Course Syllabus ITCC 2410

**COURSE DESCRIPTION:**
This course explains the principles of traffic control and access control lists (ACLs) and provides an overview of the services and protocols at the data link layer for wide-area access. Describes user access technologies and devices and discover how to implement and configure Point-to-Point Protocol (PPP), Point-to-Point Protocol over Ethernet (PPPoE), DSL, and Frame Relay. WAN security concepts, tunneling, and VPN basics are introduced. Discuss the special network services required by converged applications and an introduction to quality of service (QoS).

**PREREQUISITES, CO-REQUISITES and OTHER REQUIREMENTS:**
ITCC 2408 Cisco Exploration 3 - LAN Switching and Wireless

**TEXTBOOKS and REQUIRED MATERIALS/RECOMMENDED READINGS:**
Cisco Online Curriculum at [http://cisco.netacad.net](http://cisco.netacad.net)

No Textbooks Required - Optional Books Below:

[Accessing the WAN, CCNA Exploration Companion Guide](http://cisco.netacad.net)

*By Cisco Networking Academy.*

[Accessing the WAN, CCNA Exploration Labs and Study Guide](http://cisco.netacad.net)

*By Cisco Networking Academy.*

**Required reading:** Chapter 1 through Chapter 8

**COURSE CONTENT:**

Chapter 1: Describe the impact of applications (Voice Over IP and Video Over IP) on a network; implement basic switch security (port security, trunk access, management vlan other than vlan1, etc.); configure, verify, and troubleshoot DHCP and DNS operation on a router (CLI/SDM); describe today’s increasing network security threats and explain the need to implement a comprehensive security policy to mitigate the threats; configure and apply ACLs based on network filtering requirements (CLI/SDM); configure and apply an ACLs to limit telnet and SSH access to the router using (SDM/CLI); configure NAT for given network requirements using (CLI/SDM); configure and verify a basic WAN serial connection; configure and verify Frame Relay on Cisco routers; and describe VPN technology (importance, benefits, role, impact, components).
Chapter 2: In this chapter you will also learn the key concepts of serial communications, and how to configure and troubleshoot a PPP serial connection on a Cisco router.

Chapter 3: In this chapter, you will learn to: Describe the fundamental concepts of Frame Relay technology in terms of enterprise WAN services, including operation, implementation requirements, maps, and Local Management Interface (LMI) operation. Configure a basic Frame Relay permanent virtual circuit (PVC), including configuring and troubleshooting Frame Relay on a router serial interface and configuring a static Frame Relay map. Describe advanced concepts of Frame Relay technology in terms of enterprise WAN services, including subinterfaces, bandwidth, and flow control. Configure an advanced Frame Relay PVC, including solving reachability issues, configuring subinterfaces, and verifying and troubleshooting a Frame Relay configuration.

Chapter 4: In this chapter, you will learn to: Identify security threats to enterprise networks, Describe methods to mitigate security threats to enterprise networks, Configure basic router security, Disable unused router services and interfaces, use the Cisco SDM one-step lockdown feature, and manage files and software images with the Cisco IOS Integrated File System (IFS).

Chapter 5: In this chapter, you will learn to: Explain how ACLs are used to secure a medium-size enterprise branch office network, including the concept of packet filtering, the purpose of ACLs, how ACLs are used to control access, and the types of Cisco ACLs. Configure standard ACLs in a medium-size enterprise branch office network, including defining filtering criteria, configuring standard ACLs to filter traffic, and applying standard ACLs to router interfaces. Configure extended ACLs in a medium-size enterprise branch office network, including configuring extended ACLs and named ACLs, configuring filters, verifying and monitoring ACLs, and troubleshooting extended ACL issues. Describe complex ACLs in a medium-size enterprise branch office network, including configuring dynamic, reflexive, and timed ACLs, verifying and troubleshooting complex ACLs, and explaining relevant caveats.

Chapter 6: In this chapter, you will learn to: Describe the enterprise requirements for providing teleworker services, including the differences between private and public network infrastructures. Describe the teleworker requirements and recommended architecture for providing teleworking services. Explain how broadband services extend enterprise networks using DSL, cable, and wireless technology. Describe the importance of VPN technology, including its role and benefits for enterprises and teleworkers. Describe how VPN technology can be used to provide secure teleworker services to an enterprise network.

Chapter 7: In this chapter, you will learn to: Configure DHCP in an Enterprise branch network. This includes being able to explain DHCP features and benefits, the differences between BOOTP and DHCP, DHCP operation: and configuring, verifying, and troubleshooting DHCP. Configure NAT on a Cisco router. This includes explaining key features and operation of NAT and NAT Overload, explaining advantages and disadvantages of NAT, configuring NAT and NAT Overload to conserve IP address space in a network, configuring port forwarding, and verifying and troubleshooting NAT configurations. Configure new generation RIP (RIPng) to use IPv6. This includes explaining how IPv6 solves any problem of IP address deletion, explaining how to assign IPv6 addresses, describing transition strategies for implementing IPv6 and configuring, verifying and troubleshooting RIPng for IPv6.
Chapter 8: In this chapter, you will learn to: Establish and document a network baseline. Describe the various troubleshooting methodologies and troubleshooting tools. Describe the common issues that occur during WAN implementation. Identify and troubleshoot common enterprise network implementation issues using a layered model approach.

