



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

III Year – I Semester		L	T	P	C
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DIGITAL COMMUNICATIONS					

UNIT I:

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, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems

UNIT II:

DIGITAL MODULATION TECHNIQUES: Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

UNIT III:

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:

INFORMATION THEORY: Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties, Information rate, Mutual information and its properties

SOURCE CODING: Introductions, Advantages, Shannon's theorem, Shannon-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:

LINEAR BLOCK CODES: Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes.

CONVOLUTION CODES: Introduction, encoding of convolution codes, time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram decoding using Viterbi algorithm.

TEXTBOOKS:

1. Digital communications- Simon Haykin, John Wiley, 2005
2. Digital and Analog Communication Systems - Sam Shanmugam, John Wiley, 2005.

REFERENCES:

1. Principles of Communication Systems–H. Taub and D. Schilling, TMH, 2003
2. Digital Communications–John Proakis, TMH, 1983.
3. Communication Systems Analog & Digital– Singh & Sapre, TMH, 2004.
4. Modern Digital and Analog Communication Systems–B.P. Lathi, Zhi Ding, Hari Mohan Gupta, Oxford University Press, 4th Edition, 2017



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Course Outcomes:

After going through this course the student will be able to

1. Analyze the performance of a Digital Communication System for probability of error and are able to design a digital communication system.
2. Analyze various source coding techniques.
3. Compute and analyze Block codes, cyclic codes and convolution codes.
4. Design a coded communication system.