



# SALINE COUNTY CAREER CENTER

"Training students to pursue excellence in scholastics, work, and life."

## SYLLABUS

2009-2010 SCH YR.

**COURSE: CISCO NETWORKING**

**INSTRUCTOR: BILL MICHAEL**

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### COURSE DESCRIPTION:

The CCNA Discovery curriculum is composed of four courses over two years:

- Networking for Home and Small Businesses
- Working at a Small-to-Medium Business or ISP
- Introducing Routing and Switching in the Enterprise
- Designing and Supporting Computer Networks

CCNA Discovery teaches networking based on application covering the types of practical networks students may encounter, from simple home or small office networks to more complex enterprise models. Students learn the technical skills and soft skills needed to succeed in entry-level networking professions such as a network installer, help desk technician, pre-sales support technician, or network technician. CCNA Discovery also provides an introduction to advanced technologies such as voice, video, wireless, and security.

### PREREQUISITES:

Must be a sophomore, junior or senior.

The courses are delivered sequentially, and each course is a prerequisite for the next course.

### Other Expectations:

Students are expected to attend all classes, participate in class discussions, and complete all labs/assignments/activities. All exams are to be taken on the assigned date and time. Assignments are due at the start of class on the assigned date and time. If you must miss a class for any reason, you are responsible for making up the work and collecting any notes/assignments that you missed. "Makeup" exams and assignments will be accepted at the instructor's discretion and allowed only in extraordinary situations. On the first day that you return to class, it is your responsibility to check with the instructor.

### TEXTBOOK:

All Cisco textbooks are maintained online by the Cisco Network Academy.

Website: <http://www.cisco.com/web/learning/netacad/index.html>

### INSTRUCTIONAL/SUPPLEMENTARY SUPPLIES:

Notebook paper, pencil and pen.

### CLASS MEETING TIME:

6<sup>TH</sup> AND 7<sup>TH</sup> HOUR

### OBJECTIVES:

*Upon completion of this course the student will be able to:*

#### Networking for Home and Small Businesses

- Set up a personal computer system, including the operating system, interface cards, and peripheral devices.
- Plan and install a small network connecting to the Internet.
- Troubleshoot network and Internet connectivity.
- Share resources such as files and printers among multiple computers.

- Recognize and mitigate security threats to a home network.
- Configure an integrated wireless access point and wireless client.

**Working at a Small-to-Medium Business or ISP**

- Understand the structure of the Internet and how communication occurs between hosts.
- Install, configure, and troubleshoot Cisco IOS devices.
- Plan a basic wired infrastructure to support network traffic.
- Configure a server to share resources and provide common Web services.
- Implement basic WAN connectivity using Telco services.
- Demonstrate proper disaster-recovery procedures and perform server backups.

**Introducing Routing and Switching in the Enterprise**

- Implement a LAN for an approved network design.
- Configure a switch with VLANs and inter-switch communication.
- Implement access lists to permit or deny specific traffic.
- Implement WAN links.
- Configure routing protocols on Cisco devices.
- Perform LAN, WAN, and VLAN troubleshooting using a structured methodology and the OSI model.

**Designing and Supporting Computer Networks**

- Gather customer requirements
- Design a simple Internetwork using Cisco technology
- Design an IP addressing scheme to meet LAN requirements
- Create an equipment list to meet LAN design requirements
- Install and configure a prototype Internetwork
- Obtain and upgrade Cisco IOS software in Cisco devices

**METHODS OF INSTRUCTION:**

Students will be expected to meet all of the course goals and be able to demonstrate their understanding of the underlying concepts. The instruction includes a combination of discussion/lecture actives and laboratory/application-based activities. Students will be required to work independently in part of the course and in teams throughout the remaining part of the course. Assignments will require students to draw upon academic skills in various fields.

**METHODS OF EVALUATION:**

Students will be assessed using activity classroom participation, online chapter exams, reports, professionalism and pride in their work. And hands on networking lab work.

