EE 414/514 Analog and Digital Filter Design
Fall 2009

Class Info: Meeting time: 5:30-6:50 Tuesday and Thursday
Location: Engineering Building 207

Instructor: Laurie Joiner
Email: ljoiner@ece.uah.edu
Office: EB 217-B
Phone: 824-6126

Office Hours: Monday and Wednesday 2:00-3:00

Prerequisites: EE 383 Analytical Methods for Multivariable and Discrete Time Systems
EE 315 Introduction to Electronic Analysis and Design

Text: A. Antoniou, *Digital Filters: Analysis, Design, and Applications*, 2ed, McGraw-Hill, 2000.

References: R. Schaumann and M. Van Valkenburg, *Design of Analog Filters*, Oxford University Press, 2001.
S. Orfanidis, *Introduction to Signal Processing*, Prentice Hall, 1996.
B. Lathi, *Signal Processing & Linear Systems*, Oxford University Press, 1998.

Objectives: By the end of the semester you should be able to:

- Design analog filters using Butterworth, Chebyshev, and elliptical approximations
- Determine the filter frequency response
- Design active filters using operational amplifiers
- Design infinite impulse response digital filters
- Design finite impulse response digital filters

Topics: Review of signals and systems
Introduction to Filtering
Implementation of Analog Filters
Analog Filter Approximations
  Butterworth approximations
  Chebyshev approximations
  Inverse Chebyshev approximations
  Elliptic approximations
Implementation of Digital Filters
Infinite Impulse Response (IIR) Digital Filter Design
  Impulse invariance
  Bilinear transform design
Finite Impulse Response (FIR) Digital Filter Design
  Windowing techniques to improve design
  Frequency sampling

Grading:

Homework / projects	20%
Quizzes	15%
Midterm exam	30%
Final exam	35%

Final average of:	90 – 100	A
	80-89	B
	70-79	C
	60-69	D
	< 60	F

Graduate Level: Graduate students will perform an additional filter design. The design will include theoretical and simulation results.

Academic Honesty: All work submitted for the tests and final must be your own unaided work. Collaboration on homework is permitted, but solutions must be your own.

Web Site: A web site for this course will be maintained at http://www.ece.uah.edu/~ljoiner/ee414. Course handouts and all homework assignments will be posted to this page.

Final Exam: The final exam is on Tuesday, December 8 from 6:30 pm-9:00 pm.