II Year II Semester	**L**	**T**	**P**	**C**
Code: 20EC4709	**3**	**1**	**0**	**4**

FUNDAMENTALS OF ANALOG AND DIGITAL COMMUNICATIONS

Course Objectives:

1. To understand fundamentals of analog communication systems
2. To analyse various modulation and demodulation techniques of analog signals
3. To classify and understand various functional blocks of communication transmitters and receivers
4. To discuss basic techniques for generating and demodulating various pulse modulated signals
5. To know various digital modulation techniques and their comparison

UNIT–I: Amplitude & Angle Modulation

Amplitude Modulation: Introduction to Communication system, Need for modulation, Frequency Division Multiplexing. Amplitude Modulation AM Generation: Square law modulator, switching modulator. AM Detection: Square law detector, Envelope detector, DSB-SC MODULATION: Balanced Modulator. Detection: Coherent detection. SSB Generation: Frequency and Phase discrimination method. Demodulation: Synchronous detection

Angle Modulation: Phase and Frequency Modulation: Narrow band FM, Wide band FM, FM Transmitters-Direct and Armstrong type FM Modulators., FM Demodulators: Balanced Frequency discriminator, Zero crossing detector, Phase Locked Loop, Comparison of PM, FM & AM.

UNIT–II: Noise

Noise sources, Types of noise, Noise Figure and Noise Temperature, Noise in communication Systems: Noise in AM System, Noise in DSB and SSB Systems, Noise in Angle Modulation Systems, Pre-emphasis & de-emphasis

UNIT–III: Transmitters & Receivers

Transmitters: Classification of Transmitters, AM Transmitters: Low level and High-level Transmitters, FM Transmitters: variable reactance type and phase modulated FM Transmitter.

Receivers: Classification of Receiver Types, tuned radio frequency receiver, Superheterodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting. Communication Receivers.

UNIT–IV: Pulse Modulation

Sampling theorem, Time Division Multiplexing, Types of Pulse modulation, PAM, PWM and PPM Generation and Demodulation, Digital representation of analog signal, PCM,PCM generation & reconstruction, Quantization noise & Companding, Differential PCM, Delta Modulation & Adaptive Delta Modulation.

UNIT–V: Digital Modulation Techniques

Modulators & Detectors of Amplitude Shift Keying (ASK), Frequency Shift Keying (FSK), Phase Shift Keying (PSK), Binary PSK, Differential PSK, Quadrature PSK, M-aryPSK.

Course Outcomes:

A student who successfully fulfils this course requirement will be able to:

S.No	Course Outcome	BTL
1.	Understand the fundamentals of Amplitude & Angle modulation techniques	L2
2.	Describe and analyse the Noise performance of various modulation schemes	L4
3.	Demonstrate and classify communication transmitters and receivers	L2
4.	Classify different pulse modulation schemes	L2
5.	Summarize and distinguish various digital modulation schemes	L2

Correlation of COs with POs& PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	-	-	-	-	-	-	-	-	-	1	-
CO2	1	2	-	-	-	-	-	-	-	-	-	-	2	-
CO3	1	-	-	-	-	-	-	-	-	-	-	-	2	-
CO4	1	-	-	-	-	-	-	-	-	-	-	-	2	-
CO5	1	-	-	-	-	-	-	-	-	-	-	-	3	-

Text Books:

1. Principles of Communication Systems – H. Taub, D. Schilling & Gautam Sahe, Tata McGraw Hill, Third Edition, 2007.
2. Digital communications – Simon Haykin, John Wiley, 2005.
3. Communication Systems – B.P. Lathi, BS Publication, 2006.
4. Communication Systems – Sanjeev Sharma, S.K.Kataria & Sons, 2007.

Reference Books:

1. Principles of Communication Systems – Simon Haykin, John Wiley, Second edition.
2. Electronics & Communication System – George Kennedy and Bernard Davis, Tata McGraw Hill, Second Edition, 2004.
3. Communication Systems– R.P. Singh, S.P.Sapre, Tata McGraw Hill, Second Edition, 2007.
4. Electronic Communication systems – Tomasi, Pearson Education.