AU 10681
Electrical Engineering 10681
Digital Communications

PART I.
Catalog Description:

> Probability and Stochastic processes. Source coding. Characterization of digital signals and systems (bandpass signals and systems, signal space representation, digital modulation signals, spectrum). Optimum receivers in AWGN channels. Channel capacity and coding. Block and convolution codes. Signal design for bandlimited channels. Fading channels

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PART II.

Major, Measurable Learning Objectives

Having successfully completed this course, the student will be able to:
- Analyze communication problems using statistical tools.
- Design efficient source codes for discrete memoryless sources
- Analyze signals in signal space.
- Design optimum receivers for a given signal set in additive white Gaussian noise channels.
- Derive the probability of error for different digital signal types in additive white Gaussian noise channels and slow Rayleigh fading channels.
- Design simple block codes with given error correction capability.
- Write matlab programs to simulate simple communication systems.

PART III. Texts and Special Teaching Aids

1. J. Proakis, "Digital Communications" 4th Edition, McGraw-Hill.
2. S. Haykin, "Communication Systems" 4th edition, Wiley.
3. Lecture presentations posted on instructor home page:
http://teaching.alexeng.edu.eg/EE/selnouby/

PART IV. Topics

- Introduction to communications systems.
- Probability theory, random variables, density functions, distribution functions, and stochastic processes.
- Introduction to information theory and source coding.
- Waveform coding.
- Bandpass signals and systems representation in complex form and signal space representation of signals
- Digitally modulation signals.
- Optimum receivers and probability of error of digital signals.

- Block Codes and Convolution codes.
- Fading channels models.

PART V. Tentative Grading

Type	Percentage %
Home Work	20%
Mid Term	30%
Matlab project	10%
Final-Exam	40%

Part VI: Honor Code

The Alexandria university honor code will be strictly enforced.