INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

COMMUNICATION SYSTEMS LABORATORY

IV Semester: ECE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AECD15	**Core**	-	-	2	1	40	60	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 45**				**Total Classes: 45**		
Prerequisite: Signals and Stochastic Process								

I. COURSE OVERVIEW:

Communication engineering is the field of study concerned with the transmission of information either in analog or digital form. The objective of this lab course provides a platform to the students to understand the basics of analog and digital communication systems, modulation techniques, data transmission, multiplexing, etc. There are a wide variety of applications for communications like outdoor broadcasting transmissions and long distance telephone calls.

II. COURSES OBJECTIVES:

The students will try to learn
  I. The basic theory of communication system in practice..
  II. The concept of analog to digital conversion for pulse modulation techniques.
  III. The analog and digital modulation techniques using MATLAB tool.

III. COURSE OUTCOMES:

At the end of the course students should be able to:

CO1 Discriminate the generation and detection of amplitude modulated and frequency modulated signals to calculate the modulation index and frequency deviation.

CO2 Analyze the analog pulse modulation and demodulation methods for transmitting the information by pulses.

CO3 Apply the concept of pulse code modulation and demodulation for encoded data in analog to digital conversion.

CO4 Select the time division or frequency division multiplexing techniques for transmitting multiple signals ata time in the communication system.

CO5 Examine the digital modulation techniques for convey more information, high quality and security

CO6 Choose appropriate techniques for signal processing and filtering in communication systems.

IV. LIST OF EXPERIMENTS:

WEEK-1: Getting Started Exercises
Verification of Communication is the process of establishing connection or link between two points for information exchange.

WEEK-2: Exercises on Analog Modulation Techniques
Design of amplitude modulation (AM) systems

WEEK-3: Exercises on Angle Modulation Techniques
Calculation of Frequency Deviation and modulation index in Frequency Modulation (FM).

WEEK-4: Exercises on Analog Pulse Modulation Techniques
Verification of Analog Pulse Modulation Techniques

WEEK-5: Exercises on Digital Pulse Modulation Techniques
Verification of Digital Pulse Modulation Techniques.

WEEK -6: Exercises on Digital Modulation Techniques
Verification of Digital Modulation Techniques.

WEEK -7: Exercises on Signal Processing in Communication Systems
Obtain the frequency response curve of the CE amplifier and determine the mid frequency gain, Amid, lower and higher cutoff frequency.

WEEK -8: Exercises on Signal filtering
Implement the filtering of signals

WEEK -9: Exercises on Wireless Communication Systems
Implement: Internet of Things (IoT) Connectivity Trials.

WEEK -10: Exercises on Data transmission
Implement the Data transmission.

WEEK -11: Exercises on Generation of Noises
Implement the Multiplexing like frequency division, time division multiplexing

WEEK -12: Exercises on Generation of Noises
Obtain the hands-on experience on generation of noises.

WEEK -13: Exercises on case study: Software-Defined Radio (SDR)
Creating a complete Software-Defined Radio (SDR) system in MATLAB

WEEK -14: Exercises on case study: Communication Systems Design and Simulation Create a simple voice communication system using microcontrollers and wireless modules.

IV. TEXT BOOKS:
1. J. G. Proakis, Digital Communications, McGraw-Hill, 5th edition, 2006.
2. B.P.Lathi, "Modern Analog and Digital Communication", Oxford reprint, 3rd edition, 2004.

V. REFERENCE BOOKS:
1. Wayne Tomasi, "Electronics Communication Systems-Fundamentals" 5th edition, 2009.

VI. ELECTRONICS RESOURCES:
1. https://archive.org/details/analog communications
2. https://archive.org/details/digital communications

VII. MATERIALS ONLINE
1. Course template
2. Lab Manual