



Course Title: Routing Protocols and Concept v4.0

Duration: 44 hours

Course Overview

The primary focus of this course is on routing and routing protocols. The goal is to develop an understanding of how a router learns about remote networks and determines the best path to those networks. This course includes both static routing and dynamic routing protocols. By examining multiple routing protocols, you will gain a better understanding of each of the individual routing protocols and a better perspective of routing in general. Learning the configuration of routing protocols is fairly simple. Developing an understanding of the routing concepts themselves is more difficult, yet is critical for implementing, verifying, and troubleshooting routing operations.

Each static routing and dynamic routing protocol chapter uses a single topology throughout that chapter. You will be using that topology to configure, verify, and troubleshoot the routing operations discussed in the chapter.

The labs and Packet Tracer activities used in this course are designed to help you develop an understanding of how to configure routing operations while reinforcing the concepts learned in each chapter.

Chapter 1 Introduction to Routing and Packet Forwarding -

In Chapter 1, you will be introduced to the router, its role in the networks, its main hardware and software components, and the packet forwarding process. You will also be given an overview of directly connected networks, static routing, and dynamic routing protocols, along with a brief introduction to the routing table. Each of these topics is discussed in more detail in later chapters. Chapter 1 also includes a review of basic Cisco IOS commands.

Chapter 2 Static Routing -

Chapter 2 focuses on the role and configuration of static routes. The routing table process is introduced, and you will be shown how to verify route entries as they are added and deleted from the routing table. This chapter also discusses Cisco Discovery Protocol, which is a tool that you can use to help verify network operations.

Chapter 3 Introduction to Dynamic Routing Protocols –

Chapter 3 provides an overview of routing protocol concepts and the various dynamic routing protocols available for routing in IP networks. In this chapter, you will examine the role of routing protocols. There is an overview of the classification of dynamic routing protocols. This overview is useful for comparing and contrasting the different protocols. Most of the information in this chapter is examined in more detail in later chapters.

Chapter 4 Distance Vector Routing Protocols –

Chapter 4 presents two different types of routing protocols: distance vector and link-state. You will examine distance vector concepts and operations, including network discovery, routing table maintenance, and the issue of routing loops. In this chapter, you will also be introduced to the concepts used in RIPv1, RIPv2, and EIGRP routing protocols. These routing protocols are discussed in more detail in later chapters.

Chapter 5 RIP version 1 –

Chapter 5 is the first chapter that focuses on a specific dynamic routing protocol. In this chapter, you will learn about RIP (Routing Information Protocol) version 1. RIPv1, a classful, distance vector routing protocol, was one of the first IP routing protocols. You will examine the characteristics, operations, and limitations of RIPv1. You will also learn about RIPv1 configuration, verification, and troubleshooting techniques.

Chapter 6 VLSM and CIDR -

Chapter 6 reviews the VLSM (Variable Length Subnet Mask) and CIDR (Classless Inter-Domain Routing) concepts that were presented in the Network Fundamentals course. You will explore the benefits of VLSM along with the role and benefits of CIDR in today's networks. Next, you will be introduced to the role of classless routing protocols. Classless routing protocols RIPv2, EIGRP, and OSPF are examined in later chapters.

Chapter 7 RIPv2 -

Chapter 7 examines the next routing protocol presented in this course, RIPv2. RIPv2 is a classless, distance vector routing protocol. You will see how RIPv2 demonstrates the advantages and operations of a classless routing protocol. The chapter begins with a discussion of the limitations of the classful routing protocol, RIPv1. Then RIPv2 is introduced, to show how a classless routing protocol can be used to overcome these limitations. In this chapter, you will also learn the commands necessary to configure and verify RIPv2.

Chapter 8 The Routing Table: A Closer Look –

Chapter 8 examines Cisco's IPv4 routing table in detail. The chapter begins with a discussion of the structure of the routing table. While examining the routing table, you will learn about the lookup process, how the routing table process determines the best match with a packet's destination IP address, and how to enter a route in the routing table. The chapter concludes with a discussion about the differences between classful and classless routing behaviors.

Chapter 9 EIGRP –

Chapter 9 focuses on Cisco EIGRP (Enhanced Interior Gateway Routing Protocol). EIGRP is a classless, enhanced distance vector routing protocol. You will examine the advantages and operations of EIGRP's DUAL (Diffusing Update Algorithm). Then you will learn about the configuration of EIGRP, including verification and troubleshooting commands.

Chapter 10 Link-State Routing Protocols –

Chapter 10 examines link-state routing protocol concepts. You will be introduced to link-state terminology and the link-state routing process. The chapter discusses the benefits and advantages of a link-state routing protocol compared to a distance vector routing protocol. You will then examine the Shortest Path First (SPF) algorithm and how it is used to build a topology map of the network. The link-state routing protocol OSPF is discussed in the following chapter.

Chapter 11 OSPF –

The final chapter in this course is an examination of the classless, link-state routing protocol OSPF (Open Shortest Path First). In this chapter, you will examine OSPF operations and configuration, including verification and troubleshooting commands. By the end of this course, you should feel confident in your knowledge of routing and routing protocols. With continued study and practice, you will be able to put your new skills to work.