IT Essentials: PC Hardware and Software v4.0 Scope and Sequence (April 2007)

This document is a preliminary overview of the new Cisco® IT Essentials: PC Hardware and Software v4.0 curriculum and is subject to change since the courses are still under development. The English version of IT Essentials: PC Hardware and Software v4.0 will be available in June 2007.

Target Audience
IT Essentials: PC Hardware and Software v4.0 is intended for students in high school, technical school, community college, or a four-year institution who want to pursue careers in IT and gain working knowledge of how computers work, how to assemble computers, and how to troubleshoot hardware and software issues.

Prerequisites
There are no prerequisites for this course.

Target Certifications
IT Essentials: PC Hardware and Software v4.0 helps to prepare students for the CompTIA A+ certification exams (www.comptia.org). The fundamental portion of the course, chapters 1–10, prepares students for the required CompTIA A+ Essentials exam. The advanced part of the course, chapters 11–16, prepares students for CompTIA’s three job environment certification exams: IT technician (220-602), remote support technician (220-603), and bench technician (220-604).

This course also aligns to the objectives in the first three modules of the EUCIP IT Administrator certification (www.eucip.org): Module 1 PC Hardware, Module 2 Operating Systems, and Module 3 Local Area Networks and Network Services.

Curriculum Description
This course covers the fundamentals of computer hardware and software as well as advanced concepts. Students who complete this course will be able to describe the internal components of a computer, assemble a computer system, install an operating system, and troubleshoot using system tools and diagnostic software. Students will also be able to connect to the Internet and share resources in a network environment. New topics included in this version include laptops and portable devices, wireless connectivity, security, safety and environmental issues, and communication skills.

Hands-on lab activities will continue to be an essential element of the course. In support of this, virtual learning tools have been integrated into this course. The Virtual Laptop, Virtual Desktop, and Virtual Printer and Scanner are stand-alone tools designed to supplement classroom learning and provide an interactive "hands-on" experience in learning environments with limited physical equipment.
Curriculum Objectives

The primary objective of this course is to prepare students for entry-level positions in the IT field within several different working environments:

- A corporate or mobile environment with a high level of face-to-face client interaction. Job titles include enterprise technician, IT administrator, field service technician, and PC technician.
- A remote-based work environment where client interaction, client training, operating systems, and connectivity issues are emphasized. Job titles include remote support technician, help desk technician, call center technician, IT specialist, and representative.
- Settings with limited customer interaction where hardware-related activities are emphasized. Job titles include depot technician and bench technician.

In addition, students will gain confidence with the components of desktop and laptop computers by learning the proper procedures for hardware and software installations, upgrades, and troubleshooting.

By the end of the course, students will be able to complete the following objectives:

- Define information technology (IT) and describe the components of a personal computer
- Protect herself or himself against accidents and injury, protect equipment from damage, and protect the environment from contamination
- Perform a step by step assembly of a desktop computer tower
- Explain the purpose of preventive maintenance and identify the elements of the troubleshooting process
- Explain, install, and navigate an operating system; upgrade components based on customer needs and perform preventive maintenance and advanced troubleshooting
- Describe, remove, and replace select components of a laptop; upgrade components based on customer needs and perform preventive maintenance and advanced troubleshooting
- Describe, remove, and replace select components of a printer/scanner; perform preventive maintenance and troubleshooting
- Describe and install a network; upgrade components based on customer needs and perform preventive maintenance and advanced troubleshooting
- Apply good communication skills and professional behavior while working with customers
- Perform advanced installation of a desktop computer tower; select components based on customer needs and perform preventive maintenance and advanced troubleshooting
- Upgrade security components based on customer needs and perform preventive maintenance and advanced troubleshooting

Minimum System Requirements

The hands-on lab portion of the IT Essentials: PC Hardware and Software v4.0 course requires the following computer configurations and peripheral equipment.

Typical Lab Layout

For the best student learning experience, we recommend a typical lab size of 12 to 15 students and a ratio of one Lab PC per student. A ratio of one Lab PC for two students is the minimum acceptable for the hands-on lab activities. Some of the lab activities require
the student Lab PCs to be connected to a local network.

