CISCO-ROUTING AND SWITCHING-I

Course Code : 20NHOP609 | **Credits : 3**
L:T:P:S : 3:0:0:0 | **CIE Marks : 50**
Exam Hours : 03 | **SEE Marks : 50**

Course Outcomes: At the end of the Course, the student will be able to:

CO1	Identify various network devices, topologies and protocols.
CO2	Construct IP addressing table and perform subnetting in IPv4 network.
CO3	Analyze Dynamic Host Configuration Protocol (DHCP) operation for scalable networks.
CO4	Configure and troubleshoot advanced operations of routers and implement Link State routing protocols (OSPF).
CO5	Design logically separate networks using Virtual LANs and IEEE802.1Q trunking protocol.
CO6	Examine redundancy using Spanning tree protocols and Ether-Channel for network scalability

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	-	-	-	-	3	-	3
CO2	3	3	3	3	3	-	-	-	-	3	-	3
CO3	3	3	3	3	3	-	-	-	-	3	-	3
CO4	3	3	3	3	3	2	2	2	3	3	-	3
CO5	3	3	3	3	3	2	2	2	3	3	-	3
CO6	3	3	3	3	3	2	2	2	3	3	-	3

Module No	Module Contents	Hours	COs
1	**Layered Architecture:** Layered Architecture and protocols, **Network Devices:** Switches, Routers, NIC, Access Points, Modem. **Topologies:** Mesh Topology, Star Topology, Bus Topology, Ring Topology, Hybrid Topology. **HANDS-ON** **1. Basic Router Configuration: Configure Initial Router Settings, Configure Interfaces, Configure the Default Gateway, Ping and Traceroute Testing** **2. SSH Configuration and verify the secure access to the network device.**	9	**CO1**

2	**IPv4 Addressing:**IPv4 Address Structure, IPv4 Unicast, Broadcast, and Multicast, Types of IPv4 Addresses, Subnetting Concept, **DHCPv4:** DHCP4 Concepts Configure a Cisco IOS DHCP4 Server; Configure a DHCP4 Client **IPv6 Addressing:**IPv6 Address Representation, IPv6 Address Types, **SLAAC and DHCPv6:** IPv6 Global Unicast Address Assignment, SLAAC, DHCPv6	9	**CO2,CO3**
	HANDS-ON **1. DHCPv4 Configuration** **2. DHCPv6 Configuration**		
3	**Routing Concepts:** Path Determination, Packet Forwarding, IP Routing Table, Dynamic Routing, Default Static Route **Single-Area OSPF Concepts:** OSPF Features and Characteristics, OSPF Packets, OSPF Operation	9	**CO4**
	HANDS-ON **1. Configure IP Default Static Routes** **2. Single-Area OSPFv2 Configuration**		
4	**VLANS:** Overview of VLANs, VLAN Configuration, VLAN Trunks, DynamicTrunking Protocol, Inter VLAN routing	9	**CO5**
	HANDS-ON **1. VLAN Configuration** **2. Inter-VLAN routing Configuration**		
5	**Spanning Tree Protocol:** Purpose of STP,STP Operations, Evolution of STP,RSTP,RSTP+ **EtherChannel:** EtherChannel Operation, LACP, PAGP	9	**CO6**
	HANDS-ON **1. Spanning Tree Protocol Configuration** **2. EtherChannel Configuration**		

TEXT BOOKS:

5. CISCO Netacad (ONLINE ACCESS)
6. CCNA Routing and Switching – Todd Lammle, 2nd Edition, Sybex Publisher (Wiley Brand), 2016.

REFERENCE BOOKS:

3. Data Communications and Networking. Forouzan,5th Edition, McGraw Hill, Reprint-2017.

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Taxonomy	Tests	Assignments	Quizzes
Marks	**25**	**15**	**10**
Remember			
Understand			5
Apply	15	10	5
Analyze	10	5	
Evaluate			
Create			

SEE- Semester End Examination (50 Marks)

Bloom's Taxonomy	Tests
Remember	
Understand	
Apply	30
Analyze	20
Evaluate	
Create	-

CISCO-ROUTING AND SWITCHING-II

Course Code : 20NHOP712 | **Credits : 3**
L: T:P:S : 3:0:0:0 | **CIE Marks : 50**
Exam Hours : 03 | **SEE Marks : 50**

Course Outcomes: At the end of the Course, the student will be able to:

