TestOut®

TestOut PC Pro - English 5.0.x

LESSON PLAN

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Powered by LABSIM

Table of Contents

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1.1: Course Introduction

Summary

This course is designed to prepare you to pass the TestOut PC Pro and CompTIA A+ certifications. The TestOut PC Pro Certification is the first exam in our line of TestOut Pro Certifications. This certification measures not just what you know, but what you can do. It measures your ability to install, manage, repair, and troubleshoot PC hardware and Windows, Linux, and Mac operating systems.
Before taking this course, you should have a basic understanding of computers. You should be familiar with how to:

- