

Course Title	Information Theory and Coding
Course Code	ET112
Course Credit	Theory : 04
	Practical : 00
	Tutorial : 00
	Total : 04

Course Objective

This course contains basics of probability, information and entropy in understanding the various encoding and decoding techniques used in communication. It also includes various encryption and decryption techniques used to encapsulate data.

Detailed Syllabus

Sr. No.	Name of chapter & details	Hours Allotted
Section – I		
1	Coding and decoding Basic concept of coding, Unique decodable codes and instantaneous decodable codes (IDC), Construction of IDC, Kraft's inequality and McMillan's theorem, Huffman and Shannon-fano code	04
2	Arithmetic coding Introduction, Coding a sequence, Generating a tag, Deciphering a tag, Generating a binary code, Algorithm implementation, Integer implementation	08
3	Convolution code Convolution encoding, Viterbi decoding algorithm, Wozencraft's sequential decoding algorithm	06
4	Cryptography Secret key encryption, Public key encryption, Encryption based on large prime numbers, Encryption based on knapsack problems, Data encryption standard	06
Section – II		
5	Channel coding Basic of channel coding, Hamming distance, Channel capacity, Shannon's theorem, Continuous channel, Capacity of a Gaussian	12

	channel	
6	Linear block code Systematic linear code, Optimum decoding for binary symmetric channel, Generator and parity Check Matrices Syndrome decoding on symmetric channels, Hamming code, Cyclic code, Burst errors, Reed-solemn code, BCH code	12

Instructional Method and Pedagogy:

- Lectures will be conducted with the aid of multi-media projector, blackboard, OHP etc. Assignments based on course contents will be given to the students at the end of each unit/topic and will be evaluated at regular interval
- Minimum five experiments shall be there in the laboratory related to course contents
- Minimum six tutorials which includes solution of minimum five computer programs in each head

Students Learning Outcomes:

At the end of the course students will be able

- To understand the basic concepts of encoding and decoding algorithm used in communication
- To understand the basic concepts of encapsulation of data.

Text books:

1. Jiri Adamek, Foundation of coding, John Wiley and sons.
2. Bernard Sklar, Digital communication fundamental and Application, PE India
3. Khalid Sayood, Introction to data compression, morgan Kaufmann publications.

Reference Books:

1. A.J. Viterbi and J.K.Ormura, Principal of Digital Communication and Coding, McGraw Hill
2. N. Abramson, Information and Coding, McGraw Hill
3. M Mansurpur, Introduction to Information Theory, McGraw Hill
4. R.B.Ash, Information Theory, Prentice Hall
5. Shu Lin and S.J.Costello Jr., Error Control Coding, Prentice Hall



SYLLABUS

Additional Resources

- <http://www.learnerstv.com>
- <http://www.mathworks.com>