ANALOG COMMUNICATIONS LABORATORY

IV Semester: ECE								

Course Code	Category	Hours / Week			Credits	Maximum Marks		
AECB16	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		-	-	3	1.5	30	70	100

Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36	Total Classes:36

I. COURSE OVERVIEW:

Communications is a vital and rapidly expanding field. Students will familiarize with elements of communication. The lab course consists of analog communications in practice, time domain and the frequency domain. It covers the basic types of analog modulation (AM, DSBSC, and FM . . .) from both MATLAB and equipment based.

II. OBJECTIVES:

The course should enable the students to:

I The concepts like Amplitude modulation, Frequency modulation, demodulation, Phase Locked Loop and multiplexing

II The generation, detection of pulse analog modulation techniques and receiver characteristics

III The time and frequency domain analysis of the signals in communication system by using MATLAB tools

III. COURSE OVERVIEW:

After successful completion of the course, students should be able to:

CO 1 **Discriminate** the generation and detection of amplitude modulated and frequency   Analyze
modulated signals to calculate the modulation index and frequency deviation

CO 2 **Analyze** the working principle for generating and detecting DSBSC and SSBSC   Analyze
modulated wave

CO 3 **Distinguish** the time division and frequency division multiplexing techniques for   Analyze
transmitting multiple signals at a time in the communication system

CO 4 **Examine** the mixer characteristics of super heterodyne receiver to verify the   Analyze
characteristics of automatic gain control unit

CO 5 **Make use of** phase locked loop to verify the operation of frequency synthesizer   Apply

CO 6 **Experiment** with the spectrum analyzer to calculate the bandwidth of AM and FM   Apply
waveforms from their frequency spectrum

IV. SYLLABUS:

LIST OF EXPERIMENTS

Week-l	LTI SYSTEM AND ITS RESPONSE

a) Verification of linearity, time invariance, stability properties of a given system
b) Computation of impulse, step, sinusoidal response of a given linear time invariant system using MATLAB

Week-2	AMPLITUDE MODULATION AND DEMODULATION

Generation of amplitude modulation and demodulation using hardware and MATLAB

Week-3	DSB-SC MODULATOR & DETECTOR

Generation of AM-Double Side Band Suppressed Carrier (DSB-SC) signal using Balanced Modulator.

Week-4	SSB-SC MODULATOR & DETECTOR (PHASE SHIFT METHOD)

Generation of single side band suppressed carrier modulation and demodulation using hardware and MATLAB

Week-5	FREQUENCY MODULATION AND DEMODULATION
Generation of frequency modulation and demodulation using hardware and MATLAB	
Week-6	PRE-EMPHASIS & DE-EMPHASIS
Verification of pre-emphasis and de-emphasis to boost high frequency modulating signal using hardware and MATLAB	
Week-7	FREQUENCY DIVISION MULTIPLEXING & DE MULTIPLEXING
Generation of the frequency division multiplexing and demultiplexing circuit and to verify its operation	
Week-8	TIME DIVISION MULTIPLEXING & DE MULTIPLEXING
To study the operation of Time-Division multiplexing	
Week-9	AGC CHARACTERISTICS
To study the AGC Characteristics.	
Week-10	CHARACTERISTICS OF MIXER
To obtain the mixer characteristics of a super heterodyne receiver.	
Week-l1	PHASE LOCKED LOOP
To compare the theoretical and practical values of capture range and lock range of phase locked loop.	
Week-l2	GENERATION OF DSBSC USING RING MODULATION OBSERVATION OF OUTPUT WAVEFORM
To generate AM-Double Side Band Suppressed Carrier (DSB-SC) signal using Ring Modulator.	
Week-l3	FREQUENCY SYNTHESIZER
To study the operation of frequency synthesizer using PLL.	
Week-l4	SPECTRAL ANALYSIS OF AM AND FM SIGNALS USINGSPECTRUM ANALYZER
To study the operation of spectrum analyzer	

Reference Books:

1. Devdas Shetty, Richard A. Kolk (2011), ―Mechatronics System Design‖, PWS Publishing Company.
2. Dan Necsulescu, (2002), ―Mechatronics‖, 3rd Edition, Pearson Education.
3. Michael B. Histand and David G. Alciatore (2005), ―Introduction to Mechatronics and Measurement systems‖, McGraw-Hill.
4. B.P. Singh (2002), ―Advanced Microprocessor and Microcontrollers‖, New Age International Publisher.

Web References:

1. https://ocw.mit.edu/courses/electrical.../6...analog-communications.../lecture-notes
2. https://everythingvtu.wordpress.com
3. http://www.iare.ac.in

SOFTWARE AND HARDWARE REQUIRED FOR A BATCH OF 36 STUDENTS

HARDWARE: Desktop Computer Systems 18 nos

SOFTWARE:MATLAB