CS 82.21C Course Outline as of Fall 2009

CATALOG INFORMATION

Dept and Nbr: CS 82.21C Title: LAN SWITCHING
Full Title: LAN Switching (Cisco Networking 3)
Last Reviewed: 5/11/2015

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	8	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 157.50

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 55.11C

Catalog Description:
Students develop an in-depth understanding of how switches operate and are implemented in the local area network (LAN) environment for small and large networks. Beginning with a foundational overview of Ethernet, this course provides detailed explanations of LAN switch operation, virtual local area network (VLAN) implementation, Rapid Spanning Tree Protocol (RSTP), VLAN Trunking Protocol (VTP), Inter-VLAN routing, and wireless network operations. Students analyze, configure, verify, and troubleshoot VLANs, RSTP, and VTP. Campus network design and Layer 3 switching concepts are introduced.

Prerequisites/Corequisites:
Course Completion of CS 82.21B (or CIS 55.11B)

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Schedule of Classes Information:
Description: Students develop an in-depth understanding of how switches operate and are implemented in the local area network (LAN) environment for small and large networks.

Beginning with a foundational overview of Ethernet, this course provides detailed explanations of LAN switch operation, virtual local area network (VLAN) implementation, Rapid Spanning Tree Protocol (RSTP), VLAN Trunking Protocol (VTP), Inter-VLAN routing, and wireless network operations. Students analyze, configure, verify, and troubleshoot VLANs, RSTP, and VTP. Campus network design and Layer 3 switching concepts are introduced. (Grade or P/NP)
Prerequisites/Corequisites: Course Completion of CS 82.21B (or CIS 55.11B)
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:	Fall 2015
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:
Not Certificate/Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon completion of this course, students will be able to:
1. Explain the history and development of Ethernet technologies
2. Examine the basic functions and operations of a Local Area Network (LAN) switch
3. Experiment with Cisco Discovery Protocol (CDP)
4. Summarize the inner functions of a LAN switch
5. Compare and contrast various campus data network design schemes
6. Build and manage basic LAN switch configurations
7. Organize Virtual Local Area Networks (VLANs)
8. Solve VLAN redundant topology problems with Rapid Spanning Tree Protocol (RSTP)
9. Manage and modify VLANs within a domain using Trunking and VLAN Trunking Protocol (VTP)
10. Effect Inter-VLAN routing by configuring a router with virtual sub-interfaces

Topics and Scope:

Topics will include but not be limited to:
I. Ethernet in-depth

- A. The history of Ethernet
- B. Framing and encapsulating packets
- C. Ethernet Operation
  1. Rules governing when a device can transmit
  2. Full duplex, half duplex and collision domains
- D. Ethernet technologies
  1. 10- and 100Mbps
  2. Gigabit Ethernet
  3. The future of Ethernet

II. Switching Concepts - Cisco IOS Software and Cisco Discovery Protocol (CDP)
- A. Local Area Network (LAN) switching
- B. Basic switching and bridging operation of a switch
  1. The forwarding and filtering process
  2. Symmetric and asymmetric switching
- C. Communication between switches and workstations
- D. Discovering neighbors using CDP
  1. Information learned by CDP
  2. Configuration, verification and troubleshooting CDP commands

III. Inside the Switch
- A. Layer 2 addresses and broadcasts
- B. Switch internal processing
  1. Latency
  2. Forwarding methods
- C. The Cisco switch Content Addressable Memory (CAM)

IV. Campus Network Design
- A. Design principles
- B. Modular network design
  1. Hierarchical network design models
  2. The enterprise composite network model

V. Basic Switch Configuration
- A. Startup of the Catalyst switch
- B. Logging on with the Command Line Interface (CLI)
- C. Basic switch configuration commands
- D. Managing configuration files and password recovery

VI. Virtual Local Area Networks (VLANs) and IP Telephony Basics
- A. Broadcast domains with VLANs and routers
- B. Configuring, verifying and troubleshooting static VLANs
- C. Managing a separate VLAN for a Voice over IP (VoIP) telephone system

VII. Rapid Spanning Tree Protocol (RSTP)
- A. Redundant topologies for fault tolerance
- B. Problems with redundant topologies
  1. Loops, broadcasts storms, database instability
  2. Broadcasts storms
  3. Database instability
- C. RSTP as a software solution to a hardware problem

VIII. Trunking and VLAN Trunking Protocol (VTP)
- A. Multiple signal sources across a single link or trunk line
- B. Configuring trunks with the IEEE 802.1Q protocol
- C. Maintaining VLANs within a domain with VTP
- D. Configuring VTP

IX. Inter-VLAN Routing
- A. Communication between VLANs requires a router or multilayer switch

B. Configuring a router with virtual sub-interfaces (Router-on-a-stick)

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. Objective examinations and 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, Performance exams, Network device configuration	Skill Demonstrations 20 - 30%

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

Multiple choice, True/false, Matching items, Completion, 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:
LAN Switching and Wireless, CCNA Exploration Companion Guide. Lewis, Wayne. Cisco Press: 2008