



MANIPAL UNIVERSITY JAIPUR

School of Electrical, Electronics & Communication Engineering (SEEC)

Department of Electronics & Communication Engineering
Course Hand-out

Analog Communication | EC 1501 | 4 Credits

Session: July 14 – Dec. 14 | Faculty: Mr. Ashish Vijay | Class: Core Course

Course Outcomes: At the end of the course, students will be able to

[EC 1501.1] Explain basic elements of communication system.

[EC 1501.2] Analyse and compare different analog modulation and demodulation schemes.

[EC 1501.3] Understand behaviour of random signal and its application it helps to improves research skill of students.

[EC 1501.4] Understand different transmitter and receiver of analog communication it improves their skill and help improve employability in communication sector.

A. SYLLABUS

Spectral analysis: Review of Fourier Transform Theory, Energy, Power, Parseval's Theorem, and Spectra of signals, Cross-Correlation and Auto-correlation functions, Power and Energy spectral density; Random processes: Review of Probability theory and Random Variable, Central Limit theorem, Random Process, Correlation; Noise: Introduction, Thermal Noise, Shot Noise, Signal to Noise ratio, S/N of a tandem connection, Noise Factor, Amplifier Noise in terms of F, Noise Factor of Amplifiers in Cascade, Noise Factor and Equivalent input Noise Generators, Noise Factor of a Lossy Network, Noise Equivalent Temperature, Narrow Band pass Noise. Introduction to communication system; Amplitude modulation: Introduction, Time and Frequency domain analysis, Modulation index for Sinusoidal AM, Average power for Sinusoidal AM, Effective voltage and current for sinusoidal AM, Single tone AM, AM by several sine waves. Generation of AM using square law Modulator and switching modulator, Detection of AM using square law Detector and Envelope detector, AM transmitter and receiver, Noise in AM system; Double side band suppressed carrier (DSBSC) modulation: Introduction, Time and Frequency domain analysis, Generation of DSBSC using balanced modulator and ring modulator, Coherent detection of DSBSC modulated waves, Noise in DSBSC system; Single side band (SSB) modulation: Introduction, Time and Frequency domain analysis, Generation of SSB using Filter method, Phase Discrimination method and Third method, Coherent detection of SSB. Noise in SSB system, Pilot carrier system, VSB modulation; Angle modulation: Introduction to phase Modulation (PM) and frequency modulation(FM), FM Time and frequency domain analysis, Modulation index for sinusoidal FM, Average power for sinusoidal FM, Single tone FM, Generation of FM using Direct Method and Indirect method, Detection of FM using slope Detector, zero cross detector and phase locked loop, Amplitude limiters in FM, Automatic frequency control (AFC), FM stereo Transmitter and Receiver, FM receiver, Noise in FM system, pre-emphasis and De-emphasis filters

B. TEXT BOOKS

1. Taub & D.L. Schilling, Principles of Communication systems, 3rd Ed. McGraw-Hill Co 2008.
2. B. P. Lathi & Z. Ding, Modern Digital and Analog Communication Systems, Oxford, 2010.
3. D. Roddy & J. Coolen, Electronic Communications, Fourth Edition, PHI 2001.
4. Kennedy, Electronic Communication Systems, Third Edition, TMH 1994.
5. H.P. Hsu, Analog and Digital Communications, Schaum's outline series TMH 2006