STUDENT LEARNING OUTCOMES:

Describe the impact of applications (Voice Over IP and Video Over IP) on a network; implement basic switch security (port security, trunk access, management vlan other than vlan1, etc.); configure, verify, and troubleshoot DHCP and DNS operation on a router (CLI/SDM); describe today’s increasing network security threats and explain the need to implement a comprehensive security policy to mitigate the threats; configure and apply ACLs based on network filtering requirements (CLI/SDM); configure and apply an ACLs to limit telnet and SSH access to the router using (SDM/CLI); configure NAT for given network requirements using (CLI/SDM); configure and verify a basic WAN serial connection; configure and verify Frame Relay on Cisco routers; and describe VPN technology (importance, benefits, role, impact, components).

PERFORMANCE OBJECTIVES:

STUDENTS WHO COMPLETE ACCESSING THE WAN WILL BE ABLE TO PERFORM THE FOLLOWING FUNCTIONS:

1. Configure router security with Cisco IOS and SDM.
2. Configuration of remote access to routers using VPN.
3. Advanced ACL configuration.
4. IPv6 configuration.
5. Enterprise troubleshooting using Cisco’s layered model
6. Describe the impact of Voice Over IP and Video Over IP applications on a network
7. Identify and correct common network problems at layers 1, 2, 3, and 7 using a layered model approach
8. Interpret network diagrams
9. Describe the components required for network and Internet communications
10. Implement basic switch security measures such as port security, trunk access, and management VLANs
11. Explain the operation and benefits of DHCP and DNS
12. Configure, verify, and troubleshoot DHCP and DNS operations on a router
13. Describe current network security threats and explain how to implement a comprehensive security policy to mitigate common threats to network devices, hosts, and applications
14. Describe the functions of common security appliances and applications

METHODS OF MEASUREMENT (grade requirements):

Each chapter is followed with an Exam given online by the Cisco Academy System. The exams are graded by Cisco and scores are given immediately. Labs and study guides will be considered as a part of your attendance. Cheating, texting, IMing, and idly surfing the web will not be tolerated.

Online Chapter Exams 10%
Quizzes, Homework, etc 20%
Online Final Exam  25%
Skill-Based Final Exam  30%
Daily Grade & Labs  15%

100%

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<th>NVC Grade</th>
<th>Cisco Academy</th>
<th>Status – Advance to next Academy Level</th>
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<td>90 – 100</td>
<td>A</td>
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<td>70 – 79</td>
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<td>60 – 69</td>
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<td>F</td>
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**NOTE:** A successful Cisco Academy student will pass the Skills Based Final exam with an 80% or better. An opportunity to retake an alternate Skills Based Final Exam will be given, however, the grade for the second exam attempt will be reduced by 10% or 1 letter grade.

**GRADE APPEALS PROCESS:**

If a student has an objection to a grade received, the following is the process to dispute the grade and must be followed in this order:

1. Informal resolution with the instructor
2. Written appeal to the instructor
3. Written appeal to the department chair
4. Written appeal to the college committee

**STUDENT RESPONSIBILITIES:**

A. Attendance

Effective Spring Term 2010, student absences will be recorded from the first day the class meets. Regular and punctual attendance in all classes and laboratories, day and evening, is required. Students who are absent for any reason should always consult with their instructors. Course syllabi must provide specific information regarding attendance, including, for courses involving the internet, online activity that constitutes “attendance.” Also, both tardiness and early departure from class may be considered forms of absenteeism. In all cases, students will be held responsible for completion of course requirements covered in their absence. Additionally, it is the student’s responsibility to drop a course
for nonattendance. Course instructors establish policy with regard to attendance in their respective syllabi and may drop a student for excessive absences. Absences are considered excessive when more than 12.5 percent of the total contact hours of instruction in a semester, including lecture and lab, are missed. For example, in a three-credit-hour lecture class, students may be dropped after more than six contact hours of absences. In a four-credit-hour lecture/lab class, students may be dropped after more than eight contact hours of absences. Absences are counted regardless of whether they occur consecutively. In special programs with additional accreditation or certification standards, additional attendance requirements may be enforced but faculty must clearly explain these policies in their syllabi. Students who stop attending class for any reason should contact the instructor and the college registrar to officially withdraw from the class. Students may be required to consult with an advisor or designee before dropping. Failure to officially withdraw may result in a failing grade for the course. It is the student’s responsibility to withdraw officially from a class by submitting a completed Withdrawal Form to the Admissions and Records Office.

ADDITIONAL INSTRUCTOR REQUIREMENTS:

COLLEGE POLICIES:

A. All of the Alamo Colleges are tobacco free.

B. Alamo Colleges DPS Emergency Phone Numbers:
   - Emergency Phone: (210) 222-0911
   - General Phone: (210) 485-0099
   - Weather Phone: (210) 485-0189 (For information on college closures)

Disability Access Statement – In accordance with the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act, it is the responsibility of the student to self-identify with the campus Disability Services office. Only those students with appropriate documentation will receive a letter of accommodation from the Disability Services office. Instructors are required to follow only those accommodation and/or services outlined in the letter of accommodation. For further information, please contact the Disability Services office at (210) 486-4466 or visit the office located in the Cyprus Campus Center, Rm. 204. If you have specific needs, please discuss them privately with your instructor.

GENERAL DESCRIPTION OF THE SUBJECT MATTER OF EACH LECTURE OR DISCUSSION:

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<th>Week</th>
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<tr>
<td>1</td>
<td>Introduction, Ch 1 Lecture and Lab: Ch 2: Reading and Labs</td>
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<tr>
<td>2</td>
<td>Ch. 2 Lecture &amp; labs Ch 3 Labs</td>
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<tr>
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