

EE 3404: Fundamentals of Communication Theory

Professor: Sundeep Rangan, srangan@nyu.edu

Spring 2017

Lecture: Tuesdays and Thursdays, 2:00-3:20pm, JAB674

Recitation: Section 1: Tuesdays 3:30pm to 6:25pm; Section 2: Fridays 10:30am to 1:20pm

Overview: The course covers bandpass signal representation and quadrature receivers; noise in communication systems; Digital Modulation Schemes, coherent and noncoherent receivers; coding fundamentals, block and convolutional codes; higher-order modulation schemes, QAM, M-PSK; intersymbol interference and equalization techniques; and carrier and symbol synchronization. Alternate-week computer laboratory projects analyze and design computer packages. The course teaches principles of various modulation and coding techniques and their relative effectiveness under transmission-environments constraints and uses math packages to analyze and simulate communication systems.

Prerequisites: EE3054

Text (main): Proakis, Salehi, "Communications systems engineering" 2nd edition

Grading:

- Weekly quizzes 5%, homework 10%, labs 10%, midterm 1 25%, midterm 2 25%, final 25%
- Labs will involve MATLAB simulation
- Approximately one homework and one lab per chapter
- Quizzes will be given in class and are open book.
- Exams are closed book, 1 two-sided cheat sheet.

TA: Chris Slezak, chris.slezak@nyu.edu

Topics:

- Frequency domain analysis of signals
- Passband modulation, up and down-conversion, power spectral density, bandwidth
- Analog transmission and reception
- Linear modulation, pulse shape filtering and Nyquist sampling
- Receive filtering and effective baseband channel
- Probability review
- Symbol demodulation and probability of error
- Channel capacity and coding