

**Course Description:** CCNP routing protocol training for professional-level skills in building Enterprise level router networks and applications. Integrates Advanced Technologies.

In this course, students will learn how to create an efficient and expandable enterprise network by installing, configuring, monitoring, and troubleshooting network infrastructure equipment (especially routers such as Cisco ISRs) according to the Campus Infrastructure module in the Enterprise Composite Network model. The routed network includes the most commonly used and emerging IP routing protocols.

**Who Should Attend:** The primary audiences for this course are as follows: \* Candidates for Cisco CCNP®, CCDP®, and CCIP® certifications, \* Candidates for Cisco CCIE® Routing and Switching and CCIE Communications and Services certifications, \* Network administrators and technicians responsible for implementing and troubleshooting complex routed network environments, \* Customers or channel resellers who are experienced with Cisco products or have a broad knowledge of the internetworking industry, \* Network technicians who are experienced with Cisco products and services, \* Network administrators responsible for implementing and managing medium-to-large business networks, \* Senior network support staff performing a help-desk role in a medium or enterprise-sized company that has internal network support escalation staff, and \* Network support staff who design, implement, and troubleshoot Layer 3 connectivity issues.

**Prerequisites:** The knowledge and skills that a learner must have before attending this course include the following: \* Networking terms, numbering schemes, and topologies, \* Open Systems Interconnection (OSI) reference model, \* Operating and configuring a Cisco router, \* TCP/IP stack and configuration of IP addresses, \* IP subnetting, to include complex subnetting and variable-length subnet masking (VLSM), \* Routing protocol operation and configuration for Routing Information Protocol (RIP), EIGRP, and OSPF single-area networks, \* Using, implementing, and configuring static and default routes, \* Interpreting the contents, entries, and indicators from a Cisco routing table, \* Filtering traffic with standard and extended access lists, \* Verifying basic router configurations using show and debug command output, \* Verifying basic switch configurations using show command output, \* Configuring a WAN serial interface using High-Level Data Link Control (HDLC) and PPP, and \* Configuring a WAN serial interface using Frame Relay permanent virtual circuits (PVCs) and subinterfaces. The course assumes that the learner has achieved CCNA certification; practical experience with deploying and operating networks based on Cisco network devices and Cisco IOS software is strongly recommended.

**Benefits of Attendance:** Upon completion of this course, students will be able to:

- Describe the converged network requirements of various network and networked applications within the Cisco network architectures.
- Implement and verify Enhanced Interior Gateway Routing Protocol (EIGRP) operations.
- Build a scalable multiarea network with Open Shortest Path First Protocol (OSPF).
- Configure Integrated Intermediate System-to-Intermediate System Protocol (IS-IS) in a single area.
- Manipulate routing and packet flow.
- Implement and verify Border Gateway Protocol (BGP) for enterprise Internet service provider (ISP) connectivity.
- Implement and verify multicast forwarding using Protocol Independent Multicast (PIM) and related protocols.
- Describe how Internet Protocol version 6 (IPv6) functions to satisfy the increasingly complex requirements of hierarchical addressing.

## Course Outline:

### Course Introduction

Overview  
Course Goal and Objectives  
Course Flow  
Additional References  
Your Training Curriculum

### Module 1: Network Requirements

Describing Network Requirements

### Module 2: Configuring EIGRP

Introducing EIGRP  
Implementing and Verifying EIGRP  
Configuring Advanced EIGRP Options  
Configuring EIGRP Authentication  
Using EIGRP in an Enterprise Network  
Lab 2-0: Basic Configuration  
Lab 2-Configuring and Tuning EIGRP

### Module 3: Configuring OSPF

Introducing the OSPF Protocol  
OSPF Packet Types  
Configuring OSPF Routing  
OSPF Network Types  
Link-State Advertisements  
Configuring OSPF Route Summarization  
Configuring OSPF Special Area Types  
Configuring OSPF Authentication  
Lab 3-Configuring Single-Area OSPF

Lab 3-Configuring OSPF for Multiple Areas and Frame Relay  
Nonbroadcast

Lab 3-Configuring OSPF for Multiple Areas and Frame Relay  
Point-to-Multipoint and Point-to-Point  
Lab 3-Tuning OSPF

### Module 4: The IS-IS Protocol

Introducing IS-IS and Integrated IS-IS Routing  
Performing IS-IS Routing Operations  
Configuring Basic Integrated IS-IS  
Lab 4-Configuring Integrated IS-IS

### Module 5: Manipulating Routing Updates

Operating a Network Using Multiple IP Routing Protocols  
Configuring and Verifying Route Redistribution  
Controlling Routing Update Traffic  
Implementing Advanced Cisco IOS Features: Configuring  
DHCP  
Lab 5-Configuring Basic Redistribution  
Lab 5-Tuning Basic Redistribution with Cisco IOS Tools

### Module 6: Implementing BGP

Explaining BGP Concepts and Terminology  
Explaining EBGP and IBGP  
Configuring Basic BGP Operations  
Selecting a BGP Path  
Using Route Maps to Manipulate Basic BGP Paths  
Lab 6-Configuring Multihomed BGP  
Lab 6-Manipulating BGP Path Selection with Route Maps

### Module 7: Implementing Multicast

Explaining Multicast  
IGMP and Layer 2 Issues  
Explaining Multicast Routing Protocols  
Multicast Configuration and Verification  
Lab 7-Configuring Multicast Routing

### Module 8: Implementing IPv6

Introducing IPv6  
Defining IPv6 Addressing  
Implementing Dynamic IPv6 Addresses  
Using IPv6 with OSPF and Other Routing Protocols  
Using IPv6 with IPv4  
Lab 8-Configuring IPv6 Addresses  
Lab 8-Enabling IPv6 OSPF Routing  
Lab 8-Configuring IPv6 Tunnels