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Course Code: CSE302

COMPUTER NETWORKS

Course Objectives

This course will help the learner to analyse various application layer protocols and its implication and criticize the TCP flow control, TCP congestion control mechanism and evaluate various inter-domain, intra-domain routing protocols and link layer protocols.

UNIT - I   **15 Periods**

Computer Networks and the Internet: Introduction about Internet - The Network Edge - The Network Core - Delay, Loss, and Throughput in Packet-Switched Networks - Protocol Layers and Their Service - **Application Layer:** The Web and HTTP - FTP - Electronic Mail in the Internet - DNS - The Internet's Directory Service - Peer-to-Peer Applications

UNIT - II   **15 Periods**

Transport Layer: Introduction and Transport-Layer Services - Multiplexing and Demultiplexing - **Connectionless Transport:** UDP - Principles of Reliable Data Transfer - **Connection-Oriented Transport:** TCP - Principles of Congestion Control - TCP Congestion Control

UNIT - III   **15 Periods**

The Network Layer: Introduction - Virtual circuits and datagram networks - Inside a Router - The Internet protocol (IP) forwarding and addressing in the Internet - Routing algorithms - Routing in the Internet - Broadcast and multicast routing

UNIT - IV   **15 Periods**

The Link Layer: Introduction to the link layer - Error detection and correction techniques - Multiple access links and protocols - Switched Local area networks - Link virtualization - Data centre networking - Wireless link & network characteristics - 802.11 wireless LAN - **Network Management:** The Network management - The infrastructure for Network management - The Internet standard management framework

TEXTBOOK

1.   James F. Kurose, and Keith W. Ross. *Computer Networking: A Top-down Approach*. Pearson Education, Seventh Edition, 2017**.**

REFERENCES

1.   William Stallings. *Data and Computer Communications*. Prentice Hall of India, Tenth Edition, 2014.
2.   Behrouz A Forouzan and Firouz Mosharraf. *Computer Networks - A Top-Down Approach*. Tata McGraw Hill. Indian Edition, 2012.
3.   Larry L Peterson and Bruce S. Davie. *Computer Networks: A Systematic Approach*, Elsevier. Seventh Edition, 2011.
4.   Andrew S Tanenbaum and David J. Wetherall. *Computer Networks*. Pearson Education. Fifth Edition, 2010.

ONLINE MATERIALS

1.   NPTEL- https://nptel.ac.in/courses/106105081/
         https://onlinecourses.nptel.ac.in/noc18_cs38/preview

2. MIT Courseware: https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-829-computer-networks-fall-2002/
3. Coursera course: https://www.coursera.org/courses?query=computer%20network

UNITWISE LEARNING OUTCOMES

Upon successful completion of this course, the learner will be able to

Unit I	• Discuss about the networking principles and its Quality of Service parameters • Demonstrate the application layer functionalities
Unit II	• Categorise various routing protocols • Demonstrate IPv4 and IPv6 packet and addressing structures
Unit III	• Assemble Internet- Transport layer services and its significance in networking • Analyse the TCP congestion control strategies
Unit IV	• Describe link layer functionalities and classify various multiple link access protocols • Evaluate the network management framework

COURSE LEARNING OUTCOMES

Upon successful completion of this course, the learner will be able to

*   Analyse the networking principles and various network QoS metrics
*   Discuss about various application layer protocols
*   Compare various routing protocols in the network layer and evaluate Internet packet formatting and forwarding
*   Criticise Transport layer services in Internet and evaluate TCP congestion and flow control mechanisms
*   Demonstrate link layer functionalities and multiple link access methods
*   Analyse Internet network management framework