Lecture Contact Hours: 32-36; Homework Hours: 64-72; Total Student Learning Hours: 96-108
Laboratory Contact Hours: 48-54; Homework Hours: 0; Total Student Learning Hours: 48-54

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

COMPUTER AND INFORMATION SCIENCE 202 – CISCO ACADEMY - ROUTING, SWITCHING, AND WIRELESS ESSENTIALS

2 hours lecture, 3 hours laboratory, 3 units

Catalog Description
This is the second of four courses designed to provide knowledge, experience and skills in current and emerging networking technology. This course is also designed to help students prepare for the professional certification as a Cisco Certified Network Associate (CCNA). Routing and Switching Essentials describes the architecture, components, and operations of routers and switches. Students learn how to configure basic router and switch functions necessary for planning and implementing small networks. By the end of this course, students will be able to configure routers and switches and troubleshoot common issues with the Routing Information Protocol (RIPv1, RIPv2, and RIPng), single-area Open Shortest Path First Protocol (OSPF), Dynamic Host Configuration Protocol (DHCP), Network Address Translation (NAT), Access Control lists (ACLs), Virtual Local Area Networks (VLANs), and inter-VLAN routing in both IPv4 and IPv6 networks. This course maps to the current Cisco Certified Networking Associate curriculum version.

Prerequisite
"C" grade or higher or "Pass" in CIS 201 or completion of CCNA1 Version 6 at another Cisco Networking Academy, or explicit instructor permission

Entrance Skills
Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:
1) Basic understanding of the OSI and TCP/IP networking models. The ability to design and calculate an IPv4 and IPv6 addressing scheme, and configure simple classful and classless network topologies consisting of workstations, Cisco switches and Cisco routers.

Course Content
1) Introduction to Switched Networks
2) Basic Switching Concepts and Configuration
3) VLANs
4) Routing Concepts
5) Inter-VLAN Routing
6) Static Routing
7) Routing Dynamically
8) Single-Area OSPF
9) Access Control Lists
10) DHCP
11) Network Address Translation for IPv4

Course Objectives
Students will be able to:
1) Describe enhanced switching technologies such as Virtual Local Area Networks (VLANs), VLAN Trunking Protocol (VTP), Rapid Spanning Tree Protocol (RSTP), Per VLAN Spanning Tree Protocol (PVSTP), and IEEE 802.1q. Describe basic routing technologies such as Routing Information Protocol

(RIPv1, RIPv2,RIPng), single-area and multi-area Open Shortest Path First (OSPF), inter-VLAN routing, Network Address Translation (NAT), and Dynamic Host Configuration Protocol (DHCP).
2) Configure and troubleshoot basic operations of a small switched network.
3) Configure and verify static routing and default routing.
4) Configure and troubleshoot basic operations of routers in a small routed network.
5) Configure and troubleshoot basic VLANs and inter-VLAN routing.
6) Configure, monitor, and troubleshoot basic ACLs for IPv4 and IPv6.
7) Configure, monitor, and troubleshoot basic DCHP and NAT functions.

Method of Evaluation
A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in the 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 environments.
4) Lab exercises that require students to apply course concepts and skills in order to implement LAN solutions, compute IPv4 network addressing to network problems defined by the instructor, and connect and configure LAN devices.

Special Materials Required of Students
USB flash drive

Minimum Instructional Facilities
Smart computer lab with whiteboards, Internet browser, Internet connectivity, software, printer; network connection not connected to school academic resources; 19" equipment racks populated with cross-connect patch panels, power surge protectors, access servers, VM servers; Cisco Access routers and switches; interconnecting CAT 5E and serial cabling; lab desks with computers not connected to the school academic network resources; computer server; storage cabinets

Method of Instruction
1) Online computer-based reading assignments
2) Instructor and individual student mentoring
3) Practical application assignments using PCs, networking devices, and simulation software
4) Topic-focused mini-lectures for small groups of students

Out-of-Class Assignments
1) Read online curriculum and assignment instructions
2) Complete Packet Tracer assignments and online quizzes
3) Review online resources, including reference materials and videos

Texts and References
1) Required (representative examples):
   a. Text is provided online at *www.netacad.com*
   b. CCNA 200-301 Official Cert Guide Library, Wendell Odom, ISBN 9781587147142, 2020.
2) Supplemental: None

Exit Skills
Students having successfully completed this course exit with the following skills competencies and/or knowledge:
1) Ability to describe basic switching concepts and the operation of Cisco switches.
2) Ability to describe the purpose, nature, and operations of a router, routing tables, and the route lookup process.
3) Ability to describe how VLANs create logically separate networks and how routing occurs between them.
4) Ability to describe static routing, dynamic routing protocols, distance vector routing protocols, and link-state routing protocols.
5) Ability to configure and troubleshoot static routing, default routing and Routing Information Protocol (RIPv1, RIPv2, and RIPng).
6) Ability to configure and troubleshoot an Open Shortest Path First (OSPF) network.
7) Ability to describe, configure, and troubleshoot access control lists (ACLs) for IPv4 and IPv6 networks.
8) Ability to describe, configure, and troubleshoot Dynamic Host Configuration Protocol (DHCP) for IPv4 and IPv6 networks.
9) Ability to describe, configure, and troubleshoot Network Address Translation (NAT) operations.

Student Learning Outcomes
Upon successful completion of this course, students will be able to:
1) Build, configure, and, troubleshoot a small local area network topology consisting of Cisco routers, Cisco switches, and PCs with multiple broadcast and collision domains and basic network security techniques applied using the following network protocols: VTP, IEEE802.1q, RIP(versions 1, 2, and ng), single-area OSPF, NAT, DHCP, IPv4, and IPv6.