



NIACC

Course Syllabus

NET-213

CISCO Networking

Credit Hours: 4

Prerequisites: COMP110 / permission

Website: <http://www.niaccist.niacc.edu/>

Instructors Information

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Course Description

Networking Basics is the first of the four courses leading to the Cisco Certified Network Associate (CCNA) designation. Networking I (CCNA 1) introduces Cisco Networking Academy Program students to the networking field. The course focuses on network terminology and protocols, local-area networks (LANs), wide-area networks (WANs), Open System Interconnection (OSI) models, cabling, cabling tools, routers, router programming, Ethernet, Internet Protocol (IP) addressing, and network standards. In addition, instruction and training are provided in the proper care, maintenance, and use of networking software, tools, and equipment and all local, state, and federal safety, building, and environmental codes and regulations.

Course Materials (Text optional)

Text (optional):

CCNA Guide to Cisco Networking, Third Edition

Authors: Kurt Hudson, Kelly Cannon, Kelly Caudle

ISBN: 0-619-21346-9 © 2003 Pub date: 8/2/2002

Other: 3 ring binder, dividers, and paper for Engineering Journal

Evaluation Procedures

Grade Breakdown	Approx. points	Minimum required	Grading Scale
Assessment Lessons (15)	75	70% average	A 93% - 100%
Midterm & Skills Based Assessment (SBA)	100	70%	A - 90% - 92%
Assessment Final	100		B+ 87% - 89%
Final SBA **	25	Pass / Fail	B 83% - 86%
Case Study Project	50		B- 80% - 82%
Lab Activities	75		C+ 77% - 79%
Engineering Journal	25		C 73% - 76%
Other	50		C- 70% - 72%
			D+ 67% - 69%
			D 63% - 66%
			D - 60% - 62%
			F 59 & Below

Above policies can be adjusted upon individual instructor's discretion. Everything above affects your grade in the class

*** Highest possible score on Skill-Based Assessment retake is 70%.*

Case Study (CS) Project

The Structured Cabling Supplement for CCNA provides curriculum and laboratory exercises in seven areas:

- Structured Cabling Systems
- Structured Cabling Standards and Codes
- Safety
- Tools of the Trade
- Installation Process
- Finish Phase
- The Cabling Business

This material and the associated labs provide a broad introduction to structured cabling installation. This allows the student to complete the Case Study Project at the end of the term. Specifics on the project are in supplement materials. These materials are handed out separately.

Skills-Based Assessment

The overall goal of this skills-based assessment is for the student to connect two PCs to create a small LAN using Ethernet and have the PCs communicate using IP. The student must demonstrate the ability to properly terminate a straight-through Ethernet patch cable and connect two PCs through a hub or switch. In addition, they must be able to create a subnet scheme and configure IP settings in order for the PCs to communicate. The exam consists of three parts:

1. Build and test a patch cable (done in class)
2. Calculate subnets
3. Cable and configure workstations

All three parts must be completed for a possible total of 50 points. This exam will occur in stages. In each stage student's will be asked to carry out a simple set of instructions. The proctor(s) will score the students on their ability to COMPLETE each task.

Engineering Journal

Each student must maintain a journal. It must be a 3 ring binder with tabs indicating the main points shown below. It will be a combination of hand written information and some typed information. No printed materials from the Cisco curriculum.

Identification

- Title, dates, name, personal identification information, table of contents, evaluations, course information, and professional statement (signed).

Procedures

- Access Curriculum, both sites, how to take Assessments and view assessment results
- Conversions (binary, decimal, hexadecimal)
- Cabling and pin layouts
- Configure workstation to connect to a network
 - Static addressing
 - DHCP
 - Wireless
- Network Testing; commands, layers, etc.
- Use of network analysis software
- IP addressing and subnets
- Basic troubleshooting steps

Notes

- Curriculum materials
- Reviews
- Questions missed on exams and topic it covered

Lab Log

- Date and participants recorded on the lab handout or in journal if no handout provided.
- Fill out lab handout in your journal.
- Fill in IST log book information for each lab.
- Mark your lab handout that the logbook has been filled in per lab.

