Implementing and Administering Cisco Solutions (CCNA)

Course ID #: 7000-215-ZZ-Z

Hours: 35

Course Content

Course Description:

Implementing and Administering Cisco Solutions (CCNA) v1.0 is a 5-day class that teaches learners how to install, operate, configure, and verify a basic IPv4 and IPv6 network, including configuring a network components, such as switch, router, and Wireless LAN Controller; managing network devices, and identifying basic security threats. Today's job roles are ever changing. The new CCNA will now cover wireless, overview of SD-WAN, DNA Center and Security threats. The goal of the course is to provide learners with the knowledge and skills that are necessary to install, configure, and operate a small to medium-sized network.

Prerequisites:

The knowledge and skills that a learner should have before attending this course are as follows:
- Basic computer literacy
- Basic PC operating system navigation skills
- Basic Internet usage skills
- Basic IP address knowledge

Target Student:

The primary audience for this course is as follows:
- Individuals seeking the Cisco CCNA certification
- Entry-level network engineer
- Network administrator
- Network support technician
- Help desk technician

Topics:

Section 1: Exploring the Functions of Networking
- Identify the components of a computer network and describe their basic
- characteristics
- Define a network and describe examples of networks 12 Implementing and
- Administering Cisco Solutions (CCNA)
- Components of a Network

- Characteristics of a Network
- Physical vs. Logical Topologies
- Compare and contrast logical and physical topologies
- Interpreting a Network Diagram
- Impact of User Applications on the Network

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Section 2: Introducing the Host-To-Host Communications Model
- Host-To-Host Communications Overview
- ISO OSI Reference Model
- TCP/IP Protocol Suite
- Peer-To-Peer Communications
- Encapsulation and De-Encapsulation
- Describe the process of encapsulation and de-encapsulation
- TCP/IP Stack vs OSI Reference Model
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Section 3: Operating Cisco IOS Software
- Cisco IOS Software Features and Functions
- Cisco IOS Software CLI Functions
- Cisco IOS Software Modes

Section 4: Introducing LANs
- Local Area Networks
- LAN Components
- Need for Switches
- Characteristics and Features of Switches

Section 5: Exploring the TCP/IP Link Layer
- Ethernet LAN Connection Media
- Ethernet Frame Structure
- Describe the fields of an Ethernet frame
- LAN Communication Types
- MAC Addresses
- Frame Switching
- Duplex Communication

Section 6: Starting a Switch
- Switch Installation
- Connecting to a Console Port
- Switch LED Indicators
- Basic show Commands and Information

Section 7: Introducing the TCP/IP Internet Layer, IPv4 Addressing, and Subnets
- Internet Protocol
- Decimal and Binary Number Systems
- Binary-to-Decimal Conversion
- Decimal-to-Binary Conversion
- IPv4 Address Representation
- IPv4 Header Fields
- IPv4 Address Classes
- Subnet Masks
- Subnets
- Implementing Subnetting: Borrowing Bits
- Implementing Subnetting: Determining the Addressing Scheme
- Benefits of VLSM and Implementing VLSM
- Private vs. Public IPv4 Addresses
- Reserved IPv4 Addresses
- Verifying IPv4 Address of a Host

Section 8: Explaining the TCP/IP Transport Layer and Application Layer
- TCP/IP Transport Layer Functions
- Reliable vs. Best-Effort Transport
- TCP Characteristics
- UDP Characteristics
- TCP/IP Application Layer
- Introducing HTTP
- Domain Name System
- Explaining DHCP for IPv4

Section 9: Exploring the Functions of Routing
- Role of a Router
- Router Components
- Router Functions
- Routing Table
- Path Determination

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Section 10: Configuring a Cisco Router
- Initial Router Setup
- Configuring Router Interfaces
- Configuring IPv4 Addresses on Router Interfaces
- Checking Interface Configuration and Status
- Exploring Connected Devices
- Using Cisco Discovery Protocol
- Configure and Verify LLDP
- Implement an Initial Router Configuration

Section 11: Exploring the Packet Delivery Process
- Layer 2 Addressing
- Layer 3 Addressing
- Default Gateways
- Address Resolution Protocol
- Host-To-Host Packet Delivery

Section 12: Troubleshooting a Simple Network
- Troubleshooting Methods
- Troubleshooting Tools
- Troubleshooting Common Switch Media Issues
- Troubleshooting Common Switch Port Issues
- Identify common access port issues
- Troubleshooting Common Problems Associated with IPv4 Addressing

Section 13: Introducing Basic IPv6
- IPv4 Address Exhaustion Workarounds
- IPv6 Features
- IPv6 Addresses and Address Types
- Comparison of IPv4 and IPv6 Headers
- Internet Control Message Protocol Version 6
- Neighbor Discovery
- IPv6 Address Allocation
- Verification of End-To-End IPv6 Connectivity

Section 14: Configuring Static Routing
- Routing Operation
- When to Use Static Routing
- IPv4 Static Route Configuration
- Default Routes
- Verifying Static and Default Route Configuration
- Configuring IPv6 Static Routes
- Implement IPv4 Static Routing
- Implement IPv6 Static Routing

