ANALOG COMMUNICATIONS

IV SEMESTER: ECE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AECB12	Core	L	Т	Р	С	CIA	SEE	Total
		3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

I. COURSE OVERVIEW:

Analog communications emphasizes on generation, transmission and reception of audio, video and telephony signals. The course covers representation of signals in time and frequency domain, need of modulation and an effect of noises on the performance of communication systems. Analog communi- cation system principles are used for real world applications of Radio and TV broadcasting systems.

II. OBJECTIVES:

The course should enable the students to:

I The elementary signals, fundamental elements of analog communication systems.

II The need of modulation, generation and detection techniques of analog and pulsemodulation systems.

III The influence of external and internal noises on the performance of communication systems.

III. COURSE OUTCOMES:

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

- CO 1 Illustrate the fundamental equations, generation and detection techniques of amplitude Understand modulations for video signal transmissionsystems.
- CO 2 Compare bandwidth, power requirements, efficiency for AM andFM analog communication Analyze systems
- CO 3 **Outline** the generation and detection techniques of frequency modulated waves used for audio Understand signal transmission systems.
- CO 4 Calculate Signal to Noise Ratio (SNR) and noise figure for analysis of amplitude and Apply frequency modulation techniques.
- CO 5 Make use of the working principles of AM, FM receivers to measure selectivity, Apply sensitivity, fidelity and signal to noise ratio.
- CO 6 Interpret the generation and detection techniques of pulse modulations for introducing Understand digital communications, A/D converters.

IV. SYLLABUS:



Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector, Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

SSB MODULATION MODULE-II

SSB Modulation: Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelop detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

MODULE-III ANGLE MODULATION

Classes-09

Classes-09

Classes-09

Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power,

Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM and AM.

MODULE-IV NOISE IN ANALOG COMMUNICATION SYSTEM:

Classes-09

Types of Noise: Resistive (Thermal) Noise Source, Shot noise, Extraterrestrial Noise, Arbitrary Noise Sources, White Noise, Narrowband Noise- In phase and quadrature phase components and its Properties, Modeling of Noise Sources, Average Noise Bandwidth, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks. Noise in DSB and SSB System Noise in AM System, Noise in Angle Modulation System, Noise Triangle in Angle Modulation System, Pre-emphasis and de-emphasis.

MODULE-V RECEIVERS

Classes-09

Receiver Types -Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting. Pulse Modulation: Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation and demodulation of PWM, PPM, Generation and demodulation of PPM, Time Division Multiplexing.

Text Books:

- 1. S. S. Haykin, "Communication Systems", Wiley Eastern, 2nd Edition, 2006.
- 2. Taub, Schilling, "Principles of Communication Systems", Tata McGraw-Hill, 4th Edition, 2013

Reference Books:

- 1. B.P. Lathi, "Communication Systems", BS Publication", 2nd Edition, 2006.
- 2. John G. Proakis, Masond, Salehi, "Fundamentals of Communication Systems", PEA, 1st Edition, 2006
- George Kennedy, Bernard Davis, "Electronics and Communication System", Tata McGraw Hill, 5th Edition, 2011.

Web References:

- 1. http://www.web.eecs.utk.edu
- 2. https://everythingvtu.wordpress.com
- 3. http://nptel.ac.in/
- 4. http://www.iare.ac.in

E-Text Books:

- 1. http://www.bookboon.com/
- 2. http://www.jntubook.com
- 3. http://www.smartzworld.com
- 4. http://www.archive.org