The student Lab PCs will be in various states of assembly and repair and therefore are not suitable for viewing the curriculum.

**Lab PC Hardware Requirements**

- PC Tower Case with 300W power supply
- PCI, PCIe, or AGP-compatible motherboard
- Intel Pentium/Celeron family, AMD K6/Athlon/Duron family, or compatible processor, 300 MHz or faster recommended
- Cooling fan and heat sink
- Two 128 MB memory modules (minimum) or two 256 MB memory modules (recommended)
- Some labs will require one module of RAM to be uninstalled or the simulation of a faulty module for troubleshooting purposes.
- 128 MB is the minimum requirement to run the full functions of Windows XP Pro
- Floppy drive
- 15 GB hard drive (minimum); 20 GB or more (recommended)
- The system must support a full install of Windows XP and two 5 GB partitions.
- CD-ROM (minimum) or 24x CD/DVD-ROM (recommended)
- Ethernet card
- PCI, PCIe (recommended), or AGP video card
- Ribbon cables to connect HDD/CD/Floppy
- Mouse
- Keyboard
- Super VGA (800 x 600) or higher-resolution video monitor

**Lab PC Software requirements**

IT Essentials PC v4.0 content focuses on Microsoft Windows XP and Windows 2000 operating systems since Vista is not a required subject for either CompTIA A+ or the EUCIP IT Administrator certification.

- Only Microsoft Windows XP Professional (Media CD) is needed to complete the curriculum labs

Microsoft offers programs for academic institutions to purchase software at a reduced cost. An example of such a program is the MSDN Academic Alliance, which can be found at [http://msdn.microsoft.com/academic](http://msdn.microsoft.com/academic). Please visit the Microsoft Website for your country or region to learn more.

**Lab PC Repair Tools**

The computer toolkit should include the following tools:

- Phillips screwdriver
- Flathead screwdriver
- Hex Socket Drivers (various sizes)
- Needle-nose pliers
- Electrostatic discharge (ESD) wrist strap and cord
- Electrostatic discharge (ESD) mat with a ground cord
- Safety glasses
- Lint-free cloth
- Electronics cleaning solution
- Flashlight
- Thermal compound
- Multimeter (optional)
- Compressed air service canister (optional due to globally varying classroom health and safety laws)

Additional Items and Resources

Recommended:
- One Internet connection for each student to conduct Internet searches and download drivers
- One integrated printer/scanner/copier per two Lab PCs
- One Linksys wireless router/switch or equivalent per two Lab PCs, Linksys model WRT 300N preferred
- One Wireless PCI network adapter (compatible with the above wireless router/switch) for each Lab PC

Minimum:
- One Internet connection for Internet searches and driver downloads (this could be the instructor's workstation)
- One integrated printer/scanner/copier for the class to share
- One Linksys wireless router/switch or equivalent for the class to share, Linksys model WRT 300N preferred
- Two Wireless PCI network adapters (compatible with the above wireless router/switch) for the class to share

Minimum Equipment Required to View the Curriculum

The computer-to-student ratio for viewing the curriculum is 1:1. The recommended average class size is between 15 and 20 students. The curriculum computer can be any computer that supports Internet Explorer v5.0 or higher and Flash Player v6.0 or higher.

**Note:** This curriculum will include optional virtual equipment as part of the course content: Virtual Desktop, Virtual Laptop, and Virtual Printer and Scanner. In order to fully use these optional virtual tools, the curriculum-viewing computers should have a minimum of 512MB RAM and Windows 2000.

Course Outline

**IT Essentials: PC Hardware and Software**

This course provides an excellent introduction to the IT industry and in-depth exposure to personal computers, hardware, and operating systems. Students learn the functionality of
various hardware and software components and best practices in maintenance and safety issues. Through hands-on lab activities, students learn how to assemble and configure computers, install operating systems and software, and troubleshoot hardware and software problems.

Prerequisites: None

**Part 1: Fundamentals**

1. **Fundamentals: Introduction to the Personal Computer**
   1.1 Explain the IT industry and your place in it
      1.1.1 Identify the education and certifications required
      1.1.2 Describe the A+ certification
      1.1.3 Describe the EUCIP certification
      1.1.4 Identify advanced careers
   1.2 Explain the differences between PCs based on implementation needs
      1.2.1 Gather information from the customer about use
      1.2.2 Describe a home computer
      1.2.3 Describe an entertainment/gaming computer
      1.2.4 Describe a work computer
      1.2.5 Describe an advanced work computer
      1.2.6 Describe a server
      1.2.7 Determine the type of computer based on customer needs
   1.3 Identify the names, purposes, and characteristics of cases and power supplies
      1.3.1 Describe cases
      1.3.2 Describe power supplies
   1.4 Identify the names, purposes, and characteristics of internal components
      1.4.1 Identify the names, purposes, and characteristics of motherboards
      1.4.2 Identify the names, purposes, and characteristics of processor/CPUs
      1.4.3 Identify the names, purposes, and characteristics of cooling systems
      1.4.4 Identify the names, purposes, and characteristics of RAM and ROM
      1.4.5 Identify the names, purposes, and characteristics of adapter cards
      1.4.6 Identify the names, purposes, and characteristics of drives
      1.4.7 Identify the names, purposes, and characteristics of internal cables
   1.5 Identify the names, purposes, and characteristics of ports and cables
   1.6 Identify the names, purposes, and characteristics of input devices
   1.7 Identify the names, purposes, and characteristics of output devices
   1.8 Explain system resources and their purpose, IRQ, I/O Address, and DMA
   1.9 Chapter summary
2. Fundamentals: Safe Lab Procedure and Tool Use

2.1 Identify safe working conditions and procedures
   2.1.1 Identify safety procedures and potential hazards for users and technicians
   2.1.2 Identify safety procedures to protect equipment from damage and data from loss
   2.1.3 Identify safety procedures to protect the environment from contamination

2.2 Identify tools and software used with PC components and their purpose
   2.2.1 Identify hardware tools and their purpose
   2.2.2 Identify software tools and their purpose
   2.2.3 Identify organizational tools and their purpose

2.3 Implement proper tool use
   2.3.1 Demonstrate proper use of wrist strap
   2.3.2 Demonstrate proper use of antistatic mat
   2.3.3 Demonstrate proper use of various hand tools
   2.3.4 Demonstrate proper use of cleaning materials

2.4 Chapter summary

3. Fundamentals: Computer Assembly Step by Step

3.1 Open the case
3.2 Install the power supply
3.3 Attach components to the motherboard and install the motherboard
   3.3.1 Install a CPU and heat sink/fan assembly
   3.3.2 Install the RAM
   3.3.3 Install the motherboard

3.4 Install internal drives
3.5 Install external drives
   3.5.1 Install the optical drive
   3.5.2 Install the floppy drive

3.6 Install the adapter cards in the appropriate slots
   3.6.1 Install the NIC
   3.6.2 Install the wireless NIC
   3.6.3 Install the video adapter card

3.7 Connect all internal cables
   3.7.1 Connect the motherboard power cables
   3.7.2 Connect the drive power cables
   3.7.3 Connect the drive data cables
3.8 Reattach the side panels and connect the external cables to the computer
   3.8.1 Reattach the side panels to the case
   3.8.2 Connect peripherals to the computer
   3.8.3 Connect other external cables to the computer
   3.8.4 Connect the hub and all-in-one printer to the computer using USB cable

3.9 Boot computer for the first time
   3.9.1 Identify beep codes
   3.9.2 Describe how to enter BIOS and use settings

3.10 Chapter summary

4. Fundamentals: Basics of Preventive Maintenance and Troubleshooting
   4.1 Explain the purpose of preventive maintenance
   4.2 Identify the elements of the troubleshooting process
      4.2.1 Gather data from the customer
      4.2.2 Verify the obvious issues
      4.2.3 Try quick solutions first
      4.2.4 Gather data from the computer
      4.2.5 Evaluate the problem and implement the solution
      4.2.6 Close with the customer
   4.3 Chapter summary

