Course Type	Course Code	Name of Course	L	T	P	Credit
DC	ECC301	Principles of Communication Systems	3	0	0	09

Course Objective

The objective of the course is to give a panoramic view of communication systems, through discussion on modulation and demodulation for transmission and reception of messages, comparison of and link between analog and digital communication, a short treatment of noise that is unavoidable in any communication system, multiplexing techniques that are used for sharing the channel among different users and also an introduction to information theory which is very essential for knowing the limits of communication as well as for designing systems that approach the limit.

Learning Outcomes

Upon successful completion of this course, students will:

- Know about modulation (continuous-wave and pulse) and demodulation for transmission and reception of messages
- Get acquainted with signal conditioning for transmission as baseband digital signal
- Know about the way noise affects a CW communication system
- Know about the ways a channel which is a common resource can be shared among a number of users
- Know the mathematical definition of information in the context of communication

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Basic blocks in a communication system; Continuous wave (CW) modulation – linear and exponential modulation techniques, Phase-locked loops and their applications	12	Know about Continuous wave (CW) modulation and demodulation
2	Pulse Modulation; Sampling and quantization; Baseband encoders, Line coding; Baseband Pulse Transmission – Nyquist criterion for no Intersymbol Interference (ISI), pulse shaping	14	Acquaintance with baseband pulse transmission and related issues
3	Random process: mean, autocorrelation and PSD, Gaussian and white noise, Noise temperature and noise figure, noise in CW systems	7	Treat noise as a random process and analyze its effect in CW systems
4	Multiplexing schemes: frequency division multiplexing and time division multiplexing, Digital multiplexing	5	Know about the ways to send a set of signals through a common channel
5	Introduction to Information theory : concepts of entropy, source coding	4	concept of information from the perspective of communication systems and its efficient representation at source

Textbook:

1. Proakis J. G. and Salehi M., "Communication Systems Engineering", Pearson Education,

Reference Books:

1. Haykin S.,"Communications Systems", John Wiley and Sons.
2. Carlson, A. B.,“Communication Systems,”, McGraw Hill.
3. Lathi, B. P. ,“Modern Analog and Digital Communication systems,” Oxford University Press
4. Taub, H. and D. L. Schilling, Principles of Communication Systems, McGraw Hill.