ITE2003	Principles and Practices of Communication System	L	T	P	J	C
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Pre-requisite	**ITE1001**	**Syllabus version**				
		1.0				

Course Objectives:

- To understand the various devices used in Analog Communication
- To comprehend the impact of interference in signaling devices
- To learn the various issues in communication systems

Expected Course Outcome:

1) Demonstrate the knowledge of fundamental elements and concepts related to Communication System.
2) Design and construct devices used in Communication Systems
3) Address the challenges imposed on different types of Communication Systems.
4) Use and apply important methods in communication systems to support both analog and digital communication.
5) Provide solutions to digital communication by using different modulation techniques.
6) Develop applications by using digital transmission systems.
7) Understand the concepts of digital transmission techniques

Student Learning Outcomes (SLO):	**2, 6, 14**
[2]	Having a clear understanding of the subject related concepts and of contemporary issues
[6]	Having an ability to design a component or a product applying all the relevant standards and with realistic constraints
[14]	An ability to design and conduct experiments, as well as to analyze and interpret data

Module:1	**Amplitude Modulation Systems**	**6 hours**

Review of Spectral Characteristics of Periodic and Non-periodic signals; 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, FDM and OFDM

Module:3	**Fundamentals of Noise Theory**	**5 hours**

Review 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 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, carrier recovery types- squaring loop, Costas loop, DPSK.		
Module:6	**Digital Transmission**	**6 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.		
Module:7	**Satellite and Optical Communication**	**8 hours**
Satellite Communication Systems Keplers Law, LEO and GEO Orbits, footprint, Link model-Optical Communication Systems-Elements of Optical Fiber Transmission link, Types, Losses, Sources and Detectors.		
Module:8	**Contemporary issues:**	**2 hours**
	Total Lecture hours:	**45 hours**

Text Book(s)

1.	Analog and Digital Communications, Sudakshina Kundu, Pearson Education 2010.

Reference Books

1.	Herbert Taub & Donald L Schilling, Principles of Communication Systems, Third Edition, Tata McGraw Hill, 2013.
2.	Wayne Tomasi, Advanced Electronic Communication Systems, Sixth edition, Pearson Education, 2011
3.	Bruce Carlson, Communication Systems, Third Edition, McGraw Hill.
4.	B.P.Lathi, Modern Digital and Analog Communication Systems, Third Edition, Oxford, 2011.

Recommended by Board of Studies	05-03-2016		
Approved by Academic Council	No. 40	Date	18-03-2016