CO1	Configure advanced operation of ACL and implement extended ACL for IPv4 and IPv6
CO2	Configure Network address translation (NAT) for IPv4
CO3	Configure a secured Wireless LAN setup using Routers and extend wireless connectivity using Access Points
CO4	Examine the operations of WAN, WAN Authentication Protocols and best practices for network security
CO5	Examine the operation of virtual private network (VPN) and concepts of network automation and virtualization
CO6	Evaluate the network configurations, identify the errors and configure correctly for effective network communication for lifelong learning

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	3	-	-	-	-	3	-	3
CO2	3	3	3	3	3	-	2	-	-	3	-	3
CO3	3	3	3	3	3	2	2	-	-	3	-	3
CO4	3	3	3	3	3	2	2	2	2	3	2	3
CO5	3	3	3	3	3	2	2	-	2	3	2	3
CO6	3	3	3	3	3	2	2	2	2	3	2	3

Mapping of CO v/s PSO:

CO	PSO1	PSO2
CO1	3	2
CO2	3	2
CO3	3	2
CO4	3	3
CO5	3	3
CO6	-	3

Module No	Module Contents	Hours	COs
1	**ACL Concepts:** Overview of ACL operation, Guidelines for ACL Creation, Comparison of Standard and Extended ACLs, Implementation of Extended ACLs, Troubleshoot Scenarios. **(NETACAD-Course ENSA- Chapter 4 & 5.3, 5.4 Chapters),** **HANDS-ON** **1. Configure Extended IPv4 ACLs and its comparison with Standard ACLs**	9	**CO1, CO6**
2	**NAT for IPv4:** NAT Characteristics, Types of NAT, NAT Advantages and Disadvantages, Static NAT, Dynamic NAT, PAT, Troubleshoot Scenarios**.(NETACAD-Course ENSA- Chapter 6)** **HANDS-ON** **1. Configure Static NAT** **2.Configure Dynamic NAT**	9	**CO2,CO6**
3	**WLAN Concepts:** Introduction to Wireless, Components of WLANs, WLAN Operation, Channel Management, Securing WLANs **(NETACAD - Course SRWE Chapter 12 & Chapter 13)** **HANDS-ON** **1. Remote Site WLAN Configuration(Wireless Router)** **2. Configure a Basic WLAN on the WLC**	9	**CO3**
4	**WAN Concepts:** Purpose of WANs ,WAN Operations, **(NETACAD-Course ENSA- Chapter 7)** **Network Security Concepts :** Threat Actors, Malware, Common Network Attacks, IP Vulnerabilities and Threats, TCP and UDP Vulnerabilities **(NETACAD-Course ENSA-Chapter 3)** **HANDS-ON** **1.Configuration of WAN Point to Point Protocol (PPP) using Password Authentication Protocol (PAP).** **2. Configuration of WAN Point to Point Protocol (PPP) using Challenge Handshake Authentication Protocol (CHAP).**	9	**CO4**

5	**Virtual Private Network:** VPN and IPsec Concepts: VPN Technology, Types of VPNs **(NETACAD-Course ENSA-Chapter 8)** **Network Automation and Virtualization:**Data Formats, APIs, REST, Configuration Management Tools, Virtualization, Software-Defined Network. **(NETACAD-Course ENSA-Chapter 13 &14)**	9	**CO5**
	HANDS-ON **1. Configuration of VPN using GRE**		

TEXT BOOKS:

7. CISCO Netacad Course-3 : CCNAv7-Enterprise Network, Security and Automation(ONLINE ACCESS)
8. CCNA Routing and Switching – Todd Lammle, 2nd Edition, Sybex Publisher (Wiley Brand), 2016.

REFERENCE BOOKS:

4. Data Communications and Networking. Forouzan,5th Edition, McGraw Hill, Reprint-2017.
5. CISCO Netacad Course-2 : CCNAv7-Switching, Routing and Wireless Essentials (ONLINE ACCESS)

Assessment Pattern

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Taxonomy	Tests	Assignments	Quizzes
Marks	**25**	**15**	**10**
Remember			
Understand			5
Apply	10	10	5
Analyze	10	5	
Evaluate	05		
Create			

SEE- Semester End Examination (50 Marks)

Bloom's Taxonomy	Tests
Remember	
Understand	10
Apply	20
Analyze	10
Evaluate	10
Create	-