5. Fundamentals: Operating Systems
   5.1 Explain the purpose of operating systems
      5.1.1 Describe the characteristics of modern operating systems
      5.1.2 Explain operating system concepts
   5.2 Describe and compare operating systems to include purpose, limitations, and compatibilities
      5.2.1 Compare and contrast operating systems
      5.2.2 Compare and contrast network operating systems
   5.3 Determine operating system based on customer needs
      5.3.1 Identify job tasks, applications, OS, and ensure compatibility
      5.3.2 Determine minimum hardware requirements
      5.3.3 Ensure compatibility with platform
   5.4 Install an operating system
      5.4.1 Identify hard drive setup procedures
      5.4.2 Install the OS using default settings
      5.4.3 Prepare disk
5.4.4 Create accounts
5.4.5 Complete the installation
5.4.6 Describe custom installation option
5.4.7 Identify the boot sequence files and registration files
5.4.8 Describe how to manipulate OS files
5.4.9 Describe directory structures

5.5 Navigate a GUI (Windows)
5.5.1 Manipulate items on the desktop
5.5.2 Install, remove, and configure control panel applets
5.5.3 Install, navigate, and uninstall an application
5.5.4 Describe upgrading OS

5.6 Identify and apply common preventive maintenance techniques for OS
5.6.1 Create a preventive maintenance plan
5.6.2 Schedule a task using the Schedule Task Wizard
5.6.3 Back up the hard drive

5.7 Troubleshoot operating systems
5.7.1 Gather data from the customer
5.7.2 Verify the obvious issues
5.7.3 Try quick solutions first
5.7.4 Gather data from the computer
5.7.5 Evaluate the problem and implement the solution
5.7.6 Close with the customer

5.8 Chapter summary

6. Fundamentals: Laptops and Portable Devices
6.1 Describe laptops and the various portable devices currently available
   6.1.1 Identify the common uses of laptops
   6.1.2 Identify the common uses of PDAs and Smartphones
6.2 Identify the names, purposes, and characteristics of laptops
   6.2.1 Describe the components found on the outside of the laptop
   6.2.2 Describe the components found on the inside of the laptop
   6.2.3 Describe the components found on the laptop docking station
6.3 Compare and contrast desktop and laptop components
   6.3.1 Compare and contrast desktop and laptop motherboards
   6.3.2 Compare and contrast desktop and laptop processors
   6.3.3 Compare and contrast desktop and laptop power management
   6.3.4 Compare and contrast desktop and laptop expansion capabilities
6.4 Explain how to configure laptops
   6.4.1 Describe how to configure power
   6.4.2 Describe installation of laptop components

6.5 Define the various mobile phone standards

6.6 Identify common preventive maintenance techniques for laptops and portable devices
   6.6.1 Identify appropriate cleaning procedures
   6.6.2 Identify optimal operating environments

6.7 Troubleshoot laptops and portable devices
   6.7.1 Gather data from the customer
   6.7.2 Verify the obvious issues
   6.7.3 Try quick solutions first
   6.7.4 Gather data from the computer
   6.7.5 Evaluate the problem and implement the solution
   6.7.6 Close with the customer

6.8 Chapter summary

7. Fundamentals: Printers and Scanners

7.1 Describe the types of printers currently available
   7.1.1 Describe the characteristics and capabilities of printers
   7.1.2 Explain printer-to-computer interfaces
   7.1.3 Describe laser printers
   7.1.4 Describe impact printers
   7.1.5 Describe inkjet printers
   7.1.6 Describe solid ink printers
   7.1.7 Describe other printer types

7.2 Describe the installation and configuration process for printers
   7.2.1 Describe how to set up a printer
   7.2.2 Explain how to power and connect a device using local or network port
   7.2.3 Describe how to install and update a device driver, firmware, and RAM
   7.2.4 Identify configuration options and default settings
   7.2.5 Explain how to optimize printer performance
   7.2.6 Describe how to print test pages
   7.2.7 Describe how to share a printer

7.3 Describe the types of scanners currently available
   7.3.1 Describe scanner types, resolution, and interfaces
7.3.2 Describe all-in-one devices
7.3.3 Describe flatbed scanners
7.3.4 Describe handheld scanners
7.3.5 Describe drum scanners
7.3.6 Compare costs of different types of scanners

7.4 Describe the installation and configuration process for scanners
7.4.1 Explain how to power and connect a scanner
7.4.2 Describe how to install and update the device driver
7.4.3 Identify configuration options and default settings

