COURSE CURRICULUM

Network Fundamentals

- Explain the role and function of network components
- Routers
- L2 and L3 switches
- Next-generation firewalls and IPS
- Access points
- Controllers (Cisco DNA Center and WLC)
- Endpoints
- Servers

Describe characteristics of network topology architectures

- 2 tier
- 3 tier
- Spine-leaf
- WAN
- Small office/home office (SOHO)
- On-premises and cloud

Compare physical interface and cabling types

- Single-mode fiber, multimode fiber, copper
- Connections (Ethernet shared media and point-to-point)
- Concepts of PoE

Identify interface and cable issues (collisions, errors, mismatch duplex, and/or speed) Compare TCP to UDP

Configure and verify IPv4 addressing and subnetting Describe the need for private IPv4 addressing

Configure and verify IPv6 addressing and prefix

Compare IPv6 address types 1.9. a Global unicast

- Unique local
- Link-local
- Anycast
- Multicast
- Modified EUI 64

Verify IP parameters for Client OS (Windows, Mac OS, Linux)

Describe wireless principles

- Nonoverlapping Wi-Fi channels
- SSID
- RF
- Encryption

Explain virtualization fundamentals (virtual machines)

Describe switching concepts

- MAC learning and aging
- Frame switching
- Frame flooding
- MAC address table

2.0 Network Access

- Configure and verify VLANs (normal range) spanning multiple switches
- Access ports (data and voice)
- Default VLAN
- Connectivity

Configure and verify interswitch connectivity

- Trunk ports
- 802.1Q
- Native VLAN

Configure and verify Layer 2 discovery protocols (Cisco Discovery Protocol and LLDP) Configure and verify (Layer 2/Layer 3) EtherChannel (LACP)
Describe the need for and basic operations of Rapid PVST+ Spanning Tree Protocol and identify basic operations

- Root port, root bridge (primary/secondary), and other port names
- Port states (forwarding/blocking)
- PortFast benefits

Compare Cisco Wireless Architectures and AP modes

Describe physical infrastructure connections of WLAN components (AP, WLC, access/trunk ports, and LAG)

Describe AP and WLC management access connections (Telnet, SSH, HTTP, HTTPS, console, and TACACS+/RADIUS)

Configure the components of a wireless LAN access for client connectivity using GUI only such as WLAN creation, security settings, QoS profiles, and advanced WLAN settings

3.0 IP Connectivity
Interpret the components of routing table

- Routing protocol code
- Prefix
- Network mask
- Next hop
- Administrative distance
- Metric
- Gateway of last resort

Determine how a router makes a forwarding decision by default

- Longest match
- Administrative distance
- Routing protocol metric

Configure and verify IPv4 and IPv6 static routing

- Default route
- Network route
- Host route
- Floating static

Configure and verify single area OSPFv2 3.4.a Neighbor adjacencies

- Point-to-point
- Broadcast (DR/BDR selection)
- Router ID

Describe the purpose of first hop redundancy protocol

4.0 IP Services

- Configure and verify inside source NAT using static and pools
- Configure and verify NTP operating in a client and server mode
- Explain the role of DHCP and DNS within the network
- Explain the function of SNMP in network operations
- Describe the use of syslog features including facilities and levels
- Configure and verify DHCP client and relay
- Explain the forwarding per-hop behavior (PHB) for QoS such as classification, marking, queuing, congestion, policing, shaping
- Configure network devices for remote access using SSH
- Describe the capabilities and function of TFTP/FTP in the network

5.0 Security Fundamentals

- Define key security concepts (threats, vulnerabilities, exploits, and mitigation techniques)

- Describe security program elements (user awareness, training, and physical access control)
- Configure device access control using local passwords
- Describe security password policies elements, such as management, complexity, and password alternatives (multifactor authentication, certificates, and biometrics)
- Describe remote access and site-to-site VPNs
- Configure and verify access control lists
- Configure Layer 2 security features (DHCP snooping, dynamic ARP inspection, and port security)
- Differentiate authentication, authorization, and accounting concepts
- Describe wireless security protocols (WPA, WPA2, and WPA3)
- Configure WLAN using WPA2 PSK using the GUI

6.0 Automation and Programmability

- Explain how automation impacts network management
- Compare traditional networks with controller-based networking
- Describe controller-based and software defined architectures (overlay, underlay, and fabric)
- Separation of control plane and data plane
- North-bound and south-bound APIs

Compare traditional campus device management with Cisco DNA Center enabled device management

Describe characteristics of REST-based APIs (CRUD, HTTP verbs, and data encoding) Recognize the capabilities of configuration management mechanisms Puppet, Chef, and Ansible Interpret JSON encoded data