

## Course Outline for CNT 8002

### ROUTING AND SWITCHING ESSENTIALS (CCNA2)

Effective: Spring 2018

#### I. CATALOG DESCRIPTION:

CNT 8002 — ROUTING AND SWITCHING ESSENTIALS (CCNA2) — 3.00 units

This is the second course in the Cisco® Networking Academy®. This course describes the architecture, components, and operations of routers and switches in a small network. Students learn how to configure a router and a switch for basic functionality. By the end of this course students will be able to configure and troubleshoot routers and switches and resolve common issues with RIPv1, RIPv2, single-area and multi-area OSPF, virtual LANs, and inter-VLAN routing in both IPv4 and IPv6 networks.

2.50 Units Lecture 0.50 Units Lab

#### Prerequisite

CNT 8001 - Introduction to Networks (CCNA1)  
with a minimum grade of C

#### Grading Methods:

Letter or P/NP

#### Discipline:

- Computer Service Technology

	<u>MIN</u>
<b>Lecture Hours:</b>	45.00
<b>Lab Hours:</b>	27.00
<b>Total Hours:</b>	72.00

#### II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

#### III. PREREQUISITE AND/OR ADVISORY SKILLS:

**Before entering the course a student should be able to:**

##### A. CNT8001

1. describe and differentiate the devices and services used to support communications in data networks and the Internet;
2. describe the role of protocol layers in data networks;
3. evaluate the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments;
4. design, calculate, and apply subnet masks and addresses to fulfill given requirements in IPv4 and IPv6 networks;
5. explain fundamental Ethernet concepts such as media, services, and operations;
6. build a simple Ethernet network using routers and switches;
7. compose Cisco command-line interface (CLI) commands to perform basic router and switch configurations;

#### IV. MEASURABLE OBJECTIVES:

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

- A. describe basic switching concepts, how VLANs create logically separate networks and how routing occurs between them, and enhanced switching technologies such as VLANs, VLAN Trunking Protocol (VTP), Rapid Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree Protocol (PVSTP), and 802.1q
- B. configure and troubleshoot basic operations of a small switched network, VLANs, and inter-VLAN routing;
- C. describe the purpose, nature, and operations of a router, routing tables, and the route lookup process, dynamic routing protocols, distance vector routing protocols, and link-state routing protocols, the purpose and types of access control lists (ACLs), and the operations and benefits of Dynamic Host Configuration Protocol (DHCP), Domain Name System (DNS) for IPv4 and IPv6, and Network Address Translation (NAT)
- D. configure and verify static routing and default routing
- E. configure and troubleshoot basic operations of routers in a small routed network including Routing Information Protocol (RIPv1 and RIPv2) and Open Shortest Path First (OSPF) protocol (single-area OSPF)
- F. Configure, monitor, and troubleshoot ACLs for IPv4 and IPv6; and configure and troubleshoot NAT operations

#### V. CONTENT:

##### A. Lecture Content:

1. Introduction to Switched Networks

2. LAN Design
  3. VLANs
  4. Routing Concepts
  5. Inter-VLAN Routing
  6. Static Routing
  7. Routing Dynamically
  8. Single-Area OSPF
  9. Characteristics of OSPF
  10. Access Control Lists
  11. DHCP
  12. Network Address Translation (NAT)
- B. Lab Content
1. Basic Switch Settings
  2. Switch Security Features
  3. VLANs and Trunking
  4. Mapping the Internet
  5. Per-Interface Inter-VLAN Routing
  6. IPv4 & IPv6 Static and Default Routes & Troubleshooting
  7. Basic RIPv2 and RIPv6
  8. Configuring and Verifying Standard ACLs
  9. DHCPv4 on a Router & Switch
  10. Configuring Dynamic and Static NAT

#### VI. METHODS OF INSTRUCTION:

- A. **Lecture** -
- B. **Lab** -
- C. **Discussion** -
- D. **Demonstration** -

#### VII. TYPICAL ASSIGNMENTS:

- A. Typical Assignments
1. Addressing structure worksheet: Given a list of a small business host PCs, servers, and existing networking infrastructure, produce a structured addressing plan and assign addresses and subnets for all devices on the network.
  2. Cisco IOS® router configuration lab: Configure IP addresses, subnet masks, gateway, and routing protocols. Verify connectivity to hosts and to other routers with Ping and Telnet.

#### VIII. EVALUATION:

##### A. **Methods**

1. Exams/Tests
2. Quizzes
3. Home Work
4. Lab Activities

##### B. **Frequency**

1. One mid-term and one final examination will be administered.
2. Weekly quizzes
3. Weekly home work
4. Weekly labs

#### IX. TYPICAL TEXTS:

1. Cisco Networking Academy, . *Routing and Switching Essentials Course Booklet*. 1st ed., Cisco Press, 2013.
2. Cisco Networking Academy, . *Routing and Switching Essentials Companion Guide*. 1st ed., Cisco Press, 2014.
3. Cisco Networking Academy, . *Routing and Switching Essentials Lab Manual*. 1st ed., Cisco Press, 2013.
4. Cisco Networking Academy, . *Routing and Switching Essentials v6 Companion Guide*. 1st ed., Cisco Press, 2017.
5. Cisco Networking Academy, , and Allan Johnson. *Routing and Switching Essentials v6 Labs & Study Guide*. 1st ed., Cisco Press, 2016.
6. Cisco Networking Academy on-line curriculum.

#### X. OTHER MATERIALS REQUIRED OF STUDENTS: