

TestOut®

TestOut PC Pro – English 4.1.x

LESSON PLAN

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Course Overview

This course prepares students for the PC Pro exam and CompTIA's Exam 220-801 and Exam 220-802.

Module 1 – Computing Overview

This module introduces the students to the PC Pro and the basic skills a student should have before taking this course, and the content of the PC Pro course. Students will learn how to use the simulator to complete the lab exercises. This module also provides an overview of the basic elements and functions of computer hardware and operating systems.

Module 2 – PC Technician

This module examines the roles of the PC technician: protection and safety of users and computers, acting in a professional manner, maintaining computer systems, troubleshooting systems, and utilizing Windows tools and utilities to view configuration information and manage computers.

Module 3 – System Components

In this module students will learn concepts about the components that make up computer systems. Students will explore the basics of cases, form factors, power supplies, motherboards, PC expansion buses, processors, memory, BIOS, video, and cooling devices.

Module 4 – Peripheral Devices

This module teaches the students about the following peripheral devices: IO interfaces, USB devices, IEEE 1394-based products, display devices, and sound devices. Students will also receive guidelines for installing devices.

Module 5 – Storage

This module discusses concepts about the storage of digital data. Students will become familiar with storage devices, storage device interfaces, optical media, and file systems. They will also learn details about managing files, using RAID arrays, and optimizing hard disk performance.

Module 6 – Networking

This module examines the fundamentals of networking. Student will learn of the components that make up a network. They will learn about network addressing, networking media (cabling), IP configuration settings, 802.11 wireless networks, Infrared (IrDA) and Bluetooth.

Module 7 – Printing

In this module students will learn concepts about selecting, installing, configuring, and managing printers. They will learn about different types of printers, printer languages, and the components that make up network printing.

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Module 8 – Mobile Devices

This module discusses portable computing devices. Topics covered include classifications for portable devices, components in a notebook system, PC cards, batteries, and power management.

Module 9 – Windows System Management

This module discusses basic concepts of system management which include installing and managing applications, updating Windows and non-Microsoft software, protecting a system through backups, managing virtual memory, handling system errors, and providing system recovery for a system that does not work properly.

Module 10 – System Implementation

This module discusses the elements of pre-installation, installation, and post installation of the Windows Operating Systems.

Module 11 – File Management

This module examines the location of system files, file extensions and file attributes, and the commands to manage files. Students will also learn how to configure NTFS permissions, change file ownership, share a file, and work with offline files.

Module 12 – Security

In this module students will learn the basics of securing a computer system. Concepts covered include; protecting against malware and social engineering attacks, authenticating to validate a user, configuring BIOS security, utilizing encryption technologies, physically securing computer systems, and employing firewalls.

Module 13 – Troubleshooting

This module discusses troubleshooting of hardware devices, operating systems, networks, notebooks, and printer devices.

Module 14 – Capstone Exercises

This module contains 2 exercises that allow the students to practice all the skills they have acquired during this course.

Practice Exams

In Practice Exams students will have the opportunity to test themselves and verify that they understand the concepts and are ready to take the certification exam. The practice exams are divided into three separate areas and will contain examples of the types of questions that a student will find on the actual exam:

- PC Pro Certification Practice Exams
- CompTIA 220-801 Practice Exams
- CompTIA 220-802 Practice Exams

Section 1.1: Course Introduction

Summary

This course provides the student with the knowledge to become industry certified as a PC technician. This course actually meets the specifications for two different industry certification programs. It prepares the student for the PC Pro certification and the CompTIA A+ certification.

TestOut's PC Pro certification is a new certification which measures not just what you *know*, but what you can *do*. The TestOut PC Pro Certification measures your ability to install, manage, repair, and troubleshoot PC hardware and Windows operating system software.

*TestOut's PC Pro objectives are listed in **Appendix B: PC Pro Objectives**.*

CompTIA's A+ certification is an entry-level certification that verifies the student has the knowledge equivalent to that of an entry-level IT professional with about 12 months of hands-on experience. The A+ certification has been updated for 2012. To obtain the A+ certification, students must pass two exams:

- CompTIA A+ Exam 220-801 covers PC hardware and networking.
- CompTIA A+ Exam 220-802 covers operating systems, security, and troubleshooting.

*For a complete list of CompTIA's exam objectives, visit, **www.comptia.org**.*






In addition to covering everything students need to know for the CompTIA A+ exams, this course has been designed to help students gain real-world skills that they will use every day on the job as a PC technician. By the time students have completed this course, they should be able to do the following:

- Set up a new computer
- Identify system requirements when purchasing a new computer
- Understand the technology and specifications used to describe computer components, and make informed choices about which device characteristics are required for the situation.
- Install or upgrade the operating system.
- Manage external devices.
- Troubleshoot common computer problems that can be resolved without replacing internal components.
- Connect to a small home network.

Before taking this course, students should have a basic understanding of computers, including the following skills:

- Installing and running programs.
- Using basic productivity software including word processing applications.
- Saving files created by common applications.
- Browsing the Internet.

The following icons are placed in front of lesson items in LabSim to help students quickly recognize the items in each section:

-  = Demonstration
-  = Exam
-  = Lab/Simulation
-  = Text Lesson or Fact Sheet
-  = Video

The video and demonstration icons are used throughout the lesson plans to help instructors differentiate between the timing for the videos and demonstrations.

Video/Demo

Time

 1.1.1 PC Pro Course Introduction

9:03

Total Time

About 10 minutes

The **Total Time** for each section is calculated by adding the approximate time for each section which is calculated using the following elements:

- Video/demo times
- Approximate time to read the text lesson (the length of each text lesson is taken into consideration)
- Simulations (5 minutes is assigned per simulation. This is the amount of time it would take for a knowledgeable student to complete the lab activity. Plan that new students will take much longer than this, depending on their knowledge level and computer experience.)
- Questions (1 minute per question)

Appendix A: Approximate Time for the Course contains all the times for each section, which are totaled for the whole course.

Section 1.2: Using the Simulator



Summary

This section introduces the student to the TestOut simulator, which is used in most of the lab exercises throughout the course. Students will become familiar with the:

- Scenario
- Workspace
- Shelf
- Selected Component Details
- Processes to Complete Labs
- Elements of the Score Report.

Students will learn how to:

- Read simulated component documentation and view components to make appropriate choices to meet the scenario.
- Add simulated computer components to the Workspace.
- Change views and zoom in on objects on the Workspace.
- Attach simulated cables.
- Use the simulation interface to identify where simulated cables connect to the computer.
- Use the simulated Windows desktop to complete software configuration tasks.

| Video/Demo | Time |
|--|--------------|
|  1.2.1 Using the Simulator | 21:57 |
|  1.2.3 Working with Internal Components | <u>20:55</u> |
| <i>Total</i> | <i>42:52</i> |

Lab/Activity

- Explore the Lab Interface
- Connect Internal Components

Total Time

About 55 minutes

Section 1.3: Hardware Basics

Summary

This section discusses the basic elements and functions of computers. Basics discussed include:

- Elements of a computer:
 - Hardware
 - Software
 - Firmware
- Functions that computers perform:
 - Input
 - Processing
 - Storage
 - Output
 - Networking and Communications
- Componentization
- Standardization
- Common types of ports and connectors:
 - DB-9 Serial port
 - DB-25 Parallel port
 - DB-15 (two rows)
 - High Density DB-15 (three rows)
 - DVI Video port
 - 6-pin Mini-DIN
 - TRS
 - RJ-11 (four wires)
 - RJ-45 (eight wires)
 - USB Type A
 - Firewire 6-pin




Students will learn how to:

- Connect common peripherals to standard ports.

Lecture Focus Questions:

- What is the difference between hardware, software, and firmware?
- What types of devices use USB ports?
- What are common input and output devices?
- What is the definition of processing?
- What are the most common types of storage devices?
- Why is it important to increase componentization and standardization?

Video/Demo

| | Time |
|---|--------------|
|  1.3.1 Computing Basics | 17:04 |
|  1.3.3 External Components | 8:14 |
|  1.3.6 Internal Components | <u>4:20</u> |
| <i>Total</i> | <i>29:38</i> |

Lab/Activity

- Set Up a Computer

Number of Exam Questions

7 questions

Total Time

About 45 minutes

Section 1.4: Operating System Basics

Summary

In this section students will learn the basics of operating systems. An operating system is a set of programs that act as an interface between the applications that are running on a computer and the computer's hardware. Concepts covered in this section include:

- Actions performed by operating systems
- Operating system attributes:
 - Multi-processing
 - Multi-tasking
 - Multi-threading
- Parts of an operating system:
 - Kernel
 - Drivers
 - Interface
 - Utilities
 - Applications
- Types of Windows operating systems discussed in this course:
 - Windows XP (Home and Professional)
 - Windows Vista (Home Premium, Business, and Ultimate)
 - Windows 7 (Home Premium, Professional, and Ultimate)
- Components of the Windows interface:
 - Desktop
 - Start Menu
 - Taskbar
 - Notification Area
 - Windows Explorer
 - Computer
 - Control Panel
 - Sidebar
 - Aero
 - Search
 - User Account Control (UAC)



Students will learn how to:

- Customize the Windows Taskbar.
- Add and remove gadgets in Windows 7.

Lecture Focus Questions:

- What are the functions of the *kernel*?
- What is the difference between a GUI and a CLI?
- How are Windows Explorer and Computer similar?
- What type of information is shown on the Taskbar?
- Which Windows interface components would you use to switch from one running program to another?
- Which Windows versions include the Sidebar, Aero, and UAC?
- How does an index improve searching on your computer?

Video/Demo

| | Time |
|---|--------------|
|  1.4.1 Operating Systems | 10:28 |
|  1.4.3 Using the Windows Interface | <u>16:52</u> |
| <i>Total</i> | <i>27:20</i> |

Number of Exam Questions

10 questions

Total Time

About 45 minutes

Section 2.1: Protection and Safety

Summary

This section examines the protection and safety of users and computers. Concepts covered include:

- Recommendations to provide personal safety of users.
- Awareness of hazardous issues.
- Measures to protect against Electrostatic Discharge (ESD).
- Proper disposal of equipment and hazardous chemicals.

Students will learn how to:





- Use an anti-static mat and strap to protect against ESD.
- Implement appropriate grounding procedures.

Lecture Focus Questions:

- Which specific computer components require special care when handling to protect your safety?
- What is the proper way to lift heavy objects?
- How can ESD be a hazard to electronic computer components?
- What is the difference between a static-shielding bag and a static-resistant bag?
- What steps can you take to reduce ESD if you do not have the proper equipment handy?
- What is the MSDS? When would the information it provides be important?

Video/Demo

Time

| | |
|--|--------------|
|  2.1.1 Safety | 5:59 |
|  2.1.3 ESD | 7:35 |
|  2.1.4 Protecting Against ESD | 4:54 |
|  2.1.6 Environmental Concerns | <u>7:12</u> |
| <i>Total</i> | <i>25:40</i> |

Number of Exam Questions

17 questions

Total Time

About 50 minutes

Section 2.2: Professionalism

Summary




This section provides information about acting in a professional manner when working as a PC technician. Concepts covered include:

- Creating good first impressions.
- Utilizing good communication skills.
- Dealing with customers in a respectful manner.
- Guidelines to follow when identifying and resolving problems.
- Incident response
- Investigations
- Procedures for collecting and analyzing computer evidence

Lecture Focus Questions:

- What specific things can you do to improve your people skills?
- What actions and comments contribute to common stereotypes about PC technicians?
- How does professionalism affect customer satisfaction?
- How does respect affect your actions towards customers?
- Why should you avoid jargon and acronyms when dealing with customers?
- What should you do if you get a phone call while at a customer site?

Video/Demo

| | Time |
|---|--------------|
|  2.2.1 Professionalism | 3:00 |
|  2.2.3 Incident Management | 7:17 |
|  2.2.4 Basic Forensic Procedures | <u>18:31</u> |
| <i>Total</i> | <u>28:48</u> |

Number of Exam Questions

18 questions

Total Time

About 55 minutes

Section 2.3: PC Tools

Summary

This section discusses devices and components used for computer repair and maintenance. PC tools discussed include:

- Combination ratchet/screwdriver
- IC insertion/extraction tool
- Anti-static pad/wrist strap
- Extension magnet
- 3-pronged parts retriever
- Multimeter
- Power supply tester
- Cable tester
- Loopback plug
- Known good spares
- POST card

Students will learn how to:

- Use an anti-static mat and strap to protect against ESD.
- Implement appropriate grounding procedures.

Lecture Focus Questions:

- When working with computer hardware, what is the advantage of having a ratcheting handle on a screwdriver?
- What is a good tool to use to retrieve a screw that has fallen into a computer case?
- What types of electrical properties can a *multimeter* measure?
- How is a *power supply tester* used to test the output from a PC power supply?
- How does a *loopback plug* verify that a device can both send and receive signals?
- How can ESD damage computer components?
- What measures should you take to protect hardware against ESD damage?
- When a wrist strap is unavailable, how can you still protect the computer from ESD while working in it?

Video/Demo

 2.3.1 PC Toolkit

Time

3:17

Number of Exam Questions

12 questions

Total Time

About 20 minutes

Section 2.4: PC Maintenance

Summary

This section discusses considerations and guidelines that can be used to help maintain computer systems. Concepts covered include:

- Creating the proper environment:
 - Heating, ventilation, and air conditioning (HVAC)
 - Interference:
 - EMI
 - RFI
 - Magnetic fields
- Details about cleaning the computer
- Tips for maintaining your computer
- Power conditions to be aware of:
 - Surge
 - Spike
 - Sag
 - Brownout
 - Blackout
- Devices used to prevent power problems:
 - Surge protector
 - Line conditioner
 - Standby Power Supply (SPS)
 - Uninterruptible Power Supply (UPS)

Students will learn how to:




- Connect a UPS to a computer.
- Configure UPS settings for notifications and shutdown.

Lecture Focus Questions:

- Why is dust an enemy to a computer?
- What will too much, or too little, humidity do to a computer?
- When considering HVAC, what is the difference between a *positive pressure system* and a *negative pressure system*?
- What causes EMI and what can be done to prevent problems with it?
- How can a magnet affect a floppy disk or tape?
- What types of materials can you use to clean internal PC components?
- When is it important to use an anti-static vacuum?
- How are backups related to preventive maintenance?
- What is the difference between a *surge* and a *spike*?
- Which type of device protects against over voltages?

- What is the difference between the way an online UPS provides power to a system and an offline UPS provides power?

Video/Demo**Time**

| | |
|--|--------------|
|  2.4.1 PC Maintenance | 4:05 |
|  2.4.3 Protecting Power | 15:40 |
|  2.4.4 Configuring UPS Settings | <u>14:27</u> |
| <i>Total</i> | <i>34:12</i> |

Lab/Activity

- Install a UPS

Number of Exam Questions

14 questions

Total Time

About 60 minutes

Section 2.5: Troubleshooting Overview

Summary

This section examines procedures for troubleshooting systems. Concepts covered include:

- A systematic approach to problem solving.
- Tips for troubleshooting systems.

Lecture Focus Questions:

- Why is checking the obvious first so important?
- What place does intuition have in the troubleshooting process?
- What is *escalation* and when should you do it?
- You have identified the most likely cause of a problem and a course of action to correct the problem. When should you *not* immediately fix the problem?
- How could user education be a beneficial step in the troubleshooting process?
- How does good documentation help in the troubleshooting process?

Video/Demo

 2.5.1 Troubleshooting Process

Time

7:35

Number of Exam Questions

12 questions

Total Time

About 25 minutes

Section 3.1: Cases and Form Factors

Summary

In this section students will explore basics about computer cases and form factors. Details about the following concepts will be covered:

- Types of motherboards:
 - ATX
 - Mini-ATX
 - Micro-ATX
 - Mini-ITX
 - NLX
 - BTX
- Types of system cases:
 - Desktop
 - Tower
 - Small form factor (SFF)
 - Notebook
- Components of a system case

Lecture Focus Questions:

- Why must the case and the power supply be matched to the motherboard?
- How does the BTX form factor differ from the ATX form factor?
- What is the main difference between full, mid-, and mini-tower cases?
- What are the standard components typically included with a system case?

Video/Demo

 3.1.1 Cases and Form Factors

Time

10:04

Number of Exam Questions

5 questions

Total Time

About 20 minutes

Section 3.2: Power Supplies

Summary

This section discusses power supplies. Details covered include:

- Facts about power supplies:
 - They must be matched to the motherboard and case form factor
 - They convert AC current to DC current
 - Standard ATX Power supplies provide + 3.3 volts, +/- 5 volts, and +/- 12 volts
 - Each separate voltage output circuit is referred to as a rail
 - Most power supplies can receive both 110 and 220 volt power by toggling a switch
 - They are rated in watts
 - They can calculate a system's wattage requirements
 - Include a fan to cool the system
 - An ATX power supply provides soft power
 - They include connectors for powering various computer components
 - Connectors are standardized following the ATX specifications
 - They can detect symptoms of a bad power supply
- Personal safety when working with power supplies
- Common power supply connectors include:
 - 20-pin
 - 24-pin (20+4 pin)
 - 4-pin +12 volt power (P4)
 - 8-pin EPS +12 volt
 - 6-pin PCI Express
 - 4-pin accessory power
 - SATA power cable
 - 4-pin mini-Molex




PC Pro Exam Objectives:

- 8.0 Power Supply
 - Identify power supply connectors by sight or name.
 - Given a scenario with an existing motherboard and end user requirements, select the appropriate power supply based on power output, the number of available connectors, and the type of connectors used.
 - Given motherboard and power supply documentation, install a power supply in an existing case, connecting it to peripheral devices and the motherboard.
 - Given motherboard and power supply documentation, test the functionality of a power **supply**.

Lecture Focus Questions:

- How does the case form affect the type of power supply you purchase?
- What function does the red switch on a power supply perform? Why is this important?
- What is a *watt*? How does the watt rating for a power supply affect the devices you can use in a system?
- What is a *soft power* supply?
- Why must you be careful when using a proprietary power supply?

Video/Demo

| | Time |
|---|--------------|
|  3.2.1 Power Supplies | 10:48 |
|  3.2.3 Identifying Power Supply Components | 8:49 |
|  3.2.4 Changing the Power Supply | <u>16:03</u> |
| <i>Total</i> | <i>35:40</i> |

Lab/Activity

- Install a Power Supply

Number of Exam Questions

15 questions

Total Time

About 55 minutes

Section 3.3: Motherboards and Buses

Summary

This section discusses the details about motherboards and expansion buses in PC systems. Concepts covered include:

- The components of a typical motherboard:
 - Processor interface
 - Memory modules
 - Expansion slots
 - Onboard components
 - Faceplate connectors
 - Onboard internal connectors
 - BIOS chip
 - CMOS battery
 - Chipset
 - Jumpers
 - Documentation
- The process to install a motherboard

PC Pro Exam Objectives:



- 3.0 Expansion Slots
 - Given an existing system without documentation, identify expansion cards and slots by sight or by name, including ISA, PCI, AGP, PCI Express (1x, 2x, and 8x), and PCMCIA.
 - Given an existing system, select and install expansion cards based on bus type that meets end-user requirements.
- 6.0 Motherboard
 - Given a scenario where a new motherboard is required in a new or existing PC system, use system documentation and end-user requirements to select and install an appropriate motherboard.
 - Given motherboard and system case documentation, connect header devices and system case connectors to the motherboard.
 - Using the BIOS, enable and disable onboard devices.
 - Using manufacturer-supplied documentation and utility, update the BIOS on a motherboard to the latest revision.

Lecture Focus Questions:

- What factors will you consider when selecting a motherboard?
- What is the difference between the *northbridge* and *southbridge* chipsets on a motherboard?
- How can you add peripheral devices to a system?
- How are PCI and PCI Express different?
- What is the most common bus type for video cards on new motherboards?

Video/Demo

Time

| | |
|--|--------------|
|  3.3.1 Motherboard Components | 6:27 |
|  3.3.3 Installing a Motherboard | <u>14:40</u> |
| <i>Total</i> | <i>21:07</i> |

Lab/Activity

- Choose and Install a Motherboard

Number of Exam Questions

12 questions

Total Time

About 45 minutes

Section 3.4: Processors

Summary

This section examines the basics of selecting and installing a CPU. Concepts covered include:

- Considerations for choosing a processor:
 - Manufacturer
 - 32-bit or 64-bit processor
 - Speed
 - Multi-core
 - Cache
 - Process size
 - Hyper-threading
 - Throttling
 - Mobile processors
 - Virtualization
 - Integrated memory controller
 - Cooling
- Details about CPU performance
- Processor socket categories:
 - Pin Grid Array (PGA)
 - Land Grid Array (LGA)
- Commonly-implemented processor sockets
- Details when installing a CPU

PC Pro Exam Objectives:

- 2.0 CPU
 - Given an existing system with or without documentation, select an appropriate processor to meet end-user requirements.
 - Use correct procedures to install a CPU in a motherboard using a thermal pad or paste, a heat sink and fan, and power connectors.
 - View BIOS settings to verify proper installation of the processor.
 - Enable or disable hyper-threading in the BIOS.
 - Enable or disable VT support in the BIOS.
 - Monitor cooling fan speed and CPU temperature.

