

UNIVERSITY OF TEXAS AT EL PASO
Spring 2015 Syllabus: EE5371 DIGITAL SIGNAL PROCESSING
(Version 1, January 19, 2015)

INSTRUCTOR: SERGIO D. CABRERA, Associate Professor
OFFICE ROOM: Engineering Annex 306

OFFICE HRS.:

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|--------------------------------|---|
| Daily (except Friday) | 11:20-12:20 PM |
| Monday & Wednesday | 4:30 – 5:00 PM (after class) |
| Friday (unless other meetings) | 11-12 noon (send e-mail or call before) |

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COURSE DETAILS: **Call Number: 21900**
CLASS TIME/PLACE: **M,W 3:00 – 4:20 PM, CRBL 303**

TEXTBOOK: Applied Digital Signal Processing: Theory and Practice, Dimitris G. Manolakis and Vinay K. Ingle, Cambridge University Press, ISBN 978-0-521-11002-0

PREREQUISITES: A first course (undergraduate) in Digital Signal Processing (DSP), such as our own EE4383, is the ideal background but this will not be strictly enforced. A course on Signals and Systems (SS) including a good treatment of Discrete-Time SS and/or a good Math. background could be enough if you are willing to put in extra effort. The textbook has everything that you need. The following topics are typically covered in a first DSP course and they will consist of the first half of EE5371: bilateral z-transform, discrete-time Fourier transform (DTFT), Discrete Fourier Transform (DFT/FFT), FIR filters, IIR filters, basic Sampling Theory. Students are expected to have (or quickly develop) proficiency in the use of the Matlab software package for weekly homeworks and for the Project (time permitting).

OVERVIEW OF THE COURSE:

This is a solid graduate-level course in Digital Signal Processing with review followed by two graduate-level topics: *multirate DSP* and an introduction to *Statistical Signal Processing*. The course emphasis is on theory and methods and Matlab verification of the theory. Also, some Matlab implementations and real-world applications will be encountered in order to appreciate the transition from theory to implementation to application.

COURSE GRADING:

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| Two in-class semester Exams: | 50 % |
| Homeworks, Quizzes, and Computer Projects | 20 % |
| Project (time permitting) | 0-10% |
| Exam 3 during Finals Week | 20-30 % |
| TOTAL | 100 % |

KEY DATES:

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| Exam 1 tentative date: | March 4 (Wednesday) |
| Spring Break: | March 9-13 |

Exam 2 tentative date:
Exam 3 actual date:
Project deadline

April 8 (Wednesday)
May 11 (Monday) 1:00 PM
May 19 (Tuesday) 5:00 PM

COMPUTER USAGE: The MATLAB software package (with many Toolboxes including the Signal Processing Toolbox) is made available via the Engineering Technology Center (ETC) Engineering building E351D (3rd floor between CRBL and Eng. Bldg.)

URL: <http://etc.utep.edu/> . Hours: Mon. – Thu: 8AM – 7PM; Friday 8AM – 5 PM,
Tel. (915)747-5223, E-mail: etchelpdesk@utep.edu

DISTRIBUTION OF TOPICS COVERED (highlighted in yellow) FROM THE INDICATED CHAPTERS. All other sections are available for your own catching up and/or review.

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- 1.2 Systems 9
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Additional Policy and Guidelines for Homeworks
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I- Working in Groups: Group discussions and team problem solving is allowed to the degree that everybody will contribute and understand everything that has been worked on. This approach should be joint effort where all parties benefit.

II- Theory problems must always be written-up by each student *individually and uniquely* in his/her own handwriting and in his/her own style (NOTE: exams will be solved in a handwritten way and thus this is the preferred way to solve theory problems). Present solutions to theory problems in the order in which the problems were assigned. Do everything that is asked keeping in mind that sometimes there may be multiple possible correct approaches. Theory problems will be graded pass/fail to verify that you have attempted the problems. You can check your own work since solutions will be provided for your own personal use (you must agree not to give these to anyone else).

III- Matlab projects: Each person should try to do their own computer implementations (writing MATLAB code), simulations (running MATLAB code), plots (generating them and adding them to an electronic report) and write-ups (presentation and discussion of results in the form of a report). If you prefer to work with others, this should be reported up-front on the title page of the assignment. Teams greater than 2 people are not allowed.

Your homework Matlab project solutions should be in the form of a report integrated into a single file to be submitted via e-mail to the class account: scabrer1_ee5371@yahoo.com . The report file should have a name that starts with your Last Name, for example: *Lee_HW3_Matlab_EE5371Sp2015.pdf* Include your MATLAB code (with comments) in your electronic report. Include plots (with titled and labels) to present as many of your solutions as possible in a visual form. A printout of a list of numbers should be a last resort. *Stem* plots are preferred for time-domain or spatial-domain short-duration signals. *Continuous* curves (use of “plot” command) are best for frequency domain plots. Unless otherwise noted, show only magnitude plots of complex functions. Include a write-up with an explanation and discussion for each exercise and include answers to the questions asked. Number all figures and refer to them using that figure number.

IV- Creating electronic documents from Matlab: Consider using the menu option “publish to” which will produce a file (html which can be converted to MS Word) with your code and the resulting figures all in a single file. To add your input, edit the file produced by Matlab and finalize it as a PDF file or leave it as an MS Word document.