

PANIPAT INSTITUTE OF ENGINEERING & TECHNOLOGY

Department of Electronics & Communication Engineering

LESSON PLAN

Subject Name: - Information Theory & Coding

Subject Code: - EC-307A

Year: - 3rd

Semester:- 5th

Lecture No	Unit No	Topic	References
L1	UNIT-I	Introduction to Subject & Information Theory	
L2		Concept of Probability & Properties	Communication System by R P Singh, S D Sapre
L3		Concept of Random Variable, CRV, DRV	Communication System by R P Singh, S D Sapre
L4		Probability distribution functions and probability density functions	Communication System by R P Singh, S D Sapre
L5		Expectation, moments	Communication System by R P Singh, S D Sapre
L6		Random Processes, Stationary and ergodicity	Communication System by R P Singh, S D Sapre
L7		Mean and Auto Correlation	Communication System by R P Singh, S D Sapre
L8		Information theory : the definition of information	Communication System by R P Singh, S D Sapre
L9		the zero-memory information source, entropy for discrete ensembles	Communication System by R P Singh, S D Sapre
L10		Entropy, Properties of entropy	Information and Coding by N. Abramson
L11		Joint & Conditional Entropy	Information and Coding by N. Abramson
L12		Shannon's noiseless coding theorem	Information and Coding by N. Abramson

L13	UNIT-I	Encoding of discrete sources	Information and Coding by N. Abramson
L14	UNIT-II	Properties of codes, types of codes	Information and Coding by N. Abramson
L15		uniquely decodable codes, instantaneous codes	Information and Coding by N. Abramson
L16		construction of an instantaneous code	Information and Coding by N. Abramson
L17		Kraft inequality: statement and discussion and Proof	Information and Coding by N. Abramson
L18		Markov sources	Information and Coding by N. Abramson
L19		Shannon's noisy coding theorem	Information and Coding by N. Abramson
L20		Calculation of channel capacity and bounds for discrete channels	Information and Coding by N. Abramson
L21		Application to continuous channels	Information and Coding by N. Abramson
L22		UNIT-III	Coding information sources: The average length of a code
L23	Shannon's First Theorem		Information and Coding by N. Abramson
L24	Huffman codes, Code efficiency and redundancy		Information and Coding by N. Abramson
L25	Channels and mutual information		Information and Coding by N. Abramson
L26	Information channels, Binary symmetric channels		Information and Coding by N. Abramson
L27	Probability relations in a channel		Information and Coding by N. Abramson
L28	A priori and A posteriori entropies		Information and Coding by N. Abramson
L29	Mutual information, properties of mutual information		Information and Coding by N. Abramson
L30	Types of channels: Noiseless, deterministic, Cascaded channels		Information and Coding by N. Abramson
L31	UNIT-III		Channel capacity

L32	UNIT-IV	Shannon second theorem for Noisy channels	Information and Coding by N. Abramson
L33		Introduction to error control coding, Types of codes	Information and Coding by N. Abramson
L34		Maximum Likelihood decoding	Information and Coding by N. Abramson
L35		Linear block codes- Introduction	Information and Coding by N. Abramson
L36		Generation of Linear Block Codes	Information and Coding by N. Abramson
L37		Detection of Linear Block Codes	Information and Coding by N. Abramson
L38		Error detecting and correcting capabilities of a block code	Information and Coding by N. Abramson
L39		Hamming code	Information and Coding by N. Abramson
L40		cyclic code-Introduction & Generation	Information and Coding by N. Abramson
L41		Detection of Cyclic Codes	Information and Coding by N. Abramson
L42		Convolutional Code- Generation	Information and Coding by N. Abramson
L43		State Diagram, Trellis Diagram	Information and Coding by N. Abramson
L44		Viterbi Algorithm	Information and Coding by N. Abramson
L45			Revision

Text Books:

1. N. Abramson, Information and Coding, McGraw Hill, 1963
2. R P Singh, S D Sapre, Communication System, TMH

Reference Books:

1. M. Mansurpur, Introduction to Information Theory, McGraw Hill, 1987.
2. R.B. Ash, Information Theory, Prentice Hall, 1970.
3. Shu Lin and D.J. Costello Jr., Error Control Coding, Prentice Hall, 1983.