Course Syllabus ITCC 1404

COURSE DESCRIPTION:
This course describes the architecture, components, and operation of routers, and explains the principles of routing and routing protocols. Students analyze, configure, verify, and troubleshoot the primary routing protocols RIPv1, RIPv2, EIGRP, and OSPF. This course also describes how to recognize and correct common routing issues and problems, and how to model and analyze the routing processes.

PREREQUISITES, CO-REQUISITES and OTHER REQUIREMENTS:
ITCC 1401

TEXTBOOKS and REQUIRED MATERIALS/RECOMMENDED READINGS:
Cisco Online Curriculum at http://cisco.netacad.net

No Textbooks Required - Optional Books Below:
Routing Protocols and Concepts, CCNA Exploration Companion Guide
By Rick Graziani, Allan Johnson.


CCNA Exploration Course Booklet: Routing Protocols and Concepts, Version 4.0
By Cisco Networking Academy


Required reading: Chapter 1 through Chapter 11

COURSE CONTENT:
Chapter 1 Introduction to Routing and Packet Forwarding - In Chapter 1, you will be introduced to the router, its role in the networks, its main hardware and software components, and the packet forwarding process. You will also be given an overview of directly connected networks, static routing, and dynamic routing protocols, along with a brief introduction to the routing table. Each of these topics is discussed in more detail in later chapters. Chapter 1 also includes a review of basic Cisco IOS commands.
Chapter 2 Static Routing - Chapter 2 focuses on the role and configuration of static routes. The routing table process is introduced, and you will be shown how to verify route entries as they are added and deleted from the routing table. This chapter also discusses Cisco Discovery Protocol, which is a tool that you can use to help verify network operations.

Chapter 3 Introduction to Dynamic Routing Protocols – Chapter 3 provides an overview of routing protocol concepts and the various dynamic routing protocols available for routing in IP networks. In this chapter, you will examine the role of routing protocols. There is an overview of the classification of dynamic routing protocols. This overview is useful for comparing and contrasting the different protocols. Most of the information in this chapter is examined in more detail in later chapters.

Chapter 4 Distance Vector Routing Protocols – Chapter 4 presents two different types of routing protocols: distance vector and link-state. You will examine distance vector concepts and operations, including network discovery, routing table maintenance, and the issue of routing loops. In this chapter, you will also be introduced to the concepts used in RIPv1, RIPv2, and EIGRP routing protocols. These routing protocols are discussed in more detail in later chapters.

Chapter 5 RIP version 1 – Chapter 5 is the first chapter that focuses on a specific dynamic routing protocol. In this chapter, you will learn about RIP (Routing Information Protocol) version 1. RIPv1, a classful, distance vector routing protocol, was one of the first IP routing protocols. You will examine the characteristics, operations, and limitations of RIPv1. You will also learn about RIPv1 configuration, verification, and troubleshooting techniques.

Chapter 6 VLSM and CIDR - Chapter 6 reviews the VLSM (Variable Length Subnet Mask) and CIDR (Classless Inter-Domain Routing) concepts that were presented in the Network Fundamentals course. You will explore the benefits of VLSM along with the role and benefits of CIDR in today’s networks. Next, you will be introduced to the role of classless routing protocols. Classless routing protocols RIPv2, EIGRP, and OSPF are examined in later chapters.

Chapter 7 RIPv2 - Chapter 7 examines the next routing protocol presented in this course, RIPv2. RIPv2 is a classless, distance vector routing protocol. You will see how RIPv2 demonstrates the advantages and operations of a classless routing protocol. The chapter begins with a discussion of the limitations of the classful routing protocol, RIPv1. Then RIPv2 is introduced, to show how a classless routing protocol can be used to overcome these limitations. In this chapter, you will also learn the commands necessary to configure and verify RIPv2.

Chapter 8 The Routing Table: A Closer Look – Chapter 8 examines Cisco’s IPv4 routing table in detail. The chapter begins with a discussion of the structure of the routing table. While examining the routing table, you will learn about the lookup process, how the routing table process determines the best match with a packet’s destination IP address, and how to enter a route in the routing table. The chapter concludes with a discussion about the differences between classful and classless routing behaviors.

Chapter 9 EIGRP – Chapter 9 focuses on Cisco EIGRP (Enhanced Interior Gateway Routing Protocol). EIGRP is a classless, enhanced distance vector routing protocol. You will examine the advantages and operations of EIGRP’s DUAL (Diffusing Update Algorithm). Then you will learn about the configuration of EIGRP, including verification and troubleshooting commands.

