Course Syllabus

Course Information

Course Prefix, Number, Section:	EESC 6352-001
Course Title:	Digital Communications Systems
Term:	Spring 2018
Days & Times:	Mo We 1:00-2:15 PM
Room:	JSOM 11.210

Professor Contact Information

Professor's name:	Dr. Hlaing Minn
Phone number:	972-883-2889
Email:	hlaing.minn@utdallas.edu
Office:	ECSN 4.204
Office Hours:	Mo We 2:30-3:30 PM

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

Pre-requisites: ENGR 3341 or equivalent

Course Description

This course is intended for first year graduate students in Electrical and Telecommunications Engineering Programs. This course discusses the basic principles that underline the analysis and design of digital communication systems. Main topics to be covered are the representations of digitally modulated signals, the characterization of narrowband signals, noise and systems, the spectral characteristics, the design of modulation, optimum demodulation and detection methods in AWGN channel, the evaluation of the error rate performance, the channel bandwidth requirements, signal design for band-limited channels, optimum receiver for channels with ISI and AWGN, and introduction to source coding and channel coding. Brief discussions on multi-carrier communications (OFDM), spread spectrum communications, multiple access techniques, and overview of wireless systems will be included, if time permits.

Student Learning Objectives/Outcomes

1. Ability to characterize, analyze, and design digitally modulated signals
2. Ability to design and analyze demodulators and detectors
3. Ability to evaluate error rate performance
4. Ability to analyze and design digital communication systems

Required Textbooks and Materials

- "Digital Communications" 5-th Edition, John G. Proakis and Masoud Salehi, *McGraw-Hill*, 2008. ISBN 978-0-07-295716-7. Chapters 2, 3, 4, parts of 9, and related topics.
- Lecture Notes.

Suggested Course Materials

- "Digital Communication Techniques-Signal Design and Detection", M. K. Simon, S. M. Hinedi and W. C. Lindsey, Prentice Hall PTR, 1995. ISBN: 0-13-200610-3.
- "Lecture Notes from Digital Communications and Advanced Digital Communications" by Prof. John Cioffi, Stanford University.
- "Principles of Communication Engineering", J. M. Wozencraft and I. M. Jacobs, (Reprint 1990), Waveland Press Inc., ISBN: 0881335541.
- "Fundamentals of Communication Systems" J. G. Proakis and M. Salehi, Pearson Prentice Hall, 2005, ISBN 0-13-147135-X.
- "Digital Communications: Fundamentals and Applications" (2-nd Edition), B. Sklar, Prentice Hall, 2001, ISBN 0-13-084788-7.
- "Probability and Random Processes with Applications to Signal Processing" (3rd Edition), H. Stark & J.W. Woods, Prentice Hall, 2002. ISBN 0-13-020071-9.
- "Probability, Random Variables and Stochastic Processes", A. Papoulis and S.U. Pillai, McGraw Hill, 2002.

Assignments & Academic Calendar

Lists of Topics	**Number of Weeks**
• Introduction and preliminaries	~ 1
• Signal representation & digital modulations (PAM, PSK, QAM, FSK, OFDM, MSK, CPM)	~ 3
• Demodulators & Detectors	~ 2
• Probability of error calculation	~ 1.5
• Simulation of communication system	~ 0.5
• Capacity & link budget	~ 1.25
• Duplexing, multiplexing, multiple access	~ 0.25
• Power spectral density calculation	~ 1
• Introduction to source and channel coding	~ 1.5
• Wireless channels and systems	~ 1
Exam.	**Date & Time**
Computer Project	Apr. 23, 2018
Exam. 1 (on objective 1)	TBA
Exam. 2 (on objectives 2 and 3)	TBA
Exam. 3 (on objectives 1 to 4)	TBA

Grading Policy

Final grades in this course will be based on quizzes and three examinations. Any graded work can be disputed in writing *within one week* of the return or release of that work or grade. Complete work will be re-graded.

The grading policy is:

Quizzes:	10 %
Computer Project:	10 %
Exam. 1:	20 %
Exam. 2:	20 %
Exam. 3:	40 %

Course & Instructor Policies

No makeup examinations will be offered in this course. In the event of an excused absence (illness, job-related travel, holy day absence, etc.), only one excused exam (not the last exam) is allowed; proper documents should be provided; the weight of the exam will be shifted to the other appropriate exams. All exams are closed-book, closed-note. No electronic devices except basic calculators are allowed. All announcements and homework assignments will be posted at http://elearning.utdallas.edu. It is the responsibility of each student to check this web page at least once a week for new announcements and homeworks.
Backup Plan: In cases of the elearning server down-time, please check www.utdallas.edu/~hlaing.minn/teaching.html for announcements and course material postings.

Comet Creed
This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to http://go.utdallas.edu/syllabus-policies for these policies.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.