Case Study and Project Materials

- Case study resource materials
- Project handout
- Project working papers (individuals)
- Final Project documentation

The journal will be evaluated based on the following:

- Chronological or topical order - maintain consistency in organization - tabs to identify sections
- Efficiency - well labeled and easy to use - can be used to solve a problem.
- Contains the 5 main points above
- Neat and Professional

These items will be evaluated on a scale of 1 to 5 as listed below:

1. very little signs of item covered
2. some requirements present but not fulfilled
3. requirements minimally fulfilled
4. good job of fulfilling the requirements
5. excellent work done with all requirements fulfilled

Evaluations will be a self-review, peer review, instructor review, and/or in-class quiz/project(s) in which you will use your journal.

Cabling

- Passes cable test
- Jacket (shielding) has to be in the connector and compressed
- Ability to see all the coloring on the end
- Follows standards (right sequence)

Portfolio

Your portfolio is an accumulation of key pieces of work that you have done related to technology along with any other areas of expertise. It will also contain a current resume and your Case Study Project with documentation stating what you learned from doing the project. It may also contain important parts of your networking journals. This information will be stored in an electronic form that is easy to navigate and use. It will be accessible from the web. The portfolio may be evaluated by your instructor at the end of the term and also must be presented to an advisory committee for comment following conclusion for your degree program.

Classroom Policies and Procedures

If you have any concerns or disabilities that affect your ability to learn, be sure to notify the instructor!

Refer to the NIACC Information Technology Professionalism statement for general classroom policies and procedures. This can be located at <http://web.niaccist.niacc.edu/~niaccit/it-professionalism.pdf>. Check with your instructor for further information.

Course Objectives:

The CCNA certification indicates knowledge of networking for the small-office, home-office (SOHO) market and the ability to work in small businesses or organizations whose networks have fewer than 100 nodes. A CCNA certified individual can:

- Install and configure Cisco switches and routers in multiprotocol internetworks using LAN and WAN interfaces
- Provide Level 1 troubleshooting service
- Improve network performance and security
- Perform entry-level tasks in the planning, design, installation, operation and troubleshooting of Ethernet, TCP/IP Networks.

Upon completion of this course, you will be able to perform tasks related to:

- Connecting to the Internet
- Network Math
- Networking Terminology
- Bandwidth
- Networking Models
- Copper Media
- Optical Media
- Wireless Media
- Frequency-Based Cable Testing (Core)
- Signals and Noise
- Cabling LANs
- Cabling WANs
- Ethernet Fundamentals
- Ethernet Operation
- 10-Mbps and 100-Mbps Ethernet
- Gigabit and 10-Gigabit Ethernet
- Ethernet Switching
- Collision Domains and Broadcast Domains
- Introduction to TCP/IP
- Internet Addresses
- Obtaining an IP address
- Routed Protocol
- IP Routing Protocols
- The Mechanics of Subnetting
- TCP/IP Transport Layer
- The Application Layer

Expected Outcomes:

CCNA 1 is an integral step towards achieving CCNA Certification.

Upon completion of this course, students will be able to perform tasks related to:

- Networking Mathematics, Terminology, and Models
- Networking Media: copper, optical, and wireless
- Cable testing and cabling LANs and WANs
- Ethernet Operation and 10/100/1000/10 G versions of Ethernet
- Ethernet Switching
- IP Addressing, Subnetting
- TCP/IP Protocols: IP, TCP and UDP, Application Layer Protocols

Prerequisites

The successful completion of this course, requires the following:

- . Reading Age Level (RAL) of 13
- . Basic computer literacy and awareness of the Internet

The following skills are beneficial, but not required:

- . Prior experience with computer hardware, binary math, and basic electronics
- . Background in cabling

Course Description

CCNA 1: Networking Basics is the first of four courses leading to the Cisco Certified Network Associate (CCNA) designation. CCNA 1 introduces Cisco Networking Academy Program students to the networking field. The course focuses on the following:

- . Network terminology
- . Network protocols
- . Local-area networks (LANs)
- . Wide-area networks (WANs)
- . Open System Interconnection (OSI) model
- . Cabling
- . Cabling tools
- . Routers
- . Router programming
- . Ethernet
- . Internet Protocol (IP) addressing
- . Network standards

In addition, the course provides instruction and training in the proper care, maintenance, and use of networking software, tools, and equipment

Course Overview

The course has been designed for 70 contact hours. Approximately 35 hours will be designated to lab activities and 35 hours will be spent on curriculum content. A case study on structured cabling is required, but format and timing will be determined by the Local Academy.

