



KAMALDNP

kamaldnp.com • IT Training, Varanasi

PDF created by Raj Kamal using AI

Digital Communication Systems — Complete Syllabus (Program Elective-1, Option 3)

BTEUP Diploma in Electronics Engineering • 5th Semester • Session 2026-27

Subject 5.2.3 — Program Elective-1, Option 3 (Theory) • Total 100 Marks • 3 Credits • L 3
– P 0 • Choose this OR Control System & PLC OR Microwave and Radar

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.2.3	Program Elective-1: Digital Communication Systems	Theory	3 - 0	3	Theory 40	Theory 60 (3 hrs)	100
Digital Communication Systems Total				3	40	60	100

What This Subject Aims To Do

To understand the facts, concepts and working principles of digital communication systems — digital information theory (information rate and channel capacity), digital modulation techniques, channel coding and error control, multiple access schemes and spread spectrum modulation — and to apply them in modern communication systems.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction to Digital Communication	6	14%

2	Modulation Techniques	10	24%
3	Error Control Coding	8	19%
4	Multiplexing and Multiple Access Techniques	8	19%
5	Digital Transmission Fundamentals and Performance Analysis	10	24%

Unit 1 — Introduction to Digital Communication (6 Periods, 14%)

Topics: Overview of digital communication systems, Analog vs. digital communication, Elements of digital communication systems, Basics of information theory, entropy, relationship between information theory and communication systems.

In simple words: Digital vs analog communication, the parts of a digital link, and information theory — entropy and how much information a channel can carry.

Unit 2 — Modulation Techniques (10 Periods, 24%)

Topics: Pulse Amplitude Modulation (PAM), Pulse Position Modulation (PPM), Pulse Width Modulation (PWM). Pulse Code Modulation, Basic concept of sampling theorem, quantization, coding and Shannon's theorem, Types of PCM system and its application (Basic idea only). Basic idea of: Amplitude Shift Keying (ASK) modulation and demodulation technique, Frequency Shift Keying (FSK) modulation and demodulation technique, Phase Shift Keying (PSK) modulation and demodulation technique, Quadrature Amplitude Modulation (QAM) modulation and demodulation technique

In simple words: How digital data rides on an analog carrier: pulse modulation, PCM and the sampling theorem, and ASK, FSK, PSK and QAM.

Unit 3 — Error Control Coding (8 Periods, 19%)

Topics: Introduction to channel coding, Basics of code theory, Error detection and correction codes, Block codes and Convolution codes, Introduction to error detection and correction technique.

In simple words: Adding clever redundancy so the receiver can spot — and fix — errors: block codes and convolutional codes.

Unit 4 — Multiplexing and Multiple Access Techniques (8 Periods, 19%)

Topics: Frequency division Multiplexing (FDM), Time division Multiplexing (TDM), Code division Multiplexing (CDM), Basics of orthogonal frequency division Multiplexing (OFDM). Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA), Orthogonal Frequency Division Multiple Access (OFDMA)

In simple words: Sharing one channel among many users: multiplexing by frequency, time or code, and the multiple-access schemes built on them (FDMA, TDMA, CDMA, OFDMA).

Unit 5 — Digital Transmission Fundamentals and Performance Analysis (10 Periods, 24%)

Topics: Line coding techniques (NRZ, RZ, Manchester), Baseband and passband transmission, Signal-to-noise ratio (SNR) and bit error rate (BER), Channel capacity, Shannon-Hartley theorem, Link budget analysis, Brief idea of interference and noise in digital communication systems.

In simple words: How good a digital link is: line codes, SNR and bit error rate, channel capacity (Shannon-Hartley), and link budgets.

Reference Books (as listed in the syllabus)

- Modern Digital and Analog Communication Systems, Lathi, B.P. and Ding, Z
- Communication Systems, Haykin, S
- Digital & Analog Communication Systems By K.S. Shanmugam, John Wiley
- E-books/e-tools to be used as recommended by AICTE/NITTTR, Chandigarh. Websites for Reference: <http://swayam.gov.in>

KAMALDNP • kamaldnp.com • support@kamaldnp.com • +91 8318013442 • Varanasi, UP

Source: BTEUP 3rd Year curriculum (folder2627), approved in C.D.C. meeting held on 16.07.2026. Topic lists follow the official syllabus; short explanations are the author's own plain-English summaries, not syllabus text.

Please confirm with your own polytechnic for any local changes.