EE 567: Communication Systems
Fall 2017

Lecture: Monday 6:40-9:20 p.m. in OHE 136

Instructor: Christopher Wayne Walker, Ph.D.
Office: PHE 414
Office Hours: Monday 5:15-6:30 p.m.
Daytime phone: (213) 740-7654 – USC during office hours
or (310) 812-5176 (voicemail available)
email: cwwalker@cwwphd.com

TA: TBD

Course web page: http://www.cwwphd.com

Text: Required: Modern Digital and Analog Communication Systems, 4th edition,
Authors: B.P. Lathi and Zhi Ding

First Lecture: Monday, August 21
Last Lecture: Monday, November 27
No class: Monday, Sept. 4 (Labor Day)

Course Grading Policy:

Method	**Date**	**Weight**
Homework	As assigned in class	25%
Project	Due Nov. 27	25%
Midterm	Monday, October 23, 6:40-8:30 p.m.	25%
Final	Monday, Dec. 11, 7-9 p.m.	25%

Notes: One 8 ½ x 11 sheet of notes (front and back) is allowed on the Midterm. Two such sheets are allowed on the Final. Calculators are allowed on all exams. No computers or cell phones are allowed on exams nor is any device allowed that has internet capability.

Contact Information: You are welcome to consult with me or your TA during office hours. Please consult with the TA only during his office hours (he is busy with studies like you are). If my office hours are not convenient for you or else you have a question that needs addressing before you can see me then you are welcome to call or email me. Email is the preferred method of contact if I can answer your question with an email response, but if we need to have more interaction then you are welcome to call me at my office. If you call and I cannot speak with you immediately then I will set up a time to call you back to discuss any issues or concerns you may have. I want this course to be a positive learning experience for you so please make sure you get all your questions answered.

Homework: Homework will be assigned regularly. You may work with others on the homework assignments but the work you hand in must be your own and not copied from another student. Homework is due at 6:40 p.m. on the due date. Late homework will be accepted for up to 2 days with 20% penalty.

Project: A project will be assigned and will be due at 6:40 p.m. on Nov. 27 (the last lecture). The project is to be an individual effort. You may consult with only me or the TA with questions related to the project.

EE 567 Outline

Fall 2017

Inst: C.W. Walker

Section	Title
1.0	**Review of Fourier Transforms**
2.0	**Introduction to Communication Systems**
	Transmitter
	Channel
	Receiver
3.0	**Signaling Techniques**
	Analog Communications
	Digital Communication
	Baseband Systems
4.0	**Spectral Concepts**
	Bandwidth
	SNR
	Frequency Bands
	Lowpass and Bandpass Signals
	Bandpass Systems
	Representation of Bandpass Systems
	Representation of Linear Bandpass Systems
	Response of a Bandpass System to a Bandpass Signal
5.0	**Analog Modulation and Demodulation Techniques**
	Amplitude Modulation
	Bandwidth Efficient Amplitude Modulation
	Frequency Division Multiplexing
	Angle Modulation
	Phase Modulation
	Frequency Modulation
	Bandwidth of FM Waves
	Generation of FM Waves
	Demodulation of FM Signals
	Frequency Discrimination
	Phase-Locked Loop Demodulation
6.0	**Bandpass Systems**
	Representation of Bandpass Systems
	Representation of Linear Bandpass Systems
	Response of a Bandpass System to a Bandpass Signal

7.0	**Probability and Random Processes**
	Probability and Random Processes in Communication Systems
	Noise in Communication Systems
	Spectral Analysis
8.0	**Basic Antenna Concepts**
9.0	**Sampling and A/D Conversion**
10.0	**Digital Signaling Techniques and Performance**
	AWGN Channel
	BPSK, QPSK, MPSK Modulation
	FSK, MSK, QAM Modulation
	Effect of Coding on BER Performance
11.0	**Receiver Design**
	Carrier Acquistion and Tracking with Phase-Locked Loops
	Synchronization
	Scramblers
	Noise Figure
12.0	**Signal Detection Techniques**
	Correlation Detection
	Matched Filter Detection
	Square Law Detection/Radiometer
	M of N Detection
13.0	**Spread Spectrum Communications and Multiple Access Channels**
	PN Spreading Codes
	DS-CDMA
	TDMA
	FDMA
	Chaotic Waveforms
14.0	**Miscellaneous Topics**
	Link Budgets
	Channel Capacity
	TDOA/FDOA
	Eye Diagram
	Intersymbol Interference
	Jamming and Anti-jamming Techniques
	Fading Channel
	Channelizers
	Channel Equalization
	Geolocation

The above outline is tentative and may change if circumstances warrant.