



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

COMPUTER NETWORKS LABORATORY								
V Semester: CSE / CSD / CSM								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
2450579	Foundation	0	0	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 30			Total Classes: 30			
Prerequisites: Data Structures Laboratory, Operating Systems Laboratory								

Course Overview:

1. To Understand core data link and network layer concepts including framing, error detection (CRC), flow control, and routing protocols to build a strong theoretical foundation.
2. To Implement practical network algorithms and protocols—such as character/bit stuffing, CRC (CRC-12/CRC-16/CRC-CCITT), sliding-window (Go-Back-N), Dijkstra's shortest path, and distance-vector
3. routing—through hands-on programming assignments. To Develop and evaluate network mechanisms for reliability and performance, including loss recovery, congestion control (leaky bucket), buffer/frame sorting techniques, and encryption/decryption for secure data transmission.
4. To Use industry tools and simulators (Wireshark, Nmap, NS2) to capture/analyze traffic, perform scans and OS detection, simulate packet drops, throughput, congestion, and compare TCP/UDP behavior under varied network conditions.
5. To Analyze and interpret results from experiments and simulations to produce meaningful performance metrics (packet drop, throughput, congestion plots, broadcast trees) and to propose improvements or configuration choices based on empirical evidence.

Course Outcomes: After Completion of the Course, Students should be able to

1. Implement data link layer techniques for framing, error detection, and flow control.
2. Apply routing algorithms for compute paths, routing tables, and broadcast trees.
3. Develop congestion control, buffer management, and loss recovery mechanisms.
4. Use Wireshark, Nmap, and NS2 tools to capture, analyze, and simulate network performance.

5. Analyze results for evaluate network efficiency, reliability, and security.

List of Experiments

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC- 12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijkstra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting techniques used in buffers.
10. Implement the following using Wireshark
 - i. Packet Capture Using Wire shark
 - ii. Starting Wire shark
 - iii. Viewing Captured Traffic
 - iv. Analysis and Statistics & Filters.
11. How to run Nmap scan Operating System Detection using Nmap
12. Do the following using NS2 Simulator
 - Simulate to Find the Number of Packets Dropped
 - Simulate to Find the Number of Packets Dropped by TCP/UDP
 - Simulate to Find the Number of Packets Dropped due to Congestion
 - Simulate to Compare Data Rate & Throughput.
 - Simulate to Plot Congestion for Different Source/Destination
 - Simulate to Determine the Performance with respect to Transmission of Packets

TEXT BOOK:

1. Computer Networks, Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI.

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.
2. Data Communications and Networking – Behrouz A. Forouzan. 3rd Edition, TMH.

ELECTRONIC RESOURCES:

1. <https://www.geeksforgeeks.org/computer-networks/computer-network-tutorials/>
2. https://onlinecourses.nptel.ac.in/noc26_cs35/preview
3. <https://www.netacad.com/courses/networking-basics>

MATERIALS ONLINE:

1. Course template
2. Open-ended experiments
3. Lab Manual