**GRADES** – Grades will be based on the percentage of total points earned out of total points possible for this semester. The assignments will vary in the number of possible points based upon amount of work involved and complexity of material.

**GRADING SCALE:**

A	95-100	C	73-76
A-	90-94	C-	70-72
B+	87-89	D+	67-69
B	83-86	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	59-0

Keep a record of your scores so you can calculate and always know your grade. If you are ever concerned about your progress or your grade, please talk to your instructor.

**UNITS OF INSTRUCTION:**

**Year One**

**Networking for Home and Small Businesses**

**Chapter 1. Personal Computer Hardware**

1.0 Chapter Introduction

- 1.1 Personal Computers and Applications
- 1.2 Types of Computers
- 1.3 Binary Representation of Data
  
- 1.4 Computer Components and Peripherals
- 1.5 Computer System Components
- 1.6 Chapter Summary

## **Chapter 2. Operating Systems**

- 2.0 Chapter Introduction
- 2.1 Choosing the Operating System
- 2.2 Installing the Operating System
- 2.3 Maintaining the Operating System
- 2.4 Chapter Summary

## **Chapter 3. Connecting to the Network**

- 3.0 Chapter Introduction
- 3.1 Introduction to Networking
- 3.2 Principals of Communication
- 3.3 Communicating on a Local Wired Network
- 3.4 Building the Access Layer of an Ethernet Network
- 3.5 Building the Distribution Layer of a Network
- 3.6 Plan and Connect a Local Network
- 3.7 Chapter Summary

## **Chapter 4. Connecting to the Internet Through an ISP**

- 4.0 Chapter Introduction
- 4.1 The Internet and How We Connect to It
- 4.2 Sending Information Across the Internet
- 4.3 Networking Devices in a NOC
- 4.4 Cables and Connectors
- 4.5 Working with Twisted-Pair Cabling
- 4.6 Chapter Summary

## **Chapter 5. Network Addressing**

- 5.0 Chapter Introduction
- 5.1 IP Addresses and Subnet Masks
- 5.2 Types of IP Addresses
- 5.3 How IP Addresses are Obtained
- 5.4 Address Management
- 5.5 Chapter Summary

## **Chapter 6. Network Services**

- 6.0 Chapter Introduction
- 6.1 Client/Servers and Their Interaction
- 6.2 Application Protocols and Services

6.3 Layered Model and Protocols

6.4 Chapter Summary

## **Chapter 7. Wireless Technologies**

7.0 Chapter Introduction

7.1 Wireless Technology

7.2 Wireless LANs

7.3 Security Considerations on a Wireless LAN

7.4 Configuring an Integrated AP and Wireless Client

7.5 Chapter Summary

## **Chapter 8. Basic Security**

8.0 Chapter Introduction

8.1 Networking Threats

8.2 Methods of Attack

8.3 Security Policy

8.4 Using Firewalls

8.5 Chapter Summary

## **Chapter 9. Troubleshooting Your Network**

9.0 Chapter Introduction

9.1 Troubleshooting Process

9.2 Troubleshooting Issues

9.3 Common Issues

9.4 Troubleshooting and the Help Desk

9.5 Chapter Summary

## **Chapter 10. Course Summary**

10.0 Putting It All Together

## **Working at a Small-to-Medium Business or ISP**

### **Chapter 1. The Internet and Its Uses**

1.0 Chapter Introduction

1.1 What is the Internet?

1.2 Internet Service Providers

1.3 ISP Connectivity

1.4 Chapter Summary

### **Chapter 2. Help Desk**

2.0 Chapter Introduction

2.1 Help Desk Technicians

2.2 OSI Model

2.3 ISP Troubleshooting

2.4 Chapter Summary

## **Chapter 3. Planning a Network Upgrade**

- 3.0 Chapter Introduction
- 3.1 Common Issues
- 3.2 Planning the Network Upgrade
- 3.3 Purchasing and Maintaining Equipment
- 3.4 Chapter Summary

