**CSE 318: Computer Networks Laboratory**

**Part A**

**Course Code:**CSE 318

**Course Title:**Computer Networks Laboratory

**Course Type:** Core Course **Year/Semester:**6thSemester **Academic Session:**

**Course Teacher:**

**Pre-requisite:**CSE 313 Data Communication

**Credit Value:** 3.0

**Contact Hours:** 3 Hours/Week

**Total Marks:** 100

**Rationale:**This course provides students with hands on training regarding the design, troubleshooting, modeling and evaluation of computer networks. In this course, students are going to experiment in a real test-bed networking environment, and learn about network design and troubleshooting topics and tools such as network addressing, Address Resolution Protocol (ARP), basic troubleshooting tools (e.g., ping). Student will also be introduced to the network modeling and simulation, and they will have the opportunity to build some simple networking models using the packet tracer tool and perform simulations that will help them evaluate their design approaches and expected network performance.

**Course Objectives:**

* To learn strong comprehension of the protocols and networking to design computer networks.
* To learn the mechanics, maintenance, and policies of the Internet.
* To develop good programming practices for accessing networks through operating low level and high level.
* To learn the security and privacy issues enabled by modern computer networks.

**Course Learning Outcomes (CLOs):**

|  |  |
| --- | --- |
| CLO 1 | Understand the strong comprehension of the protocols and networking to design computer networks. |
| CLO 2 | Learn the mechanics, maintenance, and policies of the Internet. |
| CLO 3 | Develop good programming practices for accessing networks through operating low level and high level. |
| CLO 4 | Understand the security and privacy issues enabled by modern computer networks. |

**Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs):**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Course Learning Outcomes (CLOs) | Program Learning Outcomes(PLOs) | | | | |  |  |  |  |  |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLO 1 | X | X | X | X |  |  |  |  |  |  |  |  |
| CLO 2 |  |  |  |  | X |  |  | X |  | X | X | X |
| CLO 3 |  |  |  |  | X |  | X |  | X |  |  |  |
| CLO 4 |  |  |  | X |  | X |  |  | X |  | X |  |

