

EC2410 - Fourier analysis of signals and systems

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 office hours: posted or by appointment

Text: Signals and Systems, A. Oppenheim & A. Willsky, 2nd ed, Prentice Hall, 1997.

Course objectives:

- 1) Recognize and manipulate linear time-invariant (LTI) systems
- 2) Calculate the Fourier series representation of a continuous periodic signal
- 3) Calculate the Fourier series representation of a discrete periodic signal
- 4) Calculate the Fourier transform of continuous signals using the following properties: linearity, symmetry, time-shifting, differentiation, integration, time and frequency scaling, duality, Parseval's theorem, convolution, and modulation.
- 5) Calculate the discrete-time Fourier transform
- 6) Calculate the output of a filter given the input and the system impulse response.
- 7) Design systems to amplitude modulate and demodulate a signal for communication applications under synchronous and asynchronous conditions
- 8) Design systems to sample a signal and reconstruct that signal from the samples.
- 9) Understand the consequences of undersampling: aliasing.

Grades: 3 tests, each worth 25%
 1 comprehensive final, worth 25%

HWs: A few problems will be assigned on a regular basis to apply the various concepts covered in the classroom. Hws will not be collected, however they constitute an essential part of the learning process for the course. You are responsible for working on the problems as they get assigned to facilitate the understanding of the concepts covered in class. Solutions will be made available.

Exams: All exams will be closed books/notes. One of the problems will be selected out of the HW sets. You will be allowed to bring in one one-sided (8.5*11") sheet on which you may write whatever you feel may be useful to you. For the final you will be allowed to a two-sided (8.5*11") sheet of notes.

test 1 (1/29/04)

test 2 (2/19/04)

test 3 (3/11/04)

Course outline:

Signals and systems
 LTI systems
 Fourier series
 Continuous-time Fourier transform
 Discrete-time Fourier transform
 Filtering
 Sampling and aliasing
 Applications to Communication systems