

**EC6402 COMMUNICATION THEORY**

DETAILED SYLLBUS

**OBJECTIVES:**

- To introduce the concepts of various analog modulations and their spectral characteristics.
- To understand the properties of random process.
- To know the effect of noise on communication systems.
- To study the limits set by Information Theory.

**UNIT I AMPLITUDE MODULATION**

Generation and detection of AM wave-spectra-DSBSC, Hilbert Transform, Pre-envelope & complex envelope - SSB and VSB –comparison -Super heterodyne Receiver.

**UNIT II ANGLE MODULATION**

Phase and frequency modulation-Narrow Band and Wide band FM - Spectrum - FM modulation and demodulation – FM Discriminator- PLL as FM Demodulator - Transmission bandwidth.

**UNIT III RANDOM PROCESS**

Random variables, Central limit Theorem, Random Process, Stationary Processes, Mean, Correlation & Covariance functions, Power Spectral Density, Ergodic Processes, Gaussian Process, Transmission of a Random Process Through a LTI filter.

**UNIT IV NOISE CHARACTERIZATION**

Noise sources and types – Noise figure and noise temperature – Noise in cascaded systems. Narrow band noise – PSD of in-phase and quadrature noise –Noise performance in AM systems – Noise performance in FM systems – Pre-emphasis and de-emphasis – Capture effect, threshold effect.

**UNIT V INFORMATION THEORY**

Entropy - Discrete Memoryless channels - Channel Capacity -Hartley - Shannon law - Source coding theorem - Huffman & Shannon - Fano codes

**TEXT BOOKS:**

1. J. G. Proakis, M. Salehi, "Fundamentals of Communication Systems", Pearson Education 2006.
2. S. Haykin, "Digital Communications", John Wiley, 2005.

**REFERENCES:**

1. B. P. Lathi, "Modern Digital and Analog Communication Systems", 3rd Edition, Oxford University Press, 2007.
2. B. Sklar, "Digital Communications Fundamentals and Applications", 2nd Edition Pearson Education 2007