Lecture Focus Questions:

- What is the difference between the three levels of cache memory?
- What is the biggest limitation of using a 32-bit processor?
- What factors should be considered when comparing the speed of computers?
- What are the benefits of using a smaller process size during CPU manufacture?
- What is the difference between hyper-threading and multithreading?
- Under what circumstances might you choose to use *throttling*?
- What is virtualization? Which CPU features enable advanced virtualization support?
- What three components are used with a CPU to dissipate heat?

Video/Demo

- 3.4.1 Processor Concepts
- 3.4.5 Installing a Processor
- Total*

Time

8:08
5:02
13:10

Lab/Activity

- Select and Install a Processor 1
- Select and Install a Processor 2

Number of Exam Questions

24 questions

Total Time

About 60 minutes

Section 3.5: Memory

Summary

In this section students will learn about the factors that should be considered when selecting and installing memory. Concepts covered include:

- Types of Random Access Memory (RAM):
 - Dynamic RAM (DRAM)
 - Static RAM (SRAM)
- RAM standards:
 - SDRAM (Synchronous Dynamic RAM)
 - DDR (Double-Data Rate Synchronous Dynamic RAM)
 - DDR2
 - DDR3
 - RDRAM (Rambus DRAM)
- Increasing memory bandwidth using multiple channels
- Types of generic form factor labels:
 - SIMM
 - DIMM
 - SO-DIMM
 - RIMM
- Considerations when selecting RAM:
 - Packaging (form)
 - Capacity
 - Frequency
 - CAS latency/timing
 - Error correction
 - Buffered (registered)
 - Single- or double-sided
- Comparison of different types of memory:
 - SDRAM (Synchronous Dynamic RAM (DIMM)
 - RDRAM (Rambus DRAM) RIMM
 - DDR (Double-Data Rate synchronous Dynamic RAM) DIMM
 - DDR-2 DIMM
 - DDR-3 DIMM
 - 144-pin SODIMM
 - 200-pin SODIMM
- Considerations when selecting memory
- Issues when installing memory








PC Pro Exam Objectives:

- 5.0 Memory
 - Identify memory module form factors and motherboard memory slots by name or sight (SDRAM, DDR, DDR2, DDR3, Rambus, and Sodimm).
 - Given an existing system with or without documentation, select and install memory modules to meet end-user requirements. Important characteristics include speed, capacity, parity/ECC, dual or triple channels, and continuity modules.
 - Using the BIOS or Windows utilities, identify the amount of installed memory.
 - Use a memory module tester to identify malfunctioning memory.
 - Given a Windows system, configure virtual memory settings to meet scenario requirements.

Lecture Focus Questions:

- How does RAM differ from ROM?
- What is the difference between SRAM and DRAM?
- What are two advantages of using DDR3 memory over DDR2 memory?
- What are two places where the memory controller might be located in modern PC systems?
- Why is consulting the motherboard documentation so important when purchasing memory?
- You have DDR2 memory with a CAS latency of 6 and DDR3 memory with a CAS latency of 7. What can you tell about the relative speed of the two memory modules?
- What is the difference between ECC and registered memory?

Video/Demo

| | Time |
|---|--------------|
|  3.5.1 Memory | 7:09 |
|  3.5.2 Memory Types | 13:09 |
|  3.5.4 Memory Factors | 13:12 |
|  3.5.5 Memory Speed | 17:50 |
|  3.5.7 Memory Forms | 8:20 |
|  3.5.9 Selecting the Correct Memory Module | 10:26 |
|  3.5.10 Installing Memory | <u>5:01</u> |
| <i>Total</i> | <i>75:07</i> |

Lab/Activity

- Select Memory by Sight
- Install Triple Channel Memory

Number of Exam Questions

26 questions

Total Time

About 125 minutes

Section 3.6: BIOS

Summary

This section examines information about the BIOS. Concepts covered include:

- Basic Input Output System (BIOS) details.
- Complementary Metal-Oxide Semiconductor (CMOS) details.
- Common reasons for editing the CMOS settings.
- The process to start up the system.






PC Pro Exam Objectives:

- 5.0 Memory
 - Using the BIOS or Windows utilities, identify the amount of installed memory.
- 6.0 Motherboard
 - Using the BIOS, enable and disable onboard devices.
 - Using manufacturer-supplied documentation and utilities, update the BIOS on a motherboard to the latest revision.
- 10.0 Security
 - Configure BIOS security settings such as configuring drive lock, setting user and administrator passwords, enabling/disabling chassis intrusion detection, and enabling/disabling TPM.

Lecture Focus Questions:

- What are the functions of the BIOS?
- What is the role of CMOS? How does it differ from the BIOS?
- Why does the CMOS require a battery?
- What might be some common reasons for editing the CMOS settings?
- What determines the keystroke to open a CMOS editor? How can you find this information?
- What functions are performed in the POST process?

Video/Demo

| | Time |
|--|--------------|
|  3.6.1 BIOS and CMOS | 13:13 |
|  3.6.2 PC Boot Process | 4:55 |
|  3.6.4 Editing the BIOS | 17:05 |
|  3.6.5 Editing the BIOS 2 | 22:16 |
|  3.6.6 Flashing the BIOS | <u>10:22</u> |
| <i>Total</i> | <i>67:51</i> |

Lab/Activity

- Find BIOS Settings
- Clear CMOS Settings

Number of Exam Questions

10 questions

Total Time

About 90 minutes

Section 3.7: Expansion Cards

Summary

This section examines using expansion cards to connect devices to the PC system. Common expansion buses in a PC system include:

- Peripheral Component Interconnect (PCI)
- Mini-PCI
- Peripheral Component Interconnect Express (PCIe)
- Accelerated Graphics Port (AGP)
- Audio/Modem Riser (AMR)
- Communications Network Rise (CNR)

Students will learn how to:

- Identify expansion buses and cards by sight.
- Install an expansion card.

PC Pro Exam Objectives:



- 3.0 Expansion Slots
 - Given an existing system without documentation, identify expansion cards and slots by sight or by name, including ISA, PCI, AGP, PCI Express (1x, 2x, and 8x), and PCMCIA.
 - Given an existing system, select and install expansion cards based on bus type that meets end-user requirements.

Lecture Focus Questions:

- What is an advantage of the PCIe bus over the PCI bus?
- Which type of devices typically use mini-PCI cards?
- Which buses are commonly used by graphics cards?
- What type of slot can a PCIe x1 card be placed in?
- How are cards added to an AMR slot?

Video/Demo

Time

| | |
|--|-------------|
|  3.7.1 Expansion Buses and Slots | 3:36 |
|  3.7.3 Installing an Expansion Card | <u>5:29</u> |
| <i>Total</i> | <u>9:05</u> |

Lab/Activity

- Install Expansion Cards

Number of Exam Questions

8 questions

Total Time

About 25 minutes

Section 3.8: Video

Summary

In this section students will learn about facts that should be considered when choosing a video card. Concepts covered include:

- Bus type
- Monitor interface
- Processing capabilities
- Multi-GPU
- Memory
- Display quality
- High-bandwidth Digital Content Protection (HDCP) support
- TV input and output
- HDMI audio
- DirectX/OpenGL
- Details about installing video cards

PC Pro Exam Objectives:

- 13.0 Video
 - Given an existing system with an open video slot and documentation, select and install a video card to meet end-user requirements.
 - Identify video connectors and cables by sight or name.
 - Given an existing system with one or more installed video cards, select one or more monitors to meet end-user requirements.
 - Connect one or more monitors to an installed video card.
 - Use Windows utilities to configure display and video adapter settings, including resolution, native resolution, color depth, dual monitor configuration, and refresh rate.

Lecture Focus Questions:

- How does the video card affect the quality of the image on the monitor?
- Which type of DVI connector can be used to send either analog or digital signals?
- How does the GPU increase the video performance?
- What advantages are provided by SLI and CrossFire?
- What is the general function of HDCP? When should you be concerned with an HDCP video card or monitor?

- What is the difference between ATSC and NTSC? Which format would you most likely choose if you wanted to watch broadcast TV in the United States?

Video/Demo**Time** 3.8.1 Video Cards

3:31

 3.8.3 Installing a Video Card6:41*Total**10:12***Lab/Activity**

- Upgrade a Video Card

Number of Exam Questions

6 questions

Total Time

About 30 minutes

Section 3.9: Audio

Summary

In this section students will learn about facts that should be considered when purchasing and installing a sound card. Concepts covered include:

- Bus support
- Channels
- Sampling rate
- Feature support
- Analog input and output
- Digital audio
- Additional ports
- Common file types used to save digital audio into:
 - WAV (Windows Standard)
 - AIFF (Audio Interchange File Format)
 - AU (UNIX standard)
 - MP3 (MPEG-1 Layer 3)
 - AAC (Advanced Audio Coding)
 - RA or RAM (Real Networks)
 - WMA (Windows Media Audio)
 - MIDI (not a true audio file)
- Details about configuring system sound
- Troubleshooting sound problems
- Input and output ports for connecting external audio-related devices:
 - Mini TRS
 - Toslink
 - RCA
 - DB-15
 - Firewire
 - HDMI

Students will learn how to:

- Select a sound card for a given scenario.
- Create a multi-media system by installing sound devices.

PC Pro Exam Objectives:

- 1.0 Audio
 - Identify audio connectors and cables by sight or name.
 - Given an existing system with or without documentation, select and install a sound card to meet end-user requirements.




- Given an existing system, connect external audio equipment to sound card audio connectors.

Lecture Focus Questions:

- You installed a PATA DVD drive, but when you play a CD no sound is played on the sound card. Other sounds play fine. What should you do to correct the problem?
- What might you need to do to play AIFF files on a Windows computer?
- What color typically indicates the speaker port on a sound card? What color is used for the microphone?
- Which connectors are used for digital S/PDIF audio?
- What is a DB-15 connector on a sound card typically used for?

Video/Demo

Time

| | |
|--|--------------|
|  3.9.1 Digital Audio | 9:04 |
|  3.9.2 Sound Cards | 7:22 |
|  3.9.4 Managing Audio Devices | <u>15:50</u> |
| <i>Total</i> | <i>32:16</i> |

Lab/Activity

- Select and Install a Sound Card

Number of Exam Questions

7 questions

Total Time

About 55 minutes

Section 3.10: Cooling

Summary

This section discusses the following methods that can be used to cool the system:

- Heat sensors
- Fans
- Heat sink
- Rounded cables
- Liquid cooling
- Room temperature
- Ventilation

PC Pro Exam Objectives:

- 2.0 CPU
 - Use correct procedures to install a CPU in a motherboard using a thermal pad or paste, a heat sink and fan, and power connectors.
 - View BIOS settings to verify proper installation of the processor.
 - Monitor cooling fan speed and CPU temperature.

Lecture Focus Questions:

- How does adequate cooling improve performance and extend the life of components?
- How does organizing and attaching cables and wires in and around a computer system help with internal airflow?
- Why should you keep the system case cover on during normal operations?
- When might you want to add liquid cooling to a computer?
- What is the difference between a heat sink and a heat spreader?
- What is the function of a thermal pad? When should it be used?

Video/Demo

 3.10.1 System Cooling

Time

11:30

Number of Exam Questions

4 questions

Total Time

About 20 minutes

Section 4.1: Peripheral Devices

Summary

In this section students will learn how to connect peripheral devices through an external port to your computer. Concepts covered include:

- Connection types:
 - PS/2
 - USB
 - Firewire
 - Serial
 - Parallel
 - PC Card (PCMCIA)
 - PCI Express (ExpressCard)
- Troubleshooting techniques specific to the following devices:
 - Input devices
 - USB/Firewire
- Common interfaces used for connecting input devices include:
 - 6-pin mini-DIN (PS/2 connector) for keyboard and mouse
 - USB for keyboard, mouse, and other devices
 - Infrared and wireless connections for keyboards, mouse, and other devices
 - DB-9 (serial) connector for specialized input devices
- Considerations for selecting the following input devices:
 - Keyboard
 - Mouse
 - Touchscreen
 - Digitizer
 - Game pad
 - Scanner
 - Barcode reader
 - KVM switch

Students will learn how to:

- Connect peripheral devices using the appropriate cables and connectors.
- Add USB and Firewire support using adapter cards and motherboard header devices.
- Edit peripheral device settings in the BIOS.
- Install, update, and roll back device drivers.
- Enable, disable, and uninstall devices using Device Manager.

PC Pro Exam Objectives:

- 4.0 External Devices (USB), Firewire, parallel, keyboard/mouse, serial)
 - Identify external device connectors and cables by sight or name.
 - Connect external devices using the appropriate connectors and cables.
 - Install drivers for external devices.
 - In the Windows operating system, prepare devices for safe removal.

Lecture Focus Questions:

- What is the difference between the way serial and parallel devices transmit data?
- Why might you have a resource sharing problem if you install a serial device on both COM 2 and COM 4?
- What type of ports are common parallel devices such as printers and scanners connected to?
- What types of peripheral devices does USB support?
- How can you verify that a device is compatible with the version of Windows on the system?
- What is different about installing a USB device driver and installing drivers for other device types?

Video/Demo

- 4.1.1 Peripheral Devices
- 4.1.3 Input Devices
- Total*

Time

4:11
3:32
7:43

Lab/Activity

- Connect a KVM Switch

Number of Exam Questions

4 questions

Total Time

About 25 minutes

Section 4.2: Serial, Parallel, and PS/2

Summary

In this section students will learn the interfaces used for connecting devices to computer systems. Concepts covered include:

- Interfaces for connecting devices:
 - Serial devices
 - Parallel devices
 - PS/2 devices
- Identifying common connectors:
 - Serial Connectors
 - Parallel connectors
 - PS/2 Connectors

Students will learn how to:

- Select the correct port to use to install different peripheral devices.
- Install peripheral devices such as keyboards, serial devices, and parallel devices.

PC Pro Exam Objectives:

- 4.0 External Devices (USB), Firewire, parallel, keyboard/mouse, serial)
 - Identify external device connectors and cables by sight or name.
 - Connect external devices using the appropriate connectors and cables.
 - Install drivers for external devices.
 - In the Windows operating system, prepare devices for safe removal.

Lecture Focus Questions:

- What is the difference between serial and parallel communications?
- Theoretically, which form of communication (serial or parallel) provides faster communication?
- Generally speaking, which form of communication (serial or parallel) will provide communication over longer distances without amplification?
- What is the relationship between the serial port and the COM ports?
Between the parallel port and LPT ports?
- What is the difference between SPP and EPP standards?
- What are three ways you can tell the difference between a keyboard and mouse PS/2 port?

- How do you configure a computer to use EPP?

Video/Demo**Time**

 4.2.1 Serial, Parallel, and PS/2

9:19

Lab/Activity

- Connect Devices

Number of Exam Questions

7 questions

Total Time

About 25 minutes

Section 4.3: USB

Summary

This section provides an overview of using USB devices to connect to computer system. Details about the following are presented:

- USB versions:
 - 1.0/1.1
 - 2.0
 - 3.0
- Types of USB connectors:
 - A Connector
 - B Connector
 - Mini Connector (4 pin)
 - Mini Connector (5 pin)
 - Micro Connector
- Methods to connect a USB device to a computer:
 - Directly to a USB port on a computer.
 - To an external USB hub.
- Types of USB devices:
 - Self-powered
 - Bus powered

Students will learn how to:

- Identify typical USB connectors and ports.
- Connect devices such as a printer and a camera.
- Select and install USB devices based on customer requirements.



PC Pro Exam Objectives:

- 4.0 External Devices (USB), Firewire, parallel, keyboard/mouse, serial)
 - Identify external device connectors and cables by sight or name.
 - Connect external devices using the appropriate connectors and cables.
 - Install drivers for external devices.
 - In the Windows operating system, prepare devices for safe removal.

Lecture Focus Questions:

- What are the differences between USB 1.1 and 2.0?
- What types of devices are typically self-powered? Bus-powered?
- What are the power requirements for low and high-powered bus powered devices?
- Where do you typically connect the B end of a USB cable?

Video/Demo

| | |
|--|--------------|
|  4.3.1 Universal Serial Bus (USB) | 15:56 |
|  4.3.2 USB Components | <u>2:00</u> |
| <i>Total</i> | <i>17:56</i> |

Time

Lab/Activity

- Install USB Devices
- Install USB Adapter

Number of Exam Questions

7 questions

Total Time

About 40 minutes

Section 4.4: IEEE 1394 (Firewire)

Summary

This section discusses using IEEE 1394 standards to create a high-performance serial bus. Details covered include:

- Trademarked names for IEEE 1394-based products
 - Firewire
 - i.Link
 - Lynx
- Firewire specifics
- IEEE 1394 standards
 - 1394
 - 1394.A
 - 1394.B
 - 1394.3
- Details about IEEE 1394
- Common IEEE 1394 cables and connectors
 - 6-pin connector
 - 4-pin connector

Students will learn how to:

- Connect peripheral devices to a Firewire port.

PC Pro Exam Objectives:

- 4.0 External Devices (USB), Firewire, parallel, keyboard/mouse, serial)
 - Identify external device connectors and cables by sight or name.
 - Connect external devices using the appropriate connectors and cables.
 - Install drivers for external devices.
 - In the Windows operating system, prepare devices for safe removal.

Lecture Focus Questions:

- What are the additional functions of a six-wire IEEE 1394 over a four-wire IEEE 1394 cable?
- What is the maximum cable length of an IEEE 1394 cable?
- What are common devices that use IEEE 1394?

Video/Demo 4.4.1 Firewire**Time**

3:31

Lab/Activity

- Connect Firewire Devices

Number of Exam Questions

4 questions

Total Time

About 15 minutes

Section 4.5: Display Devices

Summary

This section discusses details about monitors and video interfaces. Concepts covered include:

- Considerations when choosing a CRT monitor:
 - Screen size
 - Resolution
 - Display type
 - Dot pitch
 - Refresh rate
 - Interlacing
 - Additional features
- Characteristics of LCD monitors:
 - Display characteristics
 - Display types
 - Backlight method
 - Aspect ratio
 - Resolution
 - HDTV support
 - Screen size
 - Dead pixels
 - Filters
- Types of LED monitors:
 - Edge-lit backlights using white LEDs (EL-WLED)
 - RGB LED
 - Organic Light-Emitting Diode (OLED)
- Types of video interfaces:
 - D-sub
 - DVI-A
 - DVI-D
 - DVI-I
 - DMS-59
 - Composite video
 - S-video
 - HDTV (component)
 - HDMI
 - DisplayPort
 - Cable TV (F-type)
- Settings for the monitor and video adapter:
 - Resolution
 - Color depth
 - Monitor relationship
 - Refresh rate

- Hardware acceleration
- Color management

Students will learn how to:







- Identify digital and analog connectors by sight.
- Select the appropriate monitor based on customer requirements and system support.
- Configure display properties in Windows including dual monitor support.

PC Pro Exam Objectives:

- 13.0 Video
 - Given an existing system with an open video slot and documentation, select and install a video card to meet end-user requirements.
 - Identify video connectors and cables by sight or name.
 - Given an existing system with one or more installed video cards, select one or more monitors to meet end-user requirements.
 - Connect one or more monitors to an installed video card.
 - Use Windows utilities to configure display and video adapter settings, including resolution, native resolution, color depth, dual monitor configuration, and refresh rate.

Lecture Focus Questions:

- What feature of a non-interlaced monitor makes it a better quality than an interlaced monitor?
- Which LCD display type typically has the fastest response time? What makes a monitor with a slow response time a poor choice?
- Which LCD display type has the best color representation and viewing angle?
- What are two methods used for the backlight in LCD monitors?
- Which aspect ratio is used by high definition movies and television?
- What is the difference between 720p, 1080p, and 1080i? Which would you choose for full HDTV support?
- How can you tell the difference between a DVI-A and a DVI-D cable?
- Which connectors are used for an analog video signal? Which connectors provide only a digital signal?
- What are the advantages of dual link cables over single link cables?
- What is the difference between *composite* and *component* video?
- When might you see an F-type connector on a video card?

| Video/Demo | Time |
|---|--------------|
|  4.5.1 CRT Monitors | 15:04 |
|  4.5.3 LCD Monitors | 6:27 |
|  4.5.5 LED and Plasma Monitors | 14:54 |
|  4.5.7 Videos Interfaces | 7:24 |
|  4.5.13 Configuring Display Settings | 8:46 |
|  4.5.16 Optimizing Video | <u>8:01</u> |
| <i>Total</i> | <i>60:36</i> |

Lab/Activity

- Connect Monitors
- Install a VGA Monitor
- Choose and Configure a Monitor
- Install an HDTV Monitor
- Configure Dual Monitors
- Optimize Video Settings

Number of Exam Questions

16 questions

Total Time

About 130 minutes

Section 4.6: Device Installation

Summary

This section examines guidelines and considerations to take into account when installing devices. Concepts covered include:

- Factors related to installing hardware devices:
 - System resources
 - Plug and Play (PnP)
 - Driver
 - Hot swapping/plugging
- Guidelines for installing devices
- Using Device Manager to view installed devices and their status.

