DIGITAL COMMUNICATIONS

Course Code: 13EC1114

Prerequisites: Communication system basics

Course Educational Objectives:

ToSelector familiarize with Digital modulation and demodulation techniques in communication systems.

Course Outcomes:

Student will understand the importance of modulations for various applications.

Estimates the system performance from parameters.

Applies channel coding for detection and correction of errors.

UNIT-I (14 Lectures)

PULSE DIGITAL MODULATION:

Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM).

DELTA MODULATION:

Delta modulation, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems, Line coding.

UNIT-II (12 Lectures)

DIGITAL CARRIER MODULATION TECHNIQUES:

Introduction, ASK, FSK, PSK, DPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.
UNIT-III (10 Lectures)
DIGITAL DATA TRANSMISSION:
Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK, QPSK.

UNIT-IV (12 Lectures)
INFORMATION THEORY:
Discrete messages, concept of amount of information and its properties, Average information, Entropy and its properties. Information rate, joint and conditional entropy and its properties, Mutual information and its properties

SOURCE CODING:
Introduction, Advantages, Shannon’s theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

UNIT-V (12 Lectures)
ERROR CONTROLLING TECHNIQUES:
Forward Error control codes (FEC), Automatic repeat request codes (ARQ), Linear Block Codes, Error detection and error Correction, capabilities of Linear block codes, cyclic codes, Convolution Codes, Comparison between Linear codes and convolution codes.

TEXT BOOKS:

REFERENCES:

