| CODE | COURSE NAME | CATEGORY | L | T | P | CREDIT |
|---|---|---|---|---|---|---|
| ITL332 | COMPUTER NETWORKS LAB | PCC | 0 | 0 | 3 | 2 |

**Preamble:** The course aims to equip students to perform networking using IPv4 and Ipv6. The lab covers static, default, and dynamic routing, setting up layer 2 switching, VLANs and security and access list.

**Prerequisite:**ITT305 Data Communication and Networking

**Course Outcomes:** After the completion of the course the student will be able to

| CO No. | Course Outcome(CO) | Bloom's Category Level |
|---|---|---|
| CO 1 | Demonstrate internetworking and network components | Level 2: Understand |
| CO 2 | Explain IPv4 addressing, IPv6 addressing, subnetting and design networks | Level 2: Understand |
| CO 3 | Experiment with static, dynamic and inter VLAN routing | Level 3: Apply |
| CO 4 | Make use of standard and extended access lists | Level 3: Apply |
| CO 5 | Use Webserver, remote login, file transfer and automatic network configuration protocols | Level 3: Apply |
| CO 6 | Use network simulators | Level 3: Apply |

**Mapping of course outcomes with program outcomes**

| POs / COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | 3 | 1 | - | - | 2 | - | - | - | - | - | - | 1 |
| CO 2 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | 2 |
| CO 3 | 3 | 3 | - | - | 2 | - | - | - | - | - | - | 2 |
| CO 4 | 3 | 3 | 3 | - | 2 | - | - | - | - | - | - | 2 |
| CO 5 | 3 | 2 | - | - | - | - | - | - | - | - | - | 2 |
| CO 6 | 3 | 1 | 2 | - | 3 | - | - | - | - | - | - | 2 |

3/2/1: high/medium/low

**Assessment Pattern**

**Mark distribution**

| Total Marks | CIE | ESE | ESE Duration |
|---|---|---|---|
| 150 | 75 | 75 | 2.5 hours |

**Continuous Internal Evaluation Pattern:**

| | | |
|---|---|---|
| Attendance | : | 15 marks |
| Continuous Assessment | : | 30 marks |
| Internal Test (Immediately before the second series test) | : | 30 marks |

**End Semester Examination Pattern:** The following guidelines should be followed regarding award of marks

(a) Preliminary work : 15Marks
(b) Implementing the work/Conducting the experiment : 10 Marks
(c) Performance, result and inference (usage of equipments and troubleshooting): 25 Marks
(d) Viva voce : 20 marks
(e) Record : 5 Marks

General instructions: Practical examination to be conducted immediately after the second series test covering entire syllabus given below. Evaluation is a serious process that is to be conducted under the equal responsibility of both the internal and external examiners. The number of candidates evaluated per day should not exceed 20. Students shall be allowed for the University examination only on submitting the duly certified record. The external examiner shall endorse the record.

**Course Level Assessment Questions**

**Course Outcome 1 (CO1):**

1. Differentiate between a router and a switch
2. Crimp a network cable

**Course Outcome 2 (CO2)**

1. An IP address of 172.16.0.0/16 is assigned to an ISP. The ISP has to distribute it among 17 organizations. Design the subnets
2. You are given the IP Address of 193.103.20.0 /24 and need 50 Subnets. How many hosts per network, and total networks do you get once sub netted?

**Course Outcome 3(CO3):**

1. An organization with 7 departments is assigned an IP address of 200.0.0.0/24. The organization should assign address to each department. Design the subnets and connect the first and third network using RIP
2. Subnet the Class B IP Address 130.13.0.0 into 500 Subnets. What is the new Subnet Mask and what is the Increment? Connect the $6^{th}$ and $15^{th}$ Subnet using static routing

**Course Outcome 4 (CO4):**

1. Connect hosts on the networks 17.10.0.0/8 and 168.18.0.0/16 and block FTP traffic from the first network to the second network

**Course Outcome 5 (CO5):**

1. Install and configure any popular webserver
2. Configure TELNET, login to a remote machine and view the files on the remote machine
3. Configure FTP and transfer files between two machines

**Course Outcome 6 (CO6):**

1. Implement a mesh network in NS3 network simulator. Perform RIP routing between the nodes in the network. Analyse the packet transfer between the nodes.

## LIST OF EXPERIMENTS

**(All the listed experiments are mandatory)**

### I. Internetworking Basics

1. Familiarization of Internetworking - Network Cables- Colour coding - Crimping. Internetworking Operating Systems- Configurations.
2. Backing up and restoring IoS
3. Familiarization of network components – Hub, Switch, Bridge, Router, Access Point

### II. Addressing

1. Configure and verify IPv4 addressing and sub netting
2. Configure and verify IPv6 addressing and prefix
3. Compare IPv6 address types

### III. IP Routing

1. Configure and verify IPv4 routing
    a. Static Routing
    b. Dynamic Routing – RIP, OSPF, EIGRP
2. Implement Unicast IPv6 Addresses on Routers and verify
    a. Static routing
    b. Dynamic routing – RIPng, OSPFv3
3. Configure and verify dual stack routing

### IV. Switching Concepts

1. Layer 2 Switching Configuration – VLAN Configuration
2. VTP Configuration, VTP Pruning
3. Implement inter-VLAN routing

### V. Configuring Protocols

1. HTTP
2. TELNET

3. FTP
4. DHCP

**VI. Security**

1. Standard Access List
2. Extended Access List
3. Familiarization of Wireshark

**VII. Network Simulators**

1. Familiarize with any popular network simulator

**Reference Books**

1. CCNA 200-301 Official Cert Guide, Volume 1,Wendell Odom, Cisco Press
2. CCNA –Cisco Certified Network Associate. Study Guide ,Todd Lammle, CCSI, Wiley India Edition-Sixth Edition