Chapter 10 Link-State Routing Protocols – Chapter 10 examines link-state routing protocol concepts. You will be introduced to link-state terminology and the link-state routing process. The chapter discusses the benefits and
advantages of a link-state routing protocol compared to a distance vector routing protocol. You will then examine the Shortest Path First (SPF) algorithm and how it is used to build a topology map of the network. The link-state routing protocol OSPF is discussed in the following chapter.

Chapter 11 OSPF – The final chapter in this course is an examination of the classless, link-state routing protocol OSPF (Open Shortest Path First). In this chapter, you will examine OSPF operations and configuration, including verification and troubleshooting commands. By the end of this course, you should feel confident in your knowledge of routing and routing protocols. With continued study and practice, you will be able to put your new skills to work.

STUDENT LEARNING OUTCOMES:
Describe the purpose, nature, and operations of a router; describe the purpose and nature of routing tables; describe the purpose and procedure of configuring static routes; design and implement a classless IP addressing scheme for a given network; describe the basis features and concepts of link-state routing protocols; and configure and verify basic RIPv1, RIPv2, single area OSPF, and EIGRP operations in a small routed network.

PERFORMANCE OBJECTIVES:
Students who complete Routing Protocols and Concepts will be able to perform the following functions:

1. Describe the purpose, nature, and operations of a router
2. Explain the critical role routers play in enabling communications across multiple networks
3. Describe the purpose and nature of routing tables
4. Describe how a router determines a path and switches packets
5. Explain the route lookup process and determine the path packets will take in a network
6. Configure and verify basic operations for a newly-installed router
7. Describe the purpose of static routes and the procedure for configuring them
8. Configure and verify static and default routing
9. Describe the role of dynamic routing protocols and place these protocols in the context of modern network design
10. Describe how metrics are used by routing protocols and identify the metric types used by dynamic routing protocols
11. Identify the characteristics of distance vector routing protocols
12. Describe the network discovery process of distance vector routing protocols using Routing Information Protocol (RIP)
13. Describe the functions, characteristics, and operations of the RIPv1 protocol
14. Compare and contrast classful and classless IP addressing
15. Describe classful and classless routing behaviors in routed networks
16. Design and implement a classless IP addressing scheme for a given network
17. Describe the main features and operations of the Enhanced Interior Gateway Routing Protocol (EIGRP)
18. Use advanced configuration commands with routers implementing EIGRP and OSPF
19. Describe the basic features and concepts of link-state routing protocols
20. Describe the purpose, nature, and operations of the Open Shortest Path First (OSPF) Protocol
21. Configure and verify basic RIPv1, RIPv2, single area OSPF, and EIGRP operations in a small routed network
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 22%
Quizzes, Homework, etc 8%
Online Final Exam 20%
Skill-Based Final Exam 35%
Daily Grade & Labs 15%

100%

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<th>Semester Average</th>
<th>NVC Grade</th>
<th>Cisco Academy</th>
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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:

The Alamo Colleges do not discriminate on the basis of race, religion, color, national origin, sex, age, or disability with respect to access, employment programs, or services.
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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<tbody>
<tr>
<td>1</td>
<td>Introduction, Ch 1: Routing and Packet Forwarding, Ch 2: Static Routing, Ch 3: Dynamic Routing Protocols</td>
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<tr>
<td>2</td>
<td>Exam Ch 2, 3, Ch 4: Distance Vector Routing Protocols, Ch 5 RIP V1</td>
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<td>3</td>
<td>Exam Ch 4, Exam Ch 5, Ch 6: VLSM &amp; CIDR, Ch 7 RIP V2</td>
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<td>4</td>
<td>Exam Ch 6, Exam Ch 7, Ch 8: The Routing Table, Ch 9: EIGRP (Skills Test 1)</td>
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<td>Exam Ch 8, Exam Ch 9, Ch 10: Link State Routing Protocols, Ch 11: OSPF</td>
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<td>6</td>
<td>Ch 10: Link State Routing Protocols, Ch 11: OSPF</td>
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<td>7</td>
<td>Exam Ch 10, Exam Ch 11 Final Review, (Skills Test 2)</td>
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<td>8</td>
<td>Final Exam and Practical Retake if Necessary</td>
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