Course Outline

Module 1. Introduction to Networking

1.1 Your Connection to the Internet

- 1.1.1 Requirements for Internet connection
- 1.1.2 PC basics
- 1.1.3 Network interface card
- 1.1.4 NIC and modem installation
- 1.1.5 Overview of high-speed and dialup connectivity
- 1.1.6 TCP/IP description and configuration
- 1.1.7 Testing connectivity with ping
- 1.1.8 Web browser and plug-ins
- 1.1.9 Troubleshooting Internet connection problems

1.2 Networking Math

- 1.2.1 Binary presentation of data
- 1.2.2 Bits and bytes
- 1.2.3 Base 10 number system
- 1.2.4 Base 2 number system
- 1.2.5 Converting decimal numbers to 8-bit binary numbers
- 1.2.6 Converting 8-bit binary numbers to decimal numbers
- 1.2.7 Four-octet dotted decimal representation of 32-bit binary numbers
- 1.2.8 Hexadecimal
- 1.2.9 Boolean or binary logic
- 1.2.10 IP addresses and network masks
- Summary

Module 2. Networking Fundamentals

2.1 Networking Terminology

- 2.1.1 Data networks
- 2.1.2 Network history
- 2.1.3 Networking devices
- 2.1.4 Network topology.
- 2.1.5 Network protocols
- 2.1.6 Local-area networks (LANs)
- 2.1.7 Wide-area networks (WANs)
- 2.1.8 Metropolitan-area networks (MANs)
- 2.1.9 Storage-area networks (SANs)
- 2.1.10 Virtual private network (VPN)
- 2.1.11 Benefits of VPNs
- 2.1.12 Intranets and extranets

2.2 Bandwidth

- 2.2.1 Importance of bandwidth
- 2.2.2 Analogies
- 2.2.3 Measurement
- 2.2.4 Limitations
- 2.2.5 Throughput
- 2.2.6 Data transfer calculation
- 2.2.7 Digital versus analog
- 2.3 Networking Models
- 2.3.1 Using layers to analyze problems in a flow of materials
- 2.3.2 Using layers to describe data communication
- 2.3.3 OSI model
- 2.3.4 OSI layers
- 2.3.5 Peer-to-peer communications
- 2.3.6 TCP/IP model
- 2.3.7 Detailed encapsulation process
- Summary

Module 3. Networking Media

3.1 Copper Media

- 3.1.1 Atoms and electrons
- 3.1.2 Voltage
- 3.1.3 Resistance and impedance
- 3.1.4 Current
- 3.1.5 Circuits
- 3.1.6 Cable specification and termination.
- 3.1.7 Coaxial cable
- 3.1.8 STP cable
- 3.1.9 UTP cable

3.2 Optical Media

- 3.2.1 The electromagnetic spectrum
- 3.2.2 Ray model of light
- 3.2.3 Reflection
- 3.2.4 Refraction
- 3.2.5 Total internal reflection
- 3.2.6 Multimode fiber
- 3.2.7 Single-mode fiber
- 3.2.8 Other optical components
- 3.2.9 Signals and noise in optical fibers
- 3.2.10 Installation, care, and testing of optical fiber

3.3 Wireless Media

- 3.3.1 Wireless LAN organizations and standards
- 3.3.2 Wireless devices and topologies
- 3.3.3 How wireless LANs communicate
- 3.3.4 Authentication and association
- 3.3.5 The radio wave and microwave spectrums
- 3.3.6 Signals and noise on a WLAN
- 3.3.7 Wireless security
- Summary

Module 4. Cable Testing

4.1 Background for Studying Frequency-Based Cable Testing

- 4.1.1 Waves
- 4.1.2 Sine waves and square waves
- 4.1.3 Exponents and logarithms
- 4.1.4 Decibels
- 4.1.5 Time and frequency signals
- 4.1.6 Analog and digital signals in time and frequency
- 4.1.7 Noise in time and frequency
- 4.1.8 Bandwidth

