

Subject Code	Subject Name (Lab oriented Theory Courses)	Category	L	T	P	C
CS19541	COMPUTER NETWORKS	PC	3	0	4	5

Objectives:						
●	Understand the concepts of computer networks and error detection-correction of data.					
●	Be exposed to various addressing schemes and routing protocols.					
●	Learn the Transport Layer, flow control and congestion control algorithms.					
●	Be familiar with real time applications of networking devices and tools.					
●	To configure different devices and trace the flow of information between nodes in the network using various tools.					

UNIT-I	FUNDAMENTALS AND DATA LINK LAYER	9
Building a network – Requirements – Layering and protocols – Internet Architecture – Network software – Application Programming Interface (sockets) - Performance - Link layer Services - Framing – Error Detection and Correction - Reliable transmission.		
UNIT-II	MEDIA ACCESS AND INTERNETWORKING	9
Media Access Protocols – ALOHA - CSMA/CA/CD –Ethernet – Wireless LANs - 802.11- Bluetooth - Switching and Forwarding - Bridges and LAN Switches – Basic Internetworking- IP Service Model – IP fragmentation - Global Addresses – ARP - DHCP - ICMP- Virtual Networks and Tunnels.		
UNIT-III	ROUTING	9
Routing – Network as Graph - Distance Vector – Link State – Global Internet –Subnetting - Classless Routing (CIDR) - BGP- IPv6 – Multicast routing - DVMRP- PIM.		
UNIT-IV	TRANSPORT LAYER	9
Overview of Transport layer – UDP – TCP - Segment Format – Connection Management – Adaptive Retransmission - TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements.		
UNIT-V	APPLICATION LAYER	9
E-Mail (SMTP, MIME, POP3, IMAP), HTTP – DNS - FTP - Telnet – web services - SNMP - MIB – RMON.		
Contact Hours		: 45

List of Experiments			
1.	To Configuration of Network in Linux Environment.		
2.	Learning and Assign of IP Address to computers.		
3.	Implementation of Subnet mask in IP addressing.		
4.	Write a socket PING program to testing the server connectivity.		
5.	Design, Build & Configure Networks using Cisco Packet Tracer tools.		
6.	Study & Implement the different types of Network Cables (RS 232C).		
7.	Implementation of setup a Local Area Network (using Switches) – Minimum 3 nodes and Internet.		
8.	Write a socket program Remote Procedure Call using connection oriented / connectionless protocols (programs like echo, chat, file transfer etc).		
9.	To Identify the various port & its usage using NMAP tool.		
10.	To capture, save, and analyze network traffic on TCP / UDP / IP / HTTP / ARP /DHCP /ICMP /DNS using Wireshark Tool.		
11.	Write a code using Raw sockets to implement packet Sniffing.		
12.	Perform a case study using OPNET / NS3 tools about the different routing algorithms to select the Network path with its optimum and economical during data transfer.		
13.	Simulation of Link State routing algorithm using OPNET or NS3 tool.		
14.	Simulation of Distance Vector Routing algorithm OPNET or NS3 tool.		
15.	To Analyze the different types of servers using Webalizer tool.		
Contact Hours		:	60
Total Contact Hours		:	105

Course Outcomes:	
On completion of the course, the students will be able to	
●	Choose the required functionality at each layer for given application.
●	Trace the flow of information from one node to another node in the network.
●	Apply the knowledge of addressing scheme and various routing protocols in data communication to select optimal path.
●	Monitor the traffic within the network and analyze the transfer of packets.
●	Develop real time applications of networks using different tools.

Text Books:	
1	Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.
2	Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition, McGrawHill, 2017.

Reference Books:	
1	William Stallings, “SNMP, SNMPv2, SNMPv3 and RMON 1 and 2”, Third Edition, Pearson Education, 2009.
2	James F. Kurose, Keith W. Ross, Computer Networking - A Top-Down Approach Featuring the Internet, Seventh Edition, Pearson Education, 2017.
3	Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, 5th Edition, Prentice Hall publisher, 2010.
4	William Stallings, “Data and Computer Communications”, Eighth Edition, Pearson Education, 2011.

Web link:

1. <https://realpython.com/python-sockets/>

CO - PO – PSO matrices of course

PO/PSO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO
CO	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CS19541.1	3	2	1	0	3	1	1	1	1	0	1	1	2	1	1
CS19541.2	2	2	1	0	2	1	1	0	0	0	2	2	1	1	1
CS19541.3	3	3	1	0	3	0	1	0	0	0	2	1	2	3	2
CS19541.4	2	3	0	0	3	1	1	1	0	0	2	2	1	2	3
CS19541.5	3	2	2	2	3	0	1	1	0	0	3	3	3	3	3
Average	2.6	2.4	1	2	2.8	1	1	0.6	1	0	2	1.8	1.8	2	2

Correlation levels 1, 2 or 3 are as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

No correlation: “-”