

CS1140 Computer Networks

Course Title and Code: Computer Networks		
Hours per Week		L-T-P: 3-0-2
Credits		4
Students who can take		B.Tech. CSE Semester V
Prerequisite		None
Evaluation		Theory 60% Lab 40%
Course Objective: This course focuses on the design, installation, configuration, troubleshooting and operation of wired and wireless networks. This course introduces an understanding of the fundamental concepts of computer networking, layers of protocols and network technologies.		
Learning Outcome: On successful completion of this course, the students should be able to: <ul style="list-style-type: none"> CS1124.1. Build simple LANs, perform basic configurations for routers and switches, and implement IPv4 and IPv6 addressing schemes. CS1124.2. Identify the different types of network topologies and protocols. CS1124.3. Analyse the requirements for a given organizational structure and select the most appropriate networking architecture and technologies. CS1124.4. Configure routers, switches, and end devices to provide access to local and remote network resources and to enable end-to-end connectivity between remote devices. CS1124.5. Apply the concepts of IP addressing, subnet masking and routing algorithms to design efficient computer networks. CS1124.6. Design, analyse, and evaluate networks and services for homes, data centres, WANs. 		
Prerequisites		
Sr. No	Specifications	Marks
1	Attendance	05
2	Assignment	10
3	Class Participation	Nil
4	Quiz	05
5	Theory Exam-I	Nil
6	Theory Exam-II	15
7	Theory Exam-III	30
8	Report-I	Nil
9	Report-II	Nil
10	Report-III	Nil
11	Project-I	Nil
12	Project-II	Nil
13	Project-III	Nil
14	Lab Evaluation-I (continuous)	15
15	Lab Evaluation-II (Exam)	15
16	Course Portfolio	05
17	Presentation	Nil
18	Viva	Nil
	Total (100)	100

Course Syllabus (Theory):

- **Unit I-** Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, - Data Communication System and Its Components, Data Flow, Networks, types of Connection and Topologies, LAN, MAN, WAN, Internetwork, Internet The OSI reference model, TCP/IP Model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design
- **Unit II-** Application Layer: Application Layer: File Transfer, Access and Management, Web and HTTP, DNS, Electronic mail, Virtual Terminals, Telnet ,SSH, Other application. Example Networks - Internet and Public Networks. Introduction to Firewall, IDS, SSH, Key Certificates, etc. Understanding Exposure Risk.
- **Unit III-** Transport Layer: Transport Layer - Design issues, connection management, session Layer- Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography - TCP - Window Management.
- **Unit IV-** Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking -TCP / IP, IP packet, IP address, IPv6.
- **Unit V-** Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling. Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling.

Lab Syllabus (all experiment in CISCO Packet Tracer).	
	Unit/ Title
1	Study of Network Devices in Detail.
2	Study of basic network command and Network configuration commands.
3	Study of different types of network cables and practically implement the cross wired cable and straight through cable using clamping tool.
4	Connect the computers in Local Area Network.
6	Study of network IP.
7	Configure a DHCP using packet tracer software.
8	Configure an FTP, HTTP and Servers using packet tracer software.
9	Configuring an Switch and Wireless Access point
10	Configuring a router and security measures in a router
11	Configuring a router for remote access with Telnet and SSH
12	Configure a Network using RIP (Distance Vector Routing protocol).
13	Configure Network using Link OSPF (State Vector Routing protocol).
14	Configure Network using ACL (Access Control List) and VLAN.

Text Books:

1. Forouzan, B. A. (2008). Data communications and Networking, Networking series. Tata Mcgraw-Hill.
2. Computer Networking- A Top-Down approach, 5th edition, Kurose and Ross, Pearson

3. Stallings, W. (2007). Data and computer communications. Pearson Education India.

Reference Books:

1. Computer Networking and the Internet (5th edition), Fred Halsall, Addison Wesley
2. Tanenbaum, A. S. (2003). Computer networks. Pearson Education India.
3. TCP/IP Protocol Suite (6th edition), Behrouz Forouzan, McGraw Hill.

Recommended MooC:

Computer Networks - NPTEL

<https://nptel.ac.in/courses/106/105/106105183/>

<https://nptel.ac.in/courses/106/105/106105081/>

Computer Networks - SWAYAM

https://onlinecourses.swayam2.ac.in/cec20_cs01/preview

Bits and Bytes of Networking – Coursera

<https://www.coursera.org/learn/computer-networking>