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SYLLABUS OF DIGITAL COMMUNICATION (EC-602)

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UNIT-I

Elements of Digital Communication and Information Theory: Model of a Digital Communication, Logarithmic measure of information System, Entropy and Information Rate, Conditional Entropy and Redundancy, Source Coding theorem, Prefix coding and Kraft Inequality, Shannon-Fanon and Huffman Coding for nth order expressions, maximum entropy of a continuous source (with Gaussian distribution), Entropy of band limited white Gaussian noise, mutual information & channel capacity of a discrete memoryless channel, continuous AWGN channel, channel coding theorem, Hartley-Shannon law. **[8]**

UNIT-II

Waveform coding techniques: Discretization in time and amplitude, Linear quantizer, quantization noise, power calculation, signal to quantization ratio, non uniform quantizer, A-law, μ -law compounding, encoding, PCM, bandwidth of PCM, differential pulse code modulation, delta modulation, idling noise and slope overload, adaptive delta modulation, adaptive DPCM, comparison of PCM & DM.

Digital Multiplexing: Fundamentals of Time Division Multiplexing, Electronic Commutator, Bit, Byte Interleaving T1 Carrier System, Synchronization and Signaling of T1, M12 multiplexer. **[8]**

UNIT-III

Digital Base Band Transmission: Line Coding and Its Properties, NRZ & RZ Types, Signalling Format For Unipolar, Polar, Bipolar (AMI) & Manchester Coding and Their Power Spectra (No Derivation) HDB & BBZS signaling, ISI, Nyquist Criterion For Zero ISI & Raised Cosine Spectrum, Matched Filter Receiver, Derivation of Its Impulse Response and Peak Pulse Signal to Noise Ratio. Correlation Detector Decision threshold and Error Probability for unipolar Signalling **[8]**

UNIT-IV

Digital Modulation Technique: Types of Digital Modulation, Wave forms for Amplitude, Frequency and Phase Shift Keying, Gram-Schmitt Orthogonalization Procedure, detection of known signals in noise, maximum likelihood detector, Method of Generation and Detection of Coherent & Non-Coherent Binary ASK, PSK & FSK signals, Differential Phase Shift Keying, QPSK & MSK, Probability of Error and Comparison of Various Digital Modulation Techniques. [8]

UNIT-V

Error Control Coding: Error Free Communication Over Noise Channel, Hamming sphere, Hamming distance and Hamming bound, Relation Between Minimum Distance and error detecting & Correcting Capability, Linear Block Codes, encoding and syndrome decoding, Cyclic codes, Encoder and Decoder For systematic Cyclic Codes, Convolution codes, code Tree and Trellis Diagram, Viterbi and Sequential Decoding, Burst error detection and correction. [8]

Text Book:

1. Digital Communication Systems: Haykin Simon, John Wiley.
2. Communication Systems: Haykin Simon, John Wiley
3. Modern Digital & Analog Communication Systems: Lathi, B.P Oxford University Press
4. Analog & Digital Communication Systems: Singh R.P. & Sapre S.D. Tata McGraw-Hill
5. Digital Communication: Prokis, Tata McGraw-Hill