



Cisco CCNA with Network Automation (Ansible)

Duration: 3 Months

Training Hours: 96 Hours (8 Hours/Week)

Prerequisites

- Basic Computer Knowledge
- No Prior Networking Experience Required
- Basic Understanding of Windows Operating System

MONTH 1 – Networking Fundamentals & Cisco Device Configuration

Week 1 – Networking Fundamentals

Module 1: Introduction to Computer Networking

What You'll Learn

Develop a strong foundation in networking by understanding how devices communicate, network types, transmission media, and the role of routers and switches in modern enterprise networks.

Topics Covered

- Introduction to Computer Networking
- Why Networking is Important
- LAN (Local Area Network)
- WAN (Wide Area Network)

- Characteristics of LAN & WAN
- Network Devices Overview
- Switch Fundamentals
- Router Fundamentals
- Ethernet Standards
- STP vs UTP Cable
- Straight-through & Cross-over Cable
- RJ45 Color Coding
- Power over Ethernet (PoE)
- Fiber Optic Cable
- Types of Fiber Optic Cables
- Bandwidth Concepts

Practical Labs

- LAN Cable Identification
- Cable Standards
- Network Topology Design
- Cisco Packet Tracer Installation
- Build a Basic LAN Topology

Week 2 – Network Communication & Cisco IOS

Module 2: Network Communication & Device Management

What You'll Learn

Understand how data travels across a network while learning Cisco IOS basics and device management.

Topics Covered

- What is a Packet?
- Packet Creation Process
- DNS Fundamentals
- Port Numbers
- OSI Model
- TCP/IP Model
- TCP vs UDP
- Ping Utility
- How Ping Works
- Packet Tracer Basics
- Trace Utility

- Switch MAC Address Table
- ARP
- Broadcast Communication
- Router Operation
- Default Gateway
- Routing Table
- Cisco Router & Switch Memory
- Boot Process
- Running Configuration
- Startup Configuration
- Configuration Modes
- Cisco IOS Basic Commands

Practical Labs

- Configure Cisco Router
 - Configure Cisco Switch
 - Verify Connectivity
 - Analyze Packet Flow using Packet Tracer
-

Week 3 – Cisco Device Administration & Automation

Module 3: Cisco Device Security & Network Automation

What You'll Learn

Secure Cisco devices and automate repetitive networking tasks using Ansible.

Topics Covered

- Enable Password
- Console Password
- SSH Configuration
- Disable Telnet
- SSH vs Telnet
- Configuration Backup
- Erase Configuration
- Router IOS Upgrade
- Running Configuration Backup
- Recovery from ROMMON
- Password Recovery
- Introduction to Network Automation

- What is Ansible?
- Installing Ansible
- Ansible Architecture
- Inventory Files
- Ansible Modules
- Playbooks
- Automating Cisco Device Configuration
- Automated Backup
- Scheduled Backup using Cron Jobs

Practical Labs

- Configure Secure Remote Access
 - Configure SSH
 - Disable Telnet
 - Perform IOS Upgrade
 - Backup Router Configuration
 - Automate Backup using Ansible
-

Week 4 – IP Addressing & Subnetting

Module 4: IP Addressing Fundamentals

What You'll Learn

Master IPv4 addressing, subnetting techniques, IPv6 basics, and enterprise IP planning.

Topics Covered

- IPv4 Addressing
- Subnet Mask
- Binary Calculations
- Subnetting
- Network Address
- Broadcast Address
- Host Address Calculation
- Address Classes
- Public IP vs Private IP
- Introduction to IPv6
- IPv6 Address Structure

Practical Labs

- Perform Subnetting
 - Create IP Addressing Plans
 - Configure IPv4 Addressing
 - Configure IPv6 Addressing
-

Skills Gained After Month 1

Students will be able to:

- Understand networking fundamentals.
 - Configure Cisco routers and switches.
 - Secure Cisco devices.
 - Configure SSH access.
 - Perform IOS upgrades and backups.
 - Automate device configuration using Ansible.
 - Design IPv4 addressing schemes and subnet networks.
-

MONTH 2 – Switching, VLANs & Routing Technologies

Week 5 – Switching Technologies

Module 5: VLAN & Layer 2 Switching

What You'll Learn

Learn enterprise switching concepts and configure VLANs to improve network segmentation and performance.

Topics Covered

- VLAN Concepts
- Benefits of VLANs
- Access Ports
- VLAN Configuration
- Layer 3 Switch
- Managed vs Unmanaged Switch

- Trunk Ports
- IEEE 802.1Q
- Inter-VLAN Routing

Practical Labs

- Create VLANs
 - Configure Access Ports
 - Configure Trunk Ports
 - Configure Inter-VLAN Routing
-

Week 6 – Switching Redundancy

Module 6: Layer 2 Redundancy

What You'll Learn

Prevent switching loops and improve network resilience using Spanning Tree Protocol and EtherChannel.

