

UC Irvine
EECS 141B – Communication Systems
Spring Quarter 2013

Meets: TuTh 9:30 AM-10:50 AM DBH 1429

Instructor: Prof. Ender Ayanoglu (*pronounced A-ya-no-lu*)

Discussion Hour: Tu 11:00 AM-11:50 AM DBH 1420

Office Hour: Wed 3:00-4:00 PM ET 408B

Course Web Site: <http://eee.uci.edu/13s/18140>

Optional Text (Recommended not Required):

S. Haykin, *Communication Systems*, 4th Ed., Wiley, 2001.
New edition of this text (5th) by S. Haykin and M. Moher, although useful, omits a number of topics we will cover. It is still a useful text, however.

or

S. Haykin, *Digital Communication Systems*, Wiley, 2013.
Updated version of *Communication Systems*, 4th Ed.

Relevant Texts:

1. J. G. Proakis, M. Salehi, *Communication Systems Engineering*, 2nd Ed., Prentice-Hall, 2002.
2. B. P. Lathi. Z. Ding, *Modern Digital and Analog Communication Systems*, 4th Ed., Oxford University Press, 2009.
3. R. E. Ziemer, W. H. Tranter, *Principles of Communications*, 5th Ed., Wiley, 2002.

Covers:

Signal space analysis. Optimum receivers for digital communication. Maximum a posteriori and maximum likelihood detection. Matched filter and correlation receiver. PAM, QAM, PSK, FSK, and MSK and their performance. Introduction to equalization, synchronization, information theory, and error control codes. Prerequisite: EECS141A. (Design units: 1)

Grading:

10% Homework, 40% Midterm, 50% Final, 5% Extra Credit (ABET and Course Evaluations).

Lec	Date	Subject	Nts (up to)	Text (4th Ed.)	DUE
1	2-Apr	Digital Communication System Model	p. 2.8	5.1-5.2	
2	4-Apr	Vector Channel, Optimum Detection	p. 2.15	5.3-5.4	
3	9-Apr	Optimum Receivers, Probability of Error	p. 2.21	5.5-5.6	
4	11-Apr	Probability of Error	p. 2.29	5.7-5.8	
5	16-Apr	Phase Shift Keying (BPSK, QPSK, M-PSK)	p. 3.6	6.1-6.3	HW1
6	18-Apr	Pulse and Quadrature Amplitude Modulation (PAM, QAM)	p. 3.13	6.4	
7	23-Apr	Frequency and Minimum Shift Keying (FSK, MSK)	p. 3.21	6.5	
8	25-Apr	Intersymbol Interference, Nyquist Criterion	p. 4.5	4.4-4.5	
9	30-Apr	Adaptive Equalization	p. 4.12	4.10	HW2
10	2-May	LMS Algorithm	p. 4.16		
11	7-May	MIDTERM			
12	9-May	Synchronization, Carrier Phase Recovery	p. 5.7	6.14	
13	14-May	Decision Directed Phase and Timing Recovery	p. 5.12		
14	16-May	Introduction to Information Theory	p. 6.9	9.1-9.3	
15	21-May	Mutual Information, Channel Capacity	p. 6.17	9.4-9.7	
16	23-May	Shannon Channel Capacity Limit, Rate-Distortion Theory	p. 6.23	9.8-9.13	HW3
17	28-May	Error Control Coding	p. 7.8	10.1-10.3	
18	30-May	Cyclic Codes	p. 7.16	10.4	
19	4-Jun	Convolutional Codes	p. 7.24	10.5	
20	6-Jun	The Viterbi Algorithm	p. 7.32	10.6	HW4