ELC 4350: Principles of Communication
9:05–9:55 a.m. Monday, Wednesday, Friday
Rogers ECS Building 312

Instructor:	Dr. Liang Dong
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Course Description:

This course is a senior-level introduction to the basic principles of digital and analog communication systems. A communication system is one that transfers a source (voice, video, data, etc.) from the transmitter to the receiver. A digital communication system converts the source information into a stream of bits then symbols that can be transmitted over a channel (cable, wireless, storage, etc.). Topics in this course include signal waveform, spectrum and bandwidth, upconversion and downconversion, sampling, automatic gain control, analog and digital modulation, digital filtering, communication channel impairment, carrier recovery, pulse shaping and receive filtering, synchronization, timing recovery, linear equalization, coding and decoding. Theory is explained and supported through classroom demonstrations and Matlab simulation projects. We use a textbook that breaks things into pieces, each with a small amount of Matlab codes. We will see how a signal is generated and passed through an ideal channel and a channel with impairments. It helps us master every specific aspect of communication system design.

Prerequisite:	ELC 3335 – Signals and Systems
	STA 3381 – Probability and Statistics
	Basic Matlab skills

Credit Hours:	3

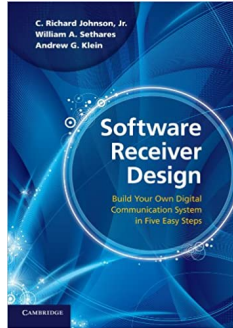|	
Textbook 1:	*Modern Digital and Analog Communication*
	Oxford University Press; 5th edition, 2018
Author(s):	B. P. Lathi and Zhi Ding
ISBN-13:	978-0190686840

Textbook 2:	Reference Book
	Software Receiver Design
	Cambridge University Press; 1st edition, 2011
Author(s):	C. Richard Johnson, Jr , William A. Sethares, and Andrew G. Klein
ISBN-13:	978-0521189446

Course Objectives:

At the completion of this course, you will:

1. Master the mathematical foundation of digital and analog telecommunication system design.
2. Implement a working version of the digital communication transceiver using Matlab.
3. Understand the general techniques that support modern communication systems.
4. Learn to integrate various parts of the communication system, and iteratively improve the system to adapt to increasing levels of channel distortion and different types of real-world conditions.
5. Understand how to objectively evaluate the performance of each part of the communication system.

Computer Usage:

Matlab and Simulink Communications Toolbox (available on computers of College of Engineering and Computer Science, available for download from Baylor ITS with Baylor Bear ID.)

We will use computers extensively to program and verify homework assignments. Various software tools are available at the Baylor Engineering Computer Center.

Reading Assignment, Homework, and Quiz:

There will be biweekly reading assignments. Reading assignments include textbook reading and technical paper reading. The outcome of your reading assignments will be evaluated through self-reporting, classroom discussions, and quizzes.

There will be homework assignments every two to three weeks. Homework includes textbook problems and Matlab programming projects.

There will be a few in-class quizzes. Each quiz has a few questions that are related to the knowledge covered in the previous classes and/or the current class. The quiz is designed to measure your classroom involvement and learning effectiveness.

Midterm Exams:

There will be two in-class midterm exams. The date for the midterm exams are

- Midterm Exam 1:   Wednesday, March 2, 2022

- Midterm Exam 2:   Wednesday, April 13, 2022

Final Exam:

The final exam will be a comprehensive exam. The date and time are according to the online Baylor University Final Exam Schedule.

Grade Distribution:

Reading Assignment	10%
Homework Assignments	15%
Quizzes	10%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	25%

Letter Grade Distribution:

>= 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	<= 59.99	F

Class Notifications

I will use the announcement function in Canvas to let you know about class assignment deadlines and possible class changes (occasionally move to online if necessary), provide homework instructions and tips, announce possible office hours changes, and more. You need to properly configure Canvas notifications in order to receive all appropriate notifications in a timely manner.