7.5 Identify and apply common preventive maintenance techniques for printers and scanners
7.5.1 Describe printer maintenance
7.5.2 Describe scanner maintenance

7.6 Troubleshoot printers and scanners
7.6.1 Gather data from the customer
7.6.2 Verify the obvious issues
7.6.3 Try quick solutions first
7.6.4 Gather data from the computer
7.6.5 Evaluate the problem and implement the solution
7.6.6 Close with the customer

7.7 Chapter summary

8. Fundamentals: Networks
8.1 Explain the principles of networking
8.1.1 Define computer network
8.1.2 Explain the benefits of networks

8.2 Describe types of networks
8.2.1 Describe a LAN
8.2.2 Describe a WAN
8.2.3 Describe a WLAN
8.2.4 Explain Peer to Peer
8.2.5 Explain Client/Server

8.3 Describe basic networking concepts and technologies
8.3.1 Explain bandwidth
8.3.2 Describe IP addressing
8.3.3 Define DHCP
8.3.4 Describe common network protocols
8.3.5 Define ICMP

8.4 Describe physical components of a network
   8.4.1 Identify names, purposes, and characteristics of network devices
   8.4.2 Identify names, purposes, and characteristics of common network cables

8.5 Describe LAN topologies and architectures
   8.5.1 Describe topologies
   8.5.2 Describe LAN architectures

8.6 Identify standards organizations

8.7 Identify Ethernet standards
   8.7.1 Explain cabled Ethernet standards
   8.7.2 Explain wireless Ethernet standards

8.8 Explain OSI and TCP/IP Data Models
   8.8.1 Define the OSI model
   8.8.2 Define the TCP/IP model
   8.8.3 Compare OSI and TCP/IP

8.9 Configure a NIC and a modem
   8.9.1 Update a driver
   8.9.2 Attach a computer to an existing network
   8.9.3 Describe installation of a modem

8.10 Identify names, purposes, and characteristics of other technologies for establishing connectivity
   8.10.1 Describe telephone technologies
   8.10.2 Define Electronic Wireline
   8.10.3 Define Broadband
   8.10.4 Define VoIP

8.11 Identify and apply common preventive maintenance techniques for networks

8.12 Troubleshoot the network
   8.12.1 Gather data from the customer
   8.12.2 Verify the obvious issues
   8.12.3 Try quick solutions first
   8.12.4 Gather data from the computer
   8.12.5 Evaluate the problem and implement the solution
   8.12.6 Close with the customer

8.13 Chapter summary

   9.1 Explain why security is important
9.2 Describe security threats
   9.2.1 Define virus, worms, and Trojan horses
   9.2.2 Explain Internet security
   9.2.3 Define adware, spyware, and grayware
   9.2.4 Explain denial of service
   9.2.5 Describe SPAM and pop-ups
   9.2.6 Explain social engineering
   9.2.7 Explain TCP/IP attacks
   9.2.8 Explain hardware deconstruction and recycling

9.3 Identify security procedures
   9.3.1 Explain what is required in a basic local security policy
   9.3.2 Explain the tasks required to protect physical equipment
   9.3.3 Describe the various ways to protect data
   9.3.4 Describe wireless security techniques

9.4 Identify common preventive maintenance techniques for security
   9.4.1 Explain how to update signature files for virus checker and spyware
   9.4.2 Explain how to install operating systems service packs and security patches

9.5 Troubleshoot security threats
   9.5.1 Gather data from the customer
   9.5.2 Verify the obvious issues
   9.5.3 Try quick solutions first
   9.5.4 Gather data from the computer
   9.5.5 Evaluate the problem and implement the solution
   9.5.6 Close with the customer

9.6 Chapter summary

10. Fundamentals: Communication Skills
    10.1 Explain the relationship between communications and troubleshooting
    10.2 Describe good communication skills and professional behavior
        10.2.1 Determine the customer’s computer problem
        10.2.2 Display professional behavior with the customer
        10.2.3 Focus the customer during the call
        10.2.4 Use proper Netiquette
        10.2.5 Implement time and stress management techniques
        10.2.6 Observe Service Level Agreements (SLAs)
        10.2.7 Follow business policies
10.3 Explain ethics and legal aspects of working with computer technology