Topics Covered

- Need for STP
- Spanning Tree Protocol
- Root Bridge Election
- STP States
- RSTP
- STP vs RSTP
- EtherChannel
- Link Aggregation
- Load Balancing

Practical Labs

- Configure STP
 - Select Root Bridge
 - Configure EtherChannel
 - Test Redundant Links
-

Week 7 – Routing Technologies

Module 7: Static & Dynamic Routing

What You'll Learn

Configure routers to communicate across multiple networks using static and dynamic routing protocols.

Topics Covered

- Static Routing
- Default Route
- Routing Table
- Administrative Distance
- OSPF Fundamentals
- OSPF Areas
- Process ID
- OSPF Neighbor Formation
- OSPF Route Advertisement

Practical Labs

- Configure Static Routes
 - Configure OSPF
 - Verify Routing Tables
 - Troubleshoot Routing
-

Week 8 – Enterprise Routing

Module 8: Advanced Routing

What You'll Learn

Implement enterprise routing using Layer 3 switches and EIGRP.

Topics Covered

- Layer 3 Switching
- Routing using Layer 3 Switch
- EIGRP Fundamentals
- Autonomous System
- Neighbor Formation
- Route Advertisement
- OSPF vs EIGRP

Practical Labs

- Configure Layer 3 Switching
 - Configure EIGRP
 - Verify Neighbor Relationships
 - Test Routing
-

Skills Gained After Month 2

Students will be able to:

- Configure VLANs.
 - Configure Inter-VLAN Routing.
 - Implement STP and EtherChannel.
 - Configure Static Routing.
 - Configure OSPF.
 - Configure EIGRP.
 - Design enterprise LAN infrastructure.
-

MONTH 3 – Enterprise Networking, Security & WAN Technologies

Week 9 – Network Security & Address Translation

Module 9: Network Security

What You'll Learn

Protect enterprise networks using Access Control Lists (ACLs), Network Address Translation (NAT), and monitoring protocols.

Topics Covered

- Access Control Lists
- Standard ACL

- Extended ACL
- ACL Processing
- NAT
- PAT
- Static NAT
- Dynamic NAT
- SNMP Fundamentals
- Network Monitoring

Practical Labs

- Configure ACLs
 - Configure NAT
 - Configure PAT
 - Test Network Security Policies
-

Week 10 – Wireless & Enterprise WAN Technologies

Module 10: Enterprise Connectivity

What You'll Learn

Understand wireless networking, DHCP services, and enterprise WAN routing using BGP.

Topics Covered

- Wireless Networking Fundamentals
- Access Point Configuration
- Router as DHCP Server
- DHCP Concepts
- Border Gateway Protocol (BGP)
- BGP Neighbor Formation
- BGP Network Advertisement
- Enterprise WAN Design

Practical Labs

- Configure Wireless Access Point
- Configure DHCP
- Configure Basic BGP
- Verify WAN Connectivity

Week 11 – VPN & Network Troubleshooting

Module 11: Secure Enterprise Networking

What You'll Learn

Implement secure communication between networks and perform advanced network troubleshooting.

Topics Covered

- Virtual Private Network (VPN)
- Site-to-Site VPN
- Cisco Discovery Protocol (CDP)
- Wireshark Fundamentals
- Packet Analysis
- Network Troubleshooting Methodology
- Enterprise Network Documentation

Practical Labs

- Configure Site-to-Site VPN
 - Analyze Packets using Wireshark
 - Troubleshoot Connectivity Issues
 - Verify Cisco Neighbor Discovery
-

Week 12 – Capstone Project & Career Preparation

Module 12: Enterprise Network Deployment

What You'll Learn

Apply all networking concepts to build a complete enterprise network while preparing for Cisco certification and networking job roles.

Capstone Project

Students will design and deploy a complete enterprise network including:

- LAN & WAN Design
- Cisco Switch Configuration
- Cisco Router Configuration
- Secure Device Management (SSH)
- Network Automation using Ansible
- VLAN Configuration
- Inter-VLAN Routing
- STP & EtherChannel
- Static Routing
- OSPF Routing
- EIGRP Routing
- ACL Implementation
- NAT & PAT Configuration
- Wireless Network Deployment
- DHCP Server Configuration
- Basic BGP Configuration
- Site-to-Site VPN
- Network Monitoring using SNMP
- Packet Analysis with Wireshark
- Network Documentation & Troubleshooting

Career Preparation

- Cisco Certification Guidance (CCNA)
 - Resume Preparation
 - Interview Questions & Practical Scenarios
 - Enterprise Network Design Best Practices
-

Course Outcomes

Upon successful completion of this course, learners will be able to:

- Design and implement LAN and WAN infrastructures.
- Configure and manage Cisco routers and switches.
- Secure network devices using SSH and access control.
- Automate network administration using Ansible.
- Perform IPv4 subnetting and basic IPv6 configuration.
- Configure VLANs, Inter-VLAN Routing, STP, and EtherChannel.
- Implement static and dynamic routing using OSPF and EIGRP.
- Configure ACLs, NAT, PAT, and basic SNMP monitoring.
- Deploy wireless networking and DHCP services.
- Configure basic BGP and Site-to-Site VPN connectivity.
- Troubleshoot enterprise networks using Cisco tools and Wireshark.
- Prepare for the Cisco CCNA certification and entry-level networking roles.