CS 82.21B Course Outline as of Fall 2015

CATALOG INFORMATION

Dept and Nbr: CS 82.21B Title: ROUTE/SWITCH ESSENTIALS
Full Title: Routing and Switching Essentials (Cisco Networking 2)
Last Reviewed: 4/27/2015

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	4.00	17.5	Lecture Scheduled	70.00
Minimum	4.00	Lab Scheduled	0	8	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 140.00 Total Student Learning Hours: 210.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	CIS 55.11B

Catalog Description:
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 and learn and the principles of routing and routing protocols. By the end of this course students will be able to configure and troubleshoot routers and switches and resolve common issues with single-area OSPF (Open Shortest Path First), VLANS (Virtual Local Area Networks), and inter-VLAN routing in both IPv4 and IPv6 networks. Routing and Switching Essentials is the second of the four courses leading to the Cisco Certified Network Associate (CCNA) designation. CCNA 2 builds and expands on the topics learned in Networking Fundamentals (CCNA 1) and prepeares the students to take the Cisco Certified Entry Networking Technician (CCENT) test.

Prerequisites/Corequisites:
Completion of CS 82.21A

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Schedule of Classes Information:

Description: 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 and learn and the principles of routing and routing protocols. By the end of this course students will be able to configure and troubleshoot routers and switches and resolve common issues with single-area OSPF (Open Shortest Path First), VLANS (Virtual Local Area Networks), and inter-VLAN routing in both IPv4 and IPv6 networks. Routing and Switching Essentials is the second of the four courses leading to the Cisco Certified Network Associate (CCNA) designation. CCNA 2 builds and expands on the topics learned in Networking Fundamentals (CCNA 1) and prepeares the students to take the Cisco Certified Entry Networking Technician (CCENT) test. (Grade or P/NP)
Prerequisites/Corequisites: Completion of CS 82.21A
Recommended: Eligibility for ENGL 100 or ESL 100
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Spring 2009	Inactive:	Spring 2022
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:
Certificate Applicable Course

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Analyze the processes routers and switches employ to enable communication across multiple networks.
2. Perform, with an increasing degree of proficiency, basic router and switch configurations, demonstrating increasing comprehension of routing and switching metrics and protocols.
3. Design and implement a classless Internet Protocol (IP) addressing scheme, applying the skills and knowledge obtained in this class.

Objectives:
Upon completion of this course, students will be able
to:
1. Examine the purpose, nature, and operations of a router and a switch
2. Summarize the processes routers and switches perform in enabling communications across multiple networks
3. Explain the purpose and nature of routing tables
4. Determine how a router and switches select paths

5. Set up and verify router and switch interfaces
6. Describe the purpose and procedure for configuring static routes
7. Evaluate the role of dynamic routing protocols in the context of network design
8. Differentiate between routing metrics and infer the metric types used by dynamic routing protocols
9. Summarize the characteristics of distance vector routing protocols
10. Describe the network discovery process of distance vector routing protocols using Routing Information Protocol (RIP)
11. Check the functions, characteristics, and operations of the RIPv1 protocol
12. Compare and contrast classful and classless IP addressing
13. Compare and contrast classful and classless network routing behaviors
14. Design and implement a classless IP addressing scheme for a given network
15. Validate comprehensive RIPv1 configurations
16. Test the basic RIPv2 configuration commands and evaluate RIPv2 classless routing updates
17. Summarize the basic features and concepts of link-state routing protocols
18. Contrast the purpose, nature, and operations of the Open Shortest Path First (OSPF) Protocol with distance vector routing protocols

Topics and Scope:

Topics will include but not be limited to:
1. Introduction to Switched Networks
   a. Local AreaNetwork(LAN) Design
   b. The Switched Environment
2. Basic Switching Concepts and Configuration
   a. Basic Switch configuration
   b. Switch Security Management and Implementation
3. Virtual Local Area Networks(VLANs)
   a. VLAN Segmentation
   b. VLAN Implementation
   c. VLAN Security and Design
4. Routing Concepts
   a. Initial configuration of a Router
   b. Routing Decisions
   c. Router Operation
5. Inter-VLAN Routing
   a. Inter-VLAN Routing
   b. Troubleshoot Inter-VLAN Routing
   c. Layer 3 Switching
6. Static Routing
   a. Static Routing Implementation
   b. Configure Static Routing and Default Routes
   c. Review Classless Inter-Domain Routing (CIDR) and Variable Length Subnetmask (VLSM)
   d. Configure Summary and Floating Static Routes
   e. Troubleshoot Static and Default Route Issues
7. Routing Dynamically
   a. Dynamic Routing Protocols
   b. Distance Vector Dynamic Routing
   c. Routing Information Protocol (RIP) and RIP next generation routing
   d. Link-State Dynamic Routing
   e. The Routing Table
8. Single-Area OSPF

a. Characteristics of OSPF
b. Configuring Single-Area Open Shortest Path First (OSPF) version 2
c. Configure Single-Area OSPFv3
9. Access Control Lists (ACL)
a. Internet Protocol (IP) ACL Operations
b. Standard IPv4 ACLS
c. Extended IPv4 ACLs
d. Troubleshoot ACLs
e. IPv6 ACLs
10. Dynamic Host Configuration Protocol (DHCP)
a. Dynamic Host Configuration Protocol DHCPv4
b. Dynamic Host Configuration Protocol v6
11. Network Address Translation (NAT) for IPv4
a. NAT Operation
b. Configuring NAT
c. Troubleshooting NAT

Assignment:

Reading assignments may include:
1. Online research of network devices and deployment practices
2. Approximately 50 pages weekly from the textbook
Homework problems may include:
1. Hands-on exercises to demonstrate proficiency with each topic
2. Online quizzes
3. Creation of network design diagrams
Other assignments may include:
1. 9-11 quizzes
2. Skill demonstration examinations
3. Classroom scenario based exercises

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems, Creation of network design diagrams and layouts	Problem solving 15 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances of Network device configuration	Skill Demonstrations 20 - 30%

Exams: All forms of formal testing, other than skill performance exams.

9-11 quizzes and Simulated equipment configuration	Exams 20 - 30%

Other: Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation in scenario based exercises	Other Category 10 - 25%

Representative Textbooks and Materials:
Routing and Switching Essentials (1st). Cisco Neworking Academy. Cisco Press: 2014