Students will learn how to:

- Install devices using drivers included with Windows and drivers available on disc.
- Use Device Manager to verify the proper installation of devices.
- Safely remove hot swappable devices.
- Configure Windows to search Windows Update for updated drivers.
- Configure driver signing behavior in Windows.
- Update device drivers.

PC Pro Exam Objectives:

- 4.0 External Devices (USB), Firewire, parallel, keyboard/mouse, serial)
 - Identify external device connectors and cables by sight or name.
 - Connect external devices using the appropriate connectors and cables.
 - Install drivers for external devices.
 - In the Windows operating system, prepare devices for safe removal.




Lecture Focus Questions:

- What type of hardware devices use DMA channels to communicate directly with RAM?
- When is manual configuration of a device necessary?
- What system rights are required to install devices?
- What is the role of the *driver*?

- What is the importance of driver signing? What should you be aware of when using a driver that is not signed?
- How do you safely remove a hot swappable component?
- How do you verify that a device is compatible with the version of Windows you are running before you purchase it?
- Why is it good practice to check the manufacturer's Web site for an updated driver, rather than using the driver included on the installation disk?

Video/Demo

Time

| | |
|---|--------------|
|  4.6.1 Device Installation | 5:47 |
|  4.6.2 Installing Devices | 15:06 |
|  4.6.3 Managing Devices | <u>17:52</u> |
| <i>Total</i> | <u>38:45</u> |

Lab/Activity

- Manage Devices

Number of Exam Questions

5 questions

Total Time

About 55 minutes

Section 5.1: Storage Devices

Summary

This section provides an overview of storage devices. Concepts covered include:

- Common storage devices:
 - Floppy disks
 - Hard disks
 - Optical discs
 - Flash devices
 - Solid state drives
 - Tape drives
- Common storage device interfaces:
 - Parallel ATA (PATA)
 - Serial ATA (SATA)
 - Small Computer System Interface (SCSI)
 - USB/Firewire
 - Ethernet

PC Pro Exam Objectives:

- 11.0 Storage
 - Given a scenario and a set of user requirements, select the appropriate storage solution (such as flash storage, hard disk, optical disk, or tape drive).
 - Identify SATA and IDE/ATA data connectors, power connectors, and cables by name or by sight.
 - Given an existing system and hard disk labels, install SATA and IDE/ATA storage devices using the appropriate cables, power connectors, and device/jumper settings.

Lecture Focus Questions:

- What are the advantages of hard disks over all other forms of storage media?
- How do optical drives store and read data from a disc?
- How does a flash device differ from a floppy disk or a hard disk?
- How does SATA improve upon the limitations of PATA?
- What is a typical application for SCSI devices?
- Which storage device types are magnetic media? Which are optical? Solid state?
- Which type of interface would you commonly use to attach a flash card reader to the computer?

Video/Demo

| |
|---|
|  5.1.1 Storage Devices |
|  5.1.3 Storage Device Interfaces |
| <i>Total</i> |

Time

| |
|-------------|
| 23:47 |
| <u>7:31</u> |
| 31:18 |

Number of Exam Questions

13 questions

Total Time

About 55 minutes

Section 5.2: Floppy Drives

Summary

This section discusses installing and troubleshooting floppy drives. Concepts covered include:

- Facts when installing floppy drives
- Conditions when troubleshooting floppy drives

Students will learn how to:

- Install a floppy drive, connecting the necessary data and power cables.

Lecture Focus Questions:

- How do you change the drive letter for a floppy drive?
- How do you identify pin 1 on a floppy drive cable?
- Where is the software driver for floppy disks located? How does the system recognize which type of drive is installed?
- What precautions should you take with floppy disks?

Video/Demo

Time

📺 5.2.1 Installing a Floppy Drive

10:52

Lab/Activity

- Install a Floppy Drive

Number of Exam Questions

4 questions

Total Time

About 25 minutes

Section 5.3: Parallel ATA (IDE)

Summary

This section discusses installing PATA devices.

Students will learn how to:

- Install PATA devices by setting jumpers and connecting data and power cables.



PC Pro Exam Objectives:

- 11.0 Storage
 - Given a scenario and a set of user requirements, select the appropriate storage solution (such as flash storage, hard disk, optical disk, or tape drive).
 - Identify SATA and IDE/ATA data connectors, power connectors, and cables by name or by sight.
 - Given an existing system and hard disk labels, install SATA and IDE/ATA storage devices using the appropriate cables, power connectors, and device/jumper settings.
 - Configure BIOS settings for hard disks (including drive detection, SATA mode, and boot order).

Lecture Focus Questions:

- With multiple devices on a single data cable, how do you identify which drive is the master and which is the slave?
- How should you configure a single device on one channel?
- What is cable select and how does it work?
- You have an optical drive and a hard disk in a system with two PATA channels. How should you install the devices for best performance?
- How would you increase the number of hard drives after reaching the limit for the ATA connectors the motherboard has on board?

Video/Demo

| | Time |
|--|--------------|
|  5.3.1 ATA/IDE Devices | 13:55 |
|  5.3.2 Installing an ATA Device | <u>10:05</u> |
| <i>Total</i> | <i>24:00</i> |

Lab/Activity

- Install PATA Devices

Number of Exam Questions

8 questions

Total Time

About 40 minutes

Section 5.4: Serial ATA

Summary

This section discusses installing a Serial ATA device.

- SATA standards:
 - SATA 1.5 Gbps (SATA 1)
 - SATA 3 Gbps (SATA II or SATA-IO)
 - SATA 6 Gbps
 - eSATA
- Options to configure the SATA mode in the BIOS:
 - IDE
 - AHCI
 - RAID

Students will learn how to:

- Install SATA devices.
- Add eSATA ports and connect eSATA devices.



PC Pro Exam Objectives:

- 11.0 Storage
 - Given a scenario and a set of user requirements, select the appropriate storage solution (such as flash storage, hard disk, optical disk, or tape drive).
 - Identify SATA and IDE/ATA data connectors, power connectors, and cables by name or by sight.
 - Given an existing system and hard disk labels, install SATA and IDE/ATA storage devices using the appropriate cables, power connectors, and device/jumper settings.
 - Configure BIOS settings for hard disks (including drive detection, SATA mode, and boot order).

Lecture Focus Questions:

- What are the main differences between PATA and SATA?
- What enhancements does SATA II (SATA-IO) provide over the original SATA specifications?
- What is eSATA and when would you use it?
- What are two possible ways to configure a SATA II drive into a system that only supports SATA I?

Video/Demo**Time**

| | |
|--|--------------|
|  5.4.1 Serial ATA | 9:31 |
|  5.4.2 Installing a Serial ATA Device | <u>5:33</u> |
| <i>Total</i> | <i>15:04</i> |

Lab/Activity

- Install SATA Devices

Number of Exam Questions

4 questions

Total Time

About 30 minutes

Section 5.5: SCSI

Summary

This section discusses configuring SCSI devices. Concepts covered include:

- Steps to configure SCSI devices
- SCSI Host Adapters
- SCSI Cable and Connector Types:
 - IDC
 - DB
 - Centronics
 - HD (high density)
 - VHD (very high density)
- SCSI IDs
- Termination
- Examples of termination
- CMOS settings
- Device drivers on a SCSI bus can use one of three kinds of device drivers:
 - Advanced SCSI Programming Interface (ASPI)
 - Common Access Method (CAM)
 - Layered Device Driver Architecture (LADDR)

Students will learn how to:

- Install a SCSI adapter in a PC system.
- Connect SCSI devices to a SCSI adapter.
- Set the ID of a SCSI device.
- Terminate the SCSI bus.

Lecture Focus Questions:

- What types of systems typically employ SCSI storage devices?
- How are SCSI devices connected to a PC system?
- What do SCSI connectors look like?
- What is the function of the SCSI ID number?
- How is termination configured on a SCSI bus?
- What SCSI standards are currently used in PC systems?

| Video/Demo | Time |
|--|--------------|
| 📺 5.5.1 SCSI | 17:39 |
| 📺 5.5.2 SCSI Standards | 13:23 |
| 📺 5.5.4 Installing a SCSI Adapter and Device | <u>9:15</u> |
| <i>Total</i> | <i>40:17</i> |

Number of Exam Questions

5 questions

Total Time

About 50 minutes

Section 5.6: Optical Media

Summary

This section provides an overview of selecting and using optical media. Concepts covered include:

- Types of Compact disc (CD) formats
- Digital Video Disc (DVD) basics
- Blu-ray Disc (BD) basics
- Factors to consider when selecting an optical drive:
 - Interface
 - Drive function
 - Speed
 - Format
 - Loading type
 - Cache
 - Additional Features
- Fundamentals when working with optical drives.
- Precautions to protect discs.





PC Pro Exam Objectives:

- 11.0 Storage
 - Given a scenario and a set of user requirements, select the appropriate storage solution (such as flash storage, hard disk, optical disk, or tape drive).
 - Identify SATA and IDE/ATA data connectors, power connectors, and cables by name or by sight.
 - Given an existing system and hard disk labels, install SATA and IDE/ATA storage devices using the appropriate cables, power connectors, and device/jumper settings.
 - Configure BIOS settings for hard disks (including drive detection, SATA mode, and boot order).

Lecture Focus Questions:

- How much data does a CD typically hold? DVD? Blu-ray disc?
- What does the book color of the compact disc formats identify?
- What is the difference between DVD-R and DVD+R?
- An optical drive speed is identified as 24x10x70. What does each of the numbers indicate?

- A DVD drive and a Blu-ray drive can both read data at 4x speeds. How do the drives compare in speed and the amount of data that can be transferred?
- What is the difference between *dual layer* and *dual sided* discs?
- How are Blu-ray drives made compatible with both Blu-ray and CD/DVD discs?
- What is the difference between BD-R and BD-RE discs?

| Video/Demo | Time |
|---|--------------|
|  5.6.1 CD Drives | 11:39 |
|  5.6.3 DVD Drives | 14:21 |
|  5.6.4 Blu-ray | 6:48 |
|  5.6.6 Choosing an Optical Drive | <u>4:03</u> |
| <i>Total</i> | <i>36:51</i> |

Number of Exam Questions

10 questions

Total Time

About 55 minutes

Section 5.7: File System

Summary

This section provides the basic information about using a file system to organize and store data. Concepts covered include:

- The main components of a file system:
 - Partition
 - Volume
 - Directory
 - File
- Windows supports two different kinds of disks:
 - Basic
 - Dynamic
- Managing partitions and volumes
- The characteristics of the file systems supported in Windows systems:
 - FAT32
 - NTFS
- The process of formatting
- Disk and volume statuses in Disk Management

Students will learn how to:







- Format drives.
- Use the **Convert** utility to convert a drive to NTFS.

PC Pro Exam Objectives:

- 11.0 Storage
 - Given a newly installed drive and a set of end-user requirements, use Disk Management to configure the drive for use by Windows.
 - Upgrade to a dynamic disk if required.
 - Create volumes or partitions.
 - Assign a drive letter.
 - Format the drive using an appropriate file system (such as FAT32, NTFS, or FAT64) based on end user requirements.
 - Using Disk Management in Windows, add space to an existing volume by extending the volume or configuring a mount point.
 - Manage the file system type on an existing drive.
 - Convert a file system to NTFS
 - Reformat a partition to use the FAT32 file system.

Lecture Focus Questions:

- What is the difference between a *partition* and a *volume*?
- What advantages does NTFS provide over FAT32?
- Why should you back up all data before formatting a drive?
- How can you reformat a drive from FAT to NTFS without losing all of the data?
- How would you convert a drive from NTFS to FAT32?
- Which operating systems can use NTFS?

| Video/Demo | Time |
|--|--------------|
|  5.7.1 File System | 5:11 |
|  5.7.2 Viewing File System Components | 12:49 |
|  5.7.4 Partitions and Disks | 22:12 |
|  5.7.6 Creating Volumes | 16:40 |
|  5.7.8 Formatting and Converting | 17:28 |
|  5.7.10 Disk Status | <u>3:01</u> |
| <i>Total</i> | <i>77:21</i> |

Lab/Activity

- Create Volumes
- Format Drives

Number of Exam Questions

21 questions

Total Time

About 115 minutes

Section 5.8: RAID

Summary

In this section students will learn about using a RAID array to improve performance and/or provide fault tolerance. Concepts covered include:

- Common RAID levels:
 - RAID 0 (striping)
 - RAID 1 (mirroring)
 - RAID 5 (striping with distributed parity)
- Methods of implementing RAID:
 - Hardware
 - Software
 - Operating system
- A typical method for configuring software RAID
- The steps to install the operating system on a RAID array

PC Pro Exam Objectives:



- 11.0 Storage
 - Configure common RAID arrays using motherboard utilities or Windows Disk Management.

Lecture Focus Questions:

- How does a RAID 0 configuration improve disk read and write performance?
- With a RAID 0 configuration, what happens to your data if a drive in the set fails?
- What is the minimum number of disks required for a RAID 5 configuration?
- What advantages does RAID 5 have over RAID 1?
- What is JBOD? How does it differ from RAID?

Video/Demo

Time

| | |
|---|--------------|
|  5.8.1 RAID | 13:02 |
|  5.8.3 Configuring RAID Arrays | <u>16:41</u> |
| <i>Total</i> | <u>29:43</u> |

Lab/Activity

- Create RAID Arrays
- Implement a RAID Solution

Number of Exam Questions

8 questions

Total Time

About 55 minutes

Section 5.9: Adding Storage

Summary

This section discusses strategies for configuring a mount point and extending the volume.

Students will learn how to:

- Mount a partition to a folder.
- Extend existing volumes.



PC Pro Exam Objectives:

- 11.0 Storage
 - Given a newly installed drive and a set of end-user requirements, use Disk Management to configure the drive for use by Windows.
 - Upgrade to a dynamic disk if required.
 - Create volumes or partitions.
 - Assign a drive letter.
 - Format the drive using an appropriate file system (such as FAT32, NTFS, or FAT64) based on end user requirements.
 - Using Disk Management in Windows, add space to an existing volume by extending the volume or configuring a mount point.
 - Manage the file system type on an existing drive.
 - Convert a file system to NTFS
 - Reformat a partition to use the FAT32 file system.

Lecture Focus Questions:

- What are the requirements for creating a mount point?
- Which types of volumes support mount points?
- What are the prerequisites for extending a volume on a basic disk?
- What advantages do dynamic disks provide when extending volumes?
- What is the difference between an extended volume and a spanned volume?

Video/Demo

| | Time |
|---|--------------|
|  5.9.1 Adding Storage | 10:45 |
|  5.9.2 Creating Mount Points and Extending Volumes | <u>15:32</u> |
| <i>Total</i> | <i>26:17</i> |

Lab/Activity

- Add Space to Existing Volumes

Number of Exam Questions

3 questions

Total Time

About 35 minutes

Section 5.10: Disk Optimization

Summary

This section examines details about hard disk optimization to improve a computer's overall performance. Concepts covered include:

- Optimize hard disk performance:
 - Upgrade the hard disk
 - Upgrade the disk interface
- Methods to clean up a disk drive:
 - Disk Cleanup
 - Disk Defragmenter
 - Check Disk

Students will learn how to:

- Perform Disk Cleanup.
- Defragment a hard disk.
- Check a hard disk for errors.

PC Pro Exam Objectives:



- 11.0 Storage
 - Use Windows utilities (Explorer, attrib command) to find or set drive, folder, or file attributes.
 - Schedule and run Disk Cleanup and Disk Defragmentation in Windows.

Lecture Focus Questions:

- What tasks does Disk Cleanup perform?
- Why does fragmentation take place? How does defragmenting improve how a system performs?
- How is a *lost cluster* different from a *cross-linked file*?
- Which utility could you use to detect and mark bad clusters?

Video/Demo

Time

| | |
|---|--------------|
|  5.10.1 Storage Optimization | 19:59 |
|  5.10.2 Optimizing Disks | <u>13:26</u> |
| <i>Total</i> | <u>33:25</u> |

Lab/Activity

- Perform Disk Maintenance

Number of Exam Questions

4 questions

Total Time

About 45 minutes

Section 6.1: Networking Overview




Summary

This section provides an overview of networking. Concepts covered include:

- The components that make a network:
 - Computer systems
 - Network devices
 - Transmission medium
 - Network interfaces
 - Protocols
- The role of networks
- The types of networks:
 - Peer-to-peer
 - Client/server
- Classifying networks based on size:
 - Local Area Network (LAN)
 - Wide Area Network (WAN)
 - Metropolitan Area Network (MAN)
 - Personal Area Network (PAN)
- Types of network topologies:
 - Physical
 - Logical
- Common physical topologies:
 - Bus
 - Ring
 - Star
 - Mesh

Lecture Focus Questions:

- In what ways does a network benefit a company? What is the main drawback to implementing a network?
- Why are *protocols* important for networking?
- What are the advantages of a client/server network when compared to a peer-to-peer network?
- What factor usually causes LANs to have a higher *bandwidth* than WANs?

| Video/Demo | Time |
|--|--------------|
|  6.1.1 Networking | 9:17 |
|  6.1.2 Network Types | 9:34 |
|  6.1.4 Network Topologies | <u>13:27</u> |
| <i>Total</i> | <i>32:18</i> |

Number of Exam Questions

18 questions

Total Time

About 60 minutes

Section 6.2: Network Hardware

Summary

This section provides an overview of network hardware. Concepts covered include:

- Hardware devices used on a network:
 - Media
 - Network adapter
 - Hub
 - Switch
 - Router
 - Bridge
- Details about network adapters


PC Pro Exam Objectives:

- 7.0 Networking
 - Given a scenario and networking requirements, select the necessary connectivity hardware (such as wired network adapters, wireless network adapters, and networking devices).

Lecture Focus Questions:

- What is the transmission medium for wireless networks?
- What is the difference between half-duplex mode and full-duplex mode?
- What are the main differences between a hub and a switch? What makes a switch a better choice for many networks?
- Which device would you use to connect two network segments with different subnet addresses?
- What type of device connects hosts using different transmission media on the same subnet?
- What letters are used in Ethernet standards to identify copper cables?
- Which networking types are most readily available in every part of the country?
- How does DSL provide support for both analog and digital data on the same telephone line?

Video/Demo**Time**

| | |
|---|--------------|
|  6.2.1 Network Devices 1 | 16:18 |
|  6.2.2 Network Devices 2 | 15:46 |
|  6.2.4 Networking Adapters | <u>12:13</u> |
| <i>Total</i> | <i>44:17</i> |

Lab/Activity

- Select and Install a Network Adapter

Number of Exam Questions

9 questions

Total Time

About 65 minutes

Section 6.3: Networking Media

Summary

This section discusses the following networking media:

- Coaxial cables:
 - Components that make up a coaxial cable:
 - Concentric metallic conductors:
 - Inner conductor
 - Mesh conductor
 - Insulator
 - PVC sheath
 - Advantages and disadvantages
 - Grades of coaxial cable:
 - RG-58
 - RG-59
 - RG-6
 - RG-8
 - Connectors used with coaxial cable:
 - F-Type
 - BNC
- Twisted pair cables:
 - Components that make up twisted pair cabling
 - Advantages and disadvantages
 - Grades of unshielded twisted pair (UTP) cable types:
 - Phone cable
 - Cat 3
 - Cat 5
 - Cat 5e
 - Cat 6
 - Connectors used with twisted pair cables:
 - RJ-11
 - RJ-45
 - Cable configurations:
 - Straight-through
 - Cross-over
- Fiber Optic cabling:
 - Components that make up a fiber optic cable
 - Advantages and disadvantages
 - Types of fiber cables:
 - Single Mode
 - Multi-mode
 - Connector types for fiber optic cabling:
 - ST Connector
 - SC Connector

- LC Connector
- MT-RJ Connector

Students will learn how to:

- Select the appropriate network card, cable, and connector type for a given network.
- Install a network card.

PC Pro Exam Objectives:

- 7.0 Networking
 - Identify Ethernet networking cables and connectors by sight or name.
 - Given a scenario and networking requirements, select the necessary connectivity hardware (such as wired network adapters, wireless network adapters, and networking devices).

Lecture Focus Questions:

- What are the advantages of using coaxial cable? Disadvantages?
- Which coaxial cable grade is usually used with cable and satellite TV?
- Why are wires twisted together in twisted pair cables?
- What is the difference between STP and UTP cabling?
- What is the difference between Cat3 and Cat5 cable?
- Which connector type and cable grade is used to connect a cable modem to the Internet connection?
- What advantages do fiber optic cables offer over twisted pair or other media choices? What are the disadvantages to implementing fiber optic cables?
- What is the difference between single mode and multi-mode cables?
- How can you tell the difference between an ST and an SC connector?

Video/Demo

 6.3.1 Cable Media

Time

19:59

Number of Exam Questions

14 questions

Total Time

About 45 minutes

Section 6.4: Ethernet

Summary

This section provides an overview of the basics of using Ethernet. Concepts covered include:

- Components used to create an Ethernet network:
 - Network interface card
 - Networking media
 - Connection devices
 - Standards
 - Distance
 - Power
- Ethernet standards

Students will learn how to:

- Select devices and media to create an Ethernet network.

PC Pro Exam Objectives:

- 7.0 Networking
 - Identify Ethernet networking cables and connectors by sight or name.
 - Given a scenario and networking requirements, select the necessary connectivity hardware (such as wired network adapters, wireless network adapters, and networking devices).
 - Given a set of basic IPv4 configuration settings or a network diagram, configure a wired, wireless, or dialup network connection in Windows.

Lecture Focus Questions:

- What cable types can be used on an Ethernet network?
- What is the most common cable type and connector?
- What is the difference between a hub and a switch? Why should you choose a switch over a hub?
- When would you use a router on an Ethernet network?
- What cable type and speed are supported on a 1000BaseT network?
- What is the maximum cable length for a 100BaseTX network?

Video/Demo

Time

Number of Exam Questions

4 questions

Total Time

About 15 minutes

Section 6.5: Network Addressing

Summary

In this section students will learn the basics of how network devices use addresses to identify other devices. Concepts covered include:

- The role of MAC addresses
- The role of logical addresses:
 - Network
 - Host
- The role of IP addresses
- IP classes

PC Pro Exam Objectives:



- 7.0 Networking
 - Given a set of basic IPv4 configuration settings or a network diagram, configure a wired, wireless, or dialup network connection in Windows.

Lecture Focus Questions:

- What is the difference between a MAC address and an IP address? Which address can you assign to a computer?
- How does the IP address indicate both the network and the node address? What is used to identify each part of the address?
- What is the address class of IP address 133.66.155.189?
- What is the default subnet mask for the IP address 166.88.1.45? What is the network address? What is the host address?
- What happens to the MAC address when you move a computer to another network?

Video/Demo

Time

| | |
|---|--------------|
|  6.5.1 Device Addressing | 11:42 |
|  6.5.2 IP Addressing | <u>14:35</u> |
| <i>Total</i> | <i>26:17</i> |

Number of Exam Questions

7 questions

Total Time

About 35 minutes

Section 6.6: IP Configuration

Summary

This section explores configuration settings required to connect to a TCP/IP network. Concepts covered include:

- Required parameters:
 - IP address
 - Subnet mask
 - Default gateway
 - DNS server
 - Host name
- Methods to configure TCP/IP parameters:
 - Static
 - Dynamic Host Configuration Protocol (DHCP)
 - Automatic Private IP Addressing (APIPA)
 - Alternate IP configuration
- Facts about IP address assignments

Students will learn how to:

- View the status of network connections.
- Configure basic IP configuration values necessary to connect to the Internet.

PC Pro Exam Objectives:

- 7.0 Networking
 - Given a set of basic IPv4 configuration settings or a network diagram, configure a wired, wireless, or dialup network connection in Windows.

Lecture Focus Questions:

- What service is used to automatically assign TCP/IP configuration information to hosts?
- When assigning IP addresses to hosts, which portions of the configuration must match values used by other hosts in the same subnet?
- A router has two network interfaces, each connected to a different subnet. When configuring the default gateway value on a host, which IP address would you use?
- What capability does the DNS server address provide? What would happen if the computer was not configured to use a DNS server?

Video/Demo

| | Time |
|---|--------------|
|  6.6.1 IP Configuration | 13:36 |
|  6.6.2 TCP/IP Configuration Methods | 7:20 |
|  6.6.3 Configuring TCP/IP Properties | <u>17:36</u> |
| <i>Total</i> | <u>38:32</u> |

Lab/Activity

- Configure TCP/IP Settings
- Configure Alternate TCP/IP Settings

Number of Exam Questions

9 questions

Total Time

About 65 minutes

Section 6.7: IP version 6

Summary

This section discusses the following details about the new IP version 6 addressing standard:

- Reason for the new addressing standard.
- Size and format of the new addresses.
- Concise forms for addresses with consecutive zeros.
- Parts of the 128-bit address:
 - Prefix
 - Interface ID

Lecture Focus Questions:

- What is the primary reason for developing IPv6?
- How many hexadecimal numbers are in an IPv6 address?
- What do you add to an IPv6 address when you remove one or more quartets with all 0s?
- What information is included within the IPv6 address *prefix*?
- How many numbers are used for the interface ID?

Video/Demo

 6.7.1 IP version 6

Time

8:13

Number of Exam Questions

4 questions

Total Time

About 15 minutes

Section 6.8: Protocols

Summary

This section explores how protocols are used to allow computers to communicate on a network. Details discussed include:

- Common protocol suites:
 - IP
 - NetBIOS
- Protocols in the TCP/IP protocol suite:
 - HyperText Transfer Protocol (HTTP)
 - HyperText Transfer Protocol over Secure Socket Layer or HTTP over SSL (HTTPS)
 - File Transfer Protocol (FTP)
 - Simple Mail Transfer Protocol (SMTP)
 - Internet Message Access Protocol (IMAP)
 - Post Office Protocol 3 (POP3)
 - Remote Terminal Emulation (Telnet)
 - Secure Shell (SSH)
 - Secure FTP (SFTP)
 - Domain Name System (DNS)
 - Remote Desktop protocol (RDP)
 - Dynamic Host Configuration Protocol (DHCP)
 - Lightweight Directory Access Protocol (LDAP)
 - Simple Network Management Protocol (SNMP)
 - Server Message Block (SMB)

Lecture Focus Questions:

- What is the difference between a *protocol* and a *protocol suite*?
- What is the most common protocol suite used by computers today? Why?
- What are three e-mail protocols? How are they different?
- How can you tell if your browser is using SSL?
- How is FTP different from HTTP? When would you use FTP over HTTP?
- What is a secure alternative to Telnet?

Video/Demo 6.8.1 Network Protocols**Time**

5:03

Number of Exam Questions

12 questions

Total Time

About 20 minutes

Section 6.9: 802.11 Wireless

Summary

In this section students will learn the basics of wireless networks. Concepts covered include:

- Wireless networking architecture:
 - Devices
 - Connection methods
 - SSID (Service Set Identifier)
- IEEE standards:
 - 802.11a
 - 802.11b
 - 802.11g
 - 802.11n
- 802.11n technologies to improve speed or distance:
 - Multiple Input Multiple Output (MIMO)
 - Channel bonding
- Details about wireless networks
- Authentication methods for wireless networks:
 - Open
 - Shared key
 - 802.1x
- Standards to provide security for wireless networking:
 - Wired Equivalent Privacy (WEP)
 - Wi-Fi Protected Access (WPA)
 - Wi-Fi Protected Access 2 (WPA2) or 802.11i
- Methods to limit access:
 - Change the administrator account name and password
 - Change SSID from defaults
 - Enable MAC address filtering
 - Disable DHCP

Students will learn how to:

- Configure a wireless connection.

PC Pro Exam Objectives:

- 7.0 Networking
 - Given a scenario and networking requirements, select the necessary connectivity hardware (such as wired network adapters, wireless network adapters, and networking devices).
 - Given a set of basic IPv4 configuration settings or a network diagram, configure a wired, wireless, or dialup network connection in Windows.

Lecture Focus Questions:

- What type of device is required to create an infrastructure wireless network configuration?
- What is the purpose of an SSID?
- Which wireless standards are typically backwards compatible with 802.11a?
- Two access points are part of the same wireless network. Should they use the same or a different channel? Why?
- How does MIMO differ from channel bonding?
- Why can some 802.11g devices claim to support up to 108 Mbps when the standard has a limit of 54 Mbps?
- What happens to the speed of a wireless connection as you move away from the access point?
- You are using WEP for a small home network. Which authentication type should you use?
- Why should default security settings be changed when dealing with wireless networking?

Video/Demo

Time

| | |
|---|--------------|
|  6.9.1 Wireless Networking | 15:46 |
|  6.9.3 Wireless Security | 10:23 |
|  6.9.5 Configuring a Wireless Connection | <u>6:47</u> |
| <i>Total</i> | <u>32:56</u> |

Lab/Activity

- Connect to a Wireless Network
- Configure a Wireless Profile

Number of Exam Questions

13 questions

Total Time

About 65 minutes

Section 6.10: Infrared and Bluetooth

Summary

This section examines two additional wireless communication methods that can be used:

- Infrared (IrDA)
- Bluetooth:
 - Common applications for Bluetooth include:
 - Connecting peripheral devices
 - Wireless headphones and headsets
 - Device-to-device connections



Students will learn how to:

- Configure a Windows device to be discoverable for Bluetooth connections.
- Create a pairing between two Bluetooth devices.
- Configure synchronization and service settings for Bluetooth devices.

Lecture Focus Questions:

- What are typical infrared devices and applications?
- What advantages does Bluetooth offer over infrared?
- Which types of devices typically use Bluetooth wireless?
- How does Bluetooth avoid interference with other Bluetooth devices in the area?
- Of the three Bluetooth device classifications, which transmits the farthest? Which is the most common class used by devices?

Video/Demo

| | Time |
|--|--------------|
|  6.10.1 Infrared and Bluetooth | 4:50 |
|  6.10.2 Configuring Bluetooth Connections | <u>8:21</u> |
| <i>Total</i> | <i>13:11</i> |

Number of Exam Questions

8 questions

Total Time

About 25 minutes

Section 6.11: Internet Connectivity

Summary

This section discusses the services used to connect to the Internet:

- Dialup
- Digital Subscriber Line (DSL)
- Integrated Services Digital Network (ISDN)
- Cable
- Cellular
- Satellite

PC Pro Exam Objectives:




- 7.0 Networking
 - Given a scenario and networking requirements, select the necessary connectivity hardware (such as wired network adapters, wireless network adapters, and networking devices).
 - Given a set of basic IPv4 configuration settings or a network diagram, configure a wired, wireless, or dialup network connection in Windows.

Lecture Focus Questions:

- In which situations would a PSTN still be the best Internet option? Why?
- How does DSL enable you to talk on the phone and connect to the Internet at the same time?
- What is the difference between BRI and PRI service levels when dealing with ISDN Internet?
- Which Internet connectivity options send digital signals over telephone lines?
- What is a disadvantage of cellular Internet access?
- What is required for a satellite Internet connection?
- How does VoIP replace dialup telephone access?

Video/Demo

Time

| | |
|---|--------------|
|  6.11.1 Internet Services | 21:14 |
|  6.11.2 Internet Connections | 13:20 |
|  6.11.6 Creating a Dial-up Internet Connection | <u>6:48</u> |
| <i>Total</i> | <i>41:22</i> |

Lab/Activity

- Configure a Cable Internet Connection
- Configure a DSL Internet Connection
- Configure a Dialup Internet Connection

Number of Exam Questions

12 questions

Total Time

About 75 minutes

Section 6.12: SOHO Configuration

Summary

This section discusses configuring small office/home office (SOHO) networks. Details include:

- The role of a SOHO network
- Devices used in a typical SOHO network
- General steps to configure the access point or router to provide the Internet connection:
 - Configure the Internet connection
 - Enable NAT
 - Configure DHCP
 - Additional configuration steps
- Access Point configuration steps:
 - Change the default SSID
 - Configure the wireless protocol
 - Configure the channel
 - Configure encryption and authentication
 - Enable MAC address filtering
 - Disable DHCP for wireless clients
 - Access point placement

Students will learn how to:

- Configure an Internet connection for a small office/home office network using various connection technologies.
- Configure a wired and wireless local area network with a single subnet.

PC Pro Exam Objectives:




- 7.0 Networking
 - Given a scenario and networking requirements, select the necessary connectivity hardware (such as wired network adapters, wireless network adapters, and networking devices).
 - Given a set of basic IPv4 configuration settings or a network diagram, configure a wired, wireless, or dialup network connection in Windows.

Lecture Focus Questions:

- In a SOHO network, which types of devices are typically used to connect the location to the Internet?
- What function does enabling NAT on the router provide for a SOHO network?
- What is the difference between a public and a private IP address? What are the private IP address ranges?
- What are the advantages of turning off SSID broadcasting?
- What is the purpose of MAC address filtering?
- Once DHCP is disabled on a wireless access point, what three elements would an attacker have to configure to be able to connect?
- What guidelines should you consider when selecting the location of the access point to ensure the signal strength and network access?

Video/Demo

Time

| | |
|--|--------------|
|  6.12.1 SOHO Configuration | 13:36 |
|  6.12.3 Configuring a SOHO Router | 8:52 |
|  6.12.5 Configuring a Wireless Access Point | <u>13:42</u> |
| <i>Total</i> | <i>36:10</i> |

Lab/Activity

- Configure a Wireless Infrastructure

Number of Exam Questions

15 questions

Total Time

About 65 minutes

Section 6.13: Network Utilities

Summary

This section discusses the tools to troubleshoot network problems:

- Ipconfig
- Ping
- Tracert
- Nslookup
- Netstat
- Nbtstat
- Telnet or SSH

Students will learn how to:





- Use **ipconfig** to find TCP/IP configuration information.
- Use **ipconfig** to release and renew a DHCP lease.
- Use **ping** and **tracert** to test connectivity.
- Use **nslookup** to resolve hostnames and test name resolution.

PC Pro Exam Objectives:

- 7.0 Networking
 - Use the following networking utilities to view the existing network configuration, test network communications, and troubleshoot basic connectivity problems:
 - ipconfig
 - ping
 - tracert

Lecture Focus Questions:

- What are the similarities and differences between **ping** and **tracert**?
- What information can you get from the **netstat** command?
- Which utilities can be used to perform remote management of servers?

| Video/Demo | Time |
|---|--------------|
|  6.13.1 Network Utilities | 6:06 |
|  6.13.2 Using Ipconfig | 5:36 |
|  6.13.6 Using Ping and Tracert | 10:54 |
|  6.13.7 Using Nslookup | <u>4:45</u> |
| <i>Total</i> | <i>27:21</i> |

Lab/Activity

- Find Configuration Information 1
- Find Configuration Information 2
- Find Configuration Information 3

Number of Exam Questions

13 questions

Total Time

About 60 minutes

Section 6.14: HomeGroup

Summary

This section discusses using HomeGroup to share and manage authentication of resources on a home network. Concepts covered include:

- Creating a HomeGroup
- Using the HomeGroup utility to manage the HomeGroup
- Joining a HomeGroup
- Sharing files and folders with the HomeGroup
- Starting the HomeGroup configuration automatically

Students will learn how to:

- Create a HomeGroup.
- Join an existing HomeGroup.
- Share resources with a HomeGroup.

PC Pro Exam Objectives:

- 7.0 Networking
 - Given a set of basic IPv4 configuration settings or a network diagram, configure a wired, wireless, or dialup network connection in Windows.

Lecture Focus Questions:

- How does the network interface profile affect your ability to create or join a HomeGroup?
- How many HomeGroups can a single computer join? How many HomeGroups can exist on a single LAN segment?
- How is access to a HomeGroup and its resources controlled?

Video/Demo

Time

 6.14.1 Implementing HomeGroups

8:31

Number of Exam Questions

2 questions

Total Time

About 15 minutes

Section 7.1: Printers

Summary

This section discusses facts concerning selecting and installing printers. Concepts covered include:

- Types of printers:
 - Dot matrix
 - Ink jet (ink dispersion)
 - Laser
 - Dye sublimation (dye diffusion thermal photo)
 - Solid ink
 - Thermal
- Three general laser printing process:
 - Electrophotographic Process (EP)
 - HP (Hewlett-Packard) process
 - LED (Light-Emitting Diode) process
- Components of laser printers
- Steps in the laser printing process:
 - Cleaning
 - Conditioning
 - Writing
 - Developing
 - Transferring
 - Fusing
- Types of printer connections:
 - Parallel
 - Serial
 - USB, IEEE 1394
 - Infrared/Wireless
 - SCSI
 - Network
- Factors to consider when purchasing a printer:
 - Connection interface
 - Print quality
 - Print speed
 - Memory
 - Additional features

Students will learn how to:





- Choose a printer to fulfill the requirements for a given situation.
- Install printers using the correct cabling, connectors, and ports.

PC Pro Exam Objectives:

- 9.0 Printing
 - Given an existing system, select and install a printer to meet end-user requirements.

Lecture Focus Questions:

- Which printer type is ideal for printing carbon-copy documents?
- What is a common application for a thermal printer?
- What features are used to describe the quality and speed of print jobs a printer can produce?
- Why does a laser printer use heat in the printing process?
- What are the two most common printer interfaces?
- How can memory improve the performance of your printer?

| Video/Demo | Time |
|---|--------------|
|  7.1.1 Printer Types | 15:47 |
|  7.1.3 Laser Printers | 4:52 |
|  7.1.4 Laser Printing Process | 10:08 |
|  7.1.6 Printer Interfaces | <u>8:36</u> |
| <i>Total</i> | <i>39:23</i> |

Lab/Activity

- Choose a Printer

Number of Exam Questions

14 questions

Total Time

About 70 minutes

Section 7.2: Printer Configuration

Summary

This section examines installing and configuring printers. Concepts covered include:

- Printer configuration terms:
 - Print device
 - Print driver
 - Printer
 - Print queue
 - Printer port
- Process to print a file
- Printer languages:
 - Escape Codes
 - Printer Control Language (PCL)
 - PostScript
- Steps to configure a printer

Students will learn how to:

- Install a Plug and Play printer.
- Manually configure a parallel or serial printer.
- Set and change the default printer.

PC Pro Exam Objectives:



- 9.0 Printing
 - Use Windows utilities to configure printing.
 - Configure local USB and parallel printers.
 - Share a printer, add printer drivers for other operating systems, and manage printer permissions.
 - Set the default printer.
 - Manage print jobs and the print queue.
 - Start and stop the print spooler.
 - Print a test page.

Lecture Focus Questions:

- What is the function of the print driver? The print queue?
- Which printing component takes the print job from the queue and sends it to the print device?

- What are three printer languages that printers commonly understand?

Video/Demo**Time**

| | |
|--|--------------|
|  7.2.1 Printing Configuration | 11:55 |
|  7.2.2 Installing a Local Printer | <u>19:20</u> |
| <i>Total</i> | <i>31:15</i> |

Lab/Activity

- Select and Install a Printer

Number of Exam Questions

5 questions

Total Time

About 45 minutes

Section 7.3: Network Printing

Summary

This section discusses the basics of configuring network printing. Details include:

- Components of network printing:
 - Spooling
 - Print queue
 - Print server
- Considerations when configuring network printing:
 - Connect the printer to the network
 - Use a print server
 - Install the printer drivers
- Steps to configure a printer attached to a Windows computer as a network printer

Students will learn how to:



- Share a local printer as a network printer.
- On a workstation, configure a printer pointing to a network print device.

PC Pro Exam Objectives:

- 9.0 Printing
 - Use Windows utilities to configure printing.
 - Connect to a shared printer on a network.
 - Share a printer, add printer drivers for other operating systems, and manage printer permissions.
 - Set the default printer.
 - Print a test page.

Lecture Focus Questions:

- What is the benefit of network printing?
- When sharing a printer, why might you need to load additional drivers for the printer?
- Which type of devices can act as a print server?
- What is an advantage of having a printer with a built-in print server and network interface?
- When would you use a TCP/IP port when configuring a printer object?

| Video/Demo | Time |
|--|--------------|
|  7.3.1 Network Printing | 8:18 |
|  7.3.2 Installing a Network Printer | <u>18:32</u> |
| <i>Total</i> | <i>26:50</i> |

Lab/Activity

- Configure Network Printing

Number of Exam Questions

3 questions

Total Time

About 40 minutes

Section 7.4: Printing Management

Summary

In this section students will explore managing printing on a Windows system. Details include:

- Printing components:
 - Printer properties
 - Print queue
 - Print server
 - Print spooling service

Students will learn how to:

- Modify printer properties including printer name, location, availability, and driver.
- Configure printer permissions.
- Manage print server properties.
- Start and stop the Print Spooler service.

PC Pro Exam Objectives:

- 9.0 Printing
 - Use Windows utilities to configure printing.
 - Configure local USB and parallel printers.
 - Share a printer, add printer drivers for other operating systems, and manage printer permissions.
 - Set the default printer.
 - Manage print jobs and the print queue.
 - Start and stop the print spooler.
 - Print a test page.

Lecture Focus Questions:

- Which two objects would you edit to add additional client drivers for printers? Which objects allow you to change the port used by a printer?
- What printing permissions are required to pause the printer or delete all print jobs from the print queue?
- A user prints a document and it is waiting in the print queue to be printed. Who can delete the print job?