Section 15: Implementing VLANs and Trunks
- VLAN Introduction
- Creating a VLAN
- Assigning a Port to a VLAN
- Trunking with 802.1Q
- Configuring an 802.1Q Trunk
- VLAN Design Consideration
- Troubleshoot VLANs and Trunk

Section 16: Routing Between VLANs
- Purpose of Inter-VLAN Routing
- Options for Inter-VLAN Routing
- Implement Multiple VLANs and Basic Routing Between the VLANs

Section 17: Introducing OSPF
- Dynamic Routing Protocols
- Path Selection
- Link-State Routing Protocol Overview
- Link-State Routing Protocol Data Structures
- Introducing OSPF
- Establishing OSPF Neighbor Adjacencies
- OSPF Neighbor States
- SPF Algorithm
- Building a Link-State Database
- Routing for IPv6

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Section 18: Building Redundant Switched Topologies
- Physical Redundancy in a LAN
- Issues in Redundant Topologies
- Spanning Tree Operation
- Types of Spanning Tree Protocols
- Rapid Spanning Tree Protocol
- PortFast and BPDU Guard

Section 19: Improving Redundant Switched Topologies with EtherChannel
- EtherChannel Overview
- EtherChannel Configuration Options
- Configuring and Verifying EtherChannel
- Improve Redundant Switched Topologies with EtherChannel

Section 20: Exploring Layer 3 Redundancy
- Need for Default Gateway Redundancy
- Understanding FHRP
- Understanding HSRP

Section 21: Introducing WAN Technologies
- Introduction to WAN Technologies
- WAN Devices and Demarcation Point
- WAN Topology Options
- WAN Connectivity Options
- Virtual Private Networks
- Enterprise-Managed VPNs
- Provider-Managed VPNs

Section 22: Explaining Basics of ACL
- ACL Overview
- ACL Operation
- ACL Wildcard Masking
- Wildcard Mask Abbreviations
- Types of Basic ACLs
- Configuring Standard IPv4 ACLs
- Configuring Extended IPv4 ACLs
- Verifying and Modifying IPv4 ACLs
- Applying IPv4 ACLs to Filter Network Traffic
- Implement Numbered and Named IPv4 ACLs

Section 23: Enabling Internet Connectivity
- Configure internet access using DHCP clients and explain and configure NAT on Cisco routers
- Introducing Network Address Translation
- NAT Terminology and Translation Mechanisms
- Benefits and Drawbacks of NAT
- Static NAT and Port Forwarding
- Dynamic NAT
- Port Address Translation
- Configuring and Verifying Inside IPv4 NAT
- Implement PAT

Section 24: Introducing QoS
- Converged Networks
- Quality of Service Defined
- QoS Policy
- QoS Mechanisms
- QoS Models
- Deploying End-to-End QoS

Section 25: Explaining Wireless Fundamentals
- Wireless Technologies
- WLAN Architectures
- WLAN Components
- WiFi Channels
- AP and WLC Management

Section 26: Introducing Architectures and Virtualization
- Introduction to Network Design
- Enterprise Three-Tier Hierarchical Network Design
- Spine-Leaf Network Design
- Cisco Enterprise Architecture Model
- Cloud Computing Overview
- Device Architecture
- Virtualization Fundamentals

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Section 27: Explaining the Evolution of Intelligent Networks

- Overview of Network Programmability in Enterprise Networks
- Software-Defined Networking
- Common Programmability Protocols and Methods
- Configuration Management Tools
- Introducing Cisco DNA Center
- Cisco SD-Access
- Introducing Cisco SD-WAN

Section 28: Introducing System Monitoring

- Introducing Syslog
- Syslog Message Format
- SNMP Overview
- Enabling Network Time Protocol
- Configure System Message Logging

Section 29: Managing Cisco Devices

- Cisco IOS Integrated File System and Devices
- Stages of the Router Power-On Boot Sequence
- Loading and Managing System Images Files
- Loading Cisco IOS Configuration Files
- Validating Cisco IOS Images Using MD5
- Managing Cisco IOS Images and Device Configuration Files

Section 30: Examining the Security Threat Landscape

- Security Threat Landscape Overview
- Malware
- Hacking Tools
- Denial of Service and Distributed Denial of Service
- Spoofing
- Reflection and Amplification Attacks
- Social Engineering
- Evolution of Phishing
- Password Attacks
- • Reconnaissance Attacks

- Buffer Overflow Attacks
- Man-in-the-Middle Attacks
- Vectors of Data Loss and Exfiltration
- Other Considerations

Section 31: Implementing Threat Defense Technologies

- Information Security Overview
- Firewalls
- Intrusion Prevention Systems
- Introduction to Cryptographic Technologies
- IPsec Security Services
- Secure Sockets Layer and Transport Layer Security
- Wireless Security Protocols
- Configure WPA2 PSK

Section 32: Securing Administrative Access

- Network Device Security Overview
- Securing Access to Privileged EXEC Mode
- Securing Console Access
- Securing Remote Access
- Configuring the Login Banner
- Limiting Remote Access with ACLs
- External Authentication Options
- Secure Device Administrative Access

Section 33: Implementing Device Hardening

- Securing Unused Ports
- Infrastructure ACL
- Disabling Unused Services
- Port Security Overview
- Mitigating VLAN Attacks
- DHCP Snooping
- Dynamic ARP Inspection
- Implement Device Hardening