

CCNA Routing and Switching - Course Content

Course Overview

The CCNA Routing and Switching certification provides foundational networking knowledge and skills.

It validates the ability to install, configure, operate, and troubleshoot medium-size routed and switched networks.

Module 1: Networking Fundamentals

- Introduction to Networks
- OSI and TCP/IP Models
- IPv4 and IPv6 Addressing and Subnetting
- Network Devices (Routers, Switches, Firewalls, Access Points)
- Network Topologies and Architectures
- Ethernet Fundamentals
- Cabling and Physical Layer Concepts
- IP Connectivity and Communication Process

Module 2: Physical Layer and Hardware

- Physical Layer Overview and Signal Transmission
- Copper Cables (UTP, STP, Coaxial) and Connectors (RJ45, RJ11, BNC)
- Fiber Optic Cables (Single-mode, Multi-mode, Connectors: LC, SC, ST)
- Cable Testing Tools (Cable Tester, TDR, OTDR)
- Transceivers and SFP Modules
- Patch Panels, Racks, and Power Distribution Units (PDUs)
- PoE (Power over Ethernet) Concepts and Standards
- Hardware Components – Routers, Switches, Firewalls, Access Points
- Boot Process and Hardware Troubleshooting

Module 3: LAN Switching Technologies

- Switching Concepts and Frame Forwarding
- VLANs and VLAN Trunking (802.1Q)
- Inter-VLAN Routing
- Spanning Tree Protocol (STP) and RSTP
- EtherChannel Configuration and Troubleshooting

- Switch Management and Security

Module 4: Routing Technologies

- Routing Concepts and Packet Forwarding
- Static Routing Configuration
- Dynamic Routing Protocols (RIP, OSPF, EIGRP)
- IPv6 Routing
- Route Summarization and Redistribution
- Troubleshooting Routing Issues

Module 5: WAN Technologies

- WAN Concepts and Topologies
- PPP and HDLC Protocols
- Frame Relay Basics
- MPLS Overview
- VPN Technologies (Site-to-Site, Remote Access)
- Broadband and Internet Connectivity

Module 6: Infrastructure Services

- DHCP, DNS, and NAT Configuration
- NTP and Syslog
- SNMP and Network Monitoring
- QoS Fundamentals
- IPv4 and IPv6 Services

Module 7: Infrastructure Security

- Device Access Control (Console, SSH, VTY)
- Password Encryption and AAA
- Port Security and DHCP Snooping
- Dynamic ARP Inspection (DAI)
- VLAN Security Best Practices
- Access Control Lists (ACLs)

Module 8: Infrastructure Management and Troubleshooting

- Network Device Management (IOS, Configuration Files)
- Backups and Upgrades
- CDP and LLDP for Network Discovery
- Ping, Traceroute, and Debug Commands
- Common Troubleshooting Methodologies

This CCNA Routing and Switching course content is designed to prepare students for real-world networking environments and the official Cisco CCNA 200-301 certification exam.