Video/Demo**Time**

| | |
|--|--------------|
| 🖨 7.4.1 Configuring Printer Properties | 11:21 |
| 🖨 7.4.2 Managing Print Jobs | <u>8:29</u> |
| <i>Total</i> | <i>19:50</i> |

Lab/Activity

- Configure Printer Properties
- Manage Printing

Number of Exam Questions

9 questions

Total Time

About 45 minutes

Section 7.5: Printer Maintenance

Summary

This section discusses preventative maintenance for laser printers. Details include guidelines for the following elements:

- Environment
- Maintenance Kits
- Toner
- Additional types of printers that require periodic maintenance:
 - Thermal
 - Impact (Dot Matrix)
 - Inkjet

Students will learn how to:

- Maintain commonly-used printers.

Lecture Focus Questions:

- How do you clean an ink jet printer head?
- How does the EP process differ from the LED process to create an electrostatic charge to hold dry toner to the paper's surface?
- In the laser printing process, how does the primary corona prepare the photosensitive drum for writing?
- What is the best way to clean up a toner spill?
- How does paper quality affect a printer?

Video/Demo

 7.5.1 Maintaining Laser Printers

Time

12:09

Number of Exam Questions

6 questions

Total Time

About 25 minutes

Section 8.1: Notebook Computers

Summary

This section provides an overview of portable devices. Concepts covered include:



- How notebooks and other portable devices differ from desktop systems.
- Classifications for portable devices:
 - Notebook (or laptop)
 - Tablet PC
 - PDA (Personal Digital Assistant)
 - Smart phone
 - Netbook
- Components in a notebook system:
 - Processor
 - Memory
 - Keyboard
 - Pointing devices
 - Video
 - Networking
 - Internal hard disks
 - Docking station
 - Additional devices:
 - Removable drive bays
 - USB and Firewire ports
 - ExpressCard card slots
 - Card readers
- The role of PC cards
- Types of PC Cards:
 - Type 1
 - Type II
 - Type III
- PCI Express or ExpressCard standard
- Methods to save power on notebook systems
- Types of batteries that may be used in portable devices:
 - Nickel Cadmium (Ni-Cad)
 - Nickel Metal Hydride (NiMH)
 - Lithium Ion (Li-Ion)
 - Fuel Cell

Students will learn how to:

- Identify notebook external components.
- Add peripheral devices to notebook computers using USB, PCMCIA, and ExpressCard slots.

Lecture Focus Questions:

- Why do processors for laptop computers not require the large heat sink and fan combinations that are used in PCs to dissipate heat?
- What types of devices do notebooks use instead of a mouse?
- What is the function of the *docking station*?
- What kinds of components are typically built into a notebook computer?
- How do you add devices to a notebook computer?
- What is the battery memory effect that is present in Ni-cad batteries?
- What advantages do NiMH batteries have over Li-Ion batteries?
- How should you dispose of notebook batteries?

| Video/Demo | Time |
|---|--------------|
|  8.1.1 Notebook Computers | 19:31 |
|  8.1.2 Notebook Connectors | <u>10:58</u> |
| <i>Total</i> | <u>30:29</u> |

Number of Exam Questions

14 questions

Total Time

About 60 minutes

Section 8.2: Notebook Components

Summary

This section discusses considerations when upgrading or repairing notebook components. Concepts covered include:

- Factors to consider when working with the following components:
 - Hard drive
 - Memory
 - Keyboard
 - Touchpad
 - Wireless network card
 - Processor
 - LCD display

Students will learn how to:

- Replace a hard disk in a notebook computer.
- Add memory to a notebook.
- Change notebook components such as the keyboard, video card, or other internal components.
- Troubleshoot problems with notebook components.

Lecture Focus Questions:

- How do you identify the location of components and replacement procedures for notebook systems?
- How can you tell if a failed notebook display is caused by the screen or the video card?
- How can you continue to use a notebook if a built-in component (such as a keyboard, pointing device, or network card) fails?
- When purchasing a replacement internal drive for a notebook, which specifications should you verify before the purchase?
- What type of notebook internal components may require you to remove the keyboard before replacing that component?
- How do you fix common problems with a notebook touchpad?

| Video/Demo | Time |
|--|--------------|
| 🖥 8.2.1 Changing a Notebook Hard Disk | 2:43 |
| 🖥 8.2.2 Adding Notebook Memory | 4:48 |
| 🖥 8.2.3 Changing a Notebook Keyboard | 4:30 |
| 🖥 8.2.4 Replacing LCD Components | 17:49 |
| 🖥 8.2.5 Replacing Internal Notebook Components | <u>9:04</u> |
| <i>Total</i> | <i>38:54</i> |

Number of Exam Questions

16 questions

Total Time

About 60 minutes

Section 8.3: Notebook Power Management

Summary

This section examines configuring power management. Concepts covered include:

- Advanced Configuration and Power Interface (ACPI) standards
- ACPI power states:
 - On
 - Enabled
 - Standby
 - Suspend
 - Hibernate
- The role of Power Schemes to manage power for the system
- Issues involved with power settings



Students will learn how to:

- Change the current power scheme used by a computer.
- Create, modify, and save power schemes.

Lecture Focus Questions:

- What is the difference between *standby* and *suspend*?
- What devices are controlled through Windows Power Schemes?
- What is the purpose of the WoL feature?

Video/Demo

| | Time |
|---|--------------|
|  8.3.1 Portable Power | 9:35 |
|  8.3.2 Configuring Power Options | <u>10:47</u> |
| <i>Total</i> | <i>20:22</i> |

Lab/Activity

- Edit Power Options
- Create a Power Plan

Number of Exam Questions

4 questions

Total Time

About 40 minutes

Section 8.4: Mobile Devices

Summary

In this section students will learn about the following key features of table PCs:







- Touch screen interface
- Accelerometer
- Gyroscope
- Internal storage
- Networking capabilities
- Phone
- Operating system
- Architecture
- Apps

Students will learn how to:

- Connect a mobile device to a wireless network.
- Secure a mobile device.
- Synchronize data between a mobile device and desktop PC or notebook computer.

Lecture Focus Questions:

- What is the difference between a notebook computer and mobile device?
- What operating systems run on mobile devices?
- What features are commonly included in mobile devices?
- How do you install apps on a mobile device?
- How do you connect a mobile device to a network?
- How do you secure a mobile device?
- How do you synchronize data between a mobile device and desktop PC or notebook computer?

| Video/Demo | Time |
|---|--------------|
|  8.4.1 Mobile Device Overview | 14:19 |
|  8.4.3 Networking Mobile Devices | 10:08 |
|  8.4.4 Synchronizing Mobile Devices | 7:07 |
|  8.4.5 Securing Mobile Devices | 11:05 |
|  8.4.6 Configuring Email on Mobile Devices | 4:57 |
|  8.4.7 Maintaining Mobile Devices | <u>10:06</u> |
| <i>Total</i> | <i>57:42</i> |

Lab/Activity

- Manage Mobile Devices

Number of Exam Questions

6 questions

Total Time

About 70 minutes

Section 9.1: Windows System Tools

Summary

This section discusses Windows tools and utilities. System tools covered include:

- Control Panel
- Task Manager
- Microsoft Management Console (MMC)
- Computer Management
- Event Viewer
- Services
- Performance Monitor
- Reliability Monitor
- System Information (Msinfo32)
- System Configuration Utility (Msconfig)
- DirectX Diagnostic Tool (Dxdiag)
- Command Prompt
- Regedit
- Data Sources
- Windows Memory Diagnostics
- Advanced Security

Students will learn how to:

- Use system tools to view current performance statistics.
- Use system tools to view configuration information for a computer.
- Use prebuilt and custom management consoles to manage a computer.
- View and edit registry settings.

Lecture Focus Questions:

- What are the differences between the Control Panel and Task Manager?
- Which tool lets you view running tasks and current memory use?
- What are the three types of events you might see in Event Viewer?
- What elements can affect the operating system's stability index that Reliability Monitor provides?
- How does Msconfig differ from Msinfo32? When are you more likely to use Msconfig over Msinfo32?
- Which of the following utilities typically shows the same information included in the other two utilities: Msconfig, Msinfo32, Dxdiag?
- How should you normally modify settings in the registry?

| Video/Demo | Time |
|--|--------------|
| 🖥 9.1.1 Using Task Manager | 20:48 |
| 🖥 9.1.2 Using Control Panel | 18:59 |
| 🖥 9.1.3 Using Management Consoles | 12:43 |
| 🖥 9.1.4 Viewing System Configuration Information | 15:52 |
| 🖥 9.1.5 Using Regedit | 8:55 |
| 🖥 9.1.7 System Commands | <u>17:12</u> |
| <i>Total</i> | 94:29 |

Number of Exam Questions

15 questions

Total Time

About 115 minutes

Section 9.2: Preferences and Settings

Summary

This section provides information about the following settings you can use to customize Windows:

- Aero
- Sidebar
- Indexing
- Region and Language Settings

Students will learn how to:

- Update the performance base score for a computer.
- Add or remove gadgets from the Sidebar.
- Add and remove file locations for indexing.
- Configure locales, regional settings, and alternate input languages.

Lecture Focus Questions:

- In what versions is Windows Aero available?
- What is the minimum base score to support all Aero features?
- What would you use the Sidebar for in Windows Vista?
- Where can you display gadgets?
- How does indexing improve finding files on your computer?
- What types of changes does Region and Language Settings make on your computer?

Video/Demo

- 🖥 9.2.1 Personalizing Windows 1
- 🖥 9.2.2 Personalizing Windows 2
- Total*

Time

11:36
11:43
23.19

Number of Exam Questions

5 questions

Total Time

About 30 minutes

Section 9.3: Performance Monitoring

Summary

This section discusses monitoring components to improve system performance:

- Components:
 - Processor (CPU)
 - Hard disk
 - Memory
 - Network
- Terms to identify system performance statistics:
 - Counter
 - Object
- Counters to be familiar with:
 - % Processor Time (processor utilization)
 - % Disk Time (highest active time)
 - Average Disk Queue Length
 - Available, used, and free physical memory
 - Memory committed bytes (commit charge)
 - Page file usage
 - Memory pages per second
 - Network Utilization



Students will learn how to:

- Monitor system performance using Task Manager and Performance Monitor.

Lecture Focus Questions:

- Which components are commonly examined when you need to improve system performance?
- When examining system performance statistics, what is the difference between *counters* and *objects*?
- What is indicated when the processor utilization statistic is consistently over 90%?
- How can you remedy the situation when the amount of memory being used is close to the amount of RAM installed?
- When the page file usage is near 100%, what measures should you take to remedy the situation?
- What causes *thrashing*? Which statistic might be examined to identify thrashing?
- Which statistics should be examined when you are suspicious there might be a bottleneck at the network adapter?

Video/Demo

| |
|---|
|  9.3.1 Performance Monitoring |
|  9.3.2 Monitoring System Performance |
| <i>Total</i> |

Time

| |
|--------------|
| 3:41 |
| <u>16:32</u> |
| 20:13 |

Number of Exam Questions

3 questions

Total Time

About 30 minutes

Section 9.4: Users and Groups

Summary

This section discusses using user accounts to control who can use a computer. Details include:

- Windows default groups:
 - Administrators
 - Backup Operators
 - Power Users
 - Users
 - Guests
- User Account Control (UAC)
- Settings for UAC in Windows 7:
 - Always notify
 - Notify me only when programs try to make changes to my computer
 - Notify me only when programs try to make changes to my computer (do not dim my desktop)
 - Never notify

Students will learn how to:

- Create limited and administrator users.
- Create groups and modify group membership.
- Supply credentials at the UAC prompt.
- Enable or disable UAC prompts.

PC Pro Exam Objectives:

- 12.0 System Management
 - Configure local users and groups for a Windows system.
 - Configure User Access Control (UAC) settings in Windows 7.




Lecture Focus Questions:

- What is the difference between a *right* and a *permission*?
- How can groups simplify security administration?
- How are the rights assigned to the Power User group different than the rights assigned to the Administrator group?
- What is the purpose of the Backup Operators group?
- On Windows Vista/7, a user must be a member of which group to install applications and add new device drivers?
- What is the purpose of the User Account Control (UAC)?

- When would you receive a *prompt for credentials*? How does that differ from the *prompt for consent*?

Video/Demo

Time

| | |
|---|--------------|
|  9.4.1 Users and Groups | 9:44 |
|  9.4.2 Managing Users and Groups | 14:11 |
|  9.4.5 Managing UAC Settings | <u>11:51</u> |
| <i>Total</i> | <i>35:46</i> |

Lab/Activity

- Manage Users and Groups

Number of Exam Questions

7 questions

Total Time

About 50 minutes

Section 9.5: Remote Services

Summary

This section examines using remote services to access a computer from a remote location. Details include:

- Remote Desktop
- Remote Assistance

Students will learn how to:

- Configure a host computer to accept Remote Desktop connections.
- Open the Remote Desktop port in the Windows Firewall.
- Establish a guest Remote Desktop connection.





PC Pro Exam Objectives:

- 12.0 System Management
 - Enable and configure Remote Desktop and Remote Assistance.

Lecture Focus Questions:

- Which versions of Windows support a guest Remote Desktop connection? A host Remote Desktop connection?
- Which port must be opened to allow Remote Desktop to run through the firewall?
- How does printer redirection work in Remote Desktop?
- What are the different ways you can send a Remote Assistance invitation?

Video/Demo

| | Time |
|---|--------------|
|  9.5.1 Remote Desktop | 6:48 |
|  9.5.2 Using Remote Desktop | 13:23 |
|  9.5.4 Remote Assistance | 4:54 |
|  9.5.6 Using Remote Assistance | <u>10:22</u> |
| <i>Total</i> | <i>35:27</i> |

Lab/Activity

- Configure Remote Services

Number of Exam Questions

6 questions

Total Time

About 50 minutes

Section 9.6: Applications

Summary

In this section students will learn the basics of managing applications. Concepts covered include:

- Elements an installation typically modifies
- Shortcuts
- Applications a 64-bit operating system can run
- Default directories that applications are installed to
- Permissions required to install applications
- Special rights required to run applications
- Solutions when you are unable to run an application

Students will learn how to:

- Run an application as an administrator.
- Configure compatibility mode for an application.

Lecture Focus Questions:

- How is a shortcut different than a regular file?
- What is the difference between the **Program Files** and the **Program Files (x86)** folders? Which operating systems have the **Program Files (x86)** folder?
- What group membership might be required to install or remove applications?

Video/Demo

- 📺 9.6.1 Applications
- 🖥️ 9.6.2 Managing Applications
- Total*

Time

3:16
17:53
21:09

Lab/Activity

- Manage Applications

Number of Exam Questions

12 questions

Total Time

About 40 minutes

Section 9.7: Updates

Summary

This section discusses keeping your computer up to date. Details include:

- The role of updates
- Types of Windows updates:
 - Hotfix
 - Service pack (SP)
- The role of Windows Update
- Updating non-Microsoft applications
- Updating hardware devices

Students will learn how to:

- Enable and configure Windows Updates.
- Update the firmware on a network device.




PC Pro Exam Objectives:

- 12.0 System Management
 - Configure Windows Update settings.

Lecture Focus Questions:

- What is the difference between a *hotfix* and a *service pack*?
- What should you do if you need to install service pack 2 but haven't yet installed service pack 1?
- What are two reasons why updates are released for the operating system?
- How does keeping system software up to date increase security?
- Which update setting would be appropriate if you wanted to review the list of updates before they are installed?
- In addition to using Windows Update, what else should you do to make sure that all application and driver files are updated?

Video/Demo

| | Time |
|--|--------------|
|  9.7.1 Updates | 13:59 |
|  9.7.3 Using Windows Update | 12:36 |
|  9.7.5 Performing a Firmware Update | <u>10:21</u> |
| <i>Total</i> | <i>36:56</i> |

Lab/Activity

- Configure Windows Update

Number of Exam Questions

7 questions

Total Time

About 50 minutes

Section 9.8: System Protection

Summary

This section examines protecting a system through backups. Concepts covered include:

- Types of data that backups distinguish:
 - System state data
 - User data
 - Application data
- Tools to protect Windows 2000 and XP systems:
 - Windows Backup (Ntbackup)
 - Automated System Recovery (ASR)
- Tools to protect Windows Vista and Windows 7 systems:
 - Automatic Backups
 - Complete PC Backup and Restore
- Additional tools:
 - System Restore
 - Previous Versions
- Recommendations for backing up, scheduling, and storing backup media

Students will learn how to:

- Create a system image in Windows 7.
- Schedule automatic backups of user data in Windows 7.
- Protect a system with Restore Points.

PC Pro Exam Objectives:





- 12.0 System Management
 - Use Windows Backup to configure a full system or file backup schedule.
 - Enable system restore and configure a restore point.

Lecture Focus Questions:

- What type of data is backed up with a system state backup?
- Which tools would you use to back up user data on the different versions of Windows?
- How does Complete PC Backup and Restore with Windows Vista and the System Image option in Windows 7 differ from Automated System Recovery (ASR) with Windows XP?

- What types of backup media can Ntbackup use? How does this differ from the backup media used by the backup utilities provided with Windows Vista and Windows 7?
- How are Previous Versions related to System Restore? Which would you use to restore user data?
- Where should backup media be stored for maximum security?
- Why should you test your restore methods?

Video/Demo

| | Time |
|---|--------------|
|  9.8.1 System Protection | 12:30 |
|  9.8.3 Creating Backups in Windows Vista and Windows 7 | 10:03 |
|  9.8.5 Using Restore Points | 18:52 |
|  9.8.6 Using Previous Versions | <u>12:20</u> |
| <i>Total</i> | <u>53:45</u> |

Lab/Activity

- Back Up the Computer
- Create a Restore Point

Number of Exam Questions

6 questions

Total Time

About 75 minutes

Section 9.9: Virtual Memory

Summary

This section provides information about using virtual memory to allow more applications to run on the system than physical memory could support. Concepts covered include:

- The role of the Virtual Memory Manager (VMM)
- Steps VMM uses to manage applications
- Managing virtual memory:
 - Symptoms of low physical memory
 - Disk thrashing
 - The role of the System Control Panel applet
 - Recommendation for swap size
 - Increasing performance
 - Saving a memory dump



Students will learn how to:

- Check memory usage in Task Manager.
- Configure virtual memory settings.
- Create a swap file.

Lecture Focus Questions:

- What is the benefit of virtual memory?
- How does virtual memory work? What is the purpose of swapping?
- What is the benefit of a separate partition for the swap file?
- Is a low number of page faults a bad thing? Why?
- What condition causes disk *thrashing*? How can you reduce its effects?

Video/Demo

| | |
|--|--------------|
|  9.9.1 Virtual Memory | 9:43 |
|  9.9.2 Managing the Paging File | <u>8:01</u> |
| <i>Total</i> | <i>17:44</i> |

Time

Lab/Activity

- Configure Virtual Memory

Number of Exam Questions

6 questions

Total Time

About 30 minutes

Section 10.1: Component Selection

Summary

This section provides recommendations for selecting the following components:

- Graphics design or CAD/CAM workstation
- Audio/video editing workstation
- Virtualization workstation
- Gaming system
- Home theater system
- Standard thick client
- Thin client
- Home or small office server

Students will learn how to:

- Analyze users' needs prior to purchasing or building a new computer system.
- Customize a computer's hardware to match end user requirements.

Lecture Focus Questions:

- What factors should you evaluate when purchasing or building a new computer system?
- What hardware components may need to be modified to ensure a computer system meets the needs of the end user?

Video/Demo

 10.1.1 Component Selection

Time

21:06

Number of Exam Questions

4 questions

Total Time

About 30 minutes

Section 10.2: Windows Pre-installation

Summary

This section provides an overview of decisions that must be made prior to installation. Concepts covered include:

- When selecting an operating system consider the following:
 - Versions:
 - Windows 7
 - Windows Vista
 - Windows XP
 - Features for different versions
 - Editions:
 - Starter
 - Home Basic
 - Home Premium
 - Professional
 - Business
 - Ultimate
 - Enterprise
 - Advantages of using 32-bit(x86) or 64-bit (x64 or IA-64) versions
 - Hardware requirements for:
 - Windows XP
 - Windows Vista Home Basic
 - Windows Vista (other editions)
 - Windows 7
- When planning an installation:
 - Consider compatibility of hardware and software
 - Choose the installation method:
 - In-place upgrade
 - Clean (custom) install
 - Possible installation methods for existing and target operating systems
 - Perform a backup of the existing system




Students will learn how to:

- Run the Upgrade Advisor to verify system compatibility when upgrading Windows.

Lecture Focus Questions:

- Which edition of Windows would you choose if you need to connect to a domain and implement BitLocker?
- Which operating system version(s) and edition(s) support running Windows XP as a virtual computer?
- What are the advantages of using a 64-bit version of the operating system over a 32-bit version?
- You have purchased a new computer with an x64 processor. Which operating system versions could you install (32-bit or 64-bit)?
- What are the potential problems when moving from a 32-bit operating system to a 64-bit operating system? How does the Upgrade Advisor help to alleviate these problems?
- What is the difference between an upgrade version of Windows and a full version of Windows?
- What is the difference between an in-place upgrade and a clean (custom) installation?
- You currently run the 32-bit version of Windows Vista Home Premium edition. Which type of installation media (upgrade or install) and installation method (in-place or custom) could you use to upgrade to the 64-bit version of Windows 7 Home Premium?
- You have an existing Windows XP computer that you want to upgrade to Windows 7. What tasks should you perform prior to starting the upgrade?