**Part B**

**Course Content**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Week** | **Topic** | **Teaching**  **Learning**  **Strategy** | **Assessment Strategy** | **Corresponding CLOs** |
| 1 | Download, Install and Configure Cisco Packet Tracer. | Analysis, Exercise | Lecture, Lab  Performance Test | CLO 1, CLO 2 |
| 2 | Implementation of Hub, Switch, Repeater and Router for P2P Network. | Knowledge  Apply, Analysis | Lecture, Q/A, Lab Performance Test | CLO 1, CLO 3 |
| 3 | Local Area Networks Design by different topology. | Knowledge  Apply, Analysis,  Exercise,  Implementation | Lecture, Q/A, Lab Performance Test | CLO 3 |
| 4 | **Router Labs:**  [**Setting up router name and passwords**](https://www.packettracerlab.com/configure-name-and-passwords-on-cisco-router/)  [**Basic router configuration**](https://www.packettracerlab.com/basic-router-configuration-in-packet-tracer/) | Implementation, Analysis | Lecture, Q/A, Lab Performance Test | CLO 1, CLO 2, CLO 4 |
| 5 | **Switch Labs**  [**Switch configuration**](https://www.packettracerlab.com/basic-switch-configuration-in-cisco-packet-tracer/)  [**Speed and Duplex**](https://www.packettracerlab.com/100mb-full-duplex-configuration/)  [Spanning tree protocol](https://www.packettracerlab.com/stp-network-spanning-tree-protocol-explained-with-configuration/) | Implementation, Analysis | Lecture, Q/A, Lab Performance Test | CLO 1, CLO 2, CLO 4 |
| 6 +7 | **Telnet Labs**  [Setting up telnet, MOTD banner, etc](https://www.packettracerlab.com/configuring-motd-banner-and-telnet-in-packet-tracer/)  [**Test telnet connection**](https://www.packettracerlab.com/telnet-configuration-in-cisco-packet-tracer/) | Implementation, Analysis | Lecture, Q/A, Lab Performance Test | CLO 1, CLO 3 |
| **Midterm Exam** | |  |  |  |
| 8 | **Static Routing Labs**  [Static Route](https://www.packettracerlab.com/static-route-example/)  [Default Route](https://www.packettracerlab.com/default-static-route-configuration/) | Knowledge  Apply, Analysis, Exercise | Lecture, Q/A, Lab Performance Test | CLO 2 |
| 9 | **RIP Protocol Labs**  [Rip Configuration](https://www.packettracerlab.com/rip-version-2-configuration-in-packet-tracer/) | Analysis, Exercise | Lecture, Q/A, Lab Performance Test | CLO 1, CLO 2, CLO 3 |
| 10 | **VLAN Labs**  [**Create VLANs**](https://www.packettracerlab.com/create-and-configure-vlans-in-cisco-packet-tracer/)  [Router On A Stick](https://www.packettracerlab.com/router-on-a-stick-configuration/)  [**Native VLAN and Mismatch**](https://www.packettracerlab.com/configure-native-vlan-and-fix-native-vlan-mismatch-in-packet-tracer/)  [**VTP Configuration**](https://www.packettracerlab.com/vtp-configuration/) | Analysis, Exercise | Lecture, Q/A, Lab Performance Test | CLO 1, CLO 2, CLO 3 |
| 11 | **NAT Labs**  [NAT](https://www.packettracerlab.com/nat-and-pat-explained-with-configuration-in-packet-tracer/)  [Dynamic NAT](https://www.packettracerlab.com/dynamic-nat-configuration-in-packet-tracer/)  [Static NAT](https://www.packettracerlab.com/static-nat-configuration-in-packet-tracer/) | Exercise | Lecture, Q/A, Lab Performance Test | CLO 4 |
| 12 | **WAN Connection Labs**  [Serial connection](https://www.packettracerlab.com/serial-connection-explanation-and-configuration-in-packet-tracer/)  [PPP encapsulation](https://www.packettracerlab.com/ppp-configuration-in-packet-tracer/)  **CDP Labs**  [CDP Protocol](https://www.packettracerlab.com/cdp-packet-tracer-cisco-discovery-protocol/)  **Backup and Restore**  [**FTP and TFTP**](https://www.packettracerlab.com/configure-ftp-and-tftp-server-in-packet-tracer-for-backup/) | Implementation, Exercise | Lecture, Q/A, Lab Performance Test | CLO 2, CLO 3, CLO 4 |
| 13 | **Security Labs**  [**Cisco Password Encryption**](https://www.packettracerlab.com/cisco-password-encryption/)  [**Cisco port security**](https://www.packettracerlab.com/configuring-switch-port-security-in-packet-tracer/)  [**Access lists**](https://www.packettracerlab.com/configure-acl-acess-list/) | Analysis,  Implementation | Lecture, Q/A, Lab Performance Test | CLO 2 |
| 14 | **Others**  [**DHCP server**](https://www.packettracerlab.com/setting-up-a-dhcp-server/)  [**Web server and internet**](https://www.packettracerlab.com/configure-web-server-in-cisco-packet-tracer/)  [**Configuring WiFi**](https://www.packettracerlab.com/configure-wifi-in-cisco-packet-tracer/)  [**Destination host unreachable**](https://www.packettracerlab.com/destination-host-unreachable/)  [**DNS server**](https://www.packettracerlab.com/dns-in-cisco-packet-tracer/)  [**Line VTY**](https://www.packettracerlab.com/line-vty-0-4/)  [**Access list examples**](https://www.packettracerlab.com/cisco-access-control-list-examples/)  [**Access point**](https://www.packettracerlab.com/configure-access-point/) | Analysis,  Implementation | Lecture, Q/A, Lab Performance Test | CLO 2 |
| **Final Exam** | |  |  |  |

**Part C**

**Assessment and Evaluation**

**Assessment Strategy and Marks distribution:**

|  |  |  |
| --- | --- | --- |
| Assessments | | % |
| Continuous Assessment | Class Participation and Performance | 10 |
| Class Test/Quiz | 10 |
| Assignment/Presentation | 10 |
| Lab Assessments/Practical | 20 |
| Summative Assessment | Midterm Examination | 20 |
| Final Exam | 30 |
| **Total** | | **100%** |

**Part D**

**Learning Materials**

**Recommended Readings**

* Computer Networks, Andrew S. Tanenbaum, David J. Wetherall, Fifth Edition (2011), Prentice Hall
* Data Communications and Networking, Behrouz A. Forouzan, Fifth Edition (2013), Mcgraw Hill Fundamentals of Data Communication Networks, Oliver C. Ibe, First Edition (2018), John Wiley & Sons, Inc.
* Networking All-in-One For Dummies, Doug Lowe, Seventh Edition (2018), John Wiley & Sons,

Inc.

* Data and Computer Communications, William Stallings, Tenth Edition (2014), Pearson

**Supplementary Readings**

* Computer Networking A Top-Down Approach, James F. Kurose, Keith W. Ross, Seventh Edition (2017), Pearson
* Computer Networks A Systems Approach, Larry L. Peterson and Bruce S. Davie, Sixth Edition (2020), Morgan Kaufmann Publishers
* The Internet and Its Protocols A Comparative Approach, AdrianFarrel, First Edition (2004), Morgan Kaufmann Publishers
* Internetworking with TCP/IP Principles, Protocols, and Architecture, Douglas E. Comer, Sixth Edition (2014), Volume 1, Pearson Education, Inc.

**Others (as applicable for the discipline/academic program)**

Follow provided lecture notes and use Internet to get documents on specifictopics.