

DIGITAL COMMUNICATIONS LABORATORY

V Semester: ECE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AEC105	Core	L	T	P	C	CIA	SEE	Total
		-	-	3	2	30	70	100
Contact Classes: Nil		Tutorial Classes: Nil		Practical Classes: 36			Total Classes: 36	
I. COURSE OVERVIEW:								
<p>This lab course gives the hands on experience in elements of digital communication systems. The design of various coding techniques, pulse analog and digital modulations to analyse signal to noise ratio, bit error rate, power and bandwidth for digital communication systems. This lab is useful in the digital signal processors in secured communication systems, multimedia communications and data storage applications.</p>								
II. OBJECTIVES:								
The course should enable the students to:								
<p>I The Elements of digital communication systems to convert continuous time signals into discrete time signals.</p> <p>II The pulse analog modulation techniques, generation and detection of digital modulation techniques.</p> <p>III The time and frequency domain analysis of the signals in communication system by using MATLAB tools.</p>								
III. COURSE OUTCOMES:								
After successful completion of the course, students should be able to:								
<p>CO 1 Examine sampling theorem for processing of different signals such as low pass signals, band-limited signals and band pass signals. . Analyze</p> <p>CO 2 Classify the pulse modulation and demodulation methods for encoded data in analog to digital conversion. Analyze</p> <p>CO 3 Apply the concept of pulse code modulation and demodulation for the equivalent sequence of binary code word data. Analyze</p> <p>CO 4 Categorize the digital modulation techniques used for transfer a digital bit stream over an analog channel at a high frequency. Analyze</p> <p>CO 5 Determine bit rate in delta modulation and demodulation process for the no. of bits per sample are transmitted. Apply</p> <p>CO 6 Develop frequency domain description of different digital modulation techniques for spectral characteristics analysis. Apply</p>								
IV. SYLLABUS:								
LIST OF EXPERIMENTS								
Week-1	SAMPLING THEOREM – VERIFICATION							
Verification of sampling theorem for under, perfect, over sampling cases								
Week-2	PULSE AMPLITUDE MODULATION AND DEMODULATION							
Generation of Pulse Amplitude modulation and demodulation using hardware and matlab								
Week-3	PULSE WIDTH MODULATION AND DEMODULATION							
Generation of Pulse width modulation and demodulation using hardware and matlab								

Week-4	PULSE POSITION MODULATION AND DEMODULATION.
Generation of pulse position modulation and demodulation using hardware and matlab	
Week-5	PULSE CODE MODULATION
Generation of pulse code modulation and demodulation using hardware and understanding the concept analog to digital conversion	
Week-6	DIFFERENTIAL PULSE CODE MODULATION
Generation of differential pulse code modulation and demodulation using hardware	
Week-7	DELTA MODULATION.
Generation of delta modulation and demodulation using hardware .Understanding difference between PCM and DM	
Week-8	FREQUENCY SHIFT KEYING
Generation of Frequency shift keying modulation and demodulation using hardware	
Week-9	PHASE SHIFT KEYING.
Generation of Phase shift keying modulation and demodulation using hardware	
Week-10	DIFFERENTIAL PHASE SHIFT KEYING
Generation of Differential Phase shift keying modulation and demodulation using hardware	
Week-11	AMPLITUDE SHIFT KEY(ASK)
Generation of Amplitude Shift Key modulation and demodulation using hardware	
Week-12	STUDY OF THE SPECTRAL CHARACTERISTICS OF PAM AND QAM
Understand frequency domain description of PAM and QAM	
Week-13	QUADRATURE PHASE SHIFT KEYING
Generation of QPSK modulation and demodulation using hardware	
Week-14	MATLAB for QPSK & DPSK .
Understand frequency domain description of amplitude modulation and frequency modulation	
Reference Books:	
<ol style="list-style-type: none"> 1. K. Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley & Sons, 2nd Edition, 2005. 2. B.P.Lathi, "Modern Analog and Digital Communication", Oxford reprint, 3rd Edition, 2004. 3. Singh, Sapre, "Communication Systems Analog and Digital", TMH, 2nd Edition, 2004 	
Web References:	
<ol style="list-style-type: none"> 1. https://ocw.mit.edu/courses/electrical.../6...digital-communications.../lecture-notes 2. https://everythingvtu.wordpress.com 3. http://www.iare.ac.in 	
Course Home Page:	
SOFTWARE AND HARDWARE REQUIRED FOR A BATCH OF 36 STUDENTS	
HARDWARE: Desktop Computer Systems 18 nos	
SOFTWARE: MATLAB	

LIST OF EQUIPMENT REQUIRED FOR A BATCH OF 36 STUDENTS

S.No	Name of the Equipment	Range
1	Cathode Ray Oscilloscope	0-25 MHz
2	RF Generator,	0-300 MHz
3	Function Generator	0-1 MHz
4	Function Generator	0-2 MHz
5	Sampling Theorem	--
6	Pulse Amplitude Modulation	--
7	Pulse Width Modulation	--
8	Pulse Position Modulation	--
9	Pulse Code Modulation	--
10	Pulse Shift Keying	--
11	Frequency Shift Keying	--
12	D-Phase Shift Keying	--
13	D-Pulse Code Modulation	--
14	Delta Modulation	--
15	Amplitude Shift Keying	--
16	Q-Phase Shift Keying	--
17	Spectrum Analyzer	0-500 MHz