

**DEPARTMENT CORE COURSE-5 (DCC)**  
**EC209- COMMUNICATION SYSTEMS**

**Details of course: -**

Course Title	Course Structure			Pre-Requisite
	L	T	P	
<b>Communication Systems</b>	3	0	2	Signals and Systems, Probability and stochastic process

**Course Objective:** The main objective of this course is to understand and implement the basic analog and digital communication techniques/ circuits with the help of theoretical and practical problem solving.

**Course Outcomes:**

1. Comprehend introductory principles of communication systems such as types of signals and the process of modulation
2. Elucidate the process of amplitude, frequency and phase modulation and describe the design of their transmitters, and receivers
3. Apply sampling theory and analyze pulse code modulation and delta modulation.
4. Apply the knowledge of random variables and processes to study noise in communication systems.
5. Compare the noise performance and design tradeoffs of various modulation schemes.

S. No.	Content	Contact Hours
Unit 1	Introduction to Probability, Random Process and Stochastic Process. Introduction to Communication Systems, Source of Information, Communication Channels, Base band Signals, Representation of Signals and Systems, Probabilistic Considerations, Modulation Process, Primary Communication Resources, Analog versus Digital Communication, Applications of Communications Systems.	6
Unit 2	Linear modulation: Time and Frequency domain expression of AM (including intensity modulation of light), DSB, SSB and VSB. Generation of Linearly modulated signals. Coherent Demodulation and Envelope Detection. Angle Modulation: Instantaneous Frequency; Phase and Frequency Modulation, Single tone FM and its Spectral Analysis, NBFM and WBFM, Bandwidth requirements of Angle Modulated Signals, Demodulation of Angle Modulated Signals.	14
Unit 3	Radio and Television Broadcasting: AM Radio Broadcasting and FM radio and TV Broad Casting. Frequency Division Multiplexing, Radio	12

	<p>Transmitters and Receivers, Analog Pulse Modulation: Generation and Demodulation of Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation, PAM/TDM System, Spectra of Pulse Modulated Signals, SNR Calculations for Pulse Modulation Systems.</p> <p>Waveform Coding: Sampling Theorem for Band Pass Signals, Quantization, PCM, DPCM, Delta Modulation, Adaptive Delta Modulation- Design of Typical Systems and Performance Analysis.</p>	
Unit 4	Noise in Communication Systems: Thermal noise, Shot Noise and White Noise. Noise Equivalent Bandwidth, Noise Figure and Noise Temperature. Time Domain Representation of Narrowband Noise. Properties of Narrowband Noise. Noise in CW Modulation Systems. Figure of Merit: Noise performance of Linear and Exponential modulation. Pre-emphasis and De-emphasis in FM. Comparison of the Noise Performance of CW Modulation Schemes.	10
	Total	42

#### Books:-

S. No	Name of Books/Authors/Publisher
1	Communication System by Simon Haykin John Wiley & sons. 3 <sup>rd</sup> Edition
2	Modern Analog and Digital Communication by B.P. Lathi, Oxford University Press, 4 <sup>th</sup> Edition
3	Electronic Communication Systems by Kennedy, Tata McGraw-Hill, 5 <sup>th</sup> Edition
4	Principles of Communication System by Taub & Schilling, Tata McGraw-Hill, 4 <sup>th</sup> Edition
5	Communication Systems by Proakis John Wiley & Sons., 2 <sup>nd</sup> Edition