III Year I Semester   **L   T   P   C**

Code:20CS5712   **3   0   0   3**

COMPUTER NETWORKS (Minors)

Course Objectives:
The objectives of studying of Computer Networks are as follows
1. Understand state-of-the-art in network protocols, architectures, and applications.
2. Understand the Process of physical layer.
3. Understand the process of data link layer.
4. Understand the functionality of Network layer.
5. Understand the functionality of Transport layer and application layer

Course Outcomes
Upon the completion of the course the students will learn
1. Conceptualize the data communication models using OSI/ISO and TCP/IP protocol architectures
2. Understand different multiplexing techniques
3. Inferring protocols implemented in data link layer for error and flow control
4. expressing the features of routing mechanisms and congestion control algorithms
5. understand the features of transport and application layer protocols

UNIT-I
Introduction: Data Communication, Data Flow, type of connections, History of Internet, protocol and standards. 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

UNIT-II
Physical Layer: Digital to Digital Conversion: Line coding, line coding schemes, Block coding, scrambling, analog to digital conversion: PCM and Delta Modulation. Transmission modes: serial & parallel, Digital to Analog Conversion**,** Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing, Transmission Media- guided and unguided.

UNIT-III
The Data Link Layer-Framing-Error Control-Flow Control, Error Detection and Correction-Error-Correcting Codes-Error Detecting Codes. Elementary Data Link Protocols- A Utopian Simplex Protocol-A Simplex Stop and Wait Protocol for an Error free channel-A Simplex Stop and Wait Protocol for a Noisy Channel, Sliding Window Protocols-A One Bit Sliding Window Protocol-A Protocol Using Go-Back-N, A Protocol Using Selective Repeat.

UNIT-IV
Network Layer: Design Issues-The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Connection oriented vs Connection less services-Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-Shortest path Algorithm, Distance Vector Routing, Link State Routing.
Congestion Control Algorithms- Approaches to Congestion Control-Traffic Aware Routing-Admission Control-Traffic Throttling-Load Shedding.

UNIT-V
Transport Layer – The Internet Transport Protocols: UDP, Real Time Transport Protocols, the Internet Transport Protocols: TCP, IPv4/IPv6.
Application Layer –The Domain Name System: The DNS Name Space, Resource Records, Name Servers, Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery.

Text Books:
1. Tanenbaum and David J Wetherall, Computer Networks, 5th Edition, Pearson Edu, 2010
2. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education

Reference Books:
1. Larry L. Peterson and Bruce S. Davie, "Computer Networks - A Systems Approach" (5[th]ed), Morgan Kaufmann/ Elsevier, 2011