Course Code	Course Title	L	T	P	C
PMCA505L	Data Communication and Networking	3	0	0	3
Pre-requisite	NIL	Syllabus version			
		1.0			

Course Objectives:

1. To familiarize the students with computer network communication architectures, basic terminologies, protocols, and applications.
2. To help students acquire knowledge in network design and management.
3. To understand the architecture and protocols of various web applications.

Course Outcomes:

1. Understand the basic concepts of data communication, protocols, and standards
2. Comprehend various switching techniques and analyze the performance of the network
3. Analyze various error detection and correction techniques and flow control mechanisms
4. Understand IP addressing techniques and various routing protocols
5. Identify suitable Transport layer protocol and Application layer protocol for real-time applications

Module:1	Introduction	5 hours

Basics - Data Communications - Type of Connection - Physical Topology - Categories of Networks - Protocols and Standards - Layered Tasks - OSI Model - TCP/IP Protocol Suite - TCP/IP Addressing

Module:2	Physical Layer and Media	7 hours

Data and Signals - Analog and Digital Signals - Transmission Impairment - Data Rate Limits - Performance Metrics - Bandwidth Utilization - Multiplexing and Spectrum Spreading - Transmission media types

Module:3	Switching Techniques	3 hours

Switching - Circuit Switched Networks - Datagram Networks - Virtual Circuit Networks - Structure of a Switch

Module:4	Data Link Layer	7 hours

Introduction - Error Detection - Cyclic Redundancy Check - Checksum - Error Correction - Hamming Code - Data Link Control - Framing - Flow and Error Control - Protocols - Noisy and Noiseless Channels - Multiple Access - Random Access - Controlled Access - Channelization

Module:5	Network Layer	10 hours

Addressing - IPv4 Addresses - Classful Addressing Classless Addressing - Subnetting -Network Address Translation (NAT) - IPv6 Addresses - Advantages - Transition from IPv4 to IPv6 - Delivery - Forwarding - Routing - Unicast Routing Protocols - Multicast Routing Protocols

Module:6	Transport Layer	6 hours

Process-to-Process Delivery - User Datagram Protocol - Transmission Control Protocol - Stream Control Transmission Protocol - Congestion Control - Open-Loop and Closed-Loop Congestion Control - Quality of Service - Techniques to Improve QoS		
Module:7	**Application Layer**	**5 hours**
Domain Name System - Remote Logging - Electronic Mail - File Transfer - Network Management - Simple Network Management Protocol (SNMP), Common Management Information Protocol (CMIP), Network Configuration Protocol (NETCONF)		
Module:8	**Contemporary Issues**	**2 hours**
Guest Lecture from Industry and R&D Organizations		
	Total Lecture hours:	**45 hours**

Text Book(s)	
1.	Behrouz A. Forouzan, "Data Communications and Networking", 2017, 5th Edition, McGraw- Hill, India.
Reference Books	
1.	James F. Kurose and Keith W.Ross, "Computer Networking: A Top-Down Approach", 2022, 8th Edition, Pearson, India.
2.	William Stallings, "Data and Computer Communication", 2017, 10th Edition, Pearson, India.
3.	Andrew S. Tanenbaum, Nick Feamster and David J. Wetherall, "Computer Networks", 2022, 6th Edition, Pearson, India.
4.	Behrouz A. Forouzan, "Data Communications and Networking with TCP/IP Protocol Suite", 2022, 6th Edition, McGraw- Hill, India.

Mode of Evaluation: CAT, Written Assignment, Quiz, FAT, and Seminar			
Recommended by the Board of Studies	04-05-2023		
Approved by Academic Council	No. 70	Date	24-06-2023