

Course Code: 20CM5T03	Computer Networks CSM
Year and Semester: III Year I semester	

Course Objectives:

1. To understand OSI and TCP/IP reference models and Example networks, characteristics of transmission media and classify multiplexing techniques
2. To understand the Error Control, Flow Control and Medium Access Control Protocols
3. To compute optimal path using Routing Algorithms.
4. To understand the concepts of reliable unreliable transmission
5. To acquire the knowledge on various application layer protocols

UNIT-I: Introduction to Computer Networks and Physical Layer

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models, Example Networks, Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel Guided Transmission Media, Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing

UNIT-II: Data Link Layer

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Control Protocols, Sliding Window Protocols, HDLC, PPP, Channel Allocation problem, Multiple Access Protocols, IEEE standards for Local Area Networks, WLAN, Bluetooth

UNIT- III: Network Layer

Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Internet Protocol Header, IP Addresses, sub netting and super netting.

UNIT-IV: Transport Layer

Transport Layer Design Issues, Connection Establishment, Connection Termination, Transport and User Datagram Protocols

UNIT – V: Application Layer

Design Issues, DNS, WWW, HTTP/HTTPS, E-mail, FTP

Text Books:

1. Computer Networks, Andrew S Tanenbaum, Pearson, 5 th Edition
2. Data Communications and Networking, Behrouz A Forouzan, Tata McGraw Hill, 4th Edition

Reference Book:

1. TCP/IP Protocol Suite, Behrouz A Forouzan, Tata McGraw Hill Edition, 3rd Edition Web Resources:

MICRO SYLLABUS OF COMPUTER NETWORKS

UNIT-I: Introduction and Physical Layer

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models, Example Networks, Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing

Unit	Module	Micro content
Introduction to Computer networks and Physical Layer	Introduction	Uses of Computer Networks, Topologies, Types of Networks (LAN, MAN, WAN) Network Hardware, Network Software
	Reference Models	OSI and TCP/IP
	Example Networks	ARPANet, Novell Netware, ATM Networks
	Physical Layer	Design Issues, Maximum Data Rate of a Channel, Nyquist Theorem for a noiseless channel, Shannon Theorem for noisy channel
	Transmission Media	Guided and Unguided Transmission media
	Multiplexing	FDM, TDM, WDM, CDM

UNIT-II: Data Link Layer

Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Control Protocols, Sliding Window Protocols, HDLC, PPP

Unit	Module	Micro content
Data Link Layer	Design Issues	Framing, Physical Addressing, Error Control, Flow Control, Access Control,
	Error Detection and Correction	VRC, LRC, CRC, Checksum, Single Bit Correction : Hamming Codes
	Flow Control	Elementary Data Link Control Protocols: An un- restricted Simplex, Simplex Stop and Wait, Stop Wait ARQ Sliding Window Protocols: 1-bit Sliding Window, Sliding window using Go Back N, Sliding Window Using Selective Repeat
	Example Data Link Control Protocols	HDLC, PPP
	Channel Allocation Problem	Static Channel Allocation, Dynamic Channel Allocation
	Multiple Access Protocols	Aloha, CSMA, Collision Free Protocols,
	IEEE standards LAN Protocols	IEEE-802.3, 802.4, 802.5
	IEEE WLAN Protocols	IEEE 802.11, Bluetooth

UNIT-III: Network Layer

Network Layer Design Issues, Routing Algorithms, Congestion Control Algorithms, Internet Protocol Header, IP Addresses, sub netting and super netting.

Unit	Module	Micro content
Network Layer	Design Issues	Connection Oriented and Connection less service, Comparison of Virtual Circuit subnets and Datagram Networks
	Routing Algorithms	Shortest path, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing for Mobile Hosts
	IP Headers	IPv4 and IPv6
	IP Addresses	Classful IP Addressing, Classless IP Addressing, Types of IP Addresses Sub netting and Super netting

UNIT-IV: Transport Layer

Transport Layer Design Issues, Connection Establishment, Connection Termination, Transport and User Datagram Protocols,

Unit	Module	Micro content
Transport Layer	Design Issues	Design Issues, Process Addressing, Service Primitives
	TCP Phases	Connection Establishment, Connection Termination, Data Transfer
	Protocols	TCP, UDP, RTP

UNIT-V: Application Layer

Design Issues, DNS, WWW, HTTP/HTTPS, E-mail, FTP,

Unit	Module	Micro content
Application Layer	Design Issues	File Transfer and Access Management Network Virtual Terminals Mail Services
	DNS	DNS Name space, Resource Records, Name servers
	WWW	Architecture and overview, Static/Dynamic web pages,
	HTTP/HTTPS	HTTP Request and Response headers and methods
	E-mail	Architecture, User Agents, Message formats, Message Transfer Agents, SMTP, S/MIME, POP
	FTP	Communication over control Connection, Communication Over Data Connection, Anonymous FTP