

EE 5362 : DIGITAL COMMUNICATIONS - Fall 2015 Syllabus

Time & Place : 12:30 pm -1:50 pm, Tuesday - Thursday, NH 203

Instructor : Ioannis D. Schizas

Office : NH 534 (e-mail : schizas@uta.edu)

Office Hours : 3:00pm-4:00pm Tuesday-Thursday, or by appointment

GTAs : TBD

Office Hours : TBD

Course webpage: <http://www.uta.edu/faculty/schizas/dcf2015/>

Textbook

J. Proakis and M. Salehi, *Digital Communications*, Fifth Edition, Mc Graw-Hill, 2008.

Additional Reading

[1] U. Madhow, *Fundamentals of Digital Communication*, Cambridge University Press, 2008.

[2] S. G. Wilson, *Digital Modulation and Coding*, Prentice-Hall, 1996.

Prerequisites

Linear algebra, signals and systems, probability, elementary communication systems.

Grading

Homework+Project 15% (some will involve MATLAB programming)

Midterm Exam 40%

Final Exam 45%

Course Objective

The course presents fundamental principles underlying the transmission and reception of digital information, and studies the different parts of a modern digital communication system. Specifically, the course will touch upon different digital modulation schemes, as well as design and performance analysis of optimum receivers for additive white Gaussian noise (AWGN) channels. Some concepts of information theory and channel coding will also be studied. Further, techniques for carrier and symbol synchronization will be presented. Communication over bandlimited channels will also be explored, and the effects of intersymbol interference (ISI) and channel equalization techniques will be considered. The goal of this course is to help graduate students acquire the necessary theoretical background to i) understand the components of a digital communication system, ii) be able to design a digital communication system, and iii) analyze its performance both analytically and numerically.

Course Material/Course Schedule

- Introduction to digital communication systems (1 lecture)
- Review of probability and stochastic processes (3 lectures)
- Digital modulation techniques and vector space representations (5 lectures)
- Optimum receiver design and performance analysis for AWGN channels (8-9 lectures)
- Carrier and symbol synchronization (2-3 lectures)
- Transmitter and receiver design for digital communication over bandlimited channels (2 lectures)
- Intersymbol interference, channel equalization and Viterbi algorithm (4 lectures)
- Basic information theory concepts and channel coding (2 lectures)
- Multicarrier communications and digital transmission over fading channels (if time allows)

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>).

Grade Grievances

Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current graduate catalog:

<http://www.uta.edu/gradcatalog/2012/general/regulations/#grades>

Americans 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.

Academic Dishonesty

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. 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 act designed to give unfair advantage to a student or the attempt to commit such acts. (Regents Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22).

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 contact the Maverick Resource Hotline by calling 817-272-6107, sending a message to resources@uta.edu, or visiting www.uta.edu/resources.

Electronic Communication

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. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Student Feedback Survey

At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory will be asked to complete an online Student Feedback Survey (SFS) about the course and how it was taught. Instructions on how to access the SFS system will be sent directly to students through MavMail approximately 10 days before the end of the term. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback data is required by state law; student participation in the SFS program is voluntary.

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, which is located on your left hand side when exiting NH 110. 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.