COMMUNICATION SYSTEMS

(Core Subject)

Course Code:	10B11EC514	**Semester:**	5th Semester, B. Tech (CSE/IT)
Credits:	4	**Contact Hours:**	L-3, T-1, P-2

Course Objectives

1. To introduce the concept of communication system.
2. To make the students to know the constituents of the communication systems such as transmitter, receiver and channel with their features.
3. To enhance the understanding of communication system and device.

Course Outcomes

This course provides the knowledge of analog and digital communication system analysis and design. After study through lectures and assignments, students will be able to

1. Formulate and interpret the presentation and processing of signals in communication systems.
2. Assess and evaluate different analog and digital modulation and demodulation techniques.
3. Develop an ability to compare and contrast the strengths and weaknesses of various communication systems.
4. Evaluate the influence of noise on communications signals.
5. Understand the state-of-art of the communication systems.

Course Contents

Unit	**Topics**	**References (chapter number, page no. etc)**	**Lectures**
1.	Introduction: Review of Signals and Systems, Review of Fourier Analysis, Elements of a communication system, Introduction to Modulation, Need of Modulation in Communication Systems, band-limited signals and systems, bandwidth, time-limited and frequency-limited signals.	B.P. Lathi: Chapter 1 W. Tomasi: Chapter 1	3
2.	Amplitude Modulation: DSBSC, AM, SSBSC, VSB modulation, Generation and detection of AM signals: Coherent detection, Envelope detection, Generation and detection of DSBSC, SSBSC signals.	B.P. Lathi: Chapter 4 W. Tomasi: Chapter 4-5	12
3	Angle Modulation: Concepts of FM and PM, Narrowband and Wideband FM, Carson's rule, Generation and detection of FM signals.	B.P. Lathi: Chapter 5 W. Tomasi: Chapter 7	10
4	Analog Communication Systems: Homo/Hetro/ Super-hetrodyne Receivers, Multiplexing, TDM,	W. Tomasi: Chapter 8	3

	FDM, QCM, PLL.		
5	Noise: Performance of modulation systems in presence of noise, Study of channel noise performance for various modulation schemes.	B.P. Lathi: Chapter 9 &12	3
6	Sampling and Pulse Modulation Techniques: Sampling theorem, time and frequency domain analysis of sampling , aliasing effect, under sampling and oversampling, practical sampling, Reconstruction of signals, PAM, PPM, PWM generation & demodulation methods, Overview of Digital Communication Systems (DCS) - Merits and Demerits.	B.P. Lathi: Chapter 6 W. Tomasi: Chapter 10	6
7	Analog to Digital Conversion: Quantization, Quantization Noise, Pulse code Modulation– PCM generation and reconstruction- Differential PCM, DM and ADM.	B.P. Lathi: Chapter 6	4
8	Digital Modulation Techniques: ASK, FSK, PSK, QPSK Modulation, Demodulation, Constellation diagrams, Comparison of digital modulation systems.	B.P. Lathi: Chapter 7 W. Tomasi: Chapter 9	4
		Total Number of Lectures	**45**

Evaluation Scheme

1. Test 1 : 15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks
4. **Internal Assessment** : 25 marks
   - 10 Marks : Class performance, Tutorials & Assignments
   - 10 Marks : Quizzes
   - 5 marks : Attendance

Text Books

1. B.P. Lathi, Zhi Ding, "Modern Digital and Analog Communication", 4th Ed., Oxford University Press.
2. W. Tomasi , "Electronic Communications Systems : Fundamentals Through Advanced", 5th Ed., Pearson.

Reference Books

1. Simon S. Haykin, Michael Moher, "Communication Systems", 4th Ed., John Wiley.
2. Bruce Carlson, "Communication Systems", McGrawHill.