4.2 Signals and Noise

- 4.2.1 Signaling over copper and fiber optic cabling
- 4.2.2 Attenuation and insertion loss on copper media
- 4.2.3 Sources of noise on copper media
- 4.2.4 Types of crosstalk
- 4.2.5 Cable testing standards
- 4.2.6 Other test parameters
- 4.2.7 Time-based parameters
- 4.2.8 Testing optical fiber
- 4.2.9 A new standard
- Summary

Module 5. Cabling LANs and WANs

5.1 Cabling the LAN

- 5.1.1 LAN physical layer
- 5.1.2 Ethernet in the campus
- 5.1.3 Ethernet media and connector requirements
- 5.1.4 Connection media
- 5.1.5 UTP implementation
- 5.1.6 Repeaters
- 5.1.7 Hubs
- 5.1.8 Wireless
- 5.1.9 Bridges
- 5.1.10 Switches
- 5.1.11 Host connectivity
- 5.1.12 Peer-to-peer
- 5.1.13 Client-server

5.2 Cabling the WANs

- 5.2.1 WAN physical layer
- 5.2.2 WAN serial connections
- 5.2.3 Routers and serial connections
- 5.2.4 Routers and ISDN BRI connections
- 5.2.5 Routers and DSL connections
- 5.2.6 Routers and cable connections
- 5.2.7 Setting up console connections
- Summary

Module 6. Ethernet Fundamentals

6.1 Ethernet Fundamentals

- 6.1.1 Introduction to Ethernet
- 6.1.2 IEEE Ethernet naming rules
- 6.1.3 Ethernet and the OSI model
- 6.1.4 Naming
- 6.1.5 Layer 2 framing
- 6.1.6 Ethernet frame structure
- 6.1.7 Ethernet frame fields

6.2 Ethernet Operation

- 6.2.1 MAC
- 6.2.2 MAC rules and collision detection/backoff
- 6.2.3 Ethernet timing
- 6.2.4 Interframe spacing and backoff
- 6.2.5 Error handling
- 6.2.6 Types of collisions
- 6.2.7 Ethernet errors
- 6.2.8 FCS and beyond
- 6.2.9 Ethernet auto-negotiation
- 6.2.10 Link establishment and full/half duplex
- Summary

Module 7. Ethernet Technologies

7.1 10 Mbps and 100 Mbps Ethernet

- 7.1.1 10 Mbps Ethernet
- 7.1.2 10BASE5
- 7.1.3 10BASE2
- 7.1.4 10BASE-T
- 7.1.5 10BASE-T wiring and architecture
- 7.1.6 100-Mbps Ethernet
- 7.1.7 100BASE-TX
- 7.1.8 100BASE-FX
- 7.1.9 Fast Ethernet architecture

7.2 Gigabit and 10-Gigabit Ethernet

- 7.2.1 1000-Mbps Ethernet
- 7.2.2 1000BASE-T
- 7.2.3 1000BASE-SX and LX
- 7.2.4 Gigabit Ethernet architecture
- 7.2.5 10-Gigabit Ethernet
- 7.2.6 10-Gigabit Ethernet architectures
- 7.2.7 Future of Ethernet
- Summary

Module 8. Ethernet Switching

8.1 Ethernet Switching

- 8.1.1 Layer 2 bridging
- 8.1.2 Layer 2 switching
- 8.1.3 Switch operation
- 8.1.4 Latency
- 8.1.5 Switch modes
- 8.1.6 Spanning-Tree protocol

8.2 Collision Domains and Broadcast Domains

- 8.2.1 Shared media environments
- 8.2.2 Collision domains
- 8.2.3 Segmentation
- 8.2.4 Layer 2 broadcasts
- 8.2.5 Broadcast domains
- 8.2.6 Introduction to data flow
- 8.2.7 What is a network segment?
- Summary

Module 9. TCP/IP Protocol Suite and IP Addressing

9.1 Introduction to TCP/IP

- 9.1.1 History and future of TCP/IP
- 9.1.2 Application layer
- 9.1.3 Transport layer
- 9.1.4 Internet layer
- 9.1.5 Network access layer
- 9.1.6 The OSI model and the TCP/IP model
- 9.1.7 Internet architecture

