

Fundamentals of Telecommunication Systems
EE 5361 Section 051, Fall 2005
T TH 11:00 am - 12:20 pm, Room: 109 NH

Instructor: M. Vasilyev
Office: Room 220 NanoFAB
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Course WWW site: <http://www-ee.uta.edu/Online/Vasilyev/Courses/EE5361>

Required Textbook(s):

B. P. Lathi, "Modern Digital and Analog Communication Systems," 3rd ed, Oxford University Press 1998

Course Description:

The course covers the fundamentals, principles, concepts, and techniques of digital and analog communication systems such as various modulation techniques, digital data transmission and communication technologies.

Course Learning Goals/Objectives:

To obtain familiarity and gain knowledge about various analog and digital communication techniques including different modulation schemes, time-domain and frequency domain multiplexing, noise analysis and information theory.

Attendance and Drop Policy: Follow University guidelines

Tentative Lecture/Top Schedule (Course Content):

AMPLITUDE (LINEAR) MODULATION

- Baseband and Carrier Communication
- Amplitude Modulation: Double Sideband (DSB)
- Amplitude Modulation (AM)
- Quadrature Amplitude Modulation (QAM)
- Amplitude Modulation: Single Sideband (SSB)
- Amplitude Modulation: Vestigial Sideband (VSB)
- Carrier Acquisition
- Superheterodyne AM Receiver
- Television

ANGLE (EXPONENTIAL) MODULATION

- Concept of Instantaneous Frequency
- Bandwidth of Angle Modulated Waves
- Generation of FM Waves
- Demodulation of FM
- Interference in Angle-Modulation Systems
- FM Receiver

SAMPLING AND PULSE CODE MODULATION

- Sampling Theorem
- Pulse-Code Modulation (PCM)
- Differential Pulse Code Modulation (DPCM)
- Delta Modulation

PRINCIPLES OF DIGITAL DATA TRANSMISSION

- A Digital Communication System
- Line Coding
- Pulse Shaping
- Scrambling
- Regenerative Repeater
- Detection-error probability
- M-ary Communication
- Digital Carrier Systems
- Digital Multiplexing

EMERGING DIGITAL COMMUNICATIONS TECHNOLOGIES

- The North American Hierarchy
- Digital Services
- Broadband Digital Communication: SONET
- M-ary Communication
- Synchronization
- Digital Switching Technologies
- Broadband Services for Entertainment and Home Office Applications
- Video Compression
- High-Definition Television (HDTV)

SOME RECENT DEVELOPMENTS AND MISCELLANEOUS TOPICS

- Cellular Telephone (Mobil Radio) System
- Spread Spectrum Systems
- Transmission Media
- Hybrid Circuit: 2-Wire to 4-Wire Conversions
- Public Switched Telephone Network

BEHAVIOR OF ANALOG SYSTEMS IN THE PRESENCE OF NOISE

- Baseband Systems
- Amplitude-Modulation Systems
- Angle-Modulation Systems
- Pulse-Modulation Systems
- Optimum Preemphasis-Deemphasis System

BEHAVIOR OF DIGITAL COMMUNICATION SYSTEMS IN THE PRESENCE OF NOISE

Optimum Threshold Detection
General Analysis: Optimum Binary Receiver
Carrier Systems: ASK, FSK, PSK, and DPSK
Performance of Spread Spectrum Systems

Last day of classes: Dec 1, 2005

Exams are closed book. One two-sided cheat sheet and a calculator are allowed.

Specific Course Requirements w/ Descriptions:

Test#1: Thursday, 22 Sept 2005, 11:00am-12:20pm
Test#2: Thursday, 20 Oct 2005, 11:00am-12:20pm
Final: Tuesday, 6 Dec 2005 11:00am-1:30pm (comprehensive)

Grading:

PLAN A

Test 1	30%	A=90-100%
Test 2	30%	B=80-89%
Final	40%	C=70-79%
		D=60-69%

PLAN B:

(for those who miss a test – not recommended)

Max of Test 1 and Test 2 : 50% ,
Final: 50%

Course grades are based on max. of Plan A and Plan B, i.e., whichever is higher.

Everyone must take the final, at the same time and same place. No exceptions.

1. No makeup. 2. No incomplete. Final exam papers will not be returned. The student, however, has the right to look at his/her exam paper and discuss it with the instructor. Final exam papers will be kept until the midsemester of the following semester. Summer counts as one semester. (No telephone calls or inquiries regarding course grades, please.) Everyone must take the tests and final exam at the same time and at the same place. If you have any questions on your returned tests, please do so within a week. Please bring your work, key and the test. **Videotape students** contact: Engineering center for distance education (Room 242, Nedderman Hall): Donya Ph; 1-817-272-2352 Fax:1-817-272-5630, email: drandolph@uta.edu

Teaching Assistants:

Yodchanan Wongsawat, email: yxw1769@exchange.uta.edu
Qi Dong, e-mail: precentordongqi@hotmail.com

Course Website:

<http://www-ee.uta.edu/Online/Vasilyev/Courses/EE5361>

Student Evaluation of Teaching

Evaluation forms will be given to the students at the end of the semester.

Americans with Disabilities Act:

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112-The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act - (ADA), pursuant to section 504 of The Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.

As a faculty member, I am required by law to provide "reasonable accommodation" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

If you require an accommodation based on disability, I would like to meet with you in the privacy of my office, during the first week of the semester, to make sure you are properly accommodated.

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).

ANY CHEATING WILL RESULT IN SEVERE PENALTIES.