

SPECTRAL ANALYSIS: Fourier series, Response of a linear system, Normalized power in a Fourier expansion, Power spectral density. The Fourier transform, Convolution, Parseval's theorem, Power and energy transfer through a network, Auto and Cross correlations.

RANDOM VARIABLES AND PROCESSES: Probability, Mutually exclusive events, Joint probability, Statistical independence, Random variables, Probability density function, Average and variance. The Gaussian probability density. The error function, Mean and Variance of sum of random variables, Probability density of $Z = X+Y$. The Central limit theorem, correlation between random variables, auto correlation, power spectral density.

AMPLITUDE MODULATION SYSTEMS: Frequency translation, Recovery of base band signal, Amplitude Modulation, Maximum Allowable Modulation. The square Law demodulator, Spectrum of AM signal, Balanced Modulator, SSB modulation and generation, VSB, FDM.

FREQUENCY MODULATION SYSTEM: Phase and frequency modulation and their relationship, Frequency deviation, spectrum of FM Signal, BW of FM signal, Effect of modulation on BW, constant BW, FM phasor diagram, Narrow band FM, Armstrong and Parameter Variation methods of FM generation. FM Demodulators.

ANALOG TO DIGITAL CONVERSION: Pulse Modulation Systems, Sampling theorem, Pulse Amplitude Modulation, Quantization of signals, Quantization error, Pulse code modulation (PCM) system, Companding, Time division multiplexing (TDM), DPCM, DM, ADM.

NOISE IN COMMUNICATION SYSTEM: Resistor noise, Available power, Noise temperature, Noise bandwidth, Two ports Noise bandwidth, Input Noise temperature, Noise figure, Equivalent-Noise temperature of a cascade, An example of receiving system.

Essential Reading:

1. H. Taub, D. L Schilling, G. Saha; *Principles of Communication System, 3rd Edition*; 2008, Tata McGraw Hill, India; ISBN: 0070648115.

Supplementary Reading:

1. A.B. Carlson, *Communication system* - by Mc. Graw Hill.
2. G.P. John , S. Masoud; *Communication Systems Engineering*, Second Edition; 2002; PHI, India; ISBN :81-203-2750-0