

ANALOG COMMUNICATIONS

Course Code:13EC1109

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Pre requisites: Signals & systems, probability.

Course Educational Objectives:

To understand the need for modulation and basics of analog communication systems through various techniques and the performance of communication system in presence of noise.

Course Outcomes:

- ❖ After completion of the course, student is able to
- ❖ Understand the performance of different modulation and demodulation techniques with respect to power and bandwidth
- ❖ Analyze effect of noise in channel and systems.

UNIT-I

(12 Lectures)

AMPLITUDE MODULATION:

Introduction to Communication system, Need for modulation. Amplitude Modulation - single tone and multi-tone modulation, spectral analysis, power and bandwidth relations, Generation: Square law modulator, switching modulator. Detection: Square law detector, Envelope detector.

DSB-SC MODULATION:

spectral analysis, Generation: Balanced Modulator, Ring Modulator. Detection: Coherent detection, Costas Loop. Quadrature-Carrier Multiplexing.

UNIT-II

(12 Lectures)

SINGLE SIDE BAND MODULATION :

Time and Frequency domain description, power and bandwidth relations, Generation: Frequency and Phase discrimination method. Demodulation: Synchronous detection. Vestigial sideband modulation, transmission bandwidth, Comparison of AM Techniques.

AM TRANSMITTERS AND RECEIVERS:

AM Transmitters - low level and high level modulation, Tuned radio frequency receiver, Superhetrodyne Receiver.

UNIT-III**(14 Lectures)****ANGLE MODULATION:**

Phase and Frequency Modulation: Spectral Analysis of Sinusoidal FM and PM signals, Narrow band FM, Wide band FM, Transmission bandwidth, Pre-emphasis & De-emphasis. FM Transmitters - Direct and Armstrong type FM Modulators, FM Receiver block description, FM Demodulators, Threshold effect, Amplitude Limiting, Automatic Gain Control, Comparison of PM, FM & AM.

UNIT-IV**(10 Lectures)****PULSE MODULATION:**

Sampling theorem, sampling techniques, Time Division Multiplexing, Types of Pulse modulation, PAM – Natural sampled and Flat Top sampled, PWM and PPM Generation and Demodulation.

UNIT-V**(12 Lectures)****NOISE:**

Noise sources, Thermal noise, Noise Figure and Noise Temperature, Average Noise Figure and Effective Noise Temperature of cascaded networks, Noise in communication Systems: Noise in AM System, Noise in DSB and SSB Systems, Noise in Angle Modulation Systems.

TEXT BOOKS:

1. H Taub & D. Schilling, “*Principles of Communication Systems*”, Gautam Sahe, TMH, 3rd Edition, 2007.
2. Simon Haykin, “*Communication Systems*”, John Wiley and Sons, 2nd Edition, 2010.

REFERENCES:

1. R.P. Singh, S.D Sapre, “*Communication Systems*”, 2nd Edition, TMH, 2007.
2. John G. Proakis, Masond, Salehi, “*Fundamentals of Communication Systems*”, PTR, 2004.

3. B.P.Lathi, "*Communication Systems*", BS Publication, 2006.
4. George Kennedy and Bernard Davis, "*Electronics & Communication System*", TMH, 1999.

