

SIR PADAMPAT SINGHANIA UNIVERSITY
UDAIPUR

COURSE PLAN

Subject : Information Theory & Coding
Branch: ECE Semester: VI Year: III
Course Code: EC 307 L-T-P-C: 3-0-1-4 w.e.f. 29.12.2009

Module Number	Module Heading	Related Topics	Number of class(es)
1	Information Theory	Concept of amount of information - units, Entropy - marginal	2
1	Information Theory	Conditional and joint entropies - relation among entropies Mutual information, information rate	3
1	Information Theory	Channel capacity, redundancy and efficiency of channels	2
2	Discrete Channels	Symmetric channels, Binary Symmetric Channel, Binary Erasure Channel	2
2	Discrete Channels	Cascaded channels, repetition of symbols, Binary asymmetric channel, Shannon theorem	2
2	Discrete Channels	Continuous channels: - Capacity of band limited	2

		Gaussian channels, Shannon-Hartley theorem	
2	Discrete Channels	Trade off between band width and signal to noise ratio, Capacity of a channel with infinite band width	2
2	Discrete Channels	Optimum modulation system	1
3	Source Coding	Encoding techniques, Purpose of encoding, Instantaneous codes, Construction of instantaneous codes	2
3	Source Coding	Kraft's inequality, Coding efficiency and redundancy, Noiseless coding theorem	2
3	Source Coding	Construction of basic source codes: - Shannon-Fano algorithm, Huffman coding	2
3	Source Coding	Arithmetic coding, ZIP coding	2
4	Codes For Error Detection And Correction	Parity check coding, Linear block codes, Error detecting and correcting capabilities, Generator and Parity check matrices	2
4	Codes For	Standard array	3

	Error Detection And Correction	and Syndrome decoding, Hamming codes, Encoding and decoding of systematic and unsystematic codes	
4	Codes For Error Detection And Correction	Cyclic codes: - Generator polynomial, Generator and Parity check matrices, Encoding of cyclic codes	2
4	Codes For Error Detection And Correction	Syndrome computation and error detection, Decoding of cyclic codes, BCH codes, RS codes, Burst error correction	3
5	Convolutional Codes	Encoding- State, Tree and Trellis diagrams, Maximum likelihood decoding of convolutional codes -Viterbi algorithm	2
5	Convolutional Codes	Sequential decoding -Stack algorithm, Interleaving techniques - Block and convolutional interleaving	2
5	Convolutional Codes	CIRC encoding and decoding, interpolation and muting. ARQ: - Types of ARQ	2
5	Convolutional Codes	Performance of ARQ, Probability of	2

		error and throughput	
Total Number of Classes: 42			