Video/Demo

| | |
|---|--------------|
|  10.2.1 Windows Versions | 9:33 |
|  10.2.2 Pre-installation Planning | 11:04 |
|  10.2.5 Verifying System Compatibility | <u>5:01</u> |
| <i>Total</i> | <u>25:38</u> |

Number of Exam Questions

13 questions

Total Time

About 50 minutes

Section 10.3: Windows Installation

Summary

In this section students will learn about methods to install a Windows operating system. Concepts covered include:

- Steps to install Windows from the installation disc (CD or DVD)
- Alternative methods to install Windows:
 - Bootable flash drive
 - Network installation
 - Unattended
 - Disk imaging
 - Repair installation
 - Multi-boot installation




Students will learn how to:

- Use a RAID configuration utility to create a RAID array prior to installing the operating system.
- Change the boot order of devices in the BIOS.
- Install Windows.

Lecture Focus Questions:

- You are getting ready to install Windows on a new system. You want to use disk mirroring to protect your system. When should you create the mirrored set?
- What SATA disk setting would you choose when defining a mirrored set?
- During a Windows installation, the hard disks where you configured your RAID array are not detected and listed as available for installation. What should you do?
- During a Windows installation, you select the destination disk for the install but do not configure partition and formatting information. How will Windows partition and format the disk?
- You have a new computer on which you need to install Windows. The installation files are on a network share. How would you start the installation?
- What computer requirements are necessary when using disk imaging for installation?

Video/Demo**Time**

| | |
|---|--------------|
|  10.3.1 Windows Installation | 9:17 |
|  10.3.2 Preparing Disks for Installation | 13:05 |
|  10.3.4 Installing Windows | <u>8:33</u> |
| <i>Total</i> | <i>30:55</i> |

Lab/Activity

- Prepare Disks for Installation

Number of Exam Questions

4 questions

Total Time

About 45 minutes

Section 10.4: Post Installation

Summary

This section examines details about the following tasks that need to be performed following a successful installation of Windows:

- Editing the CMOS settings to boot from the hard drive first.
- Updating device drivers for unrecognized devices.
- Configuring Windows Update and downloading the latest updates.
- Activating your copy of Windows within 30 days.
- Configuring security software.
- Migrating user configuration settings and data.
- Installing applications and adding other Windows features.
- Taking a complete PC backup and scheduling regular user data backups.



Students will learn how to:

- Migrate user settings and data using the Easy Transfer wizard and USMT.

Lecture Focus Questions:

- Why should you configure Windows Update shortly after installation?
- How does product *registration* differ from *activation*? Which one is optional?
- You have installed Windows 7 on a new computer and used USMT to migrate the settings from your previous computer. What else would you need to do to configure your new computer like your old computer?
- You have a computer running Windows XP that you want to upgrade to Windows 7. You want to make sure that all of your user settings and data are present after the upgrade. Which USMT tool would you run to save your user settings? When during the installation process should you run it?
- What are two security measures you should put into place after installing Windows?

Video/Demo

-  10.4.1 Post Installation
-  10.4.3 Migrating User Data
- Total*

Time

1:07
8:07
9:14

Number of Exam Questions

8 questions

Total Time

About 20 minutes

Section 10.5: Virtualization

Summary

This section examines details about virtualization. Details include:

- Components included in virtualization:
 - Physical machine
 - Hypervisor
 - Virtual machine
 - Virtual Hard Disk (VHD)
- Types of virtualization:
 - Full
 - Partial
 - Paravirtualization
- Security benefits of using virtual machines:
 - Isolation
 - Snapshots
 - Abstraction
 - Workload management
- Security issues when using virtual machines





Students will learn how to:

- Create and run a virtual machine.
- Configure a virtual machine to communicate with other hosts on the network.
- Secure a virtual machine.

Lecture Focus Questions:

- How does virtualization work?
- What end-user needs would require the deployment of a virtualized environment?
- What issues need to be taken into consideration before deploying a virtualized environment?
- What is a hypervisor?
- What is a virtual disk file?
- What is a virtual machine?
- How do you deploy a virtual machine?
- How do you secure a virtual machine after it has been deployed?

Video/Demo**Time**

| | |
|---|--------------|
|  10.5.1 Virtualization Overview | 15:01 |
|  10.5.3 Virtual Networking | 6:09 |
|  10.5.4 Creating a Virtual Machine | 19:02 |
|  10.5.5 Virtual Machine Security | <u>16:44</u> |
| <i>Total</i> | <i>56:56</i> |

Lab/Activity

- Enable VT in the BIOS

Number of Exam Questions

4 questions

Total Time

About 70 minutes

Section 11.1: File Locations

Summary

In this section students will learn the default location for various system files for Windows 2000, Windows XP, Windows Vista, and Windows 7. They will also become familiar with the role of libraries in Windows 7.

Lecture Focus Questions:

- What directory is identified by the %systemroot% variable?
- Which versions of Windows use the default location of C:\Program Files (x86) for the program files?
- Which Windows versions use the C:\Users directory for user profiles?

Video/Demo

- 🖥 11.1.1 System File Locations
- 🖥 11.1.3 Implementing Libraries
- Total*

Time

11:59
6:32
18:31

Number of Exam Questions

12 questions

Total Time

About 35 minutes

Section 11.2: Managing Files

Summary

This section provides an overview of the elements involved in managing files. Concepts covered include:

- What a file extension identifies
- Type of filename systems:
 - Long file names
 - Unicode
- File types and their extensions
- Details about managing files
- Common NTFS attributes:
 - Read only
 - Hidden
 - System
 - Archive
 - Encrypted
 - Compressed
 - Indexing
 - Permissions
- Facts about managing file attributes
- Common file management commands:
 - Cd
 - Dir
 - Md/mkdir
 - Rd
 - Copy
 - Xcopy
 - Edit
 - Attrib

Students will learn how to:







- Open a command prompt window.
- Find help for command prompt commands.
- Use the command prompt to manage files and directories.

Lecture Focus Questions:

- When using the command window in Windows, how can you cause the output of a command to list one screen at a time?
- You type a specific command in the **Run...** box, the command executes and you do not see the actual output. How can you remedy this problem so you can see the output?
- How do you repeat a command by causing the most recent command to appear at the command prompt?
- What function does the **cd..** command provide?
- What **dir** command can you use to display only the files that are *not* read-only?
- Which command removes subdirectories in addition to files in the current directory?
- What are the main differences between the **copy** command and the **xcopy** command?
- Which **edit** command is used to load file(s) in read-only mode?

Video/Demo

Time

| | |
|---|--------------|
|  11.2.1 File and Folder Properties | 6:07 |
|  11.2.2 Managing Files 1 | 14:31 |
|  11.2.3 Managing Files 2 | 9:41 |
|  11.2.7 Using the Command Prompt | 2:22 |
|  11.2.8 Managing Files and Directories 1 | 20:32 |
|  11.2.9 Managing Files and Directories 2 | <u>20:47</u> |
| <i>Total</i> | <i>74:00</i> |

Lab/Activity

- Manage Files
- Manage Files and Folders

Number of Exam Questions

20 questions

Total Time

About 110 minutes

Section 11.3: NTFS Permissions

Summary

This section discusses NTFS permissions. Concepts discussed include:

- Permissions for folders and files:
 - Read
 - Write
 - List Folder Contents
 - Read & Execute
 - Modify
 - Full Control
- Facts about using NTFS permissions
- How file ownership affects access and assigning permissions
- Copying or moving files with NTFS permissions

Students will learn how to:



- Configure NTFS permissions.
- Change file ownership.

Lecture Focus Questions:

- Which NTFS permissions are required to allow a user to open, edit, and save changes to a document?
- How does file ownership affect access and permissions?
- If you have the Modify permission to a folder, what actions can you complete within that folder?
- What happens when a user belongs to two groups, and a specific permission is allowed for one group and denied for the other?
- What does it mean that permissions are *cumulative*?
- To move a file or folder, what permission must you have to the source file? What permission to the destination location?

Video/Demo

Time

| | |
|---|--------------|
|  11.3.1 NTFS Permissions | 7:37 |
|  11.3.2 Configuring NTFS Permissions | <u>16:41</u> |
| <i>Total</i> | <i>24:18</i> |

Lab/Activity

- Configure NTFS Permissions

Number of Exam Questions

10 questions

Total Time

About 45 minutes

Section 11.4: Shared Folders

Summary

This section examines sharing folders. Concepts discussed include:

- Ways to share files:
 - Manually
 - Share the Public folder on the network (Vista or later)
 - Share your own media files (Vista or later)
- Comparison of share permissions for Windows 7, Windows Vista and Earlier, and Advanced sharing permission.
- *Effective* permissions to shared folders are the more restrictive of share or NTFS permissions.
- Considerations when sharing files.

Students will learn how to:





- Share a folder.
- Map a drive to a shared folder.

Lecture Focus Questions:

- How are the simple share permissions different than the advanced share permissions?
- What are the differences between share and NTFS permissions?
- Which permissions (share or NTFS) apply to both local and network access of files? Which permissions can you use on FAT32 volumes?
- How can you control access to a specific file within a shared folder?
- What is the format for the UNC path to a shared folder? How is this different from the drive letter and path?
- Which **net use** command option makes drive mappings permanent?

Video/Demo

Time

| | |
|---|--------------|
|  11.4.1 Shared Folders | 4:21 |
|  11.4.2 Sharing Folders 1 | 13:27 |
|  11.4.3 Sharing Folders 2 | 10:44 |
|  11.4.4 Configuring Share and NTFS Permissions | <u>23:14</u> |
| <i>Total</i> | <i>51:46</i> |

Lab/Activity

- Share and Secure Folders

Number of Exam Questions

9 questions

Total Time

About 70 minutes

Section 11.5: Offline Files

Summary

This section discusses using offline files to work with documents in shared folders even when you are not connected to the network.

Students will learn how to:

- Make shared files available for offline users.
- Synchronize offline files.

Lecture Focus Questions:

- How does the offline files feature provide you the ability to work with documents in shared folders even when you are not connected to the network?
- How would you force a synchronization of the stored offline files and folders to the network versions of the files?
- How do you work with an offline file when you are offline?
- Where are offline files stored? Can you directly access the offline files from this directory?

Video/Demo

 11.5.1 Using Offline Files

Time

13:06

Number of Exam Questions

2 questions

Total Time

About 20 minutes

Section 12.1: Best Practices

Summary

This section discusses the following security best practices:

- Implement the Principle of Least Privilege
- Require passwords
- Use strong passwords
- Use file and folder permissions
- Disable the Guest user account
- Don't use default user names
- Disable autorun

Students will learn how to:

- Apply the Principle of Least Privilege to increase the security of a Windows workstation.
- Implement strong passwords.
- Use file and folder permissions to restrict access to information on a Windows workstation.
- Disable high-risk user accounts, such as Guest, on a Windows workstation.
- Disable autorun on a Windows workstation.

Lecture Focus Questions:

- How does the Principle of Least Privilege apply to workstation security?
- What are the characteristics of a strong password?
- How can file and folder permissions be used to restrict access to information on a workstation?
- Which default Windows user accounts should you secure?
- How does the autorun feature in Windows reduce the security of a workstation?

Video/Demo

Time

 12.1.1 Best Practices for Securing Workstations 14:09

Lab/Activity

- Implement Workstation Security

Number of Exam Questions

4 questions

Total Time

About 25 minutes

Section 12.2: Physical Security

Summary

This section discusses the following methods of physically securing computer systems:

- Building security
- Hardware locks
- Lock the workstation
- Computer tracking service
- Removable storage
- Storage media disposal
- Mobile devices

Students will learn how to:





- Wipe data from a hard disk prior to disposal.
- Configure a screen saver and require a password to lock the Windows desktop.

PC Pro Exam Objectives:

- 10.0 Security
 - Configure a screen saver and require a password to unlock a Windows workstation.

Lecture Focus Questions:

- What precautions should you implement for good physical security for a building?
- How can you prevent laptops and their components from being stolen?
- How can you secure unattended Windows computers?
- What measures can you implement to protect data on stolen laptops?
- What is the difference between a user password and an administrator password set in the BIOS?
- What is the difference between securely disposing of magnetic media and securely disposing of optical media?

| Video/Demo | Time |
|--|--------------|
|  12.2.1 Physical Security | 19:39 |
|  12.2.3 Data Disposal and Destruction | 10:06 |
|  12.2.4 Wiping a Disk | 7:35 |
|  12.2.5 Configuring a Screen Saver Password | <u>5:20</u> |
| <i>Total</i> | <i>42:40</i> |

Lab/Activity

- Require a Screen Saver Password

Number of Exam Questions

6 questions

Time

About 60 minutes

Section 12.3: Social Engineering

Summary

In this section students will learn how social engineering exploits human nature to convince someone to perform an activity. Concepts discussed include:

- Examples of social engineering
- Social engineering attacks:
 - Dumpster diving
 - Shoulder surfing
 - Piggybacking
 - Masquerading
 - Eavesdropping
 - Phishing
- Countermeasures to social engineering

Lecture Focus Questions:

- What characteristics of human nature does social engineering exploit?
- Who is usually the target in social engineering?
- How can dumpster diving give attackers valuable information?
- What is the best defense against a social engineering attack?

Video/Demo

 12.3.1 Social Engineering

Time

8:25

Number of Exam Questions

7 questions

Total Time

About 20 minutes

Section 12.4: BIOS Security

Summary

In this section students will learn the basics of BIOS security. Concepts covered include:

- Security-related features in the BIOS:
 - BIOS passwords
 - Chassis intrusion detection
 - Hard disk password
 - Trusted Platform Module (TPM)

Students will learn how to:

- Clear BIOS passwords and settings.
- Configure BIOS and hard disk passwords.
- Enable and reset chassis intrusion detection.
- Initialize a TPM.

PC Pro Exam Objectives:



- 10.0 Security
 - Configure BIOS security settings such as configuring drive lock, setting user and administrator passwords, enabling/disabling chassis intrusion detection, and enabling/disabling TPM.

Lecture Focus Questions:

- What is the difference between a user and an administrator password in the BIOS?
- Why do BIOS passwords offer little system protection?
- How does chassis intrusion detection help to secure the BIOS?
- How does a hard disk password differ from a BIOS password? What happens to the hard disk password if the disk is moved to another system?
- What is the function of the TPM? Where is the TPM chip located?

Video/Demo

Time

| | |
|---|--------------|
|  12.4.1 BIOS Security | 9:52 |
|  12.4.2 Configuring BIOS Security Settings | <u>8:04</u> |
| <i>Total</i> | <i>17:56</i> |

Lab/Activity

- Configure BIOS Security

Number of Exam Questions

5 questions

Total Time

About 30 minutes

Section 12.5: Malware Protection

Summary

In this section students will learn the basics of protecting against malware. Concepts covered include:





- Common malware:
 - Virus
 - Worm
 - Trojan horse
 - Rootkit
 - Spyware
 - Adware
 - Grayware
 - Spam
- Using antivirus software to protect against malware
- Additional countermeasures for malware
- Malicious code
- Considerations about protecting against malware
- Symptoms of malware
- Remediation
- Actions to recover from malware

Students will learn how to:

- Install and configure malware protection software.
- Update malware definition files.
- Research virus hoaxes using Internet sources.
- Scan and repair infected files and systems.

Lecture Focus Questions:

- What is the role of a *signature file* when using anti-malware software to protect a system?
- How and when should you keep the signature files up to date?
- How does showing full file extensions on all files help to protect against malware?
- What are some common symptoms that might make you suspect that your system is infected with malware?
- When your system is infected with malware, what *remediation* actions might your antivirus software prompt you to select from?
- What is the process of quarantining a file?
- What types of actions might a *hoax virus* instruct you to perform?
- Why is user education often the best protection against malware?

| Video/Demo | Time |
|--|--------------|
|  12.5.1 Malware | 3:39 |
|  12.5.2 Implementing Malware Protection | 4:57 |
|  12.5.4 Malware Protection | 13:08 |
|  12.5.5 Implementing Virus Protection | <u>15:25</u> |
| <i>Total</i> | <i>37:09</i> |

Number of Exam Questions

18 questions

Total Time

About 70 minutes

Section 12.6: Authentication

Summary

This section discusses using authentication to validate a user's identity. Topics covered include:

- Authentication credentials:
 - Password
 - Smart card
 - Biometric
- Categories of authentication factors:
 - Something the user knows
 - Something the user has
 - Something the user is
- Multifactor authentication
- Password weaknesses
- Strong password policy
- Control passwords with policy settings:
 - Password Policy settings:
 - Minimum password length
 - Password complexity
 - Maximum password age
 - Minimum password age
 - Enforce password history
 - Account Lockout Policy settings:
 - Account lockout threshold
 - Account lockout duration
 - Reset account lockout counter after
- Troubleshooting user authentication

Students will learn how to:






- Unlock a locked user account.
- Reset a password with or without a password reset disk.
- Log on to a remote computer.

PC Pro Exam Objectives:

- 10.0 Security
 - Configure password and account lockout settings in a local security policy.

Lecture Focus Questions:

- You want a single user to log onto three computers using a local user account and the same username and password. Where do you have to create the user account?
- What tool would you use to configure a computer to require complex passwords for local user accounts?
- What is the difference between a locked account and a disabled account?
- What requirements are there for a user account that is to be used for network access (such as to access a shared folder or use Remote Desktop)?

| Video/Demo | Time |
|--|--------------|
|  12.6.1 Authentication | 16:23 |
|  12.6.4 Configuring Password Policies | 13:52 |
|  12.6.6 Using a Biometric Scanner | 3:41 |
|  12.6.7 Managing Authentication 1 | 13:10 |
|  12.6.8 Managing Authentication 2 | <u>11:20</u> |
| <i>Total</i> | <u>58:26</u> |

Lab/Activity

- Enforce Password Settings

Number of Exam Questions

14 questions

Total Time

About 90 minutes

Section 12.7: Encryption

Summary

This section discusses using encryption to secure data by obscuring it from those who do not have the required key to access the data. Details about the following are presented:

- Types of encryption:
 - File encryption
 - Disk encryption
 - Data transmission encryption

Students will learn how to:

- Encrypt files and add authorized users.



PC Pro Exam Objectives:

- 10.0 Security
 - Encrypt files and folders.

Lecture Focus Questions:

- Which encryption method encrypts individual files so that only the owner and other users who have been authorized can decrypt the file and read it?
- Why is it important to *not* move files that have been encrypted with EFS to a non-NTFS partition?
- How does file encryption differ from disk encryption?
- What is the role of a TPM when implementing whole disk encryption?
- What protocols are commonly used to establish a VPN? Which protocol is typically used for Web transactions?
- What protocols are commonly used to encrypt and secure wireless communications?

Video/Demo

| | Time |
|---|--------------|
|  12.7.1 Encryption | 5:09 |
|  12.7.3 Encrypting Files | 8:45 |
| <i>Total</i> | <u>13:54</u> |

Lab/Activity

- Encrypt Files

Number of Exam Questions

9 questions

Total Time

About 30 minutes

Section 12.8: Network Security

Summary

This section discusses securing a network. Details about the following are presented:

- Best practices for a wired network:
 - Physical security
 - Unnecessary software
 - User accounts
 - Usernames and passwords
 - MAC address filtering
 - Static IP addressing
 - Disabling ports
- Best practices for a wireless network:
 - Usernames and passwords
 - SSID names
 - SSID broadcast
 - Encryption
 - MAC address filtering
 - Static IP addressing
 - Data emanation


Students will learn how to:

- Physically secure a wired or wireless network.
- Control access to a wired network by disabling switch ports.
- Control access to a wired or wireless network by implementing MAC address filtering.
- Secure a wired or wireless network with static IP address assignments.
- Secure a wireless network access point.
- Prevent data emanation from a wireless network.

Lecture Focus Questions:

- What steps should be taken to physically secure a wired network?
- Which ports on a network switch should be disabled?
- What is the effect of unnecessary or unused software installed on a workstation or server?
- What can be done to make usernames and passwords more secure?
- How can MAC address filtering increase the security of a wired or wireless network?
- Is using static IP address assignments more secure than using dynamic assignments via DHCP?

