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Advance Computer Networks — Complete Syllabus (Program Elective-3, Option 2)

BTEUP Diploma in Computer Science & Engineering • 5th Semester • Session 2026-27
Subject 5.4.2 (Practicum) • Total 100 Marks • 5 Credits • L 3 - P 4 • Choose this OR Information Security

Examination Scheme

Code	Paper	Type	L - P	Credits	Internal	External	Total
5.4	Program Elective-3: Advance Computer Networks	Practicum	3 - 4	5	40	Theory 60 (3 hrs)	100
Advance Computer Networks Total				5	40	60	100

What This Subject Aims To Do

An understanding of the overriding principles of computer networking, including protocol design, protocol layering, algorithm design and performance evaluation.

Unit-Wise Complete Topic List

Unit	Topic	Periods	Marks Share
1	Review of Networking Basics	10	—
2	Telecom Networks, Switching Techniques	10	—

3	QoS	6	—
4	Introduction to Network Security	8	—
5	Network Simulation	8	—

Unit 1 — Review of Networking Basics (10 Periods)

Topics: Advanced topics in IPv4 — subnetting, multicasting, multicast routing protocols (IGMP, PIM, DVMRP); advanced topics in TCP — flow management, congestion avoidance, protocol spoofing; IPv6.

In simple words: Going deeper on the basics: splitting networks into subnets, sending one stream to many receivers, controlling TCP traffic jams, and IPv6.

Unit 2 — Telecom Networks, Switching Techniques (10 Periods)

Topics: Introduction to Frame Relay, ATM, MPLS; VSAT communication — star and mesh architectures, bandwidth reservation; wireless networks — WiFi, WiMax; cellular phone technologies — GSM, CDMA, 3G, 4G.

In simple words: How telecom networks actually carry data: older switching technologies, satellite links, wireless broadband, and the mobile generations from GSM to 4G.

Unit 3 — QoS (6 Periods)

Topics: Network redundancy; load balancers; caching; storage networks; QoS; network monitoring — SNMP, RMON.

In simple words: Quality of Service: making sure important traffic (like voice and video) is not delayed, and watching the network to prove it.

Unit 4 — Introduction to Network Security (8 Periods)

Topics: VLAN, VPN, firewall, IPS, proxy servers.

In simple words: Separating and protecting networks: virtual LANs, virtual private networks, firewalls, intrusion prevention and proxies.

Unit 5 — Network Simulation (8 Periods)

Topics: Network simulation; network design case studies and exercises; IP addressing schema; protocol analysers (Wireshark, etc.).

In simple words: Putting it all together in simulation: designing networks on paper and in tools, planning IP addresses, and analysing real traffic with Wireshark.

Practical Work

- Study different types of network cables and implement cross-wired and straight-through cables using clamping tools.
- From given data, find subnet, broadcast, range and subnet bits.
- Study various basic network commands and network configuration commands.
- Perform an initial router configuration.
- Interpret ping and trace-route output.
- Connect the computers in a Local Area Network.
- Perform logical troubleshooting.
- Observe static and dynamic routing.
- Configure the router as a DHCP server.
- Perform various networking operations using Packet Tracer.

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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.