PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering

SYLLABUS FOR 6th Sem BTech PROGRAMME

Information Theory & Coding (203108383)

Type of Course: BTech

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/	Tut Hrs/	Lab Hrs/		External		Internal			
				T	P	T	CE	P	
3	0	0	3	60	-	20	20	-	100

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	**Basic concept of coding**: Brief of coding techniques, Unique decodable codes and instantaneous decodable codes (IDC) Construction of IDC, Krafts inequality and MCMillan's theorem, Huffman and shannon-fano code.	15%	6
2	**Entropy**: Introduction of entropy, Entropy of sources and their extension. Loss less imagecompression	13%	6
3	**Probability Theory**: Review of probability concept. Concept of random variable: Function of random variable. Distribution and density function Moments, characteristic function and conditional statistics, sequence of random variables. Rayleigh, Rice, Lognormal, Poisson distributions.	12%	6
4	**Arithmetic Coding**: Brief of arithmetic coding, Basic of channel coding and Hamming distances, channel capacity and shannon's fundamental theorem	13%	6

5	**Linear block codes**: Introduction of linear block codes, Systematic linear codes and optimum decoding for the binary symmetricchannel; Generator and parity Check MatricesSyndrome decoding on symmetric channels; Hamming codes	20%	10
6	**Cyclic code&Convolution codes**: Introduction of Cyclic code, Burst errors, BCH Code, ReedsolomonCodes, Introduction of Convolution codes, Viterbi decoding algorithm, Cryptography	15%	6
7	**Sequential decoding algorithm**: Wozencraft's sequential decoding algorithm, Fann's algorithm andother sequential decoding algorithms	12%	5

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Information and Coding
   N. Abramson; McGraw Hill
2. Introduction to Information Theory
   M. Mansurpur; McGraw Hill
3. Information Theory
   R.B. Ash; Prentice Hall
4. Error Control Coding
   Shu Lin and D.J. Costello; Prentice Hall