Information Theory & Coding
CS-604A
Contact: 3L
Credits: 3

Source Coding [7L]
Uncertainty and information, average mutual information and entropy, information measures for continuous random variables, source coding theorem, Huffman codes.

Channel Capacity And Coding [7L]
Channel models, channel capacity, channel coding, information capacity theorem, The Shannon limit.

Linear And Block Codes For Error Correction [8L]
Matrix description of linear block codes, equivalent codes, parity check matrix, decoding of a linear block code, perfect codes, Hamming codes.

Cyclic Codes [7L]
Polynomials, division algorithm for polynomials, a method for generating cyclic codes, matrix description of cyclic codes, Golay codes.

BCH Codes [8L]
Primitive elements, minimal polynomials, generator polynomials in terms of minimal polynomials, examples of BCH codes.

Convolutional Codes [8L]
Tree codes, trellis codes, polynomial description of convolutional codes, distance notions for convolutional codes, the generating function, matrix representation of convolutional codes, decoding of convolutional codes, distance and performance bounds for convolutional codes, examples of convolutional codes, Turbo codes, Turbo decoding.

Books
9. Information theory, coding and cryptography - Ranjan Bose; TMH.
10. Information and Coding - N Abramson; McGraw Hill.
11. Introduction to Information Theory - M Mansurpur; McGraw Hill.
12. Information Theory - R B Ash; Prentice Hall.
13. Error Control Coding - Shu Lin and D J Costello Jr; Prentice Hall.