RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Electronics & Communication Engineering, VII-Semester Elective-IV

EC- 7005 (1) Information Theory & Coding

COURSE CONTENTS

Unit I

Introduction : Information Theory, Information and entropy, joint and conditional entropy, differential entropy, relative entropy, mutual information, relationship between entropy and mutual information.

Unit II

Source coding: Shannon's source coding theorem, Huffman coding, Shannon Fano coding. Channel Coding Channel capacity, binary symmetric channel, binary erasure channel, Shannon's channel coding theorem.

Unit III

Linear Block Codes: Definition, properties, matrix description of linear block codes, generator and parity check matrix, encoding of linear block codes, decoding of linear block codes, syndrome decoding, standard array, co-sets, perfect codes, systematic block code, Hamming code.

Unit IV

Cyclic Codes: Introduction, properties of cyclic codes, polynomials and division algorithm, and decoding of cyclic codes, matrix description of cyclic codes, burst error correction, cyclic redundancy check. Circuit implementation of cyclic codes.

Unit V

Convolution Codes: Introduction, tree codes and trellis codes, polynomial description of convolution codes, distance notation, generating function, matrix description, viterbi decoding. Course Outcomes: After successfully completing the course students will be able to understand concept of fundamental of Information Theory and Coding. Evaluation: Evaluation will be continuous and integral part of the class followed by final examination.

References:
1. Das, Mullick and Chatterjee: Principles of Digital Communication, New Age International Publishers.
2. Cover and Thomas: Elements of Information Theory, Wiley India.
3. Ranjan Bose: Information Theory, Coding and Cryptography, TMH.
4. Lin and Costello: Error Control Coding, Pearson Education.
5. Moon: Error Correction Coding, Wiley India. 6. Wells: Applied Coding and Information Theory for Engineers, Pearson Education