Annexure – III

Data Communication and Computer Networks

Course Code: MCSTIC010T

Course Title: Data Communication and Computer Networks

Semester: I

Credits: 03

Rationale

Data communication and computer networks have been growing with rapid technological progress. Computer communication through networking becomes an essential part of our life. By considering the importance of networking in day-to-day life, it is essential for students to know the concept of networks, the internet, layered structure, and switching. This course deals with the important concepts and techniques related to data communications and enables the student to have an insight into the technology involved to make network communication possible.

Course Outlines

Contents	No of Lectures
Unit-I Computer Networks and Internet: Internet, Protocol, The Network Edge, The Network Core, Interactive Programs for Tracing Routes in the Internet, Java Applet: Message Switching and Packet Switching, Access Networks and Physical Media, Delay and Loss in Packet-Switched Networks, Protocol Layers and Their Service Models, Internet Backbones, NAPs and ISPs, A Brief History of Computer Networking.	10
Unit-II Application Layer: Principles of Application-Layer Protocols, The World Wide Web: HTTP, File Transfer: FTP, Electronic Mail in the Internet, The Internet's Directory Service: DNS, Interactive Programs for Exploring DNS, Socket Programming with TCP, Socket Programming with UDP, Building a Simple Web Server.	10
Unit-III Transport Layer: Transport-Layer Services and Principles, Multiplexing and Demultiplexing Applications, Connectionless Transport: UDP, Principles of Reliable of Data Transfer, Java Applet: Flow Control in Action, Connection-Oriented Transport: TCP, Principles of Congestion Control, TCP Congestion Control.	10
Unit-IV Network Layer and Routing: Introduction and Network Service Model, Routing Principles, Hierarchical Routing, Internet Protocol, Java Applet: IP,	10

ragmentation, Routing in the Internet, What is Inside a Router?, IPv6, Multicast Routing. Link Layer and Local Area Network: The Data Link Layer: Introduction, Services, Error Detection and Correction, Multiple Access Protocols and LANs, LAN Addresses and ARP, Ethernet, CSMA/CD Applet, Hubs, Bridges and Switches, Wireless LANs: IEEE 802.11, The Point-to-Point Protocol, ATM, X.25 and Frame Relay.	
Unit-V Multimedia Networking : Multimedia Networking Applications, Streaming Stored Audio and Video, Making the Best of the Best-Effort Service: An Internet Phone Example, RTP, Beyond Best Effort, Scheduling and Policing Mechanisms for Providing QoS Guarantees, Integrated Services, RSVP, Differentiated Services. Security in Computer Networks: Network Security, Principles of Cryptography, Authentication, Integrity, Key Distribution and Certification, Secure E-Mail, Internet Commerce, Network-Layer Security: IPsec. Network Management: Network Management, The Infrastructure for Network Management, The Internet Network Management Framework, ASN.1, Firewalls.	10

Course Outcomes

Upon successful completion of this course, candidates will be able to:

- Analyze the functioning of data communication and computer networks.
- Select relevant transmission media and switching techniques as per need.
- Analyze transmission errors with respect to IEEE standards.
- Configure various networking devices and different TCP/IP services.
- Work with datagram and internet socket programming.

Text Books

1. Forouzan, Behrouz A., "Data Communications and Networking", Tata McGraw Hill New Delhi, 4/e 2006.
2. James F. Kurose, Keith W. Ross, "Computer Networking", Pearson, 2012.

Reference Books

1. Behrouz A. Forouzan , "TCP/IP Protocol Suite", McGraw- Hill, 4/e, 2009.
2. Larry L. Peterson & Bruce S. Davie, "Computer Network: A System Approach", Morgan Kaufmann, 5/e, 2012.
3. Charles M. Kozierok, "The TCP/IP Guide", No Starch Press, 2005.
4. Behrouz A. Forouzan , "Introduction to Computer Networks McGraw- Hill, 4/e, 2009
5. Andrew s. Tanenbaum j. Wetherall, "Computer Networks", 5/e, Pearson, 2011.