Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
EXC704	Computer Communication and Networks	4	--	--	4	--	--	4
		Examination Scheme						
		ISE		MSE	ESE			
		10		30	100 (60% Weightage)			

Pre-requisite Course Codes		EXC 405: Fundamentals of Communication Engineering EXC:504: Digital Communication
After successful completion of the course, student will be able to		
Course Outcomes	CO1	Name different types of communication networks and modes of data transmission in digital transmission systems.
	CO2	Identify error control techniques and protocols associated with data link layer of the OSI model
	CO3	Summarize various routing and routed protocols associated with network layer
	CO4	Summarize congestion control mechanisms used in circuit and packet switched communication networks associated with transport layer.
	CO5	Demonstrate the significance of software layer protocols and IP addressing schemes used in networking using software tools

Module No.	Unit No.	Topics	Ref.	Hrs.
1		**Introduction to Network Architectures, Protocol Layers, and Service models**		10
	1.1	Network Hardware: Topologies, LAN, MAN, WAN, Wireless network, Home Network, Internetworks, Virtual LANs	1,2,3	
	1.2	Network Software: Protocol Hierarchies, Design Issues for the layers, Connection oriented and connectionless Services		
	1.3	Reference Models: Layers details of OSI, TCP/IP Models, Protocol Layers and Their Service Models		
2		**Physical-layer Services and Systems**		8
	2.1	Introduction to physical media, Coax, fiber, twisted pair, DSL, HFC	1,2,3	
	2.2	Data link layer services and protocols**:** Link-layer and its services, Ethernet, hubs, bridges, and switches, Link- layer addressing, Error-detection and error-correction. Parity, check-summing, CRC, Manchester encoding. Aloha protocols, Control Access Protocol, Carrier Sense	1,2,3	
	2.3	Multiple Access (CSMA), Local Area Networks - Ethernet, Token ring, FDDI. WiMax, cellular, satellite, and telephone networks, Bit transmission, Frequency division multiplexing. Time division multiplexing	1,2,3	

3		**Data Link Layer Protocol**		**10**
	3.1	PPP, HDLC, Stop and wait protocol	1,2,3	
4		**Network Layer Services and Protocols**		**10**
	4.1	Switching fabric, Routing and forwarding, Queues and buffering, Virtual-circuit and datagram networks, Internet protocol	1,2,3	
	4.2	IPv4 and IPv6, Tunneling, LS and DV algorithms. Routing in the Internet, RIP, OSPF, and BGP		
	4.3	Broadcast and multicast, Handling mobility		
5		**Reliable and Unreliable Transport-layer Protocols**		**8**
	5.1	GBN and SR. TCP and UDP. Port numbers, Multiplexing and de-multiplexing	1,2,3	
	5.2	Flow control and congestion control. Fairness, Delay, jitter, and loss in packet-switched networks		
	5.3	Bandwidth, throughput, and quality-of-service		
6		**Principles of Network Applications**.		**6**
	6.1	Application layer protocols such as HTTP, FTP, and SMTP,	1,2,3	
	6.2	Peer-to-Peer File Sharing Protocols and Architectures, ISPs and Domain name systems, Socket API and network socket programming	1,2,3	
			Total	**52**

References:

[1] B. A. Forouzan, "Data Communications and Networking", TMH, Fourth Edition.

[2] S. Tanenbaum, "Computer Networks", Pearson Education, Fourth Edition.

[3] Computer Networking: A Top-Down Approach, by J. F. Kurose and K. W. Ross, Addison Wesley, Fifth Edition.