# Implementing Cisco IP Routing (ROUTE)
# Course Summary

## Description

Implementing Cisco IP Routing ( ROUTE ) is an instructor-led five day training course developed to help students prepare for Cisco CCNP certification.  The ROUTE course is a component of the CCNP Routing and Switching curriculum.

This course is designed to provide professionals working with medium to large networks with the skills and knowledge required to incorporate advanced routing concepts when implementing scalability for Cisco routers that are connected to LANs and WANs.  Students will build upon the knowledge and skills from CCNA Routing and Switching and help expand competencies to plan, implement, and monitor a scalable routing network.

The overall design of the new ROUTE training is now heavily focused on lab-based learning.  Some older topics have been removed or simplified from ROUTE v1.0, while several new IPv6 routing topics have been added.  The course content has been adapted to Cisco IOS Software Release 15 and technically updated.

## Objectives

After taking this course, students will be able to:
- Describe routing protocols, different remote connectivity options, and their impact on routing and implementing RIPng
- Configure EIGRP in IPv4 and IPv6 environments
- Configure OSPF in IPv4 and IPv6 environments
- Implement route redistribution using filtering mechanisms
- Implement path control using policy-based routing and IP SLA
- Implement enterprise Internet connectivity
- Secure Cisco routers according to best practices and configure authentication for routing protocols

## Topics

- Basic Network and Routing Concepts
- EIGRP Implementation
- OSPF Implementation
- Configuration of Redistribution

- Path Control Implementation
- Enterprise Internet Connectivity
- Routers and Routing Protocol Hardening

## Audience

This course is appropriate for learners who aim to be network professionals and who have knowledge obtained from Cisco CCNA courses.  Typical job roles include network engineers, support engineers, systems engineers, or network technicians.

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## Course Summary (cont'd)

**Prerequisites**

The knowledge and skills that a learner should have before attending this curriculum are as follows:
- Describing network fundamentals
- Establishing Internet and WAN connectivity (IPv4 and IPv6)
- Managing network device security
- Operating a medium-sized LAN with multiple switches, supporting VLANs, trunking, and spanning tree
- Troubleshooting IP connectivity (IPv4 and IPv6)
- Configuring and troubleshooting EIGRP and OSPF (IPv4 and IPv6)
- Configuring devices for SNMP, syslog, and NetFlow access
- Managing Cisco device configurations, Cisco IOS images, and licenses

It is highly recommended that this course be taken after the following Cisco courses:
- Interconnecting Cisco Networking Devices v2.0, Part 1 (ICND1 v2.0) and Part 2 (ICND2 v2.0), or
- Interconnecting Cisco Networking Devices: Accelerated Version 2.0 (CCNAX v2.0)

**Duration**

Five days

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# Course Outline

**I.  Basic Network and Routing Concepts**
   A.   Differentiating Routing Protocols
   B.   Understanding Network Technologies
   C.   Connecting Remote Locations with the Headquarters
   D.   Implementing RIPng

**II.  EIGRP Implementation**
   A.   Establishing EIGRP Neighbor Relationships
   B.   Building the EIGRP Topology Table
   C.   Optimizing EIGRP Behavior
   D.   Configuring EIGRP for IPv6
   E.   Discovering Named EIGRP Configuration

**III.  OSPF Implementation**
   A.   Establishing OSPF Neighbor Relationships
   B.   Building the Link-State Database
   C.   Optimizing OSPF Behavior
   D.   Configuring OSPFv3

**IV.  Configuration of Redistribution**
   A.   Implementing Basic Routing Protocol Redistribution
   B.   Manipulating Redistribution Using Route Filtering

**V.  Path Control Implementation**
   A.   Using Cisco Express Forwarding Switching
   B.   Implementing Path Control

**VI.  Enterprise Internet Connectivity**
   A.   Planning Enterprise Internet Connectivity
   B.   Establishing Single-Homed IPv4 Internet Connectivity
   C.   Establishing Single-Homed IPv6 Internet Connectivity
   D.   Improving Resilience of Internet Connectivity
   E.   Considering Advantages of Using BGP
   F.   Implementing Basic BGP Operations
   G.   Using BGP Attributes and the Path Selection Process
   H.   Controlling BGP Routing Updates
   I.   Implementing BGP for IPv6 Internet Connectivity

**VII.  Routers and Routing Protocol Hardening**
   A.   Securing Cisco Routers
   B.   Describing Routing Protocol Authentication Options
   C.   Configuring EIGRP Authentication
   D.   Configuring OSPF Authentication
   E.   Configuring BGP Authentication

**VIII. Labs:**
   A.   Configuring RIPng
   B.   Configuring and Investigating Basic EIGRP
   C.   Building The EIGRP Topology Table
   D.   EIGRP Stub Routing
   E.   EIGRP Summarization
   F.   EIGRP Load Balancing
   G.   EIGRP for IPv6 Configuration
   H.   Discovering Named EIGRP Configuration
   I.   Basic OSPF Configuration Introduction
   J.   Building the Link-State Database
   K.   OSPF Path Selection
   L.   OSPF Route Summarization
   M.   OSPF Stub Areas
   N.   Implementing OSPFv3
   O.   Basic Redistribution
   P.   Manipulate Redistribution
   Q.   Manipulate Redistribution Using Route Maps
   R.   Analyzing CEF
   S.   Implementing PBR
   T.   NAT Virtual Interface
   U.   Basic IPv6 Internet Connectivity
   V.   Basic BGP Configuration
   W.   Influencing BGP Path Selection
   X.   BGP for IPv6
   Y.   Configuring EIGRP Authentication
   Z.   OSPF Authentication Configuration
   AA.  Configure RIPng
   BB.  Configure EIGRP
   CC.  Configure and Optimize EIGRP for IPv6
   DD.  Implement EIGRP for IPv4 and IPv6 Through Named Configuration
   EE.  Configure OSPF
   FF.  Optimize OSPF
   GG.  Configure OSPFv3
   HH.  Implement Redistribution Using Route Filtering
   II.  Implement Path Control
   JJ.  Configuring BGP
   KK.  Configure Authentication for EIGRP Routes
   LL.  Configure BGP Authentication