TELECOMMUNICATION NETWROKS
(Core Subject)

Course Code:	10B11EC611	Semester:	6th Semester, B. Tech (ECE)
Credits:	4	Contact Hours:	L-3, T-1, P-0

Course Objectives

At the end of the semester, the students will be able to:

1. Build an understanding of the fundamental concepts of telecommunication networking.
2. Describe communication protocols and layered network architectures.
3. Understand the system design principles of data communication systems.
4. Understand, define, and explain data communication networks concepts.

Course Outcomes

This course provides the knowledge of data communication and networking. After study through lectures and assignments, students will be able to:

1. Identify the different types of network topologies. And to enumerate the layers of OSI model and TCP/IP model.
2. Utilize the available bandwidth in an efficient way.
3. Understand the basics of circuit switching and the multi-stage switching technologies and apply the same for the analysis and design of optimized switches.
4. Learn the different protocols working at various layers of TCP/IP model and apply the knowledge of same to design a given network.
5. Identify the key metrics required for the performance assessment of IP based networks and then to apply this knowledge to optimize a given network operation based on some specific metrics.
6. Understand various routing algorithms and apply this knowledge to design a network based on given constraints.

Course Contents

Unit	Topics	References (chapter number, page no. etc)	Lectures
1.	Data Communication: Introduction: Networks – Protocols and standards – Line configurations – Topology – Transmission mode – Categories of networks – Inter networks. OSI & TCP/IP models: Functions of the layers. Bandwidth Utilization: Multiplexing & Spreading. Transmission media: Guided media &Unguided media Switching: Circuit Switching and Packet	Forouzan: Chapters 1,2,6,7,8,9	14

	Switching, Structure of switches Telephone Network and Cable network for Data Transmission		
2.	Error Control and Data Link Protocols: Error detection and correction: Types of errors, Detection, Linear Block Codes, Cyclic Codes, Checksum Data link Control: Framing, Noiseless and Noisy Channel Protocols, HDLC, point-to-point Protocol Multiple Access: ALOHA, CSMA, CSMA/CD, CSMA/CA, Controlled Access Methods	Forouzan: Chapters 10,11,12	11
3	Wired and Wireless LANs: Wired LAN: Ethernet, Standard Ethernet, Fast Ethernet, Gigabit Ethernet Wireless LAN: Bluetooth Connecting LANs: Repeaters, Hubs, Switches, Virtual LANs	Forouzan: Chapters 13,14	4
4	Logical Addressing, Internet Protocol & Routing: IPv4 addresses, IPv6 addresses, transition from IPv4 to IPv6. Network protocols: ARP, RARP, BOOTP, DHCP, ICMP, IGMP, Unicast Routing Protocols: Distance Vector Routing, Link State Routing, Path Vector Routing	Forouzan: Chapters 19,20,21,22	11
5	Transport layer protocols: UDP, TCP, SCTP Congestion control and Quality of Service	Forouzan: Chapters 23,24	4
		Total Number of Lectures	44

Evaluation Scheme

1. Test 1 :15 marks
2. Test 2 : 25 marks
3. Test 3 : 35 marks

4. **Internal Assessment** : 25 marks
   - 5 Marks : Class performance, Tutorial presentations
   - 15 Marks : Quizzes
   - 5 marks : Attendance

Text Books

1. B. A. Forouzan: "Data Communications and Networking", Tata McGraw-Hill 4th Edition 2010.

2. A. Tanenbaum: "Computer Networks", Pearson Education, 4th Edition.

Reference Books

1. William Stallings: "Data Communications and Networking", Pearson Education.