- What can be done to secure a wireless network access point?
- How can you keep a wireless network's radio signal from emanating outside your facility or campus?

| Video/Demo | Time |
|---|--------------|
|  12.8.1 Wired Network Security Best Practices | 17:45 |
|  12.8.3 Wireless Network Security Best Practices | <u>14:57</u> |
| <i>Total</i> | <i>32:42</i> |

Number of Exam Questions

4 questions

Total Time

About 45 minutes

Section 12.9: Firewalls

Summary

This section discusses using firewalls to inspect network traffic and allow or block traffic based on a set of rules. Concepts covered include:

- Types of firewalls:
 - Network-based firewall
 - Host-based firewall
- Filtering rules use characteristics of the traffic to identify allowed and blocked traffic.
- In Windows Firewall, you can configure two exception types:
 - Program
 - Port
- Identifying the traffic type for network-based firewalls:
 - Port triggering
 - Port forwarding
- Port numbers for common network protocols

Students will learn how to:

- Enable the Windows firewall.
- Open and close ports in the Windows firewall.
- Configure a network-based firewall using port forwarding.
- Configure a network-based firewall using port triggering.

PC Pro Exam Objectives:

- 10.0 Security
 - Configure the basic Windows Firewall. Open necessary ports to support running services and applications.





Lecture Focus Questions:

- Why is using a firewall important when connecting your computer to the Internet?
- Is the Windows firewall service a host-based or a network-based firewall solution?
- In Windows Firewall, what types of exception types can be configured to allow incoming traffic?
- What information does the firewall use to allow or prevent communication?
- What are the disadvantages of using a firewall?
- What capabilities does configuring *port forwarding* provide?

- How would you configure *port triggering*?

Video/Demo

Time

| | |
|---|--------------|
|  12.9.1 Introduction to Firewalls | 8:01 |
|  12.9.2 Firewalls | 10:39 |
|  12.9.3 Configuring Windows Firewall | 3:50 |
|  12.9.4 Configuring a Network-Based Firewall | <u>13:46</u> |
| <i>Total</i> | <i>36:16</i> |

Lab/Activity

- Configure the Windows Firewall

Number of Exam Questions

9 questions

Total Time

About 55 minutes

Section 12.10: Proxy Servers

Summary

This section discusses the role of a proxy server.

Students will learn how to:



- Configure Internet Explorer to use a proxy server.

Lecture Focus Questions:

- What is the function of a proxy server and how can it be used to control access of Internet traffic?
- What types of restrictions can a proxy server use to restrict Internet traffic?
- In addition to restricting Internet access, what other functions can a proxy server perform?
- What should you do if Internet Explorer doesn't automatically detect a proxy server?

Video/Demo

Time

| | |
|--|--------------|
|  12.10.1 Proxy Servers | 4:49 |
|  12.10.2 Configuring Proxy Settings | <u>5:25</u> |
| <i>Total</i> | <i>10:14</i> |

Lab/Activity

- Use a Proxy Server

Number of Exam Questions

4 questions

Total Time

About 20 minutes

Section 13.1: Motherboard, RAM, and CPU Troubleshooting

Summary

This section discusses troubleshooting the motherboard, RAM and CPU. Details include:

- Symptoms of a failed or failing CPU
- Symptoms that a computer needs additional memory:
 - High hard disk usage
 - Not enough memory errors
- Categories of memory problems
- Identifying the memory problems for the following problems:
 - The PC boot fails and sounds a beep code
 - The PC boots, but the display remains blank
 - The PC boots, but the memory count is incorrect
 - Error messages:
 - Memory mismatch error
 - Memory parity interrupt at x
 - Memory address error at x
 - Memory failure at x, read y, expecting z
 - Memory verify error at x
 - Software-generated memory problems
 - Intermittent problems
- Critical times when memory problems manifest themselves

Students will learn how to:

- Troubleshoot system power issues.
- Troubleshoot system errors identified during POST.
- Troubleshoot memory errors.
- Troubleshoot overheating issues.
- Troubleshoot device errors





Lecture Focus Questions:

- What are the symptoms of system power problems? How do you troubleshoot system power problems?
- How do you interpret BIOS error codes generated during POST?
- What are the symptoms of memory errors? How do you troubleshoot memory problems?
- What are the symptoms of system overheating? How do you troubleshoot overheating issues?

- What are the symptoms of internal and external device failures? How do you troubleshoot internal and external device failures?

Video/Demo

Time

| | |
|---|--------------|
|  13.1.1 Common Motherboard, RAM and CPU Issues | 22:16 |
|  13.1.4 Processor Troubleshooting | 10:14 |
|  13.1.8 Memory Troubleshooting | 9:29 |
|  13.1.9 Testing Memory | <u>9:03</u> |
| <i>Total</i> | <i>51:02</i> |

Lab/Activity

- Troubleshoot System Power
- Troubleshoot Power Supply Problems
- Troubleshoot Processor Installation 1
- Troubleshoot Processor Installation 2
- Troubleshoot Memory 1
- Troubleshoot Memory 2

Number of Exam Questions

17 questions

Total Time

About 105 minutes

Section 13.2: Storage Troubleshooting

Summary

This section discusses troubleshooting storage devices. Details include:

- Resources an expert troubleshooter uses:
 - System docs
 - Knowledge bases
 - Service manuals
 - User forums
- Resolutions of hard disk issues :
 - Slow performance
 - Failure to boot (OS not found)
 - Drive not recognized by the BIOS
 - Drive noise

Students will learn how to:

- Optimize hard disk performance.
- Troubleshoot boot failures.
- Troubleshoot problems with storage device boot priority in the BIOS
- Troubleshoot floppy disk issues.
- Troubleshoot SATA and PATA drive issues.

Lecture Focus Questions:

- A hard disk is performing slowly. What can you do to speed up its performance?
- A system fails to boot, displaying an *Operating System Not Found* error message. What is causing this?
- A hard disk connected to the motherboard is not recognized by the BIOS. What is causing this?
- The light on a floppy diskette drive comes on and stays on at boot. How can you fix this?

Video/Demo

 13.2.1 Common Storage Issues

Time

20:08

Lab/Activity

- Troubleshoot Floppy Configuration
- Troubleshoot PATA Devices

Number of Exam Questions

21 questions

Total Time

About 55 minutes

Section 13.3: Video Troubleshooting

Summary

This section discusses troubleshooting the following common video problems. Concepts covered include:

- System does not boot
- Colors are not correct/Colors are not smooth
- Blurry images, strange color tints
- Image missing, doesn't fill the screen, skewed, or cut off
- Program or system lockup, system crashes, slow video performance
- Screen flickers or appears wavy, user reports headaches
- Scrambled or distorted images, blank screen, high-pitched tone
- Image does not display on a second monitor
- Slow performance when drawing screens
- Video files or DVD video does not play, audio plays but no video




Students will learn how to:

- Troubleshoot monitors with no display.
- Troubleshoot monitors displaying in VGA mode.
- Troubleshoot monitor thermal shutdown.
- Determine the native resolution for an LCD monitor.
- Troubleshoot backlight issues on LCD monitors.
- Fix dead or stuck pixels on an LCD monitor.
- Degauss a CRT monitor.

Lecture Focus Questions:

- What components comprise the video system in a PC?
- No output is displayed on a video monitor. What could be causing this?
- The output on a video monitor is displayed in VGA mode. What could be causing this?
- A monitor suddenly shuts off during use. What could be causing this?
- The display on an LCD monitor looks pixilated and chunky. What could be causing this?
- The display on an LCD monitor is dim. What could be causing this?
- The display on an LCD monitor is flickering. What could be causing this?
- An LCD monitor has dead and stuck pixels. How can you fix this?
- The display on a CRT monitor is discolored. How can you fix this?

Video/Demo**Time**

| | |
|--|--------------|
|  13.3.1 Common Video and Display Issues 1 | 14:58 |
|  13.3.2 Common Video and Display Issues 2 | 11:03 |
|  13.3.3 Video Troubleshooting | <u>15:19</u> |
| <i>Total</i> | <i>41:20</i> |

Number of Exam Questions

10 questions

Total Time

About 55 minutes

Section 13.4: Network Troubleshooting

Summary

This section discusses troubleshooting network problems. Concepts covered include:






- Steps to identify the scope of the network problem:
 - Verify the network adapter
 - Verify physical connectivity
 - Verify the IP configuration
 - Verify network connectivity
- Troubleshooting network communications:
 - Physical issues
 - Interference
 - IP configuration
 - Communication issues
 - Network issues
 - Resource access issues

Students will learn how to:

- View the status of a network connection.
- Use **ping** and **ipconfig** to troubleshoot network connectivity problems.
- Troubleshoot IP address conflicts.
- Troubleshoot DHCP client issues.

Lecture Focus Questions:

- What is the first thing you should try if the link light is not lit? What should you try next?
- What should you try if all of the computers on the network are having the same problem?
- What kind of problem is likely indicated when you can ping a device by the IP address but not the host name?
- What additional information is shown when you use the **/all** switch with the **ipconfig** command?
- Two hosts report that they are using the same IP address. What should you do?
- A host has an IP address of 169.254.0.2. What caused this?
- You are receiving an intermittent wireless network signal. What could be causing this?

| Video/Demo | Time |
|---|--------------|
|  13.4.1 Common Wired and Wireless Network Issues | 20:52 |
|  13.4.2 Network Troubleshooting 1 | 4:34 |
|  13.4.3 Network Troubleshooting 2 | 17:02 |
|  13.4.4 Troubleshooting Network Connectivity 1 | 19:50 |
|  13.4.6 Troubleshooting Network Connectivity 2 | <u>12:20</u> |
| <i>Total</i> | <i>74:38</i> |

Lab/Activity

- Fix a Network Connection 1
- Fix a Network Connection 2

Number of Exam Questions

20 questions

Total Time

About 115 minutes

Section 13.5: Operating System Troubleshooting

Summary

This section discusses troubleshooting operating system problems. Concepts covered include:

- Guidelines for troubleshooting common application issues:
 - Shortcut malfunction
 - Installation issues
 - Windows compatibility
 - Permissions
 - Error reporting
 - Service fails to start
- When troubleshooting the boot process be aware of the general stages of the startup process:
 - POST (power on/self-test)
 - Boot loader
 - Operating system startup
 - Logon and user configuration
- Boot process for:
 - Windows NT/2000/SP/2003
 - Windows Vista/2008/7
- Additional details about the stages of the startup process:
 - The steps of the POST (power on/self-test)
 - The boot loader process
 - The operating system startup process
 - Logon and user configuration

Students will learn how to:






- Edit the device priority list in the BIOS to include and exclude device types from the boot order.
- Modify the hard drive list to identify the order that the BIOS should search when booting from a hard disk.
- Troubleshoot failure to boot issues.
- Troubleshoot services and devices that fail to start on boot.
- Troubleshoot system crashes.

Lecture Focus Questions:

- What are the general stages of the startup process?
- What are the two programs that Windows might use for the boot loader program (depending on the operating system version)?
- At what stage of the boot process can you press F8 to get advanced startup options (such as Safe Mode)?
- Under what circumstances would using the Last Known Good option possibly work to help a system start? When would it not work?
- The operating system won't load at system boot. What should you do?
- Services fail to start when Windows loads. What should you do?
- A Windows system generates a BSOD error. What should you do?

Video/Demo

Time

| | |
|---|--------------|
|  13.5.1 Common Operating System Issues 1 | 17:03 |
|  13.5.2 Common Operating System Issues 2 | 14:33 |
|  13.5.3 Troubleshooting Applications | 25:05 |
|  13.5.5 Windows Boot Process | 13:32 |
|  13.5.7 Modifying the Boot Order | <u>8:46</u> |
| <i>Total</i> | <i>78:59</i> |

Lab/Activity

- Configure the Boot Order
- Troubleshoot the Boot Order

Number of Exam Questions

16 questions

Total Time

About 115 minutes

Section 13.6: Windows Recovery

Summary

This section discusses system recovery procedures. Concepts covered include:

- Methods to try before using recovery tools:
 - Removing problematic hardware or software
 - Updating drivers, applications, and operating system files
 - Booting using the Last Known Good boot option (if the problem is keeping you from logging on)
 - Booting into Safe Mode to disable devices or roll back drivers
- Recovery tools to resolve problems:
 - System Restore (restore point)
 - Repair Installation Startup Repair
 - Recovery Console (Repair command prompt)
 - Emergency Repair Disk (ERD), Automated System Recovery (ASR), Complete PC Restore
 - Recovery disc/partition
 - Parallel installation
- Methods to recover lost data files:
 - Previous Versions
 - Restore from backup

Students will learn how to:

- Boot using the installation disc and use automatic recovery options to repair an installation.
- Restore the system to a restore point.
- Restore user data using previous versions and from backup.
- Restore a system using a system image.




Lecture Focus Questions:

- Before using recovery tools, what system recovery methods should you attempt when you are unable to boot the computer?
- When using a restore point, what happens to the system changes that have been made since the restore point was taken? To the user data files?
- What types of elements does the Startup Repair inspect and automatically repair to fix problems that keep Windows from booting?
- When should the Recovery Console be used in the recovery process? Which other things should you try first?
- What are the advantages of using a recovery disc/partition to recover a system? Disadvantages?

- What are the two ways that a parallel installation can be performed?
- What are the benefits of parallel installation? What are the drawbacks?
- What methods can you use to recover lost data files?

Video/Demo

Time

| | |
|---|--------------|
|  13.6.1 System Recovery | 13:53 |
|  13.6.2 Using Windows Recovery Options | 17:42 |
|  13.6.3 Using Restore Tools | <u>20:08</u> |
| <i>Total</i> | <i>51:43</i> |

Number of Exam Questions

5 questions

Total Time

About 60 minutes

Section 13.7: System Errors

Summary

This section discusses troubleshooting system errors. Details include:

- Causes of errors, lockup and system crashes:
 - Software bugs (errors in an application, the operating system, or driver code)
 - Corrupt or missing operating system files
 - Incorrect, corrupt, or incompatible device drivers
 - Overheated hardware
 - Failing hardware (memory, hard disk, or other component)
- Suggestions for basic troubleshooting:
 - Identify the conditions when the error occurs
 - Write down any error messages, and check Event Viewer for recent events
 - Start with recently installed or updated hardware or software
 - Update operating system files, applications, and device drivers that might be the cause
 - Do an inspection of your hardware
 - Run utilities to diagnose hardware components
- Common problems and causes
- Startup modes:
 - Repair Your Computer
 - Safe Mode
 - Safe Mode with Networking
 - Safe Mode with Command Prompt
 - Enable Boot Logging
 - Enable VGA Mode
 - Last Known Good Configuration
 - Disable automatic restart on system failure
 - Disable Driver Signature Enforcement
- Recommendations to troubleshoot startup errors
- Common startup errors:
 - System does not power on
 - System power on but no display
 - Corrupt MBR or partition table
 - Corrupt boot sector
 - Inaccessible boot disk
 - Missing or corrupt file
 - Corrupt system hive
 - Bluescreen or system hang after Windows splash screen shows
 - Service fails to start
 - Corrupt or missing DLL or system file
 - Device fails to start

- Error code 4

Students will learn how to:





- Diagnose and correct errors with system power.
- Diagnose and correct system component errors.
- Recover from partition and boot record errors.
- During startup, access the advanced boot menu.
- Choose advanced boot options to customize how the system starts and to correct problems.

Lecture Focus Questions:

- What are the most likely problems if you hear a series of beeps when the system powers on and there is nothing on the monitor?
- How would you correct the problem of a corrupt MBR or partition table?
- What symptoms might indicate a corrupt or missing boot sector?
- How would you troubleshoot a corrupt system hive?
- What are the most common causes of errors when the system hangs after the Windows splash screen shows?
- When you receive an error about corrupt or missing DLLs or system files, how can you verify the integrity of the system files and replace damaged or missing files?
- What are the most common types of crashes?
- What types of things should be recorded when a crash occurs? Why is this so important?
- What sources are available for reference if common troubleshooting doesn't provide an answer?
- How can driver rollback help you recover from system instability problems?
- Which type of components does Windows Reporting monitor for errors?
- When you select the startup mode of **Last Known Good** to restore the registry to the last working configuration, where does the operating system pull the configuration information from?

Video/Demo

Time

| | |
|--|--------------|
|  13.7.1 Troubleshooting Lockups | 16:08 |
|  13.7.3 Boot Options | 1:52 |
|  13.7.4 Using Advanced Boot Options | 14:55 |
|  13.7.6 Startup Errors | <u>20:18</u> |
| <i>Total</i> | <i>53:13</i> |

Lab/Activity

- Troubleshoot System Startup 1
- Troubleshoot System Startup 2
- Troubleshoot System Startup 3
- Troubleshoot System Startup 4

Number of Exam Questions

21 questions

Total Time

About 105 minutes

Section 13.8: Security Troubleshooting

Summary

This section discusses the basics of troubleshooting workstation security issues. Details include:

- Preventative measures:
 - Implement malware prevention.
 - Implement browser security.
 - Enable automatic updates for workstation operating systems.
 - Stay current by subscribing to security alerts offered by most security software vendors.
 - Educate users about current security threats and how to respond to them.
- Security threats:
 - Hijacked email
 - Redirection to rogue web sites
 - Pharming
 - Rogue anti-virus
 - Cookies
- Symptoms of malware
- Best practices to remove malware

Students will learn how to:

- Employ preventative measures to reduce security incidents.
- Identify security issues with email hijacking, pharming, cookies, pop-up windows, and malware.
- Recognize rogue anti-virus exploits.
- Identify the symptoms of a malware infection.
- Use the correct procedure for removing malware from a computer system.

Lecture Focus Questions:

- What key preventative measures can you employ to increase the overall security of your computers and network?
- A user reports that someone on the Internet is using her Gmail account to send spam. How did this happen?
- A malicious individual has set up a fake website that looks identical to the website of a major bank. Users trying to connect to the legitimate site are redirected to the malicious site. How did this happen?
- A user reports that a pop-up window is displayed on his computer indicating he has a virus. What should you tell him to do?
- What are the symptoms of a malware infection?

- What is the proper procedure for removing malware from a system?

Video/Demo 13.8.1 Common Security Issues**Time**

15:36

Number of Exam Questions

5 questions

Total Time

About 25 minutes

Section 13.9: Notebook Troubleshooting

Summary

In this section students will learn about troubleshooting notebook components. Details include:

- Troubleshooting guidelines for components of laptop computers:
 - Power
 - Video
 - Notebook components:
 - Keyboard
 - Mouse
 - Digitizer
 - Antennae
 - Switch to turn on and off the wireless network card
 - Considerations when maintaining portable devices





Students will learn how to:

- Locate service manuals for notebook systems.
- Perform preventative maintenance on notebook systems.
- Troubleshoot power issues on notebook systems.
- Troubleshoot video issues.
- Troubleshoot malfunctioning notebook components.

Lecture Focus Questions:

- You need to replace the RAM in a notebook system. You can't find the memory slots in the system. What should you do?
- You need to clean the LCD display screen on a notebook system. What should you do?
- A warning message is displayed on a notebook system indicating the processor temperature is dangerously high. What should you do?
- A notebook display is blank. What could be causing this?
- While running on batteries, the power level of your notebook battery drops quickly. What can you do?
- The keyboard on a notebook doesn't appear to be working. How can you test it?
- A user complains that her notebook has lost connection to your organization's wireless network and can't reconnect. What could be wrong?

Video/Demo

-  13.9.1 Common Notebook Issues
-  13.9.2 Troubleshooting Power
-  13.9.3 Troubleshooting Video
-  13.9.4 Troubleshooting Components

Total

Time

17:45

8:12

12:10

10:32

48:39

Number of Exam Questions

16 questions

Total Time

About 70 minutes

Section 13.10: Printer Troubleshooting

Summary

This section examines techniques for troubleshooting printers. Details include:

- Troubleshooting techniques
- Driver issues
- Considerations when the printout quality is poor
- Laser printers




Students will learn how to:

- Troubleshoot and resolve common printing problems.

Lecture Focus Questions:

- How do you clean an ink jet printer head?
- How does the EP process differ from the LED process to create an electrostatic charge to hold dry toner to the paper's surface?
- In the laser printing process, how does the primary corona prepare the photosensitive drum for writing?
- What is the best way to clean up a toner spill?
- What are three obvious things you should check before doing more extensive printing troubleshooting?
- What problems are indicated if the printer can print a test page, but you cannot send a print job to the printer from a workstation?
- What problems are indicated if a print job is full of garbled text?
- How does paper quality affect a printer?
- What is typically the problem when a vertical stripe is printed down the print job?

Video/Demo

| | |
|--|--------------|
|  13.10.1 Common Printing Issues | 21:08 |
|  13.10.2 Printer Troubleshooting | 4:01 |
|  13.10.3 Troubleshooting Printing | <u>22:04</u> |
| <i>Total</i> | <i>47:13</i> |

Number of Exam Questions

18 questions

Total Time

About 70 minutes

Section 13.11: Device Troubleshooting

Summary

This section discusses troubleshooting device problems. Details include:

- Proper installation procedures
- Elements to check when the device is not working properly
- Strategies to consider when installing a new device causes system instability



Students will learn how to:

- Update and roll back device drivers.
- Enable and disable devices in Device Manager.
- Use the Last Known Good configuration, Safe Mode, and restore points to recover from device-related errors.
- Update hardware device firmware.

