

# GOPAL KRISHNA COLLEGE OF ENGINEERING AND TECHNOLOGY

**GOURAHARI VIHAR, PO: RANIPUT, JEYPORE – 764 005**

## **LESSON PLAN**

**Name of the Subject: DIGITAL COMMUNICATION TECHNIQUES**

**Name of the Faculty: Jagannath Das**

**Semester: 6<sup>th</sup> Semester**

**Branch: ETC**

**Semester From: January to April**

**No. of Weeks: 15 Weeks**

Week	Day	Theory/ Practical Topics	Classes
		<b>UNIT 1- Sampling Theorem and Signal Reconstruction</b>	<b>4</b>
1	1.	Sampling process, practical difficulties	1
	2.	aliasing and antialiasing filter	1
	3.	Discrete Fourier Transform (DFT)	1
	4.	Applications of Sampling Theorem: PAM, PWM, and PPM signals.	1
		<b>UNIT 2- Digital and Shift-Keying Modulation Techniques</b>	<b>10</b>
2	5.	Quantization, quantization error, non-uniform quantization	1
	6.	companding, encoder design	1
	7.	transmission bandwidth and output SNR	1
	8.	Differential PCM, Delta modulation (DM)	1
3	9.	adaptive delta modulation (ADM)	1
	10.	SNR performance and comparison with PCM. Quantization noise power	1
	11.	output signal power, thermal noise power, output SNR of PCM with different modulation techniques	1
	12.	output SNR of DM. Generation, transmission, reception	1
4	13.	spectrum and geometrical representation in signal space for BPSK	1
	14.	DPSK, DE-PSK, QPSK, $\pi/4$ QPSK, M-ary PSK, BFSK, M-ary FSK, and MSK.	1
		<b>UNIT 3- Principles of Digital Data Transmission</b>	<b>6</b>
	15.	Components of a digital communication system.	1
5	16.	Line coding techniques: polar, unipolar, bipolar, and ON-OFF signaling	1
	17.	Pulse shaping and Nyquist criterion for zero ISI. Scrambling	1
	18.	regenerative repeaters, equalizers, and eye diagram analysis	1
	19.	Timing extraction, timing jitter. Baseband signal receivers	1
6	20.	peak-to-RMS noise ratio, probability of error	1
		<b>UNIT 4- Information Theory</b>	<b>1</b>
	21.	Concept of information, average information, entropy	1
	22.	Shannon-Fano algorithm	1
	23.	Shannon's theorem on channel capacity	

7	24.	bandwidth–SNR trade-off. Use of orthogonal signals to attain Shannon’s limit	1
	25.	efficiency of orthogonal signaling.	1
		<b>UNIT 5- Error Control Coding</b>	5
	26.	Concept of information, average information	1
	27.	entropy. Shannon-Fano algorithm	1
8	28.	Shannon’s theorem on channel capacity, bandwidth–SNR trade-off	1
	29.	Use of orthogonal signals to attain Shannon’s limit	1
	30.	efficiency of orthogonal signaling.	1
	31.		

**Books Recommended:**

1. Taub & Schilling, Principles of Communication Systems, 2nd Edition, Tata McGraw-Hill.
2. Simon Haykin, Communication Systems, 4th Edition, Wiley.
3. Leon W. Couch II, Digital and Analog Communication Systems, 6th Edition, Pearson.
4. B.P. Lathi, Modern Digital and Analog Communication Systems, 3rd Edition, Oxford University Press.