

## EE 320: Communication Principles

### Instructor:

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### Reference:

- Simon Haykin and Michael Moher, *An introduction to Analog and Digital Communication*, John Wiley, 2007.
- B.P Lathi, *Modern Digital and Analog Communication Systems*, Oxford University Press, New York, 3rd edition, 1998.

### Course Outline:

Reference from text	Deliverables	Week
1	<b>Introduction:</b> Historical Notes, Elements of Communication systems, Applications, Primary Communication Resources. System Design Parameters.	1
2	<b>Fourier Representation of Signals and Systems:</b> Continues-Time Fourier Transform (CTFT), CTFT properties, Dirac Delta Function, Unit Step function, Fourier Series, Signal Bandwidth (BW), LTI system response, Frequency Response, Correlation, Energy Spectral density, Power Spectral Density.	2, 3
3	<b>Amplitude Modulation:</b> Amplitude Modulation (AM), Generation (Switching Modulator), Detection (Envelop Detector), Double Sideband-Suppressed Carrier (DSB-SC) Modulation, Generation (Product Modulator), Detection (Coherent Detector), Costas Receiver, Quadrature-Carrier Multiplexing, Single-Sideband (SSB) Modulation, Generation (Frequency and Phase Discrimination Methods), Vestigial Sideband (VSB) Modulation, VSB-Shaping Filter, Superheterodyne Receiver, Frequency-Division Multiplexing (FDM).	4, 5, 6, 7

4	<b>Angle Modulation:</b> Phase Modulation (PM), Frequency Modulation (FM), Properties of Angle-Modulated waves, Relationship between PM and FM waves, Narrow-Band FM, Wide-Band FM, BW of FM, Generation and Detection of FM, FM Stereo Multiplexing.	8, 9, 10
5	<b>Sampling and Pulse Modulation:</b> Sampling Process, Analog Pulse Modulation (Pulse-Amplitude Modulation, Pulse-Width Modulation, Pulse-Position Modulation), Quantization Process, Digital Pulse Modulation (Pulse-Code Modulation, Delta Modulation, Differential Pulse-Code Modulation), Line Codes, Time-Division Multiplexing (TDM).	11,12,13
6	<b>Introduction to Digital Band-Pass Modulation Techniques:</b> Binary Amplitude-Shift Keying (BASK), Binary Phase-Shift Keying (BPSK), Quadriphase-Shift Keying (QPSK), Binary Frequency-Shift Keying (BFSK).	14

**Grading:**

- 20 % Homework's/Quizzes/ Tutorial
- 20 % Mid-term Exam 1
- 20 % Mid-term Exam 2
- 40 % Final Exam