COMPUTER NETWORKS LAB

Course Code	23CS3552	Year	III	Semester	I
Course Category	Professional Core	Branch	CSE/IT/AIML/DS	Course Type	Lab
Credits	1.5	L – T – P	0-0-3	Prerequisites	--
Continuous Evaluation:	30	Semester End Evaluation:	70	Total Marks:	100

Course Outcomes		
Upon successful completion of the course, the student will be able to:		
CO1	Apply appropriate design techniques to solve computer networking problems using relevant protocols and models, enabling students to develop structured problem-solving approaches for networking scenarios.	L3
CO2	Implement networking-related programs and configurations independently using modern tools and simulation platforms such as Packet Tracer, Wireshark, and Python, for building practical skills and tool proficiency in simulating and analyzing network environments.	L3
CO3	Develop structured and technically sound laboratory reports demonstrating the implementation and outcomes of various network protocols, encouraging professional documentation practices aligned with engineering standards.	L3
CO4	Analyze program results and outputs based on specified test cases and constraints, and communicate findings effectively through oral presentation, promoting critical thinking and articulation of technical observations.	L4

Syllabus		
Exp. No.	Experiment Title	Mapped COs
1	Experiment with the basic network commands like Ping, IPCONFIG, and Tracert in real networks.	CO1 CO2 CO4
2	Introduction to Networking Tools and Protocol Layers	CO1 CO2 CO3
3	Design & Simulation of Basic Network Topologies (Bus, Ring, Star)	CO1 CO2 CO3
4	Static IP Addressing and LAN Configuration	CO2 CO3
5	DHCP Configuration and Validation	CO2 CO3 CO4
6	Subnetting and IP Planning for a Multi-Network Setup	CO1 CO2 CO3
7	Implementation of Static and Dynamic Routing (RIP/OSPF)	CO2, CO3, CO4
8	IPv6 Addressing and Dual Stack Configuration	CO1 CO2 CO4 CO3
9	VLAN Configuration and Inter-VLAN Routing	CO1 CO2 CO3
10	ARP and ICMP Packet Capture and Analysis	CO2 CO3 CO4
11	HTTP and DNS Packet Analysis	CO2 CO3 CO4
12	TCP vs UDP Header Structure and Behavior	CO3 CO4

13	TELNET/SSH Remote Management of Routers	CO2 CO3 CO4
14	NAT Configuration and Verification	CO2 CO3 CO4
15	Mini Project: Office or Campus Network Design	CO1 CO2 CO3 CO4
16	Wireshark Full-Stack Protocol Analysis & Group Presentations	CO3 CO4

Learning Resources

Books

1. **Andrew S. Tanenbaum, David J. Wetherall**, *Computer Networks*, 5th Edition, Pearson Education.
2. **Behrouz A. Forouzan**, *Data Communications and Networking*, 5th Edition, McGraw-Hill Education.
3. **Mayank Dave**, *Computer Networks*, CENGAGE Learning.
4. **Achyut S. Godbole, Atul Kahate**, *Data Communications and Networks*, McGraw-Hill Education.

Online Simulators & Tools

1. **Cisco Packet Tracer**
   https://www.netacad.com/courses/packet-tracer
   Tool for network topology simulation and router/switch configuration.
2. **Wireshark Network Protocol Analyzer**
   https://www.wireshark.org
   Used for capturing and analyzing live network traffic and protocol headers.
3. **Subnetting Practice Platform**
   https://subnettingpractice.com
   Helps practice CIDR, VLSM, and IP calculations.
4. **Mininet (for advanced labs or project extensions)**
   http://mininet.org
   Lightweight network emulator for software-defined networking (SDN).

Video Tutorials & Online Courses

- **Cisco Networking Academy**
  https://www.netacad.com
  → Free courses on networking, Packet Tracer, and cybersecurity.
- **NPTEL Online Course – Computer Networks by IIT faculty**
  https://nptel.ac.in/courses/106/105/106105183/
  → Full syllabus coverage with explanations and demonstrations.
- **Wireshark Tutorial for Beginners (YouTube)**
  https://www.youtube.com/watch?v=TkCSr30UojM
  → Step-by-step guide on capturing and analyzing packets.
- **GeeksforGeeks – Computer Networking**
  https://www.geeksforgeeks.org/computer-network-tutorials/
  → Topic-wise conceptual coverage with practical examples.