9.2 Internet Addresses

- 9.2.1 IP addressing
- 9.2.2 Decimal and binary conversion
- 9.2.3 IPv4 addressing
- 9.2.4 Class A, B, C, D, and E IP addresses
- 9.2.5 Reserved IP addresses
- 9.2.6 Public and private IP addresses
- 9.2.7 Introduction to subnetting
- 9.2.8 IPv4 versus IPv6

9.3 Obtaining an IP Address

- 9.3.1 Obtaining an Internet address
- 9.3.2 Static assignment of an IP address
- 9.3.3 RARP IP address assignment
- 9.3.4 BOOTP IP address assignment
- 9.3.5 DHCP IP address management
- 9.3.6 Problems in address resolution
- 9.3.7 Address Resolution Protocol (ARP)
- Summary

Module 10. Routing Fundamentals and Subnets

10.1 Routed Protocol

- 10.1.1 Routable and routed protocols
- 10.1.2 IP as a routed protocol
- 10.1.3 Packet propagation and switching with a router
- 10.1.4 Connectionless and connection-oriented delivery
- 10.1.5 Anatomy of an IP packet

10.2 IP Routing Protocols

- 10.2.1 Routing overview
- 10.2.2 Routing versus switching
- 10.2.3 Routed versus routing
- 10.2.4 Path determination
- 10.2.5 Routing tables
- 10.2.6 Routing algorithms and metrics
- 10.2.7 IGP and EGP
- 10.2.8 Link state and distance vector
- 10.2.9 Routing protocols

10.3 The Mechanics of Subnetting

- 10.3.1 Classes of network IP addresses
- 10.3.2 Introduction to and reason for subnetting
- 10.3.3 Establishing the subnet mask address
- 10.3.4 Applying the subnet mask
- 10.3.5 Subnetting Class A and B networks
- 10.3.6 Calculating the resident subnetwork through ANDing
- Summary

Module 11. TCP/IP Transport and Application Layer

11.1 TCP/IP Transport Layer

- 11.1.1 Introduction to transport layer
- 11.1.2 Flow control
- 11.1.3 Session establishment, maintenance, and termination overview
- 11.1.4 Three-way handshake
- 11.1.5 Windowing
- 11.1.6 Acknowledgement
- 11.1.7 TCP
- 11.1.8 UDP
- 11.1.9 TCP and UDP port numbers

11.2 The Application Layer

- 11.2.1 Introduction to the TCP/IP application layer
- 11.2.2 DNS
- 11.2.3 FTP and TFTP
- 11.2.4 HTTP
- 11.2.5 SMTP
- 11.2.6 SNMP
- 11.2.7 Telnet
- Summary

Case Study: Structured Cabling

Module 1-11Labs (not all labs required, separate handout lists labs required)

Module 1: Introduction to Networking

1.1.2 Lab Exercise: PC Hardware

This lab introduces the basic peripheral components of a PC computer system and PC connections including network attachment.

1.1.6 Lab Exercise: PC Network TCP/IP Configuration

In this lab, the student will identify tools used to discover a computer network configuration with various operating systems.

1.1.7 Lab Exercise: Using ping and tracert from a Workstation

In this lab, the student will learn to use the ping command and the Traceroute (tracert) command from a workstation.

1.1.8 Lab Exercise: Web Browser Basics

In this lab, the student will learn how to use a web browser to access Internet sites and become familiar with the concept of a URL.

1.1.9 Lab Exercise: Basic PC/Network Troubleshooting Process

In this lab, the student will learn the proper sequence for troubleshooting computer and network problems and become familiar with the more common hardware and software problems.

1.2.5 Lab Exercise: Decimal to Binary Conversion

In this lab, the student will learn and practice to convert decimal values to binary values.

1.2.6 Lab Exercise: Binary to Decimal Conversion

In this lab, the student will learn and practice the process of converting binary values to decimal values.

1.2.8 Lab Exercise: Hexadecimal Conversions

In this lab, the student will learn the process to convert hexadecimal values to decimal and binary values.