10.4 Perform Call Center labs
   10.4.1 Complete Level 1 Tech labs
   10.4.2 Complete Level 2 Tech labs

10.5 Perform role-playing labs

10.6 Chapter summary

Part 2: Advanced
Prerequisites: None

11. Advanced: Personal Computers

11.1 Give an overview of field, remote, and bench technician jobs

11.2 Explain safe lab procedure and tool use
   11.2.1 Review safe working environment and procedures
   11.2.2 Review names, purposes, characteristics, and appropriate and safe use of tools
   11.2.3 Identify potential safety hazards and implement proper safety procedures of computer components
   11.2.4 Describe environmental issues

11.3 Describe situations requiring replacement of computer components
   11.3.1 Select a case/power supply
   11.3.2 Select a motherboard
   11.3.3 Select a CPU/cooling system
   11.3.4 Select RAM
   11.3.5 Select adapter cards
   11.3.6 Select storage devices/hard drive
   11.3.7 Select input and output devices

11.4 Upgrade and/or configure PC components and peripherals
   11.4.1 Upgrade and/or configure motherboard
   11.4.2 Upgrade and/or configure CPU/cooling system
   11.4.3 Upgrade and/or configure RAM
   11.4.4 Upgrade and/or configure BIOS
   11.4.5 Upgrade and/or configure storage devices/hard drive
   11.4.6 Upgrade and/or configure input and output devices

11.5 Identify and apply common preventive maintenance techniques for PC components
   11.5.1 Clean internal components
   11.5.2 Clean the case
   11.5.3 Inspect computer components
11.6 Troubleshoot PC components and peripherals
   11.6.1 Gather data from the customer
   11.6.2 Verify the obvious issues
   11.6.3 Try quick solutions first
   11.6.4 Gather data from the computer
   11.6.5 Evaluate the problem and implement the solution
   11.6.6 Close with the customer

11.7 Chapter Summary

12. Advanced: Operating Systems

12.1 Select the appropriate OS based on the customer's needs
   12.1.1 Describe operating systems
   12.1.2 Describe network operating systems

12.2 Install, configure and optimize OS
   12.2.1 Compare and contrast a default versus custom installation
   12.2.2 Install Windows XP Pro using a custom installation
   12.2.3 Create, view, and manage disks, directories, and files
   12.2.4 Identify procedures and utilities used to optimize the performance of operating systems
   12.2.5 Identify procedures and utilities used to optimize the performance of browsers
   12.2.6 Describe installation, use, and configuration of mail software
   12.2.7 Set screen resolution and update video drive
   12.2.8 Describe installation of a second OS

12.3 Describe how to upgrade operating systems

12.4 Describe preventive maintenance procedures for operating systems
   12.4.1 Schedule automatic tasks and updates
   12.4.2 Set restore points

12.5 Troubleshoot operating systems
   12.5.1 Gather data from the customer
   12.5.2 Verify the obvious issues
   12.5.3 Try quick solutions first
   12.5.4 Gather data from the computer
   12.5.5 Evaluate the problem and implement the solution
   12.5.6 Close with the customer

12.6 Perform OS Work Order labs

12.7 Chapter summary
13. Advanced: Laptops and Portable Devices

13.1 Describe wireless communication methods for laptops and portable devices
   13.1.1 Describe Bluetooth
   13.1.2 Describe Infrared
   13.1.3 Describe Cellular WAN
   13.1.4 Describe WiFi
   13.1.5 Describe Satellite

13.2 Describe repairs for laptops and portable devices
   13.2.1 Describe CRU and FRU repairs
   13.2.2 Describe repair center and manufacturer repairs

13.3 Select laptop components
   13.3.1 Select batteries
   13.3.2 Select docking station or port replicator
   13.3.3 Select storage devices
   13.3.4 Select additional RAM

13.4 Describe preventive maintenance procedures for laptops
   13.4.1 Describe how to schedule and perform maintenance for laptops
   13.4.2 Explain how to manage data version control between laptops and desktops

