Course Code	Course Title	L	T	P	C
BITE203L	Principles of Communication Systems	3	0	0	3
Pre-requisite	NIL	Syllabus version			
		1.0			

Course Objectives

1. To understand the various techniques used in Analog and Digital Communication.
2. To comprehend the impact of interference in signaling devices.
3. To learn the various issues in communication systems.

Course Outcomes

1. Demonstrate the knowledge of fundamental elements and concepts related to Communication System.
2. Study the various modulation techniques used in Analog Communication Systems.
3. Address the challenges imposed on different types of Communication Systems.
4. Use and apply important methods in communication systems using digital transmission systems and different modulation techniques.
5. Understand the concepts of spread spectrum and multiple access techniques.

Module:1	Amplitude Modulation Systems	7 hours

Overview of Communication System; Channels and Their Characteristics; Modulation and its Benefits; Generation and Demodulation of AM, DSBSC, SSB and VSB Signals; Comparison of Amplitude Modulation Systems.

Module:2	Angle Modulation Systems	6 hours

Frequency Translation; Non – Linear Distortion; Phase and Frequency Modulation; Single tone, Narrow Band and Wideband FM; Transmission Bandwidth; Generation and Demodulation of FM Signal.

Module:3	Fundamentals of Noise Theory	5 hours

Overview of Probability, Random Variables and Random Process; Gaussian Process Shot noise, Thermal noise and white noise; Narrow band noise, Noise margin; Noise temperature; Noise Figure.

Module:4	Performance of Continuous Wave Modulation Systems	5 hours

Super heterodyne Radio receiver and its characteristic; SNR; Noise in DSBSC systems using coherent detection; Noise in AM system using envelope detection Envelop Detection for FM; FM threshold effect; Pre-emphasis and De-emphasis in FM; Comparison of performances.

Module:5	Digital Transmission	7 hours

Introduction, Pulse modulation, PCM sampling, sampling rate, signal to quantization noise rate, companding - analog and digital - percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission types- Intersymbol interference, eye patterns, multiplexing.

Module:6	Digital Communication	7 hours

Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of

FSK, FSK receiver, phase shift keying–binary phase shift keying QPSK, Quadrature Amplitude modulation, bandwidth efficiency, DPSK.		
Module:7	**Spread Spectrum and Multiple Access**	**6 hours**
Overview of Spread Spectrum Communication. PN sequences – properties – m-sequence – DSSS – Processing gain, Jamming – FHSS – Synchronisation and tracking – Multiple Access – FDMA, TDMA, CDMA, SDMA.		
Module:8	**Contemporary Issues**	**2 hours**
	Total Lecture hours:	**45 hours**
Text Book(s)		
1.	Taub, H, Schilling, D. L, Saha G, "Principles of communication systems" McGraw-Hill McGraw-Hill Higher Education, 4th Edition, 2017.	
Reference Books		
1.	B.P.Lathi, Z. Ding, H. M. Gupta, "Modern Digital and Analog Communication Systems, 4th Edition, Oxford, 2017.	
2.	J. W. Leis, "Communication system principles using MATLAB", John Wiley & Sons, 2018.	

Mode of Evaluation: CAT, Written assignment, Quiz, FAT			
Recommended by Board of Studies	01-11-2023		
Approved by Academic Council	No. 72	Date	13-12-2023