

ECMC1T6B: CODING THEORY & PRACTICE

UNIT-I

Information Theory : Entropy, Information rate, source coding : Shannon-Fano and Huffman coding techniques, Mutual Information, Channel capacity of Discrete Channel, Shannon- Hartly law, Trade-off between bandwidth and SNR.

UNIT II

Introduction and Overview Error Control Codes: Examples of the use of error control codes, basic notions, coding gain. Characterization of Error control codes performance of error control codes, comparison of uncoded and coded systems.

UNIT III

Convolution Codes: Convolution encoders , structural properties of convolution codes, Trellis Diagrams, Viterbi Algorithm, Performance Analysis.

UNIT IV

Linear Block Codes: Linear block Codes and their properties, standard arrays, Syndromes, Weight Distribution. Error Detection/Correction Properties, Modified Linear block codes.

UNIT V

Finite Fields: groups, Rings, Fields Properties of finite Fields, Extension Fields, Polynomials over Finite Fields, Minimal Polynomials, Conjugates.

UNIT VI

Cyclic Codes : General theory, Shift Register Implementations, Shortened Cyclic codes CRCs for Error Detection.

UNIT VII

BCH and RS Codes : Algebraic Description, Frequency Domain Description, Decoding Algorithms for BCH and RS Codes.

UNIT VIII

Applications: Concatenated Codes, Interleaves, The Compact Disc, Codes for Magnetic recording.

TEXT BOOKS:

1. Stephen B. Wicker Error Control Systems for Digital Communication and storage, Prentice Hall. 1995 ISBN 0-13-200809-2
2. Kennedy, Electronic Communication systems, Mc Graw Hill.

REFERENCE BOOKS:

1. John Proakis, Digital Communications, TMH
2. Simon Haykin, Communication Systems.