GUJARAT TECHNOLOGICAL UNIVERSITY

Master of Engineering Syllabus
Subject Code : 3710404
Subject Name : Information Theory and Coding

Type of Course : Program Elective II

Teaching and Examination Scheme :

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE(E)	PA (M)	PA (V)	PA (I)	
4	0	2	5	70	30	30	20	150

Sr. No.	Content	Total Hrs.	Weight
1	Basic concept of coding, Unique decodable codes and instantaneous decodable codes (IDC) Construction of IDC, Krafts inequality and MC Millan's theorem. Huffman and Shannon-fano code.	12	20%
2	Entropy, Entropy of sources and their extension. Loss less image compression.	10	15%
3	Basic of channel coding and Hamming distances, channel capacity and shannon's fundamental theorem.	10	15%
4	Linear block codes ; Systematic linear codes and optimum decoding for the binary symmetric channel; Generator and parity Check Matrices Syndrome decoding on symmetric channels; Hamming codes, cyclic code, Burst errors, BCH Code, Reed-solomon Codes. Arithmetic Coding.	14	20%
5	Convolution codes; Wozencraft's sequential decoding algorithm, Fann's algorithm and other sequential decoding algorithms Viterbi decoding algorithm, BCH code.	8	20%
6	Introduction to Cryptography.	4	10%

Course Outcome :

Student should be able to

- Understand information theoretic behavior of a communication system.
- Understand various source coding techniques for data compression.
- Understand various channel coding techniques and their capability.
- Build and understanding of fundamental concepts of data communication and networking.

Reference Books :

1. Jiri Adamek, Foundation of coding, John Wiley and sons
2. A.J. Viterbi and J.K.Ormura, Principal of Digital Communication and Coding, McGraw Hill
3. Bernard Sklar, Digital communication fundamental and Application, PE India.
4. N. Abramson, Information and Coding, McGraw Hill
5. M Mansurpur, Introduction to Information Theory, McGraw Hill 6. R.B.Ash, Information Theory, Prentice Hall
7. Shu Lin and S.J.Costello Jr., Error Control Coding, Prentice Hall

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