

**CSE 3313 – Introduction to Signal Processing**  
**Spring 2016**

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**Instructor:** Darin Brezeale, ERB 648  
**Office Hours:** Tuesdays and Thursdays, 1:30pm–3:00pm (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: TuTh, 3:30–4:50, NH 112

**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:**

- Robert J. Schilling and Sandra L. Harris. *Fundamentals of Digital Signal Processing Using MATLAB*. Cengage Learning, Stamford, CT, 2<sup>nd</sup> edition, 2012. ISBN: 978-0840069092

**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. Using a calculator to check your work is fine; having the calculator do all of the work isn't.

**Grading Policy:** There will be three exams plus weekly homework assignments. Your final grade will be calculated as  $\min(\text{homework average}, \text{exam average})$  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: 88–100, B: 78–87, C: 68–77, D: 58–67, F: 0–57. I round to the nearest integer, so 87.4 is a B and 87.5 is an A.

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:

Tuesday, January 19	first day of class
Thursday, February 25	<b>exam 1</b>
March 14–March 18	no class, Spring Break
Tuesday, March 29	<b>exam 2</b>
Thursday, May 12	<b>exam 3</b>

**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 except when required to determine if you have attended the class. While attendance of the lectures is not required, 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://www.uta.edu/ses/fao>).

**Disability Accommodations:** UT 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), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. 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 disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the Office for Students with Disabilities (OSD). Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

- The Office for Students with Disabilities, (OSD) [www.uta.edu/disability](http://www.uta.edu/disability) or calling 817-272-3364.
- Counseling and Psychological Services, (CAPS) [www.uta.edu/caps/](http://www.uta.edu/caps/) or calling 817-272-3671.

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](http://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 does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or

veteran status in its educational programs or activities it operates. For more information, visit [uta.edu/eos](http://uta.edu/eos). For information regarding Title IX, visit [www.uta.edu/titleIX](http://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 learning 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 <http://www.uta.edu/universitycollege/resources/index.php>

**Tentative Schedule** Note that this is subject to change, but here are the topics I intend to cover in their approximate order.

number of lectures	topic
2	Introduction, MATLAB
4	chapter 2: Discrete-Time Systems in the Time Domain
4	chapter 3: Discrete-Time Systems in the Frequency Domain
4	chapter 4: Fourier Transforms and Signal Analysis
4	chapter 5: Filter Design Specifications
4	chapter 6: FIR Filter Design
4	chapter 7: IIR Filter Design

## References

- James H. McClellan, Ronald W. Schafer, and Mark A. Yoder. *DSP First: A Multimedia Approach*. Prentice Hall, Upper Saddle River, New Jersey, 1998. This is the first signal processing book that I used. The authors believe this could be the first course taken by electrical engineering students. I don't agree, but they do assume less at the beginning than traditional texts.
- 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.
- Paul A. Lynn and Wolfgang Fuerst. *Introductory Digital Signal Processing*. John Wiley & Sons, New York, NY, 2<sup>nd</sup> edition, 1998. Covers essential topics for a first course with lots of explanations.
- Richard G. Lyons and D. Lee Fugal. *The Essential Guide to Digital Signal Processing*. Prentice Hall, Englewood Cliffs, New Jersey, 2014. This is a relatively short book. You can't learn to apply signal processing from this book, but it gives a great overview that would be a good place for most people to start.