EC8491   **COMMUNICATION THEORY**   **L T P C**
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OBJECTIVES:
The student should be made to:
- 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 AMPLITUDE MODULATION   **9**
Amplitude Modulation- DSBSC, DSBFC, SSB, VSB - Modulation index, Spectra, Power relations and Bandwidth – AM Generation – Square law and Switching modulator, DSBSC Generation – Balanced and Ring Modulator, SSB Generation – Filter, Phase Shift and Third Methods, VSB Generation – Filter Method, Hilbert Transform, Pre-envelope & complex envelope –comparison of different AM techniques, Superheterodyne Receiver.

UNIT II ANGLE MODULATION   **9**
Phase and frequency modulation, Narrow Band and Wide band FM – Modulation index, Spectra, Power relations and Transmission Bandwidth - FM modulation –Direct and Indirect methods, FM Demodulation – FM to AM conversion, FM Discriminator - PLL as FM Demodulator.

UNIT IIIRANDOM PROCESS   **9**
Random variables, 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   **9**
Noise sources – Noise figure, noise temperature and noise bandwidth – Noise in cascaded systems. Representation of Narrow band noise –In-phase and quadrature, Envelope and Phase – Noise performance analysis in AM & FM systems – Threshold effect, Pre-emphasis and de-emphasis for FM.

UNIT V   SAMPLING & QUANTIZATION   **9**
Low pass sampling – Aliasing- Signal Reconstruction-Quantization - Uniform & non-uniform quantization - quantization noise - Logarithmic Companding –PAM, PPM, PWM, PCM – TDM, FDM.
                                                            TOTAL: 45 PERIODS
OUTCOMES:
At the end of the course, the student should be able to:
- Design AM communication systems
- Design Angle modulated communication systems
- Apply the concepts of Random Process to the design of Communication systems
- Analyze the noise performance of AM and FM systems
- Gain knowledge in sampling and quantization

TEXT BOOK:
1. J.G.Proakis, M.Salehi, ―Fundamentals of Communication Systems‖, Pearson Education 2014. (UNIT I-IV).
2. Simon Haykin, ―Communication Systems‖, 4th Edition, Wiley, 2014.(UNIT I-V).

REFERENCES:
1. B.P.Lathi, ―Modern Digital and Analog Communication Systems‖, 3rd Edition, Oxford University Press, 2007.
2. D.Roody, J.Coolen, ―Electronic Communications, 4th edition PHI 2006.
3. A.Papoulis, ―Probability, Random variables and Stochastic Processes‖, McGraw Hill, 3rd edition, 1991.
4. B.Sklar, ―Digital Communications Fundamentals and Applications‖, 2nd Edition Pearson Education 2007.
5. H P Hsu, Schaum Outline Series - ―Analog and Digital Communications‖ TMH 2006
6. Couch.L., "Modern Communication Systems", Pearson, 2001.