

| Lab Code | Lab Name | Teaching Scheme (Contact Hours) | | | Credits Assigned | | | |
|----------|-------------|------------------------------------|-----------|----------|------------------|-----------|----------|-------|
| | | Theory | Practical | Tutorial | Theory | Practical | Tutorial | Total |
| ITL401 | Network Lab | -- | 02 | -- | -- | 01 | -- | 01 |

| Lab Code | Lab Name | Examination Scheme | | | | | | |
|----------|-------------|---------------------|--------|------|---------------|-----------|--------------|-------|
| | | Theory Marks | | | | Term Work | Pract. /Oral | Total |
| | | Internal assessment | | | End Sem. Exam | | | |
| | | Test1 | Test 2 | Avg. | | | | |
| ITL401 | Network Lab | -- | -- | -- | -- | 25 | 25 | 50 |

Lab Objectives:

| Sr. No. | Lab Objectives |
|---------|--|
| | The Lab experiments aims: |
| 1 | To get familiar with the basic network administration commands |
| 2 | To install and configure network simulator and learn basics of TCL scripting. |
| 3 | To understand the network simulator environment and visualize a network topology and observe its performance |
| 4 | To implement client-server socket programs. |
| 5 | To observe and study the traffic flow and the contents of protocol frames. |
| 6 | To design and configure a network for an organization |

Lab Outcomes:

| Sr. No. | Lab Outcomes | Cognitive levels of attainment as per Bloom's Taxonomy |
|---------|---|--|
| | On successful completion, of course, learner/student will be able to: | |
| 1 | Execute and evaluate network administration commands and demonstrate their use in different network scenarios | L3, L5 |
| 2 | Demonstrate the installation and configuration of network simulator. | L1, L2 |
| 3 | Demonstrate and measure different network scenarios and their performance behavior. | L1, L2 |
| 4 | Implement the socket programming for client server architecture. | L3 |
| 5 | Analyze the traffic flow of different protocols | L4 |
| 6 | Design a network for an organization using a network design tool | L6 |

Prerequisite: C /Java

Hardware & Software Requirements:

| | |
|------------------------------|--|
| Hardware Requirement: | Software requirement: |
| PC i3 processor and above | NS2.34, Protocol Analyzer (eg. Wireshark), C/Java/python |

DETAILED SYLLABUS:

| Sr. No. | Module | Detailed Content | Hours | LO Mapping |
|----------------|--|---|--------------|-------------------|
| 0 | Prerequisite | Programming Language (C/Java), Basic commands of windows and Unix/Linux operating system. editor commands (eg nano/vi editor etc) | 02 | - |
| I | Fundamentals of Computer Network | Understanding Basic networking Commands: ifconfig ,ip, traceroute, tracepath, ping, netstat, ss, dig, nslookup, route, host, arp, hostname, curl or wget, mtr, whois, tcpdump <ul style="list-style-type: none"> Execute and analyze basic networking commands. | 02 | LO1 |
| II | Basics of Network simulation | Installation and configuration of NS2. Introduction to Tcl Hello Programming <ul style="list-style-type: none"> Installation and configuring of NS-2 simulator and introduction to Tcl using Hello program | 02 | LO2 |
| III | Simulation of Network Topology with different Protocols | Implementation of Specific Network topology with respect to <ol style="list-style-type: none"> Number of nodes and physical layer configuration Graphical simulation of network with Routing Protocols (Distance Vector/ Link State Routing) and traffic consideration (TCP, UDP) using NAM. Analysis of network performance for quality of service parameters such as packet-delivery-ratio, delay and throughput Comparative analysis of routing protocols with respect to QOS parameters using Xgraph/gnuplot for different load conditions. <ul style="list-style-type: none"> Write TCL scripts to create topologies. Create and run traffics and analyze the result using NS2 Write TCL scripts for topology with Graphical simulation of traffic consideration (TCP, UDP) using NAM and plot the graph Implement distance vector and link state routing protocols in NS2. | 06 | LO3 LO5 |
| IV | Socket Programming | Socket Programming with C/Java/python <ol style="list-style-type: none"> TCP Client, TCP Server UDP Client, UDP Server <ul style="list-style-type: none"> To study and Implement Socket Programming using TCP. | 04 | LO4 |

| | | | | |
|----|--------------------------|---|-----------|-----|
| | | <ul style="list-style-type: none"> To study and Implement Socket Programming using UDP | | |
| V | Protocol Analyzer | <ol style="list-style-type: none"> Study of various Network Protocol Analyzer Tools like Wireshark, tcpdump, Windump, Microsoft Message Analyzer, Ettercap, Nirsoft SmartSniff etc. Install one of the Network protocol analyzertools and analyze the traffic <ul style="list-style-type: none"> Study various network protocol analyzer tools and analyze the network traffics using one of the network protocol analyzer tools. | 04 | LO5 |
| VI | Network Design | <p>Network Design for an organization using the following concepts:</p> <ol style="list-style-type: none"> Addressing (IP Address Assignment), Naming (DNS) Routing <ul style="list-style-type: none"> Perform remote login using Telnet Server Design a network for an organization using the concepts of Addressing (IP Address Assignment), Naming (DNS) and Routing. Also mention the internetworking devices used | 06 | LO6 |

Text Books:

1. Computer Network Simulation in NS2 Basic Concepts and Protocol Implementation.- Prof Neeraj Bhargava, Pramod Singh Rathore, Dr. Ritu Bhargava, Dr. Abhishek Kumar, First Edition. BPB Publication.
2. Packet analysis with Wire shark, Anish Nath, PACKT publishing
3. TCP/IP Protocol Suite 4th Edition by Behrouz A. Forouzan

References:

1. NS2.34 Manual
2. Practical Packet Analysis: Using Wireshark to Solve Real-World Network Problems by Chris Sanders

Term Work: Term Work shall consist of at least 10 to 12 practical's based on the above list. Also Term work Journal must include at least 2 assignments.

Term Work Marks: 25 Marks (Total marks) = 15 Marks (Experiment) + 5 Marks (Assignments) + 5 Marks (Attendance)

Practical & Oral Exam: An Oral & Practical exam will be held based on the above syllabus.