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Computer Network — Complete Syllabus

BTEUP Diploma in Computer Science & Engineering • 3rd Semester • Session 2026-27
Subject 3.3 (Practicum) • Total 100 Marks • 4 Credits • L 2 - P 4

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
3.3	Computer Network	Practicum	2 - 4	4	40	60 (3 hrs)	100
Computer Network Total				4	40	60	100

What This Subject Aims To Do

To understand the functioning of computer networks and popular networking protocols. By the end you should be able to: explain data communication fundamentals; describe the physical layer and data link layer; explain IP addressing and key network-layer protocols; describe the transport layer; and recognise network devices and network management systems.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Introduction	6	12%
2	Data Communication and Communication Methodologies	10	25%
3	Network Layer	10	25%
4	Transport Layer	8	25%
5	Network Devices	8	13%

Unit 1 — Introduction (6 Periods, 12%)

Topics: Introduction to computer networks; network models — OSI reference model, TCP/IP model.

In simple words: The two famous layered models that explain how data travels from one computer to another, layer by layer.

Unit 2 — Data Communication and Communication Methodologies (10 Periods, 25%)

Topics: Transmission media — principles, issues and examples; wired media (coaxial, UTP, STP, fibre optic cables); wireless media (HF, VHF, UHF, microwave, Ku band); network topologies; data link layer — design issues and example protocols (Ethernet, WLAN, Bluetooth); switching techniques (circuit, packet, message).

In simple words: The physical ways data travels — cables and wireless — the shapes networks take, and how data is switched from sender to receiver.

Unit 3 — Network Layer (10 Periods, 25%)

Topics: Network layer — design issues and example protocols (IPv4); concept of IPv6; routing principles, issues, algorithms (distance-vector, link-state) and protocols (RIP, OSPF).

In simple words: How data finds its way across many networks: IP addresses, IPv6, and the routing algorithms that choose the path.

Unit 4 — Transport Layer (8 Periods, 25%)

Topics: Transport layer — design issues and example protocols (TCP/UDP); application layer protocols (SMTP, DNS).

In simple words: Reliable vs fast delivery (TCP vs UDP), and the everyday application protocols behind email and website names.

Unit 5 — Network Devices (8 Periods, 13%)

Topics: Functioning of network devices — NIC, hub, bridge, switch, router, WiFi devices; network management system and example protocol (SNMP).

In simple words: What each box in a network actually does, and how whole networks are monitored and managed.

Practical Work

- Study a network simulation tool (Wireshark, Cisco Packet Tracer, NS-2, GNS3, etc.).
- Observe how data travels through the OSI layers using network tools.
- Show various types of networking cables and connectors and identify them clearly.
- Study specifications of cables and connectors of various companies on the internet and find out the differences.
- Make patch cords using different types of cables and connectors — crimping, splicing, etc.
- Demonstrate different types of cable testers and use them for testing patch cords.
- Configure computing devices (PC, laptop, mobile) for a network — IP address, gateway, DNS and security options.
- TCP communication between two devices.
- Show various networking devices — NICs, hub, bridge, switch, router, gateway, WiFi access point, etc.
- Study specifications of various networking devices of various companies on the internet and find out the differences.

Reference Books (as listed in the syllabus)

- Computer Networks, 4th Edition (or later) — Andrew S. Tanenbaum, PHI
- TCP/IP Illustrated, Volume 1 — W. Richard Stevens, Addison Wesley
- Data and Computer Communications — William Stallings, PHI
- An Engineering Approach to Computer Networking — S. Keshav, Pearson
- An Integrated Approach to Computer Networks — Bhavneet Sidhu, Khanna Publishing House
- Data Communications and Networking — Behrouz A. Forouzan, McGraw-Hill
- Cisco Press books on CCNA

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Source: BTEUP 2nd 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.