LECTURE PLAN

Principles of Communication Engineering. (ECL2150)
(3-1-0)

Faculty: Shashi Bhushan Kotwal

Week	Topics
Week 1, (17-21 Jul)	Introduction about signals& communication systems
Week 2, (24-28 Jul)	**Frequency Domain Analysis of Signals and Systems:** Fourier transform, Properties of Fourier transform, Dirac delta function,
Week 3, (31 Jul-04 Aug)	Fourier transform of periodic signals, brief idea about spectral density & its uses.
Week 4, (07 Aug-11 Aug)	**Analog communication systems:** Introduction to modulation, amplitude modulation, DSB-SC, SSB, VSB,
Week 5, (14 Aug-18 Aug)	Implementation of AM modulators & demodulators, signal multiplexing,
Week 6, (21 Aug-26 Aug)	Angle modulation- phase & frequency modulation, implementation of angle modulators & demodulators,
Week7, (28 Aug-01 Sep)	Noise on analog communication systems- introduction of noise,
Sep 03-06	**Minor I**
Week 8, (11-15 Sep)	Random processes, Gaussian & white processes, effect of noise on various communication systems,
Week 9, (18 -22 Sep)	Sampling theorem, PAM, Quantization, Quantization error,
Week 10, (25-28 Sep)	**Digital communication systems:** PCM, DPCM, DM, Adaptive DM,
Week 11, (02-06 Oct)	Effect of noise, introduction to multiple access techniques
Oct 10- 13	**Minor II**
Week 12, (16 – 20 Oct)	**Information theory and coding: Discrete messages, concept of information, entropy, information rate, mutual information,**
Week 13, (23-27 Oct)	Shannon's theorem, channel capacity, capacity of Gaussian channel, B/W and S/N trade off,
Week 14, (30 Oct-03 Nov)	Introductory ideas of different types of coding, parity check coding,
Week 15, (06 - 07 Nov)	Block code, convolution coding.
Week 16, (08-15)	**Revision Week**
Nov 17-26	**Major Exams**

Text Books

- George Kennedy: Electronic Communication Systems, 5th Edition , McGraw Hill
- Simon Haykin & Michael Moher: An Introduction to Analog and Digital Communications, 2nd Edition, John Willey & Sons

Reference Books:

- Communication Systems Engineering, Proakis & Salehi, Pearson Education
- Principles of Communication Systems, Taub Schilling Tata McGraw Hill
- Modern Digital and Analog Communication Systems, 3rd Edition, Oxford University Press.

COURSE OBJECTIVES:

1. To familiarize students with the fundamentals and Evolution of Electronic Communication systems
2. To familiarize students with various techniques for generation of modulation and demodulation of Analog and Digital signals
3. To develop the students' ability to determine the effects of noise and Bandwidth on Communication systems
4. To develop the understanding of Information from Quantitative perspective and understand the various information coding techniques

COURSE OUTCOMES:

On Completion of the course the student will be able to:

1. Understand and identify the fundamental concept and various components of analog and digital communication systems.
2. Apply mathematical techniques used in communication system for its implementation.
3. Explain the signal to noise ratio, noise figure and errors associated in communication systems.
4. To Compare and contrast the strengths and weakness of various communication systems.
5. To explain the need for information coding and compare them.

Principles of Communication Engineering Lab. (ECP2150)
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1. To Study Signal Synthesis using Fourier Series
2. To study and calculate the modulation index of AM wave
3. To study the demodulation of AM wave and find out modulation frequency
4. To Study modulation and detection of single side band AM.
5. Study of various AM receivers
6. To study and observe frequency modulation
7. To study the sample and hold process.
8. To study PAM and its demodulation
9. To study PCM, DPCM and Delta Modulation and demodulation
10. Noise power spectral density measurement