



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
ETC502	Analog Communication	4	-	--	4	-	--	4
		Examination Scheme						
		ISE		MSE		ESE		
		10	30	100 (60% Weightage)				

Pre-requisite Course Codes	ETC302: Analog Electronics-I ETC405: Signals and Systems
After successful completion of the course, student will be able to	
Course Outcomes	CO1 Demonstrate a clear understanding of different modulation and demodulation techniques using analog communication.
	CO2 Identify and solve basic communication problems, analyze transmitter and receivers.
	CO3 Compare and contrast advantages and limitations of different analog communication systems.
	CO4 Apply sampling theorem to convert analog signals to digital signals while satisfying certain specs.

Module No.	Unit No.	Topics	Ref.	Hrs.
1	Basics of Communication System		1,2,6	04
	1.1	Block diagram, electromagnetic spectrum, signal bandwidth and power, types of communication channels		
	1.2	Types of noise, signal to noise ratio, noise figure, and noise temperature		
2	Amplitude Modulation and Demodulation		1,2,6	12
	2.1	Basic concept, signal representation, need for modulation		
	2.2	spectrum, waveforms, modulation index, bandwidth, voltage distribution, and power calculation		
	2.3	DSBFC: Principles, modulating circuits, low level and high level transmitters DSB suppressed carrier:- Multiplier modulator, nonlinear modulator, and switching modulator, Single Side Band (SSB):- Principle, Filter method, phase shift method and third method Quadrature amplitude modulation (QAM), Independent sideband (ISB) and Vestigial Side Band (VSB) principles and transmitters		
	2.4	Amplitude demodulation: Diode detector, practical diode detector, and square law detector.		
	2.5	Applications of AM and use of VSB in broadcast television		
3	Angle Modulation and Demodulation		2,6	14
	3.1	Frequency modulation (FM): Basic concept, mathematical		



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

		analysis, frequency spectrum of FM wave, sensitivity, phase deviation and modulation index, frequency deviation and percent modulated waves, bandwidth requirement of angle modulated waves, deviation ratio, narrow Band FM, and Wide Band FM.		
	3.2	Varactor diode modulator, FET reactance modulator, stabilized reactance modulator-AFC, Direct FM transmitter, indirect FM Transmitter, noise triangle in FM, preemphasis and de-emphasis.		
	3.3	Phase modulation (PM): Principle and working of Transistor direct PM modulator and relationship and comparison between FM and PM		
	3.4	FM demodulation: Balance slope detector, Foster-Seely discriminator, ratio detector, Phase lock loop(PLL) FM demodulator, amplitude limiting and thresholding, comparison between FM demodulators, comparison between AM, FM and PM.		
	3.5	Applications of FM and PM		
4	Radio Receivers		2,4	10
	4.1	TRF, Super-heterodyne receiver, receiver parameters, and choice of IF.		
	4.2	AM receiver circuits and analysis, simple AGC, delayed AGC, forward AGC, and communication receiver		
	4.3	FM receiver circuits, comparison with AM receiver		
	4.4	Single and independent sideband (SSB and ISB) receivers		
5	Sampling Techniques		2,4	04
	5.1	Theorem for low pass and band pass signals, proof with spectrum, Nyquist criteria		
	5.2	Sampling techniques, aliasing error, and aperture effect		
6	Pulse Modulation and Demodulation		1,2,4	08
	6.1	PAM, PWM, PPM generation and detection		
	6.2	Delta modulation, adaptive delta modulation, principle, generation and detection		
	6.3	TDM and FDM basic concepts and block diagram		
	6.4	Applications of pulse communication		
			Total	52

References

1. Wayne Tomasi, "Electronics Communication Systems", Pearson education, Fifth edition.
2. Kennedy and Davis, "Electronics Communication System", Tata McGraw Hill, 4e.
3. B.P. Lathi, Zhi Ding, "Modern Digital and Analog Communication system", Oxford University Press, Fourth edition
4. Taub, Schilling and Saha, "Taub's Principles of Communication systems", Tata McGraw Hill, Third edition.
5. Simon Haykin, Michel Moher, "Introduction to Analog and Digital Communication", Wiley, Second edition.