Module 2: Networking Fundamentals

2.3.6 Lab Exercise: OSI Model and TCP/IP Model

In this lab, the student will learn the four layers of the TCP/IP model and the seven layers of the OSI model to the four layers of the TCP/IP model.

2.3.7 Lab Exercise: OSI Model Characteristics and Devices

In this lab, the student will learn the seven layers of the OSI model and the characteristics, functions and keywords relating to each layer.

Module 3: Networking Media

3.1.1 Lab Exercise: Safe Handling and Use of a Multimeter

In this lab, the student will learn how to use and handle a multimeter correctly.

3.1.2 Lab Exercise: Voltage Measurement

This lab will demonstrate the ability to measure voltage with the multimeter safely.

3.1.3 Lab Exercise: Resistance Measurement

This lab will demonstrate the ability to measure resistance and continuity with the multimeter.

3.1.5 Lab Exercise: Series Circuits

In this lab, the student will build and explore the basic properties of series circuits.

3.1.9 Lab Exercise: Communications Circuits

In this lab, the student will design, build, and test a simple communication system.

3.1.9 Lab Exercise: Fluke 620 Basic Cable Testing

In this lab, the student will use a simple cable tester to verify whether a straight-through or crossover cable is good or bad.

3.1.9 Lab Exercise: Straight-Through Cable Construction

In this lab, students will build a Category 5 or Category 5e UTP Ethernet network patch cable or patch cord and test the cable.

3.1.9 Lab Exercise: Rollover Cable Construction

In this lab, the student will build a Category 5 or Category 5e UTP console rollover cable and test the cable for continuity and correct pin-outs, the correct color of wire on the right pin.

3.1.9 Lab Exercise: Crossover Cable Construction

In this lab, students will build a Category 5 or Category 5e UTP Ethernet network crossover cable and test the cable.

3.1.9 Lab Exercise: UTP Cable Purchase

This lab will introduce the variety and prices of network cabling and components in the market. The student will gather pricing information for UTP patch cables and bulk cable.

3.2.8 Lab Exercise: Fiber-Optic Cable Purchase

This lab will introduce the variety and prices of network cabling and components in the market. The student will gather pricing information for fiber patch cables and fiber bulk cable.

Module 4: Cable Testing

4.2.9 Lab Exercise: Fluke 620 Cable Tester – Wire Map

In this lab, the student will learn the wire mapping feature of the Fluke 620 LAN CableMeter or its equivalent.

4.2.9 This is the instructor version of the Lab Exercise: Fluke 620 Cable Tester – Wire Map

4.2.9 Lab Exercise: Fluke 620 Cable Tester – Faults

In this lab, the student will learn the Cable Test-Pass/Fail features of the Fluke 620 LAN CableMeter or an equivalent tester.

4.2.9 This lab exercise is optional. Lab Exercise: Fluke 620 Cable Tester – Length

In this lab, the student will learn the Cable Length feature of the Fluke 620 LAN CableMeter or its equivalent.

4.2.9 Lab Exercise: Fluke LinkRunner – LAN Tests

In this lab, the student will become familiar with the capabilities of the Fluke LinkRunner and determine whether a cable drop is active.

4.2.9 Lab Exercise: Fluke LinkRunner – Cable and NIC Tests

In this lab, the student will become familiar with the capabilities of the Fluke LinkRunner and verify cable length and integrity.

Module 5: Cabling LANs and WANs

5.1.5 Lab Exercise: RJ-45 Jack Punch Down

This lab is to learn the correct process for terminating or punching down an RJ-45 jack and to learn the correct procedure for installing the jack in a wall plate.

5.1.7 Lab Exercise: Hub and NIC Purchase

This lab is to introduce the variety and prices of network components in the market.

5.1.10 Lab Exercise: Purchasing LAN Switches

This lab is to introduce the variety and prices of network components in the market.

5.1.12 Lab Exercise: Building a Peer-to-Peer Network

This lab is to create a simple peer-to-peer network between two PCs, identify the proper cable to connect the two PCs, configure workstation IP address information, and test connectivity using the ping command.

