King Saud University
College of Engineering
Elect. Eng. Dept.

EE320-Principles of Communication
2nd Semester 1425-26

Instructor: Dr. Ibrahim Elshafiey
Office 2C115 - Phone 467-6751

Lectures Schedule and Location: Sat., Mon. and Wed. at 1C19
Section I: 9-9:50 am
Section II: 11-11:50 am

Prerequisite: EE 301

Text Book:

Simon Haykin, *Communication Systems*, John Wiley & Sons, Inc., New York, 4th Edition, 2001.

References:

1. Bruce Carlson, Paul B. Crilly, and Janet C. Rutledge, *Communication Systems*, McGraw Hill, Boston, 4th Edition, 2002.
2. B. P. Lathi, *Modern Digital and Analog Communication Systems*, Oxford University Press, New York, 3rd Edition, 1998.

Course Goals:

1. Be familiar with basic communication system.
2. Understand the relationship of signal analysis to communication systems.
3. Learn how to analyze linear systems in time and frequency domains.
4. Recognize modulations techniques.
5. Recognize multiplexing techniques
6. Understand pulse code modulation
7. Understand delta modulation
8. Be aware of digital modulation techniques.

Measurable Objectives:

Upon successful completion of this course the student will be able to:

1. categorize components of communication system.
2. make use of signal analysis techniques in communication systems.
3. analyze linear systems in time and frequency domains.
4. categorize modulations techniques.
5. analyze simple modulation systems.
6. categorize multiplexing techniques.
7. identify and analyze pulse code modulation systems.
8. describe and analyze delta modulation systems.
9. Explain digital modulation techniques.

Course Content

Topic 1: INRODUCTION

Elements and Limitation of Communication System; Modulation and Coding; Historical Perspective and Societal Impact.

Topic 2: Signals and Spectral (Review)

Line Spectra and Fourier Series; Fourier Transform and Continuous Spectra.

Topic 3:Signal Transmission and Filtering

Response of LTI Systems; Signal Distortion in Transmission; Equalization.

Topic 4: Random Processes

Stationary Processes; Mean, Correlation and Covariance Functions; Ergodic Processes; Transmission of a Random Process through a Linear Time-Invariant Filter; Power Spectral Density.

Topic 5: Amplitude (Linear) Modulation

Amplitude Modulation; Linear Modulation Schemes: Double Sideband Suppressed Carrier Modulation, Single Sideband Modulation, Vestigial Sideband Modulation; Quadrature-Carrier Multiplexing; Coherent Detection; Envelope Detection; Frequency Division Multiplexing; Superheterodyne Receiver.

Topic 6: Angle (Exponential) Modulation

Narrowband Frequency Modulation; Wideband Frequency Modulation; Transmission bandwidth of FM signals; Generation and Demodulation of FM Signals; FM Stereo Multiplexing.

Topic 7: Sampling and Pulse Modulation

Sampling Theory and Practice; Pulse-Amplitude Modulation; Pulse-Time Modulation; Quantization Process; Pulse-Code Modulation; Time-Division Multiplexing; Delta Modulation; Differential Pulse-Code Modulation.

Topic 8: Principles of Digital Data Transmission

Baseband Pulse Transmission, Intersymbol Interference, Distortionless Baseband Binary Transmission, Passband data transmission, Binary Phase Shift Keying (BPSK), Quadriphase-Shift Keying (QPSK), Hybrid Amplitude/Phase Modulation Schemes, Binary Frequency Shift Keying (BFSK), Minimum Shift Keying (MSK).

Grading:

15 %	Homework and Quizzes
20 %	First Mid-Term Exam
25 %	Second Mid-Term Exam
40 %	Final Exam

Attendance: Attendance is mandatory in lectures and tutorials. A student who misses more than 25% of classes will not be allowed to take the final exam.