Lecture Focus Questions:

- What are the first items you should check when you have installed a new device and it is not working properly?
- How do you verify that a device is recognized and enabled in Device Manager?
- What should you do if the system crashes during startup before you can log on?
- If you cannot boot the system into Safe Mode, what steps should you take to boot the system?
- Once you get the system started after reducing it to a minimal state, how will you identify the component that has the problem?

Video/Demo

| | |
|---|--------------|
|  13.11.1 Device Troubleshooting | 2:52 |
|  13.11.2 Troubleshooting Devices | <u>13:45</u> |
| <i>Total</i> | <i>16.37</i> |

Lab/Activity

- Manage Devices 1
- Manage Devices 2

Number of Exam Questions

8 questions

Total Time

About 40 minutes

Section 14.0: Capstone Exercises

Summary

This section contains two complex lab activities that require students to use a combination of all the skills they have learned in this course.

Lab/Activity

- Build a Computer From Scratch
- Troubleshoot a Malfunctioning Computer

Total Time

About 40 minutes

PC Pro Certification Practice Exams

Summary

This section provides information to help prepare students to take the PC Pro Certification exam and to register for the exam.

Students will also have the opportunity to test their mastery of the concepts presented in this course to confirm that they are ready for the certification exam. For example, all simulations that apply to **Objective 1.0 Audio** are grouped together and presented in practice exam **PC Pro Domain 1: Audio**. Students will typically take about 5-10 minutes (depending upon the complexity of the lab and their level of knowledge) to complete each simulation question in the following practice exams.

PC Pro Domain 1: Audio (1 simulation question)
PC Pro Domain 2: CPU (4 simulation questions)
PC Pro Domain 3: Expansion Slots (1 simulation question)
PC Pro Domain 4: External Devices (5 simulation questions)
PC Pro Domain 5: Memory (4 simulation questions)
PC Pro Domain 6: Motherboard (1 simulation question)
PC Pro Domain 7: Networking (14 simulation questions)
PC Pro Domain 8: Power Supply (3 simulation questions)
PC Pro Domain 9: Printing (5 simulation questions)
PC Pro Domain 10: Security (8 simulation questions)
PC Pro Domain 11: Storage (13 simulation questions)
PC Pro Domain 12: System Management (9 simulation questions)
PC Pro Domain 13: Video (7 simulation questions)

PC Pro Certification Practice Exam

The *Certification Practice Exam* consists of 15 simulation questions that are selected from the above practice exams. The Certification Practice Exam has a time limit of 105 minutes. A passing score of 95% should verify that the student has mastered the concepts and is ready to take the real certification exam.

CompTIA 220-801 Practice Exams

Summary

In this section students will prepare to take the CompTIA 220-801 Certification exam and to register for the exam.

Students will also have the opportunity to test their mastery of the concepts presented in this course to confirm that they are ready for the certification exam. Students will typically take about 1 minute to complete each question in the following practice exams:

Domain 1: PC Hardware, All Questions (268 questions)

Domain 2: Networking, All Questions (132 questions)

Domain 3: Laptops, All Questions (35 questions)

Domain 4: Printers, All Questions (39 questions)

Domain 5: Operational Procedures, All Questions (50 questions)

CompTIA 220-801 Certification Practice Exam

The *CompTIA 220-801 Certification Practice Exam* consists of 90 questions that are randomly selected from the above practice exams. Each time the Certification Practice Exam is accessed different questions may be presented. The Certification Practice Exam has a time limit of 90 minutes—just like the real certification exam. A passing score of 95% should verify that the student has mastered the concepts and is ready to take the real certification exam.

CompTIA 220-802 Practice Exams

Summary

In this section students will prepare to take the CompTIA 220-802 Certification exam and to register for the exam.

Students will also have the opportunity to test their mastery of the concepts presented in this course to confirm that they are ready for the certification exam. Students will typically take about 1 minute to complete each question in the following practice exams:

Domain 1: Operating Systems, All Questions (213 questions)

Domain 2: Security, All Questions (78 questions)

Domain 3: Mobile Devices, All Questions (7 questions)

Domain 4: Troubleshooting, All Questions (184 questions)

CompTIA 220-801 Certification Practice Exam

The *CompTIA 220-802 Certification Practice Exam* consists of 90 questions that are randomly selected from the above practice exams. Each time the Certification Practice Exam is accessed different questions may be presented. The Certification Practice Exam has a time limit of 90 minutes—just like the real certification exam. A passing score of 95% should verify that the student has mastered the concepts and is ready to take the real certification exam.

Appendix A: Approximate Time for the Course

The total time for the LabSim PC Pro course is approximately 111 hours and 6 minutes. The time is calculated by adding the approximate time for each section which is calculated using the following elements:

- Video/demo times
- Approximate time to read the text lesson (the length of each text lesson is taken into consideration)
- Simulations (5 minutes assigned per simulation. This is the amount of time it would take for a knowledgeable student to complete the lab activity. Plan that the new students will take much longer than this depending upon their knowledge level and computer experience.)
- Questions (1 minute per question)

The breakdown for this course is as follows:

| Module | Sections | Time | Minute | HR:MM |
|-------------------------------|------------------------------------|------|--------|-------|
| 1.0 Computing Overview | | | | |
| | 1.1 Course Introduction | 10 | | |
| | 1.2 Using the Simulator | 55 | | |
| | 1.3 Hardware Basics | 45 | | |
| | 1.4 Operating System Basics | 45 | 155 | 2:35 |
| 2.0 PC Technician | | | | |
| | 2.1 Protection and Safety | 50 | | |
| | 2.2 Professionalism | 55 | | |
| | 2.3 PC Tools | 20 | | |
| | 2.4 PC Maintenance | 60 | | |
| | 2.5 Troubleshooting Overview | 25 | 210 | 3:30 |
| 3.0 System Components | | | | |
| | 3.1 Cases, Form Factors, and Power | 20 | | |
| | 3.2 Power Supplies | 55 | | |
| | 3.3 Motherboards and Buses | 45 | | |
| | 3.4 Processors | 60 | | |
| | 3.5 Memory | 125 | | |
| | 3.6 BIOS | 90 | | |
| | 3.7 Expansion Cards | 25 | | |
| | 3.8 Video | 30 | | |
| | 3.9 Audio | 55 | | |
| | 3.10 Cooling | 20 | 525 | 8:45 |

| | | | |
|--------------------------------|-----|-----|-------|
| 4.0 Peripheral Devices | | | |
| 4.1 Peripheral Devices | 25 | | |
| 4.2 Serial, Parallel, and PS/2 | 25 | | |
| 4.3 USB | 40 | | |
| 4.4 IEEE 1394 (Firewire) | 15 | | |
| 4.5 Display Devices | 130 | | |
| 4.6 Device Installation | 55 | 290 | 4:50 |
| 5.0 Storage | | | |
| 5.1 Storage Devices | 55 | | |
| 5.2 Floppy Drives | 25 | | |
| 5.3 Parallel ATA (IDE) | 40 | | |
| 5.4 Serial ATA | 30 | | |
| 5.5 SCSI | 50 | | |
| 5.6 Optical Media | 55 | | |
| 5.7 File System | 115 | | |
| 5.8 RAID | 55 | | |
| 5.9 Adding Storage | 35 | | |
| 5.10 Disk Optimization | 45 | 505 | 8:25 |
| 6.0 Networking | | | |
| 6.1 Networking Overview | 60 | | |
| 6.2 Network Hardware | 65 | | |
| 6.3 Networking Media | 45 | | |
| 6.4 Ethernet | 15 | | |
| 6.5 Network Addressing | 35 | | |
| 6.6 IP Configuration | 65 | | |
| 6.7 IP version 6 | 15 | | |
| 6.8 Protocols | 20 | | |
| 6.9 802.11 Wireless | 65 | | |
| 6.10 Infrared and Bluetooth | 25 | | |
| 6.11 Internet Connectivity | 75 | | |
| 6.12 SOHO Configuration | 65 | | |
| 6.13 Network Utilities | 60 | | |
| 6.14 HomeGroup | 15 | 625 | 10:25 |
| 7.0 Printing | | | |
| 7.1 Printers | 70 | | |
| 7.2 Printer Configuration | 45 | | |
| 7.3 Network Printing | 40 | | |

| | | | |
|--------------------------------------|-----|-----|------|
| 7.4 Printing Management | 45 | | |
| 7.5 Printer Maintenance | 25 | 225 | 3:45 |
| 8.0 Mobile Devices | | | |
| 8.1 Notebook Computers | 60 | | |
| 8.2 Notebook Components | 60 | | |
| 8.3 Notebook Power Management | 40 | | |
| 8.4 Mobile Devices | 70 | 230 | 3:50 |
| 9.0 Windows System Management | | | |
| 9.1 Windows System Tools | 115 | | |
| 9.2 Preferences and Settings | 30 | | |
| 9.3 Performance Monitoring | 30 | | |
| 9.4 Users and Groups | 50 | | |
| 9.5 Remote Services | 50 | | |
| 9.6 Applications | 40 | | |
| 9.7 Updates | 50 | | |
| 9.8 System Protection | 75 | | |
| 9.9 Virtual Memory | 30 | 470 | 7:50 |
| 10.0 System Implementation | | | |
| 10.1 Component Selection | 30 | | |
| 10.2 Windows Pre-installation | 50 | | |
| 10.3 Windows Installation | 45 | | |
| 10.4 Post Installation | 20 | | |
| 10.5 Virtualization | 70 | 215 | 3:35 |
| 11.0 File Management | | | |
| 11.1 File Locations | 35 | | |
| 11.2 Managing Files | 110 | | |
| 11.3 NTFS Permissions | 45 | | |
| 11.4 Shared Folders | 70 | | |
| 11.5 Offline Files | 20 | 280 | 4:40 |

| | | | | |
|--|-----|-----|-------|--|
| 12.0 Security | | | | |
| 12.1 Best Practices | 25 | | | |
| 12.2 Physical Security | 60 | | | |
| 12.3 Social Engineering | 20 | | | |
| 12.4 BIOS Security | 30 | | | |
| 12.5 Malware Protection | 70 | | | |
| 12.6 Authentication | 90 | | | |
| 12.7 Encryption | 30 | | | |
| 12.8 Network Security | 45 | | | |
| 12.9 Firewalls | 55 | | | |
| 12.10 Proxy Servers | 20 | 445 | 7:25 | |
| 13.0 Troubleshooting | | | | |
| 13.1 Motherboard, RAM, and CPU Troubleshooting | 105 | | | |
| 13.2 Storage Troubleshooting | 55 | | | |
| 13.3 Video Troubleshooting | 55 | | | |
| 13.4 Network Troubleshooting | 115 | | | |
| 13.5 Operating System Troubleshooting | 115 | | | |
| 13.6 Windows Recovery | 60 | | | |
| 13.7 System Errors | 105 | | | |
| 13.8 Security Troubleshooting | 25 | | | |
| 13.9 Notebook Troubleshooting | 70 | | | |
| 13.10 Printer Troubleshooting | 70 | | | |
| 13.11 Device Troubleshooting | 40 | 815 | 13:35 | |
| 14.0 Capstone Exercise | | | | |
| 14.1 Build a Computer From Scratch | 20 | | | |
| 14.2 Troubleshoot a Malfunctioning Computer | 20 | 40 | :40 | |

| PC Pro Certification Practice Exams | | | |
|--|-----|-------------|---------------|
| PC Pro Domain 1: Audio (1 sim) | 5 | | |
| PC Pro Domain 2: CPU (4 sims) | 20 | | |
| PC Pro Domain 3: Expansion Slots (1 sim) | 5 | | |
| PC Pro Domain 4: External Devices (5 sims) | 25 | | |
| PC Pro Domain 5: Memory (4 sims) | 20 | | |
| PC Pro Domain 6: Motherboard (1 sim) | 5 | | |
| PC Pro Domain 7: Networking (14 sims) | 70 | | |
| PC Pro Domain 8: Power Supply (3 sims) | 15 | | |
| PC Pro Domain 9: Printing (5 sims) | 25 | | |
| PC Pro Domain 10: Security (8 sims) | 40 | | |
| PC Pro Domain 11: Storage (13 sims) | 65 | | |
| PC Pro Domain 12: System Management (9 sims) | 45 | | |
| PC Pro Domain 13: Video (7 sims) | 35 | | |
| PC Pro Certification Practice Exam (15 sims) | 75 | 450 | 7:30 |
| 220-801 Practice Exams | | | |
| Domain 1: PC Hardware (268 questions) | 268 | | |
| Domain 2: Networking (132 questions) | 132 | | |
| Domain 3: Laptops (35 questions) | 35 | | |
| Domain 4: Printers (39 questions) | 39 | | |
| Domain 5: Operational Procedures (50 questions) | 50 | | |
| 220-801 Certification Practice Exam (90 questions) | 90 | 614 | 10:14 |
| 220-802 Practice Exams | | | |
| Domain 1: Operating Systems (213 questions) | 213 | | |
| Domain 2: Security (78 questions) | 78 | | |
| Domain 3: Mobile Devices (7 questions) | 7 | | |
| Domain 4: Troubleshooting (180 questions) | 184 | | |
| 220-802 Certification Practice Exam (90 questions) | 90 | 572 | 9:32 |
| Total Time | | 6666 | 111:06 |

Appendix B: PC Pro Objectives

The PC Pro course covers the following **PC Pro** objectives:

| # | Exam Objective | Module.Section |
|-----|---|----------------|
| 1.0 | <p>Audio</p> <ul style="list-style-type: none">▪ Identify audio connectors and cables by sight or name▪ Given an existing system with or without documentation, select and install a sound card to meet end-user requirements.▪ Given an existing system, connect external audio equipment to sound card audio connectors. | 3.9 |
| 2.0 | <p>CPU</p> <ul style="list-style-type: none">▪ Given an existing system with or without documentation, select an appropriate processor to meet end-user requirements.▪ Use correct procedures to install a CPU in a motherboard using a thermal pad or paste, a heat sink and fan, and power connectors.▪ View BIOS settings to verify proper installation of the processor.<ul style="list-style-type: none">○ Enable or disable hyper-threading in the BIOS.○ Enable or disable VT support in the BIOS.○ Monitor cooling fan speed and CPU temperature. | 3.4, 3.10 |
| 3.0 | <p>Expansion Slots</p> <ul style="list-style-type: none">▪ Given an existing system without documentation, identify expansion cards and slots by sight or by name, including ISA, PCI, AGP, PCI Express (1x, 2x, and 8x), and PCMCIA.▪ Given an existing system, select and install expansion cards based on bus type that meets end-user requirements. | 3.3, 3.7 |

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|-----|--|-------------------------------------|
| 4.0 | <p>External Devices (USB, Firewire, parallel, keyboard/mouse, serial)</p> <ul style="list-style-type: none"> ▪ Identify external device connectors and cables by sight or name. ▪ Connect external devices using the appropriate connectors and cables. ▪ Install drivers for external devices. ▪ In the Windows operating system, prepare devices for safe removal. | 4.1, 4.2, 4.3, 4.4, 4.6 |
| 5.0 | <p>Memory</p> <ul style="list-style-type: none"> ▪ Identify memory module form factors and motherboard memory slots by name or sight (SDRAM, DDR, DDR2, DDR3, Rambus, and Soddimm). ▪ Given an existing system with or without documentation, select and install memory modules to meet end-user requirements. Important characteristics include speed, capacity, parity/ECC, dual or triple channels, and continuity modules. ▪ Using the BIOS or Windows utilities, identify the amount of installed memory. ▪ Use a memory module tester to identify malfunctioning memory. ▪ Given a Windows system, configure virtual memory settings to meet scenario requirements. | 3.5, 3.6 |
| 6.0 | <p>Motherboard</p> <ul style="list-style-type: none"> ▪ Given a scenario where a new motherboard is required in a new or existing PC system, use system documentation and end-user requirements to select and install an appropriate motherboard. ▪ Given motherboard and system case documentation, connect header devices and system case connectors to the motherboard. ▪ Using the BIOS, enable and disable onboard devices. ▪ Using manufacturer-supplied documentation and utility, update the BIOS on a motherboard to the latest revision. | 3.3, 3.6 |

| | | |
|-----|--|---|
| 7.0 | <p>Networking</p> <ul style="list-style-type: none"> ▪ Identify Ethernet networking cables and connectors by sight or name. ▪ Given a scenario and networking requirements, select the necessary connectivity hardware (such as wired network adapters, wireless network adapters, and networking devices). ▪ Given a set of basic IPv4 configuration settings or a network diagram, configure a wired, wireless, or dialup network connection in Windows. ▪ Use the following networking utilities to view the existing network configuration, test network communications, and troubleshoot basic connectivity problems: <ul style="list-style-type: none"> ○ ipconfig ○ ping ○ traceroute | <p>6.2, 6.3, 6.4, 6.5, 6.6, 6.9, 6.11, 6.12, 6.13, 6.14</p> |
| 8.0 | <p>Power Supply</p> <ul style="list-style-type: none"> ▪ Identify power supply connectors by sight or name. ▪ Given a scenario with an existing motherboard and end user requirements, select the appropriate power supply based on power output, the number of available connectors, and the type of connectors used. ▪ Given motherboard and power supply documentation, install a power supply in an existing case, connecting it to peripheral devices and the motherboard. ▪ Given motherboard and power supply documentation, test the functionality of a power supply. | <p>3.2</p> |
| 9.0 | <p>Printing</p> <ul style="list-style-type: none"> ▪ Given an existing system, select and install a printer to meet end-user requirements. ▪ Use Windows utilities to configure printing. <ul style="list-style-type: none"> ○ Configure local USB and parallel printers. ○ Connect to a shared printer on a network. ○ Share a printer, add printer drivers for other operating systems, and manage printer permissions. ○ Set the default printer. ○ Manage print jobs and the print queue. ○ Start and stop the print spooler. ○ Print a test page. | <p>7.1, 7.2, 7.3, 7.4</p> |

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| 10.0 | <p>Security</p> <ul style="list-style-type: none"> ▪ Configure BIOS security settings such as configuring drive lock, setting user and administrator passwords, enabling/disabling chassis intrusion detection, and enabling/disabling TPM. ▪ Configure password and account lockout settings in a local security policy. ▪ Configure a screen saver and require a password to unlock a Windows workstation. ▪ Configure the basic Windows Firewall. Open necessary ports to support running services and applications. ▪ Encrypt files and folders. | <p>3.6 12.2, 12.4, 12.6, 12.7, 12.9</p> |
| 11.0 | <p>Storage</p> <ul style="list-style-type: none"> ▪ Given a scenario and a set of user requirements, select the appropriate storage solution (such as flash storage, hard disk, optical disk, or tape drive). ▪ Identify SATA and IDE/ATA data connectors, power connectors, and cables by name or by sight. ▪ Given an existing system and hard disk labels, install SATA and IDE/ATA storage devices using the appropriate cables, power connectors, and device/jumper settings. ▪ Configure BIOS settings for hard disks (including drive detection, SATA mode, and boot order). ▪ Configure common RAID arrays using motherboard utilities or Windows Disk Management. ▪ Given a newly installed drive and a set of end-user requirements, use Disk Management to configure the drive for use by Windows. <ul style="list-style-type: none"> ○ Upgrade to a dynamic disk if required. ○ Create volumes or partitions. ○ Assign a drive letter. ○ Format the drive using an appropriate file system (such as FAT32, NTFS, or FAT64) based on end user requirements. ▪ Using Disk Management in Windows, add space to an existing volume by extending the volume or configuring a mount point. ▪ Manage the file system type on an existing drive. <ul style="list-style-type: none"> ○ Convert a file system to NTFS ○ Reformat a partition to use the FAT32 file system. ▪ Use Windows utilities (Explorer, attrib command) to find or set drive, folder, or file attributes. ▪ Schedule and run Disk Cleanup and Disk Defragmentation in Windows. | <p>5.1, 5.3, 5.4, 5.6, 5.7, 5.8, 5.9, 5.10</p> |

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|------|--|-----------------------------|
| 12.0 | System Management <ul style="list-style-type: none"> ▪ Use Windows Backup to configure a full system or file backup schedule. ▪ Enable system restore and configure a restore point. ▪ Configure Windows Update settings. ▪ Use Device Manager to update drivers, roll back drivers, and enable or disable devices. ▪ Configure Power Management settings in Windows. ▪ Enable and configure Remote Desktop and Remote Assistance. ▪ Configure local users and groups for a Windows system. ▪ Configure User Access Control (UAC) settings in Windows 7. | 9.4, 9.5, 9.7, 9.8 |
| 13.0 | Video <ul style="list-style-type: none"> ▪ Given an existing system with an open video slot and documentation, select and install a video card to meet end-user requirements. ▪ Identify video connectors and cables by sight or name. ▪ Given an existing system with one or more installed video cards, select one or more monitor to meet end-user requirements. ▪ Connect one or more monitors to an installed video card. ▪ Use Windows utilities to configure display and video adapter settings, including resolution, native resolution, color depth, dual monitor configuration, and refresh rate. | 3.8 4.5 |