**Name of Course**: CCNA 4 – Connecting Networks

**Course Outcomes:**

At the end of this course, students shall be able to:

1. build simple LANs - perform basic configs for routers & switches; and implement IP addressing schemes;

2. develop critical thinking and problem-solving skills using real equipment and Cisco Packet Tracer;

3. troubleshoot routers & switches; resolve common VLAN routing issues in both IPv4 & IPv6 networks; and

4. prepare for Cisco CCNA R&S Certification.

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| **Learning Outcomes** | **Topics** | **Teaching Learning Activities** | **Assessment Tasks** |
| At the end of unit 1, the students shall be able to:  1. be familiar with the different WAN technologies  2. show understanding by properly selecting a WAN Technology applicable to small-sized to medium-sized networks | **Unit 1. WAN Concepts**   1. WAN Technologies Overview 2. Selecting a WAN Technology | 1. Demonstration  2. Skills integration challenge  3. Troubleshooting tasks using Packet Tracer | 1. Short Form Test 2. Short Answer Test |
| At the end of unit 2, the students shall be able to:  1. familiarize what serial PPP is  2. perform the needed PPP operation in a small-sized to medium-sized networks  3. configure the necessary PPP implementation  4. trace problems and recommend solutions for possible WAN connectivity issues | **Unit 2.Point-to-Point Connections**  1. Serial Point-to-Point Overview  2. PPP Operation  3. PPP Implementation  4. Troubleshoot WAN Connectivity | 1. Demonstration 2. Skills integration challenge 3. Troubleshooting tasks using Packet Tracer | 1. Short Answer Test 2. Performance Test |
| At the end of unit 3, the students shall be able to:  1. validation of appropriate connections (whether cable or wireless) to establish remote access  2. configure PPPoE on a router that is connected to a DSL modem using Ethernet cable  3. identify the appropriate VPN type applicable for a given purpose  4. create a virtual point-to-point link to Cisco routers at remote points, over an IP internetwork  5. show good understanding of eBGP for proper configuration | **Unit 3. Branch Connections**  1. Remote Access Connections  2. PPPoE  3. VPNs  4. GRE  5. eBGP | 1. Demonstration 2. Skills integration challenge 3. Troubleshooting tasks using Packet Tracer | 1. Short Answer Test  2. Performance Test |
| At the end of unit 4, the students shall be able to:  1. compare and contrast a standard ACLs operation and configuration with extended ACLs  2. configure an extended IPv4 ACLs  3. Configure IPv6 ACLs  4. find possible problems associated with ACLs and perform necessary solutions | **Unit 4. Access Control Lists**  1. Standard ACL Operation and Configuration Review  2. Extended IPv4 ACLs  3. IPv6 ACLs  4. Troubleshoot ACLs | 1. Demonstration  2. Skills integration challenge  3. Troubleshooting tasks using Packet Tracer | 1. Short Answer Test  2. Performance Test |
| At the end of unit 5, the students shall be able to:  1. identify possible LAN security attacks and apply possible LAN security best practices to help mitigate these threats  2. explain how SNMP operates and do the necessary configurations  3. configure networking devices to copy and send traffic going to ports of interest to a port connected to a packet analyzer | **Unit 5. Network Security and Monitoring**  1. LAN Security  2. SNMP  3. Cisco Switch Port Analyzer | 1. Demonstration  2. Skills integration challenge  3. Troubleshooting tasks using Packet Tracer | 1. Short Answer Test  2. Performance Test |
| At the end of unit 6, the students shall be able to:  1. explain the importance and applications of QoS in a network  2. identify different QoS models and the necessary QoS implementation techniques | **Unit 6. Quality of Service**  1. QoS Overview  2. QoS Mechanisms | 1. Demonstration  2. Skills integration challenge  3. Troubleshooting tasks using Packet Tracer | 1. Short Answer Test  2. Performance Test |
| At the end of unit 7, the students shall be able to:   1. identify possible areas where IoT are applied 2. explain how IoT works 3. explain cloud and virtualization 4. manage and dictate how the data plane of virtual switches and routers should handle network traffic | **Unit 7. Network Evolution**  1. Introduction  2. Internet of Things  3. Cloud and Virtualization  4. Network Programming | 1. Demonstration  2. Skills integration challenge  3. Troubleshooting tasks using Packet Tracer | 1. Short Answer Test  2. Performance Test |
| At the end of unit 8, the students shall be able to:   1. explain the importance of a reliable network architecture 2. perform the necessary network documentation, troubleshooting process, and the isolation of the issues using a layered model 3. perform the necessary skills in solving network issues using different troubleshooting scenarios | **Unit 8. Network Troubleshooting**  1. Introduction  2. Troubleshooting Methodology  3. Troubleshooting Scenarios | 1. Demonstration  2. Skills integration challenge  3. Troubleshooting tasks using Packet Tracer |  |