

COURSE OUTLINE

CSCO-282

Routing Protocols and Concepts

3 Credits

HOWARD COMMUNITY COLLEGE

Description

The 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. The hands-on labs and virtual lab activities used in this course are designed to help the student develop an understanding of how to configure routing operations while reinforcing the concepts learned. Prerequisite: CSCO-281. (2 hours lecture, 3 hours lab)

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Describe the purpose, nature, and operations of a router.
2. Explain the role routers play in enabling communications across multiple networks.
3. Describe the purpose and nature of routing tables.
4. Describe how a router determines a path and switches packets.
5. Explain the route lookup process and determine the path packets will take in the network.
6. Configure and verify basic operations for a newly-installed router.
7. Describe the purpose of static routes and the procedure for configuring them.
8. Configure and verify static and default routing.
9. Describe the role of dynamic routing protocols and place.
10. Describe how metrics are used by routing protocols and identify the metric types used.
11. Identify the characteristics of distance vector routing protocols.
12. Describe the network discovery process of distance vector routing protocols using RIP.
13. Describe the functions, characteristics, and operations of the RIPv1 protocol.
14. Compare and contrast classful and classless IP addressing.
15. Describe classful and classless routing behaviors in routed networks.
16. Design and implement a classless IP addressing scheme for a given network.
17. Describe the main features and operations of the Enhanced Interior Gateway Routing Protocol (EIGRP).
18. Use advanced configuration commands with routers implementing EIGRP and OSPF.
19. Describe the basic features and concepts of link-state routing protocols.
20. Describe the purpose, nature, and operations of the Open Shortest Path First (OSPF) Protocol.
21. Configure and verify basic RIPv1, RIPv2, single area OSPF, and EIGRP operations in a small network.
22. Use router show and debug commands to troubleshoot common errors that occur in small networks.

Major Topics

- I. Router and Routing Introduction
 - A. Role of Routers in Networks
 - B. Router Hardware and Software Components
 - C. Overview of Static and Dynamic Routing Protocols

- II. Static Routing
 - A. Role and Configuration of Static Routes
 - B. Introduction to Routing Table Process
 - C. Cisco Discovery Protocol
- III. Dynamic Routing Protocols
 - A. Overview of Routing Protocol Concepts
 - B. Overview of Dynamic Routing Protocols
 - C. Overview of the Classification of Dynamic Routing Protocols
- IV. Distance Vector Routing Protocols
 - A. Distance Vector Concepts and Operations
 - B. Network Discovery
 - C. Routing Table Maintenance
 - D. Routing Loops
- V. RIP (Routing Information Protocol) Version 1 Routing Protocol
 - A. Characteristics, Operations, and Limitations of RIPv1
 - B. RIPv1 Configuration, Verification and Troubleshooting Techniques
- VI. VLSM (Variable Length Subnet Mask) and CIDR (Classless Inter-Domain Routing)
 - A. Benefits of VLSM
 - B. Role and Benefits of CIDR
 - C. Role of Classless Routing Protocols
- VII. RIP (Routing Information Protocol) Version 2 Routing Protocol
 - A. RIPv2 vs. RIPv1
 - B. RIPv2 and Classless Routing
 - C. RIPv2 Configuration and Verification
- VIII. The Routing Table (Detailed Examination of Cisco's IPv4 Routing Table)
 - A. Structure of the Routing Table
 - B. Best Path Determination
 - C. Classful and Classless Routing Behaviors
- IX. EIGRP (Enhanced Interior Gateway Routing Protocol) Routing Protocol
 - A. Advantages and Operations of EIGRP's DUAL (Diffusing Update Algorithm)
 - B. EIGRP Configuration, Verification, and Troubleshooting
- X. Link-State Routing Protocols
 - A. Link-State Routing Protocol Concepts
 - B. Benefits and Advantages of Link-State routing Protocols
 - C. Examination of the Shortest Path First (SPF) Algorithm
- XI. OSPF (Open Shortest Path First) Routing Protocol
 - A. Examination of OSPF
 - B. OSPF Configuration, Operations, Verification, and Troubleshooting

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will include the following: Final grades will be based primarily on homework, lab exercises, lab practical and final exam.

Other Course Information

This course is a course in Electronics Technology, Telecommunications Technology, and Computer Support Technology Programs. This course is also intended for students who wish to become a Cisco Certified Network Associate.