## **Chapter 4. Planning the Addressing Structure**

- 4.0 Chapter Introduction
- 4.1 IP Addressing in the LAN
- 4.2 NAT and PAT
- 4.3 Chapter Summary

## **Chapter 5. Configuring Network Devices**

- 5.0 Chapter Introduction
- 5.1 Initial ISR Router Configuration
- 5.2 Configuring an ISR with SDM
- 5.3 Configuring a Router Using IOS CLI
- 5.4 Connecting the CPE to the ISP
- 5.5 Expanding LAN Switching Connectivity
- 5.6 Chapter Summary

## **Chapter 6. Routing**

- 6.0 Chapter Introduction
- 6.1 Enabling Routing Protocols
- 6.2 Exterior Routing Protocols
- 6.3 Chapter Summary

## **Chapter 7. ISP Services**

- 7.0 Chapter Introduction
- 7.1 Introducing ISP Services
- 7.2 Protocols That Support ISP Services
- 7.3 Domain Name Service
- 7.4 Services and Protocols
- 7.5 Chapter Summary

## **Chapter 8. ISP Responsibility**

- 8.0 Chapter Introduction
- 8.1 ISP Security Considerations
- 8.2 Security Tools
- 8.3 Monitoring and Managing the ISP
- 8.4 Backups and Disaster Recovery
- 8.5 Chapter Summary

## **Chapter 9. Preparing for Certification**

- 9.0 What Does a Cisco Certification Measure?
- 9.1 Ways to Prepare
- 9.2 Identifying and Correcting Layer 1 Issues
- 9.3 Identifying and Correcting Layer 2 Issues
- 9.4 Identifying and Correcting Layer 3 IP Addressing Issues
- 9.5 Identifying and Correcting Layer 3 IP Routing Issues
- 9.6 Common Upper Layer Connectivity Issues
- 9.7 Chapter Summary

## **Chapter 10. Course Summary**

- 10.0 Putting It All Together

## **Year Two**

### **Introducing Routing and Switching in the Enterprise v4.0**

#### **Chapter 1. Networking in the Enterprise**

- 1.0 Chapter Introduction
- 1.1 Describing the Enterprise Network
- 1.2 Identifying Enterprise Applications
- 1.3 Supporting Remote Workers
- 1.4 Chapter Summary

#### **Chapter 2. Exploring the Enterprise Network Infrastructure**

- 2.0 Chapter Introduction
- 2.1 Describing the Current Network
- 2.2 Supporting the Enterprise Edge
- 2.3 Reviewing Routing and Switching
- 2.4 Chapter Summary

#### **Chapter 3. Switching in an Enterprise Network**

- 3.0 Chapter Introduction
- 3.1 Describing Enterprise Level Switching
- 3.2 Preventing Switching Loops
- 3.3 Configuring VLANs
- 3.4 Trunking and Inter-VLAN Routing
- 3.5 Maintaining VLANs on an Enterprise Network
- 3.6 Chapter Summary

#### **Chapter 4. Addressing in an Enterprise Network**

- 4.0 Chapter Introduction
- 4.1 Using a Hierarchical IP Network Address Scheme
- 4.2 Using VLSM
- 4.3 Using Classless Routing and CIDR
- 4.4 Using NAT and PAT
- 4.5 Chapter Summary

## **Chapter 5. Routing with a Distance Vector Protocol**

- 5.0 Chapter Introduction
- 5.1 Managing Enterprise Networks
- 5.2 Routing Using the RIP Protocol
- 5.3 Routing Using the EIGRP Protocol
- 5.4 Implementing EIGRP
- 5.5 Chapter Summary

## **Chapter 6. Routing with a Link-State Protocol**

- 6.0 Chapter Introduction
- 6.1 Routing Using the OSPF Protocol
- 6.2 Implementing Single-Area OSPF
- 6.3 Using Multiple Routing Protocols
- 6.4 Chapter Summary

