

## Networks Lab - Syllabus

- 1. Ethernet (CSMA / CD - IEEE 802.3) , Aloha and Slotted Aloha protocols**
  - a. Create scenarios, simulate, and study the evolution of contention-oriented protocols (Aloha, Slotted Aloha, and Ethernet).
  - b. Implement ARP to find the medium access control address of the destination using the destination's internet protocol address.
- 2. Wi-fi (Wireless LANs CSMA / CA, IEEE 802.11 b)**
  - a. Create scenarios, simulate, and study the variation of throughput and Mean Delay as the number of nodes increase.
  - b. Understand and write a program to Encrypt and Decrypt the message by using Wired Equivalent Privacy (WEP).
- 3. Token Bus and Token Ring (IEEE 802.4 and IEEE 802.5)**
  - a. Create scenarios and study the difference in performance (with respect to throughput and delay) between token ring and token bus protocols.
  - b. Write a program to correct error using hamming code in a data received from a network simulator, error is introduced during transmission through as simulator.
- 4. X.25 and Frame Relay Protocols**
  - a. Simulate a network implementing X.25 protocol. Change the Automatic Repeat Request (ARQ) protocol and then compare the network's performance.
  - b. Simulate a WAN Network using Frame Relay protocol. Change the CIR and then compare the network performance.
- 5. Transmission Control Protocol (TCP)**
  - a. Create a scenario, simulate, and study the performance of the different congestion control algorithms (Old Tahoe, Tahoe, and Reno).
  - b. Write a program for any one of the flow control protocols i.e Stop and wait, Go back-N, selective repeat over UDP and verify through a simulator
- 6. Routing Protocols (RIP and OSPF)**
  - a. Study the effect of different Routing protocols (RIP and OSPF) on network's performance through simulation.
  - b. Implement, and verify through a simulator, a program to create sub-network and assign addresses based on the number of hosts connected to the network.
  - c. Write algorithm, pseudo code and program to implement classless addressing to nodes in a network.
- 7. Asynchronous Transfer Mode (ATM) - Simulation**
  - a. Through simulation, study the effect of Peak Cell Rate (per Sec) and Cell Delay Variation Tolerance on the performance of an ATM Networks.
  - b. Write algorithm, pseudo code, and program to implement Virtual Scheduling Algorithm and verify through simulator.
- 8. MANET**

- a. To create scenario and study the performance of MANET mobility model using NetSim simulation.
- b. Understand and write a program for different error detecting codes like cyclic redundancy code (CRC) and longitudinal redundancy code (LRC).

#### **9. MPLS**

- a. Study how the LSP varies for different traffic in MPLS -TE (Traffic Engineering)
- b. Compare and contrast MPLS with traffic engineering and normal routing by analyzing the overall network delay (ms)

#### **10. BGP**

- a. Study the working of BGP and formation of BGP Routing table.
- b. Understand and write a program to find the Shortest Path using Distance Vector Routing.

#### **11. GSM**

- a. Study how the number of channels increases and the Call blocking probability decreases as the bandwidth of a GSM network is increased.
- b. Study how the number of channels increases and the Call blocking probability decreases as the bandwidth of a GSM network is increased.

#### **12. CDMA**

- a. Study how call-blocking probability varies as the load on a CDMA network is continuously increased.
- b. Study how the number of channels increases and the Call blocking probability decreases as the Voice activity factor of a CDMA network is decreased.

#### **13. WiMax - Simulation**

- a. To study how the utilization of a Wi-MAX (IEEE 802.16 – 2004) network varies for UGS (Unsolicited Grant Service) QoS Class as the number of transmitting SSs increase.
- b. To study the Call Blocking probability of a Wi-MAX (IEEE 802.16 – 2004) network varies for UGS (Unsolicited Grant Service) QoS Class as the number of transmitting SSs increase beyond the bandwidth limit.