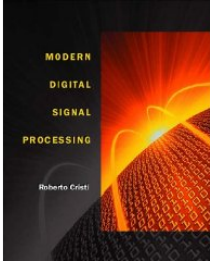


EC3400: Digital Signal Processing

Course Description

Contact: Prof. Roberto Cristi, Sp 462, tel. (831) 656 2223, rcristi@nps.edu



Text Book: Roberto Cristi, Modern Digital Signal Processing, Brooks Cole, 2003.

ISBN-13: 978-0534400958, ISBN-10: 0534400957

All Lectures on-Line: <http://faculty.nps.edu/rcristi/EC3400online/title/title.htm>

Other References (not required) :

- *Digital Signal Processing*, by Proakis and Manolakis, Prentice Hall 2006 (fourth edition);
- *Digital Signal Processing* by S.K. Mitra, McGraw Hill, 2010 (fourth edition).

Course Content:

Chapter 1: Review of basic linear systems.

- Fourier Transforms and related properties (material of EC2400, EC2410, given as a convenience to the students. This chapter will not be covered in class). If you like, you can access an online **Review for Signals and Systems**.

Chapter 2: *Discrete Time Processing of Continuous Time Signals*

- Digital Filtering of Continuous Time Signals;
- Quantization Errors;

Chapter 3: *Fourier Analysis of Discrete Time Signals*

- Discrete Time Fourier Transform (DTFT) and Discrete Fourier Transform (DFT): Definitions and Properties;
- DFT for Spectral Estimation;
- DFT for Convolution;
- DFT/DCT (Discrete Cosine Transform) for Data Compression;
- The Fast Fourier Transform (FFT).

Chapter 4: *Digital Filters*

- Ideal vs Non Ideal Filters;

- Finite Impulse Response (FIR) Digital Filters;
- Infinite Impulse Response (IIR) Analog and Digital Filters.

Chapter 5: *Digital Filters Implementation*

- State Space Realization;
- Robust Implementations.

Chapter 6: *Multi Rate Digital Signal Processing: Fundamentals*

- Downsampling, Upsampling and Sampling Rate Conversion;
- Multi Stage / Multi Rate Implementation of Digital Filters;
- Efficient Implementation of Multi Rate Systems.

Chapter 7: DFT Filter Banks and Transmultiplexers (Subject to Time Availability)

- DFT Filter Banks for Signal Decomposition: Decimated and non Decimated;
- Applications

Requirements.

2 Midterms, 1 Final (30% each) , Computer Assignments (10%);

Homework assigned weekly, *not collected* (solutions will be posted).