III Year I Semester

Code:20CS5712

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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:

 Larry L. Peterson and Bruce S. Davie, "Computer Networks - A Systems Approach" (5thed), Morgan Kaufmann/ Elsevier, 2011