Course No.	Title of the Course	Credits	Course Structure	Pre-Requisite
ITITC12	**Computer Networks**	**4**	**3L-0T-2P**	**None**

COURSE OUTCOMES:

CO1: Describe the basic computer network technology, data communications system and its components.

CO2: Classify the different types of network topologies and protocols. Compare and summarize the functioning of the layers of the OSI model and TCP/IP protocol suit.

CO3: Discover various types of MAC protocols and their function.

CO4: Analyze techniques/algorithms to solve different layers problems and issues in computer networks.

CO5: Design the protocols and services for different layers of OSI model.

Unit No.	**Topics**
Unit 1	Introductory Concepts: Introduction to Computer Networks, Goals and Applications of networks, OSI Reference Model: A Layered Approach, Introduction to TCP/IP Protocol Suite. Connecting Devices: Hubs, Repeaters, Bridges, Two-Layer Switches, Routers, Three-Layer Switches, Gateway. Physical Layer: The Physical Layer, Network structure and architecture, services, networks topology. Transmission Media - Guided and Unguided, Switching- Circuit Switching, Packet Switching- Virtual Circuits and Datagram Approach, Message Switching.
Unit 2	The Data Link Layer: Data Link Layer Design Issues, Framing, Error Detection and Correction Techniques e.g Parity, CRC, Checksum, Hamming Code etc., Flow Control Protocols, Stop-and- wait Flow Control, Sliding – Window Flow Control, Error Control, Stop-and-wait ARQ, Go-back-N, Selective-repeat, Data Link Protocols- HDLC. Medium Access Sub Layer: Channel allocations, ALOHA Protocols (Pure and Slotted), Carrier Sense Multiple Access Protocols (persistent and non-persistent etc.), CSMA with Collision Detection, CSMA/CA, Collision free protocols, IEEE Standards- Ethernet, Token Bus and Token Ring.
Unit 3	Network Layer: Routing algorithms (Link state, Distant Vector etc.), IP addressing (Classful and Classless), subnetting, IPv4 frame format and functions, IPv6, Congestion Control Algorithms, Packet discarding, Choke packets, Congestion prevention policies, Traffic shaping, Leaky bucket algorithm, Token bucket algorithm, Quality Control.
Unit 4	Transport Layer: Design Issue, Connection management, User Datagram Protocol, TCP Services, TCP Features, TCP window management, TCP frame format and functions.
Unit 5	Application Layer: Application Layer Protocols, DNS, Electronic Mail, WWW, FTP, Telnet.Network Security: Introduction to network security, Message Confidentiality, Message Integrity, Message Authentication, Message Non Repudiation, Digital signature, and Entity Authentication.

SUGGESTED READINGS:

1. Forouzan, “Data Communication and Networking”, TMH, 4th Edition.
2. A.S. Tanenbaum, “Computer Networks”, PHI, 4th Edition.
3. W. Stallings, “Data and Computer Communication”, Macmillan Press.
4. Comer, “Computer Networks and Internet”, PHI.
5. Comer, “Internetworking with TCP/IP”, PHI.
6. W. Stallings, “Data and Computer Communication”, McMillan.
7. J. Martin, “Computer Network and Distributed Data Processing”, PHI.
8. W. Stallings, “Local Networks”, McMillan.
9. M. Schwertz, “Computer Communication Network Design and Analysis”, PHI.
10. S. Keshav, “An Engineering Approach to Computer Networking, Pearson”