

## Lecture Plan For Digital Communication (EC-602)

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Units	Lecture	Topic to Cover	Reference Book
<b>Unit-1</b>		<b>Elements of Digital Communication and Information Theory</b>	
	Lecture-1	Model of a Digital Communication, Logarithmic measure of information System,	1
	Lecture-2	Entropy and Information Rate,	1
	Lecture-3	Conditional Entropy and Redundancy, Source Coding theorem, Prefix coding and Kraft Inequality	1
	Lecture-4	Shannon-Fanon and Huffman Coding for nth order expressions	1
	Lecture-5	Maximum entropy of a continuous source(with Gaussian distribution), Entropy of band limited white Gaussian noise	1
	Lecture-6	Mutual information & channel capacity of a discrete memoryless channel, continuous AWGN channel	1
	Lecture-7	Continuous AWGN channel, channel coding theorem, Hartely-Shannon law	1
	Lecture-8	Hartely-Shannon law	1
<b>Unit-2</b>		<b>Waveform coding techniques</b>	
	Lecture-1	Discretization in time and amplitude, Linear quantizer	1
	Lecture-2	Noise, power calculation, signal to quantization ratio	1
	Lecture-3	Non uniform quantizer, A-law, $\mu$ -law	1
	Lecture-4	Compounding, encoding, PCM, bandwidth of PCM	1
	Lecture-5	Differential pulse code modulation, delta modulation, idling noise and slope overload	1
	Lecture-6	Adaptive delta modulation, adaptive DPCM, comparison of PCM & DM	1
	Lecture-7	Fundamentals of Time Division Multiplexing, Electronic Commutator	1
	Lecture-8	Bit, Byte Interleaving T1 Carrier System, Synchronization and Signaling of T1, M12 multiplexer.	1
<b>Unit-3</b>		<b>Digital Base Band Transmission</b>	
	Lecture-1	Line Coding and Its Properties, NRZ & RZ Types, Signalling Format For Unipolar, Quiz-1	1,3
	Lecture-2	Polar, Bipolar(AMI) & Manchester Coding and Their Power Spectra (No Derivation) HDB & BBZS signaling	1,3
	Lecture-3	ISI, Nyquist Criterion For Zero ISI & Raised Cosine Spectrum	1
	Lecture-4	Matched Filter Receiver, Derivation of Its Impulse Response, Peak Pulse Signal to Noise Ratio.	1

	Lecture-5	Peak Pulse Signal to Noise Ratio of Matched Filter Receiver	1
	Lecture-6	Correlation Detector Decision threshold for Unipolar Signal.	1
	Lecture-7	Error Probability for unipolar Signalling	1
	Lecture-8	Error Probability for unipolar Signalling, Quiz-II	1
<b>Unit-4</b>		<b>Digital Modulation Technique</b>	
	Lecture-1	Types of Digital ModulationS, Wave forms for Amplitude, Frequency and Phase Shift Keying	1
	Lecture-2	Gram-Schmitt Orthogonalization Procedure, detection of known signals in noise, maximum likelihood detector	1
	Lecture-3	Method of Generation and Detection of Coherent & Non-Coherent Binary ASK signals	1
	Lecture-4	Method of Generation and Detection of Coherent & Non-Coherent Binary PSK signals	1
	Lecture-5	Method of Generation and Detection of Coherent & Non-Coherent Binary FSK signals	1
	Lecture-6	Differential Phase Shift Keying, QPSK & MSK	1
	Lecture-7	Probability of Error and Comparison of Various Digital Modulation Techniques	1
	Lecture-8	Probability of Error and Comparison of Various Digital Modulation Techniques	1
<b>Unit-5</b>		<b>Error Control Coding</b>	
	Lecture-1	Error Free Communication Over Noise Channel, Hamming sphere, Hamming distance and Hamming bound	1
	Lecture-2	Relation Between Minimum Distance and error detecting & Correcting Capability	1
	Lecture-3	Linear Block Codes, encoding and syndrome decoding	1
	Lecture-4	Cyclic codes, Encoder and Decoder For systematic Cyclic Codes,	1
	Lecture-5	Convolution codes	1
	Lecture-6	Code Tree and Trellis Diagram	1
	Lecture-7	Viterbi and Sequential Decoding	1
	Lecture-8	Burst error detection and correction	1

**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