

SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING
GEORGIA INSTITUTE OF TECHNOLOGY
ECE 4601: COMMUNICATION SYSTEMS
FALL 2003

TENTATIVE COURSE OUTLINE

Baseband Pulse-Amplitude Modulation [Chapter 5]

- M-ary PAM Transmission
- Baud Rate, Bit Rate, Alphabet Size
- Nyquist Pulse Shaping
- Eye Diagrams
- Intersymbol Interference
- Minimum-Distance Receiver Design
- Matched Filter vs correlator
- The correlation receiver

Digital Bandpass Transmission [Chapter 5]

- In-phase and quadrature representations
- complex envelopes
- single-sideband PAM vs QAM
- complex PAM: QAM, PSK, cross, hex, etc.
- minimum-distance receiver for complex PAM

Advanced Modulation [Chapter 6]

- M-ary communication
- Orthogonal Modulation
- OFDM

Equalization [Chapters 8 and 9]

- Gradient Algorithm
- Linear Equalization
- Adaptive Equalization using the LMS algorithm
- Decision-Feedback Equalization

Review of Probability and Random Processes [Chapter 2]

- The Gaussian Distribution and the Q function
- Random Processes
- The autocorrelation function and the PSD
- Gaussian Random Processes
- The special properties of AWGN

Performance Analysis in AWGN [Chapter 5]

- Error Probability for Binary Signals
- Error Probability for M-ary PAM
- Error Probability for QAM
- Error Probability for arbitrary M-ary modulation
- Power Efficiency versus Bandwidth Efficiency

Spread Spectrum Modulation [Chapter 6]

- Pseudo-noise Sequences
- Direct-Sequence Spread Spectrum
- Frequency-Hopped Spread Spectrum
- Code-Division Multiple Access

Error Control Coding — as time allows [Chapter 12]

- Channel Capacity
- Linear Block Codes
- Convolutional Codes