2011 at 5:00 PM in EH 106B1.
- All exams are closed-book. However, you can bring one 8.5'×11' sheet of handwritten notes to the exam.
- Final exam is comprehensive; you are allowed to bring two previously handwritten notes (from midterms 1 & 2) in addition to a new one.

Course Schedule

Week 1 Jun/13 ∽ Jun/17	DSP overview Continuous-time (CT) and discrete-time (DT) signals Complex numbers Impulses Fourier transform (FT) Discrete-time Fourier transform (DTFT) Discrete Fourier transform (DFT)
Week 2 Jun/20 ∽ Jun/24	DFT spectral analysis Sampling Ideal A/D (analog-to-digital) converter LSI Systems Convolution
Week 3 Jun/27 ∽ Jul/1	Impulse response Difference equations z-transform Poles and zeros Inverse z-transform
Week 4 Jul/4 ∽ Jul/8	Convolution via z-transform System analysis BIBO stability Frequency response
Week 5 Jul/11 ∽ Jul/15	DT processing of CT signals A/D and D/A converters Analog frequency response of a digital processor Applications of DSP systems
Week 6 Jul/18 ∽ Jul/22	Digital filter structures FIR and IIR filters Generalized linear phase FIR filter design: truncation, windows, min-max, and frequency sampling
Week 7 Jul/25 ∽ Jul/29	IIR filter design IIR design via bilinear transformation Applications of digital filtering Downsampling and upsampling
Week 8 Aug/1 ∽ Aug/5	Oversampling A/D and D/A Digital interpolation Fast Fourier transforms (FFT) Fast convolution Applications and review