CSE 3313 – Introduction to Signal Processing
Spring 2015

Instructor:	Darin Brezeale, ERB 648
Office Hours:	Tuesdays and Thursdays, 1:30pm–2:30pm (or anytime my door is open)
Contact:	darin.brezeale@uta.edu (best way to contact me)
	I don't have a phone in my office, but in case of an emergency you can call the CSE department at 817-272-3785.
Website:	http://omega.uta.edu/∼darin
Section:	001: MoWe, 1:00–2:20, ERB 129

Course Description: Examines models for presentation and processing of digital signals. Sampling theorem, correlation and convolution, time and frequency analysis of linear systems, Fourier transform, z-transform, design of digital filters structures for discrete time systems. Prerequisite: CSE 2320, IE 3301 and either CSE 3380 or MATH 3330

Learning Outcomes:

1. Understand what signals are.

2. Be able to analyze and process discrete signals.

3. Be able to go between frequency and time domains.

4. Be able to design simple FIR and IIR filters.

Textbook:

- James H. McClellan, Ronald W. Schafer, and Mark A. Yoder. *DSP First: A Multimedia Approach.* Prentice Hall, Upper Saddle River, New Jersey, 1998. ISBN: 0132431718

Homework Policy: I'm a strong believer that the best way to learn math is by doing, so you should expect plenty of homework. Calculators will not be allowed on exams, so you probably should not become dependent on them when doing your homework.

Grading Policy: There will be three exams plus weekly homework assignments. Your final grade will be calculated as `min(homework average, exam average)` where the homework average is the arithmetic mean of the homework grades and the exam average is the arithmetic mean of the exam grades. Example: you have a homework average of 50 and an exam average of $(92 + 87 + 82)/3 = 87$, then your overall grade is `min(50, 87) = 50`.

No make-up exams will be given except for emergencies (in the instructor's opinion). Poor planning or forgetfulness on your part won't be considered an emergency. I never give extra credit work nor will any grades be dropped. Final grades are based on the ranges of A: 90–100, B: 80–89, C: 70–79, D: 60–69, F: 0–59.

As someone taking an engineering course, I assume that you can 1) keep up with the grades I provide to you and 2) can calculate your current grade in the course.

Important Dates:

Wednesday, January 21	first day of class
Monday, February 23	**exam 1**
March 9–March 13	no class, Spring Break
Monday, March 30	**exam 2**
Monday, May 11	**exam 3**

Attendance: At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I will not take attendance. Attendance is not required except for exams. However, you should not expect me to catch you up if you choose not to come to class nor is not attending the lectures necessarily good for your grade.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/ses/fao).

American with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the Americans with Disabilities Act (ADA). All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Disabilities at (817) 272-3364.

Title IX: The University of Texas at Arlington is committed to upholding U.S. Federal Law Title IX such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit www.uta.edu/titleIX.

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

> I pledge, on my honor, to uphold UT Arlingtons tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group

collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents Rule 50101, 2.2, suspected violations of universitys standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the students suspension or expulsion from the University.

Electronic Communication Policy: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. **I send out a lot of emails, so check your email regularly.**
Note that while I am fine with communicating via email in general, I don't like receiving emails asking for grades and probably won't respond to any emails asking for grades.

Student Feedback Survey At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each students feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlingtons effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit http://www.uta.edu/sfs .

Final Review Week A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit; there are exits located east and west of this room. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Student Support Services UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learn-

ing centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Schedule: This is tentative and therefore likely to change.

lecture	section	topics
1		introduction to course, MATLAB
2	2.2, 2.3, App. A	signal representations, review of trig identities
3	2.5, 2.6	complex arithmetic, phasor addition
4	2.6	phasor addition
5	3.1, 3.2	spectrum of a sum of sinusoids, multiplication of sinusoids
6	3.3	periodic waves
7	2.4, 4.1	sampling, aliases
8	5.1–5.3	FIR filter, unit impulse sequence
9	5.4	unit impulse response, convolution, diagrams of FIR filters
10	5.5	linear, time-invariant (LTI) systems
11	5.5	linear, time-invariant (LTI) systems
12	5.6	convolution and LTI systems
13	6.1	sinusoidal response of FIR systems
14	6.2	superposition and the frequency response
15	6.2	superposition and the frequency response
16	6.3–6.6	steady state, transient response
17	7.1–7.4	z-transforms
18	7.5, 7.6	z-transforms
19	7.6, 7.7	useful filters
20	8.1–8.2.2	IIR filters
21	8.2.3–8.4	IIR filters
22	8.7	IIR filters
23	8.5, 8.8, 8.9	IIR filters
24	9.1–9.2	spectrum analysis
25	9.3–9.4	spectrum analysis

References

- John Kronenburger and John Sebeson. *Analog and Digital Signal Processing: An Integrated Computational Approach with MATLAB.* Thompson Delmar Learning, Clifton Park, NY, 2008

- Charles Schuler and Mahesh Chugani. *Digital Signal Processing: A Hands-on Approach.* McGraw-Hill, New York, NY, 2005. Great book for getting the big picture of DSP. Light on the math