

# ECE 539 Digital Signal Processing, Spring 2007

## Contact Information

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Office hours: Tuesday and Thursday 2:00pm – 3:00pm and by appointment.

## Registration information

Digital Signal Processing – 25844 – ECE 539 – 001

ECE 310, Tuesday and Thursday 3:30pm – 4:45pm

## Course Information

The class lecture notes and material are organized around 15 modules, following the same course given at the University of Texas at Austin:

- Module 1. Introduction
- Module 2. Review of Continuous Signals and Systems
- Module 3. Generalized Functions and Fourier Series
- Module 4. Basic Discrete-Time Concepts
- Module 5. Z-Transform
- Module 6. Discrete-Time Fourier Transform
- Module 7. Digital Processing of Analog Signals
- Module 8. Digital Filter Design I
- Module 9. Digital Filter Design II
- Module 10. Discrete Fourier Transform
- Module 11. Fast Fourier Transform Algorithms
- Module 12. Discrete-Time Random Processes
- Module 13. Quantization Effects
- Module 14. Multi-Rate Processing and Subband Filter Banks
- Module 15. Nonlinear Digital Filters

These modules are accompanied by nice demos that demonstrate many of the concepts. I will be using the Matlab demos in class. Please download the modules and demos from [ereserves.unm.edu](http://ereserves.unm.edu). I will work through these notes and also supplement them. All of this material will be placed on ereserves for you to download. Furthermore, we will be working on developing a new, open-access web-site.

## Pre-requisites

The students should be familiar with relevant undergraduate material:

- Basic concepts from Signals and Systems (ECE 314)
- Basic concepts from Probability and Stochastic Processes (ECE 340)
- Basic concepts from Linear Algebra
- Basic programming in Matlab

**Textbooks**

1. A. V. Oppenheim, R. W. Schaffer, J. R. Buck, "Discrete-Time Signal Processing", 2<sup>nd</sup> ed, Prentice Hall, New Jersey, 1999.
2. S. K. Mitra, "Digital Signal Processing: A Computer Based Approach," 3<sup>rd</sup> ed, McGraw Hill, New York, 2006.

**Grading**

Problem Sets/Computer Projects:	20%
Midterm Exam:	40%
Final Exam:	40%

Note that the problem sets will require access to Matlab, SysGen (FPGAs) and Mathematica.