

EL6013: Principles of Digital Communications. Spring 2019

Overview: Introductory graduate-level digital communication class including basics of modulation, detection, error rate calculations, Shannon theory and channel coding.

People

- Professor Sundeep Rangan srangan@nyu.edu
 - 2 MetroTech Center, 9.104
 - Office hours: Thursdays 2-4pm
- TA: Sourya Dutta sdutta@nyu.edu

Time Tuesdays, 12:30 to 3pm, JAB 673

Prerequisites: Graduate level probability, EL6303 or equivalent. Undergraduate digital communications and experience with MATLAB or similar language are also expected.

Texts: Main: Proakis, "Digital Communications," 5th edition although earlier versions may be used.

Supplementary

- Madhow, "Fundamentals of Digital Communications", 2008. (available in bookstore)
- Proakis, Salehi, "Fundamentals of Communication systems". This is the undergraduate version
- Steven Kay, "Fundamentals of Statistical Signal Processing: Detection Theory". Provides extra material on multivariable Gaussian estimation and hypothesis testing.

Grading

- Quizzes, labs and homework: 30%, midterm 35%, final 35%.
- Homework will involve (somewhat lengthy) MATLAB assignments.
- Exams are closed book, 1 two-sided cheat sheet.

Tentative Schedule

Lecture	Date	Topic	Text section
1	1/29/2019	Introduction. Passband modulation	Proakis 2.1
2	2/5/2019	Stochastic models for signals	Proakis 2.6, 2.7
3	2/12/2019	TX and RX filtering	Proakis 3.4
4	2/19/2019	Symbol mapping, signal space theory	Proakis 3.2, Proakis 2.2
5	2/26/2019	Synchronization, match filtering and noise	Proakis 4.5, 5.1-5.3
6	3/5/2019	Symbol demodulation	Proakis 4.1-4.3
7	3/12/2019	Midterm review	
8	3/19/2019	Spring break, no class	
9	3/26/2019	Midterm	
10	4/2/2019	Equalization	Proakis 9.1,9.3
11	4/9/2019	Linear codes	Proakis 7
12	4/16/2019	Convolutional and turbo codes	Proakis 8
13	4/23/2019	Information theory	Proakis 6
14	4/30/2019	Final review	
15	5/7/2019	Final exam	

Tentative syllabus