

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

COMPUTER AND INFORMATION SCIENCE 206 – CISCO NETWORKING ACADEMY VI

2 hours lecture, 3 hours laboratory, 3 units

Catalog Description

This course, combined with CIS 205 Cisco Networking Academy V, covers topics necessary to successfully complete the Cisco Certified Networking Professional ROUTE certification. Skills necessary for implementing, monitoring, and maintaining routing services in an enterprise network will be enhanced. Students will learn how to plan, configure, and verify the implementation of complex enterprise LAN and WAN routing solutions using a range of routing protocols in IPv4 and IPv6 environments. Continues using the CCNP ROUTE certification content learned in CIS 205 and introduces new topics: BGP (Border Gateway Protocol); secure routing solutions to support branch offices and mobile workers; introduction to IPv6; IPv6 addressing and routing; OSPFv3; IPv6 tunneling; and IPv4 to IPv6 translation. This lab-intensive course provides hands-on experience by performing case studies using Cisco networking devices.

Prerequisite

“C” grade or higher or “Pass” in CIS 205 or equivalent

Entrance Skills

Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:

- 1) Design, construct, and configure WAN/LAN network topologies consisting of switches, routers, and workstations.
- 2) Design, construct, configure, and troubleshoot WAN/LAN network topologies using EIGRP, single-area and multi-area OSPF, using multiple routing protocols.
- 3) Design, construct, configure, troubleshoot and manage path control in a WAN/LAN network topology.

Course Content

- 1) Routing Services
- 2) Configuring Enhanced Interior Gateway Routing Protocol (OSPF)
- 3) Configuring Open Shortest Path First Routing Protocol (EIGRP)
- 4) Manipulating Routing Updates
- 5) Implementing Path Control
- 6) Implementing Border Gateway Protocol in an Enterprise Network
- 7) Implementing Branch Office Networking
- 8) Implementing IPv6 in an Enterprise Network

Course Objectives

Given a LAN/WAN configuration scenario, students will be able to:

- 1) Describe and/or discuss complex enterprise network design frameworks, architectures, and models; the process for creating, documenting, and executing a network implementation plan; the use of route redistribution, policy-based routing, distribution lists, seed metrics, and modifying administrative distances control route optimization; the use of offset lists, Cisco IOS IP Service Level Agreements (SLA), and policy-based routing manage path control; IPv6 features, addressing architecture, headers, extension headers, routing protocols, multicast capabilities; and fundamental terminology, features, components and operating fundamentals of EIGRP, OSPF and BGP.
- 2) Implement basic EIGRP as the network Interior Gateway protocol (IGP) and include the following advanced capabilities: route summarization, load balancing, bandwidth utilization, authentication, and timers.
- 3) Implement basic single-area and multi-area OSPF as the network IGP for various network topologies and include the following advanced capabilities: route summarization, authentication, virtual links, and modifying link costs and priorities.
- 4) Implement route optimization using route maps, distribution lists, seed metrics, and controlling administrative distances when redistributing routing information.
- 5) Implement basic path control using Cisco IOS IP SLA and policy-based routing.
- 6) Configure a basic IBGP and EBGP network including the following advanced functions: authentication, path selection with route maps, injecting route information, and controlling synchronization.
- 7) Implement an IPSec VPN and GRE tunnel over IPSec.
- 8) Implement IPv6 networks by configuring: IPv6 addressing on network interfaces, single-area OSPFv3 routing protocol, manual IPv6 tunnels, 6to4 tunnels, and static IPv6 routes.
- 9) Identify, analyze, and correct network configuration problems using logical troubleshooting techniques and the IOS show and debug commands for EIGRP, OSPF, BGP, and multi-protocol networks.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Chapter exams that measure students' ability to define and appropriately use networking technology concepts and terminology to describe networking processes, protocols, functions and features.
- 2) Comprehensive final exam that measures students' ability to synthesize and apply course concepts to a variety of networking scenarios.
- 3) Comprehensive skills exam that measures students' ability to practically apply network, design, configuration and hardware connectivity techniques to LAN/WAN environments.
- 4) Lab exercises that require students to apply course concepts and skills in order to implement LAN/WAN solutions, apply IPv4 and IPv6 network addressing to network problems defined by the instructor, and connect and configure LAN/WAN devices.

Special Materials Required of Students

USB flash drive

Minimum Instructional Facilities

Computers with Internet browser, Internet connectivity, and software; network connection not connected to school academic resources; 19-inch equipment racks populated with cross-connect patch

panels, Cisco Access routers and switches, interconnecting CAT 5E and Serial cabling; whiteboards; student desks and chairs; teacher desk and chair; lab desks with computers not connected to the school academic network resources; overhead computer projection system and screen; printer; computer server; storage cabinets.

Method of Instruction

- 1) Lecture and demonstration
- 2) Hands-on practice using the laboratory routers, switches, patch panels, access servers, computers, and virtualized PCs

Out-of-Class Assignments

May include the following:

- 1) Reading assignments
- 2) Technical skill labs using NetLabs
- 3) Technical skill labs using laboratory routers, switches, patch panels, access servers, computers, and virtualized PCs
- 4) Tests and quizzes

Texts and References

- 1) Required (representative example):
 - a. Implementing Cisco IP Routing (ROUTE) Foundation Learning Guide: (CCNP ROUTE 300-101) (Foundation Learning Guides) – by Diane Teare (Author), Bob Vachon (Author), Rick Graziani (Author); Series: Foundation Learning Guides; Hardcover: 768 pages; Publisher: Cisco Press; 1 edition (January 25, 2015); Language: English; ISBN-10: 1587204568; ISBN-13: 978-1587204562
- 2) Supplemental:
 - a. CCNP Routing and Switching Portable Command Guide Paperback – by Scott Empson (Author), Patrick Gargano (Author), & 1 more; Series: Portable Command Guide; Paperback: 416 pages; Publisher: Cisco Press; 1 edition (January 1, 2015); Language: English; ISBN-10: 1587144344; ISBN-13: 978-1587144349
 - b. CCNP Routing and Switching ROUTE 300-101 Official Cert Guide by Kevin Wallace (Author); Series: Official Cert Guide; Hardcover: 880 pages; Publisher: Cisco Press; 1 edition (December 19, 2014); Language: English; ISBN-10: 1587205599; ISBN-13: 978-1587205590

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Design, construct, and configure WAN/LAN network topologies consisting of switches, routers, and workstations.
- 2) Design, construct, configure and troubleshoot:
 - a. WAN/LAN network topologies using EIGRP.
 - b. WAN/LAN network topologies using single-area and multi-area OSPF.
 - c. WAN/LAN network topologies using IPSec VPN and GRE Tunnel over IPSEC.
 - d. WAN/LAN network topologies using BGP.
 - e. Simple IP v6 WAN/LAN network topologies including installing manual IPv6 tunnels; 6to4 tunnels, and static IPv6 routes.
 - f. WAN/LAN network topologies consisting of multiple routing protocols.

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

Successfully configure an instructor-defined secure router-based network scenario using the following routing protocols: EIGRP, OSPF, BGP, IPv4, and IPv6.