5.1.13 Lab Exercise: Building a Hub-based Network

This lab is to create a simple network with two PCs using a hub, identify the proper cable to connect the PCs to the hub, configure workstation IP address information, and test connectivity using the ping command.

5.1.13 Lab Exercise: Building a Switch-based Network

This lab is to create a simple network with two PCs using a switch, identify the proper cable to connect the PCs to the switch, configure workstation IP address information, and test connectivity using the ping command.

5.2.3 Lab Exercise: Connecting Router LAN Interfaces

This lab is to identify the Ethernet or Fast Ethernet interfaces on the router.

5.2.3 Lab Exercise: Building a Basic Routed WAN

This lab is to create a simple routed WAN with two PCs, two switches or hubs, and two routers.

5.2.3 Lab Exercise: Troubleshooting Interconnected Devices

This lab is to identify and correct networking problems related to cabling issues and workstation IP addressing issues.

5.2.7 Lab Exercise: Establishing a Console Connection to a Router or Switch

This lab is to create a console connection – from a PC to a router and switch using the proper cable.

Module 6: Ethernet Fundamentals

There are no labs for this module.

Module 7: Ethernet Technologies

7.1.2 Lab Exercise: Waveform Decoding

This lab is to integrate knowledge of networking media, OSI Layers 1, 2, and 3, and Ethernet, by taking a digital waveform of an Ethernet frame and decoding it.

7.1.9 Lab Exercise: Introduction to Fluke Network Inspector

This lab is a tutorial demonstrating how to use the Fluke Networks Network Inspector (NI) to discover and analyze network devices within a broadcast domain.

7.1.9 Lab Exercise: Introduction to Fluke Protocol Inspector

This lab is a tutorial demonstrating how to use the Fluke Networks Protocol Inspector to analyze network traffic and data frames.

Module 8: Ethernet Switching

There are no labs for this module.

Module 9: TCP/IP Protocol Suite and IP Addressing

9.2.7 Lab Exercise: IP Addressing Basics

The purpose of this lab is to name the five different classes of IP addresses and to describe the characteristics and use of the different IP address classes.

9.3.5 Lab Exercise: DHCP Client Setup

The purpose of this lab is to introduce Dynamic Host Configuration Protocol (DHCP) and the process for setting up a network computer as a DHCP client to use DHCP services.

9.3.7 Lab Exercise: Workstation ARP

The purpose of this lab is to introduce Address Resolution Protocol (ARP) and the arp -a workstation command.

Module 10: Routing Fundamentals and Subnets

10.2.9 Lab Exercise: Small Router Purchase

This lab is to introduce the variety and prices of network components in the market. This lab will look specifically at small routers used by telecommuters when working from home.

10.3.5 Lab Exercise: Basic Subnetting

This lab is to identify reasons to use a subnet mask and to distinguish between a default subnet mask and custom subnet mask.

10.3.5 Lab Exercise: Subnetting a Class A Network

This lab is to analyze a Class A network address with the number of network bits specified in order to determine subnet mask, number of subnets, hosts per subnet, and information about specific subnets.

10.3.5 Lab Exercise: Subnetting a Class B Network

This lab is to provide a subnetting scheme using a Class B network.

10.3.5 Lab Exercise: Subnetting a Class C Network

This lab is to provide a subnetting scheme using a Class C network.

Module 11: TCP/IP Transport and Application Layers

11.2.4 Lab Exercise: Protocol Inspector, TCP, and HTTP

This purpose of this lab is to use Protocol Inspector, or equivalent software, to view dynamic Transmission Control Protocol (TCP) operations. The operation that will be specifically looked at is HTTP during Web page access.

Class3.1 Lab Exercise: Current cable technologies / research

This lab requires a report done by the student on the following topics: 10Gbase-T, Cable abandonment, Limited combustible cable. The instruction will be given in class

Class5.1 Lab - replaces this set of labs, 5.1.12-5.2.7. This lab builds a network, from peer to peer to a LAN to a WAN.

Class7.1 Lab: Introduction to Ethereal

This lab will have the student download Ethereal and install it.

Class9.1 Lab: DHCP and Wireless connections with security

The purpose of this lab is for the students to be able to configure workstations for DHCP and also wireless connections