## COMPUTER NETWORKS LABORATORY

| Course Code: KG23ACS310 | L | T | P | C |
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B.Tech. III Year I Sem.

**Course Objectives:** The objectives of this course for the student are to:

1. Implement data link layer mechanisms such as framing, error detection, and flow control using programming approaches.
2. Apply routing algorithms like Dijkstra's and distance vector to simulate real-time network path discovery and routing table generation.
3. Understand and simulate network traffic behavior and control mechanisms, including congestion control and encryption techniques.
4. Use network simulation and monitoring tools such as NSM, Wireshark, and NMap for analyzing and visualizing network performance and behavior.
5. Develop practical skills in analyzing protocol operations, data transmission efficiency, and network performance under various conditions.

**Course Outcomes:** After completion of this course, the students will be able to:

**CO1**. **Implement** data link layer framing and error detection techniques (CRC, stuffing). **(K3)**

**CO2**. **Develop** flow control and loss recovery using sliding window and Go-Back-N protocols. **(K6)**

**CO3**. **Apply** routing algorithms (Dijkstra's, distance vector) for network optimization. **(K3)**

**CO4**. **Analyze** network traffic and troubleshoot using Wireshark. **(K4)**

**CO5**. **Implement** encryption/decryption techniques and congestion control mechanisms. **(K3)**

**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 Dijsktra'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. Wireshark

i. Packet Capture Using Wire shark

ii. Starting Wire shark

iii. Viewing Captured Traffic

iv. Analysis and Statistics & Filters.

How to run NMap scan

Operating System Detection using Nmap

Do the following using NSM Simulator

i. NSM Simulator-Introduction

ii. Simulate to Find the Number of Packets Dropped

iii. Simulate to Find the Number of Packets Dropped by TCP/UDP

iv. Simulate to Find the Number of Packets Dropped due to Congestion

v. Simulate to Compare Data Rate & Throughput.

vi. Simulate to Plot Congestion for Different Source/Destination

vii. 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.