## **Chapter 7. Implementing Enterprise WAN Links**

- 7.0 Chapter Introduction
- 7.1 Connecting the Enterprise WAN
- 7.2 Comparing Common WAN Encapsulations
- 7.3 Using Frame Relay
- 7.4 Chapter Summary

## **Chapter 8. Filtering Traffic Using Access Control Lists**

- 8.0 Chapter Introduction
- 8.1 Using Access Control Lists
- 8.2 Using a Wildcard Mask
- 8.3 Configuring Access Control Lists
- 8.4 Permitting and Denying Specific Types of Traffic
- 8.5 Filtering Traffic Using Access Control Lists
- 8.6 Chapter Summary

## **Chapter 9. Troubleshooting an Enterprise Network**

- 9.0 Chapter Introduction
- 9.1 Understanding the Impact of Network Failure
- 9.2 Troubleshooting Switching and Connectivity Issues
- 9.3 Troubleshooting Routing Issues
- 9.4 Troubleshooting WAN Configurations
- 9.5 Troubleshooting ACL Issues
- 9.6 Chapter Summary

## **Chapter 10. Course Summary**

- 10.0 Putting It All Together

## **Designing and Supporting Computer Networks v4.0**

### **Chapter 1. Introducing Network Design Concepts**

- 1.0 Chapter Introduction
- 1.1 Discovering Network Design Basics
- 1.2 Investigating Core Layer Design Considerations
- 1.3 Investigating Distribution Layer Considerations
- 1.4 Investigating Access Layer Design Considerations
- 1.5 Investigating Server Farms and Security
- 1.6 Investigating Wireless Network Considerations
- 1.7 Supporting WANs and Remote Workers
- 1.8 Chapter Summary

## **Chapter 2. Gathering Network Requirements**

- 2.0 Chapter Introduction
- 2.1 Introducing Cisco Lifecycle Services
- 2.2 Explaining the Sales Process
- 2.3 Preparing for the Design Process
- 2.4 Identifying Technical Requirements and Constraints
- 2.5 Identifying Manageability Design Considerations
- 2.6 Chapter Summary

## **Chapter 3. Characterizing the Existing Network**

- 3.0 Chapter Introduction
- 3.1 Documenting the Existing Network
- 3.2 Updating the Existing Cisco IOS
- 3.3 Upgrading Existing Hardware
- 3.4 Performing a Wireless Site Survey
- 3.5 Documenting Network Design Requirements
- 3.6 Chapter Summary

## **Chapter 4. Identifying Application Impacts on Network Design**

- 4.0 Chapter Introduction
- 4.1 Characterizing Network Applications
- 4.2 Explaining Common Network Applications
- 4.3 Introducing Quality of Service (QoS)
- 4.4 Examining Voice and Video Options
- 4.5 Documenting Applications and Traffic Flows
- 4.6 Chapter Summary

## **Chapter 5. Creating the Network Design**

- 5.0 Chapter Introduction
- 5.1 Analyzing the Requirements
- 5.2 Selecting the Appropriate LAN Topology
- 5.3 Designing the WAN and Remote Worker Support
- 5.4 Designing Wireless Networks
- 5.5 Incorporating Security
- 5.6 Chapter Summary

## **Chapter 6. Using IP Addressing in the Network Design**

- 6.0 Chapter Introduction
- 6.1 Creating an Appropriate IP Addressing Design
- 6.2 Creating the IP Address and Naming Scheme
- 6.3 Describing IPv4 and IPv6
- 6.4 Chapter Summary

## **Chapter 7. Prototyping the Campus Network**

- 7.0 Chapter Introduction
- 7.1 Building a Prototype to Validate a Design
- 7.2 Prototyping the LAN
- 7.3 Prototyping the Server Farm
- 7.4 Chapter Summary

