PROFESSIONAL ELECTIVES (PE-I)

PET6J001 INFORMATION THEORY & CODING

MODULE-I

Basic Concepts of Information Theory- The concept of Amount of Information, Average Information, Entropy, Information rate, Mutual information; Shannon's Theorem, Channel capacity; BSC and other channels, Capacity of a Gaussian Channel, Bandwidth – S/N Trade-off; Introduction to Channel Capacity & Coding; Channel Models, Channel Capacity Theorem, Shannon Limit.

MODULE-II

Introduction to Error Control Coding- Linear Block Codes- Introduction to Linear Block codes, Syndrome and Error detection, Minimum distance of block code, Hamming Code.

Cyclic Codes- Description of Cyclic codes, Generator and parity check matrices of cyclic codes, error detection decoding of cyclic codes.

BCH Codes- Description of codes; Decoding of BCH codes; Implementation of error connection.

MODULE-III

Convolution Codes- Encoding of convolution codes; structural properties of Convolution codes; Distance Properties of convolution codes.

Automatic Repeat Request Strategies- Stop and wait, Go back and selective repeat ARQ strategies, Hybrid ARQ Schemes.

MODULE-IV

Discrete Messages and information content- The Concept of amount of Information, Average Information, Entropy; Information rate, Source coding to increase average information per bit; Shanon-Fano coding; Huffman source coding algorithm, Lempel Ziv source coding algorithm.

ADDITIONAL MODULE (TERMINAL EXAMINATION-INTERNAL)

Shanon's Theorem- Channel Capacity, Capacity of Gaussian channel, Bandwidth – S/N Trade off; Use of Orthogonal Signals to attain Shannon's limit; Matched Filter Reception, calculation of error probability, Efficiency of orthogonal Signal transmission.

TEXT BOOKS

1. Information Theory, Coding and Cryptography, Ranjan Bose, TMH Publication
2. Introduction to Error Control Codes, S Gravano, Oxford University Press
3. Digital Communications – Fundamentals and applications, Bernard Sklar, Pearson education Publication, 2nd Edition, 2009.

REFERENCE BOOKS

1. Information Coding Techniques, R. Avudaiammal, Tat McGraw-Hill Education Pvt. Ltd., 2nd Edition New Delhi
2. Information Theory, F.M Reza: McGraw Hill
3. Error Control Coding, Shu Lin& J Costeib:, PHI