EESC6360.001.14F Digital Signal Processing I

The University of Texas at Dallas□ Fall **201**4□

1 all 2014

Day & Time: 🛛

Tuesday & Thursday: 1:00pm-2:15pm (GR 2.530)

Professor Contact Information

Prof. Carlos Busso email: <u>busso@utdallas.edu</u> phone: (972) 883-4351 Room ECSN 4.216 pmce hours: Tuesday & Thursday 2:30-3:30 p.m. (or by appointment)

Course Pre-requisites, Co-requisites, and/or Other Restrictions

(strictly enforced) EE 3302 or EE 4361 or equivalent.

Textbook:

Digital Signal Processing, Principles, Algorithms, and Applications, 4th Edition, by John G. Proakis, and Dimitris G. Manolakis, Prentice Hall (ISBN 13: 978-0131873742) (April 7, 2006).

Suggested Texts, readings, & Materials:

Discrete-Time Signal Processing, by A.V. Oppenheim, and R.W. Schafer, Prentice Hall; 3 edition (August 28, 2009), ISBN 978-0131988422

Understanding Digital Signal Processing, Richard Lyons, Prentice Hall; 3 edition (November 11, 2010) ISBN 978-0137027415

Digital Signal Processing, A Computer-Based Approach, S.K. Mitra, McGraw-Hill Science/Engineering/ Math; 4 edition (September 13, 2010) ISBN-13: 978-0077366766

Student Manual for Digital Signal Processing with Matlab, Proakis & Ingle, Prentice-Hall, 2007, ISBN 0-13-199108-6 (Very useful in conjunction with the textbook)

Schaums Outline of Digital Signal Processing, (Schaum's Outline Series) by Monson Hayes, McGraw-Hill; 2 edition (September 7, 2011), 978-0071635097

Course Description:

Analysis of discrete time signals and systems, Z-transform, discrete Fourier transform, fast Fourier transform, analysis and design of digital filters. Prerequisite:

Course Website:

elearning.utdallas.edu

Student Learning Outcomes:

Students are expected to be able to:

- 1. Analysis and design of Linear Time-Invariant (LTI) signals and systems in time domain.
- 2. Analysis and design of LTI signals and systems using Z-Transform.
- 3. Analysis and design of LTI signal and systems in frequency domain (Fourier Transforms).
- 4. Filter structures and implementations.
- 5. Analysis and design of LTI signals and systems on digital computers using Discrete Fourier Transform (DFT) and FFT.
- 6. Project and technical report.

Topics:

Discrete Time Signals and Systems (Chapters 1, 2, 6.1 & 6.2) - 5 lectures

Z-Transforms and Analysis of Linear Time Invariant Systems (Chapter 3) - 4 lectures

Frequency Analysis of Discrete Time Signals and LTI Systems (Chapters 4 & 5) - 6 lectures

Design of Digital FIR and IIR Filters (Selected material from Chapter 10: 10.2, 10.3) -6 lectures

Discrete Fourier Transform (Chapter 7) — 5 lectures

Fast Fourier Transform (Selected material from Chapter 8) -2 lectures

Assignment and Grading

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Exam 1	(20%)	Thursday,	10/02/2014 (1:00-2:15 pm)
Exam 2	(20%)	Tuesday,	11/11/2014 (1:00-2:15 pm)
Final	(35%)	Thursday,	12/18/2014 (2:00-4:45 pm)
Project	(15%)		
Quiz	(10%)		

* Exams and final are in-class, closed book & notes

* HW will be assigned every *Tuesday*. They are not graded.

No exam grades will be dropped. No Make-up exam will be given without medical excuses or prior arrangement

Important Dates:

Last Day to Add a Course 09/02/2014

Last day to drop a class without a "W" 09/10/2014 Last day of classes: 12/10/2014

Teacher Statement:

My goal as teacher is that you learn as much as possible about digital signal processing, that you find the material interesting and that you finish the course wanting to know more about this subject. You can facilitate this by:

- (i) ask me questions, make use of my office hours,
- (ii) read something other than the required text book,
- (iii) if you are struggling with the material, come and ask me about it as soon as you realize this and not the day before the midterm or final,
- (iv) learn to use MATLAB,
- (v) turn up for the lectures.
- (vi) please be on time late arrivals are very disturbing to other students in the class and also to me. I review the previous class at the start of each lecture and also make announcements at this time.

Course & Instructor Policies

Email

Emails are the preferred way to contact me. Please add <EESC6360> in the subject of emails, so I can give priority of your emails. I only read eLearning mail periodically.

