Course Code	:	**CSLR52**
Course Title	:	**Networks Laboratory**
Number of Credits	:	**0-0-3-2**
Pre-requisites (Course Code)	:	**-**
Course Type	:	**PL**

Course Objectives

- To create client and server applications using the "Sockets" API and the implementation of Data link layer protocol and TCP layer
- To conduct computer communication network simulations
- To have a hands on experience of computer network simulation and modelling techniques using NS-3 simulation software

Exercises

1. Exercises on Socket Programming using C and Java
2. Exercises using NS-3 Network Simulator
   a. Basics of Network Simulation
      - Introduction , Platform required to run network simulator, Backend Environment of Network Simulator, Agents and applications, Tracing

   b. Simulating a Local Area Network
      - Local Area Network, LAN Topologies, MAC Protocol, Taking turns, Ethernet, Ethernet Frame Structure, Ethernet Versions, Simulating a LAN using Network Simulator3
      - Implementation of various MAC protocols
      - Setting up of various network topologies
      - Measurement of routing protocols

   c. Measuring Network Performance
      - Network Performance Evaluation, Performance Evaluation Metrics, Parameters Affecting the Performance of Networks, Performance Evaluation Techniques, Network Performance Evaluation using NS-3
      - Setting up of network that carries various application protocols and analyzing the performances
3. Hands on experiments on Network equipments
   a. Switches, Routers
   b. Hardware firewall

Course Outcomes

Upon completion of the course, the students will be able to:

- Invoke analytical studies of Computer Networks through network simulation
- Design a network using NS-3 toolkit and its importance in designing a real network
- Measure and analyze the network parameters for a high throughput network
- Practice experiments on Network Equipments

Text Books

1. W. Richard Stevens, “UNIX Network Programming – Networking APIs: Sockets and XTI”, Vol. 1, Second Edition, Prentice Hall, 1998.
2. Eitan Altman, Tania Jimenez, “NS Simulator for Beginners”, Morgan & Claypool Publishers, 2011.

Reference Book

1. Jack L. Burbank, “An Introduction to Network Simulator 3”, First Edition, Wiley-Blackwell, 2015.