## **Chapter 8. Prototyping the WAN**

- 8.0 Chapter Introduction
- 8.1 Prototyping Remote Connectivity
- 8.2 Prototyping WAN Connectivity
- 8.3 Prototyping Remote Worker Support
- 8.4 Chapter Summary

## **Chapter 9. Preparing the Proposal**

- 9.0 Chapter Introduction
- 9.1 Assembling the Existing Proposal Information
- 9.2 Developing the Implementation Plan
- 9.3 Planning for the Installation
- 9.4 Creating and Presenting the Proposal
- 9.5 Chapter Summary

## **Chapter 10. Course Summary**

- 10.0 Putting It All Together

### **ATTENDANCE:**

It is important to attend class each day. Lectures and class activities extend your understanding and the application of your new skills and knowledge. If you must miss a class meeting, you are responsible for any missed assignments or handouts.

### **ACADEMIC HONESTY:**

You are encouraged to assist each other and exchange information in order to master the concepts and skills covered in this class and to seek tutoring if necessary. However, collaboration on any graded assignment or exam to the extent that it is not an individual student's total, personal effort will be considered as a violation of the Student Conduct Code as printed in the Student Handbook.

When an academic exercise is designed to result in a grade, any of the following activities constitute violations of academic honesty unless expressly authorized in advance by the instructor.

1. Cheating includes the intentional giving, receiving, or use (or attempts thereof) of any assistance, including notes, copying, or prior knowledge of examination materials.
2. Plagiarism includes intentionally or knowingly representing the words, ideas, or images of another as one's own in any academic exercise.

3. Fabrication includes the intentional falsification or invention of any information.
4. Collusion includes any secret agreement among students who participate in any academically dishonest activity.

### **CLASSROOM ETIQUETTE—YOUR INSTRUCTOR’S EXPECTATIONS\***

Please arrive at class on time or before the starting time. Please attend all classes unless there is good reason to miss. If you must miss class, please inform your instructor ahead of time, by phone, by e-mail, or in person.

Please come to class prepared for the work to be done and in a positive frame of mind so that you are ready to learn. Please complete readings and other assignments on time. Please bring all necessary course materials such as paper, pencil, required books, handouts, and notes.

Please try to be pleasant and positive in your classroom behavior. Show respect for all class members. Address legitimate grievances appropriately, preferably outside of normal class time. If you have a problem with your instructor, please try to solve the problem with him or her before appealing to a higher authority.

When responding to classroom questions, please do not interrupt a fellow student or the instructor. Take your turn. When you respond to another student’s comment, please try to acknowledge the other’s position. When responding, please try your best to call other class members by name.

Your student handbook will define the rules for cell phone usage.

Please treat the furniture and equipment in the classrooms and computer labs as if they were your own. Throw any trash away on your way out.

Please remember that for the protection of our facilities and equipment, food and drinks are not allowed in the classrooms or labs. Under no condition is smoking or other tobacco use acceptable in the classroom.

Leave classrooms and labs as you find them, turning off equipment as necessary and pushing in chairs. Before leaving your computer, please log off the network. Also reset the printer so that the paper is wound back out of the platen and not left in the “tear off” position. If you have moved any equipment (keyboard, mouse, etc.), please put it back in its proper place before leaving the classroom. Also, please dispose of all discarded printer paper and torn-off perforated edges.

Most classes begin on time and end on time. If you need to know about schedule or assignment changes, please ask about them at the beginning of class. If you have a real need to leave early, please inform your instructor and leave quietly.

You will do better if you are interested in the class, and the best way to be interested is to get involved. Talk to your friends about the material, and look for current applications or examples about the course issues in newspapers or popular magazines and on the Web. If you can make connections between yourself and the course materials, you will be a happier and a better student.

Most of all, keep in touch with the class syllabus, the instructor, and your classmates. You will do better when you feel you are a real part of the class.

**\*Source:** Instructor’s Guide, *Business Communication, Process and Product*, M. E. Guffey