ITE3005	Information Coding Theo	ry	L T P J C
			3 0 0 4 4
Pre-requisite	ITE2003		Syllabus version
C Ohiti			1.0
• To understa	s: and various devices used in Digital Communic	action	
	and the impact of interference on discrete time		
	e various coding and sampling techniques	devices.	
TO REAL THE	e various county and sumpring teeninques		
Expected Course	Outcome:		
1) Understand	the design and construction of devices used i	n Communicat	ion Systems.
2) Address the	e challenges imposed in different types of Cor	nmunication Sy	ystems
	d construct various digital communication nd coding techniques.	systems and	implement various
4) Use and ap	ply various coding techniques to analyze diffe	rent communic	cation systems.
5) Compreher	nd how the compression techniques are used in	the communic	cation mediums.
6) Understand	the error control techniques to find the error	during transmis	ssion.
7) Learn and i	mplement error control coding and block code	es.	
Student Learning	Outcomes (SLO): 1, 2, 6		
	ity to apply knowledge of mathematics, science		
	understanding of the subject related concepts		
with realistic c	ity to design a component or a product applying	ng all the releva	ant standards and
with realistic c	onstraints		
Module:1 Infor	mation Theory		6 hours
	tropy, Information rate, classification of coorem, Shannon-Fano coding, Huffman coding	•	1 .
	ntropies, Mutual information - Discrete mem		•
Channel capacity,	•	•	·
	Coding Techniques		5 hours
	ulation-Delta modulation-Adaptive Delta M		erential Pulse code
modulation-Compa	arison of Different Pulse code Modulation Tec	enniques.	
Module:3 Textu	ual Data Encoding Techniques		4 hours
	daptive Huffman Coding, Arithmetic Coding.	, LZW algorith	
	o and Speech Coding		6 hours
Audio: Perceptual	coding, Masking techniques, Psychoacoustic	model, MEG A	Audio layers I,II,III,

Image and Video Formats – GIF, TIFF, SIF, CIF, QCIF. Module:6 Compression Techniques 7 hours Image compression: READ, JPEG – Video Compression: Principles-I,B,P frames, Motion estimation, Motion compensation, H.261, MPEG standard. Module:7 Error Control Coding: Block Codes 9 hours Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding - Single parity codes, Hamming codes, Repetition codes - Linear block codes, Cyclic codes - Syndrome calculation, Encoder and decoder - CRC -Convolutional codes – code tree, trellis, state diagram - Encoding – Decoding: Sequential search and Viterbi algorithm – Principle of Turbo coding. Module:8 Contemporary issues: 3 hours		Coding.		
Module:6 Compression Techniques Thours	Module:5	Source Coding: Image a	nd Video	5 hours
Image compression: READ, JPEG – Video Compression: Principles-I,B,P frames, Motion estimation, Motion compensation, H.261, MPEG standard. Module:7 Error Control Coding: Block Codes 9 hours Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding Single parity codes, Hamming codes, Repetition codes – Linear block codes, Cyclic codes Syndrome calculation, Encoder and decoder – CRC –Convolutional codes – code tree, trellis, state diagram – Encoding – Decoding: Sequential search and Viterbi algorithm – Principle of Turbe coding. Module:8 Contemporary issues: 3 hours Text Book(s) 1. R Bose, Information Theory, Coding and Cryptography, TMH, 2008. Reference Books 1. Stefan M. Moser, Po-Ning Chen, A student's guide to Coding and Information Theory, Cambridge University Press, 2012. 2. K Sayood, Introduction to Data Compression, Third Edition, Elsevier, 2012. 3. S Gravano, Introduction to Error Control Codes, Oxford University Press, 2007 4. Amitabha Bhattacharya, Digital Communication, TMH 2006, Fred Halsall, Multimedia Communications: Applications, Networks, Protocols and Standards, Pearson Education Asia, 2011 Recommended by Board of Studies 05-03-2016	Image and	l Video Formats – GIF, TIFF	, SIF, CIF, QCIF.	
Module:7 Error Control Coding: Block Codes Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding Single parity codes, Hamming codes, Repetition codes - Linear block codes, Cyclic codes - Syndrome calculation, Encoder and decoder - CRC - Convolutional codes - code tree, trellis, state diagram - Encoding - Decoding: Sequential search and Viterbi algorithm - Principle of Turbe coding. Module:8 Contemporary issues: Total Lecture hours: 45 hours Text Book(s) 1. R Bose, Information Theory, Coding and Cryptography, TMH, 2008. Reference Books 1. Stefan M. Moser, Po-Ning Chen, A student's guide to Coding and Information Theory, Cambridge University Press, 2012. 2. K Sayood, Introduction to Data Compression, Third Edition, Elsevier, 2012. 3. S Gravano, Introduction to Error Control Codes, Oxford University Press, 2007 4. Amitabha Bhattacharya, Digital Communication, TMH 2006, Fred Halsall, Multimedia Communications: Applications, Networks, Protocols and Standards, Pearson Education Asia, 2011 Recommended by Board of Studies 05-03-2016	Module:6	Compression Technique	S	7 hours
Module:7 Error Control Coding: Block Codes 9 hours Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding Single parity codes, Hamming codes, Repetition codes - Linear block codes, Cyclic codes Syndrome calculation, Encoder and decoder - CRC -Convolutional codes - code tree, trellis, state diagram - Encoding - Decoding: Sequential search and Viterbi algorithm - Principle of Turbo coding. Module:8 Contemporary issues: 3 hours	Image co	mpression: READ, JPEG -	- Video Compression:	Principles-I,B,P frames, Motion
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