Late Work

Assignments should be turned on time. Make-up exams or projects will not be given without advance notice to the instructor.

Extra Credit

I offer extra credits for students attending the practice sessions offered by the TA (every Friday 2:00-3:00PM, Room CB2-1.204). During these practice sessions, the TA will provide questions to students to reinforce the concepts. The problems are not graded. The attendance for these practice sessions is not mandatory.

With the exemption of this activity, I do not offer "extra credit" work or "special consideration" to allow students a chance to raise their grade. If a personal situation arises during the semester that may affect your classroom

performance, please talk to me sooner rather than later. If you wait until the end of the semester, I won't be able to help you. I can work with you more easily if you speak to me when the situation arises. I cannot help you if I do not indep you need help.

Classroom Citizenship

In keeping with this course's professional communication mandate, students are expected to use every opportunity in the course to practice communicating in a civil and professional manner. It is not allowed to exit the class during the lectures to avoid distracting other students. If a student need to leave early, he/she must let the instructor know perpre the class.

Technology Requirements

The course is taught using eLearning. The student should develop the habit of checking both eLearning and their UTD email often for assignments and announcements. Reliable and frequent internet connectivity is indispensable – not having internet access will make your learning more difficult and will not serve as a valid excuse for shortcomings. Failure to check UTD or eLearning email, errors in forwarding email, and email bounced from overquota mailboxes are not acceptable excuses for missing course email. Additionally, to protect your privacy rights, I will only send email through your official UTD email address or eLearning email. If you choose, you can redirect **port** of these addresses to external addresses.

Classroom and Equipment Use Policies

No laptops, cell phones, pagers, or other electronic messaging services may be used in the classrooms, unless the turnent (1) need a laptops for the presentation (2) have cleared it with me first and then only on an emergency basis.

Technical Support

If you experience any problems with your UTD account you may send an email to: <u>assist@utdallas.edu</u> or call the UTD Computer Helpdesk at 972-883-2911.

Field Trip Policies

Off-campus Instruction and Course Activities Net applicable.

Student Conduct & Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD printed publication, A to Z Guide, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the Rules and Regulations, Series 50000, Board of Regents, The University of Texas System, and in Title V, Rules on Student Services and Activities of the university's

Handbook of Operating Procedures. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391) and online at <u>http://www.utdallas.edu/judicialaffairs/UTDJudicialAffairs-HOPV.html</u>

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

Academic Integrity

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative na a student demonstrate a high standard of individual honor in his or her scholastic work.

Scholastic Dishonesty, any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any credesigned to give unfair advantage to a student or the attempt to commit such acts.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% offective.

Copyright Notice

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials, including music and software. Copying, displaying, reproducing, or distributing copyrighted works may infringe the copyright owner's rights and such infringement is subject to appropriate disciplinary action as well as criminal penalties provided by federal law. Usage of such material is only appropriate when that usage constitutes "fair use" under the Copyright Act. As a UT Dallas student, you are required to follow the institution's copyright policy (Policy Memorandum 84-I.3-46). For more information about the fair use propriate, see http://www.utsystem.edu/ogc/intellectualproperty/copypol2.htm

Email Use

The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to pther accounts.

Withdrawal from Class

The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you checose not to attend the class once you are enrolled.

Student Grievance Procedures

Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's flandbook of Operating Procedures.

In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the deal will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The **essent** student appeals process will be distributed to all involved parties.

Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff prephers are available to assist students in interpreting the rules and regulations.

Incomplete Grade Policy

As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of F.

Disability Services

The goal of Disability Services is to provide students with disabilities equal educational opportunities. Disability Services provides students with a documented letter to present to the faculty members to verify that the student has a disability and needs accommodations. This letter should be presented to the instructor in each course at the beginning of the semester and accommodations needed should be discussed at that time. It is the student's responsibility to notify his or her professors of the need for accommodation. If accommodations are granted for testing accommodations, the student should remind the instructor five days before the exam of any testing accommodations that will be needed. Disability Services is located in Room 1.610 in the Student Union. Office hours are Monday – Thursday, 8:30 a.m. to 6:30 p.m., and Friday 8:30 a.m. to 5:00 p.m. You may reach Disability **Fer**vices at (972) 883-2098.

Guidelines for documentation are located on the Disability Services website at <u>http://www.utdallas.edu/disability/</u>

Religious Holy Days

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under **Feq**tion 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may expire a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief **pre**cutive officer or designee.

These descriptions and timelines are subject to change at the discretion of the Professor.