13.5 Describe troubleshooting laptops
   13.5.1 Gather data from the customer
   13.5.2 Verify the obvious issues
   13.5.3 Try quick solutions first
   13.5.4 Gather data from the computer
   13.5.5 Evaluate the problem and implement the solution
   13.5.6 Close with the customer

13.6 Perform Laptop Work Order labs

13.7 Chapter summary

14. Advanced: Printers and Scanners

14.1 Describe potential safety hazards and safety procedures associated with printers and scanners

14.2 Install and configure a printer/scanner locally
   14.2.1 Connect the device using a local port
   14.2.2 Install and update the device driver and software
   14.2.3 Configure options and default settings
   14.2.4 Verify functionality
14.2.5 Educate user about basic printer/scanner features and operations

14.3 Describe how to share a printer/scanner on a network
   14.3.1 Describe types of printer servers
   14.3.2 Describe how to install network printer software and drivers on a computer

14.4 Upgrade and configure printers and scanners
   14.4.1 Describe printer upgrades
   14.4.2 Optimize scanner

14.5 Describe preventive maintenance techniques used with printers and scanners
   14.5.1 Determine scheduled maintenance according to vendor guidelines
   14.5.2 Describe a suitable environment for printers and scanners
   14.5.3 Describe cleaning methods
   14.5.4 Explain how to check the capacity of ink cartridges and toners

14.6 Describe troubleshooting printers and scanners
   14.6.1 Gather data from the customer
   14.6.2 Verify the obvious issues
   14.6.3 Try quick solutions first
   14.6.4 Gather data from the computer
   14.6.5 Evaluate the problem and implement the solution
   14.6.6 Close with the customer

14.7 Perform Printers and Scanners Work Order labs

14.8 Chapter summary

15. Advanced: Networks

15.1 Identify potential safety hazards and implement proper safety procedures associated with networks
   15.1.1 Explain fiber optics safety hazards
   15.1.2 Explain cable, cable cutter, and cable cuttings safety hazards

15.2 Design a network based on the customer’s needs
   15.2.1 Determine a topology
   15.2.2 Determine protocols and network applications

15.3 Determine the components for your customer’s network
   15.3.1 Select cable types
   15.3.2 Select ISP connection type
   15.3.3 Select network cards
   15.3.4 Select the network device (hub, switch, router)

15.4 Implement the customer’s network
15.4.1 Install and test network
15.4.2 Describe Internet configuration and network resources

15.5 Upgrade the customer’s network
   15.5.1 Install and configure wireless NIC
   15.5.2 Install and configure access points
   15.5.3 Test connection

15.6 Describe installation, configuration, and management of a simple mail server

15.7 Define and compare SMTP, POP, and IMAP

15.8 Describe preventive maintenance procedures for networks

15.9 Troubleshoot the network
   15.9.1 Gather data from the customer
   15.9.2 Verify the obvious issues
   15.9.3 Try quick solutions first
   15.9.4 Gather data from the computer
   15.9.5 Evaluate the problem and implement the solution
   15.9.6 Close with the customer

15.10 Perform Networks Work Order labs

15.11 Chapter summary

16. Advanced: Security

16.1 Outline security requirements for customer’s needs
   16.1.1 Outline a local security policy
   16.1.2 Explain when and how to use security hardware
   16.1.3 Explain when and how to use security applications

16.2 Select security components based on customer’s needs
   16.2.1 Describe and compare security techniques
   16.2.2 Describe and compare access control devices
   16.2.3 Describe and compare firewall types

16.3 Implement customer’s security plan
   16.3.1 Configure security
   16.3.2 Explain how to configure control devices
   16.3.3 Explain how to configure firewall types
   16.3.4 Describe protection against malicious software

16.4 Perform preventive maintenance on security risks
   16.4.1 Describe the configuration of OS updates
   16.4.2 Maintain accounts
   16.4.3 Explain data backup procedures, access to backups, and secure
physical backup material

16.5 Troubleshoot security risks

16.5.1 Gather data from the customer

16.5.2 Verify the obvious issues

16.5.3 Try quick solutions first

16.5.4 Gather data from the computer

16.5.5 Evaluate the problem and implement the solution

16.5.6 Close with the customer

16.6 Perform Security Work Order labs

16.7 Chapter summary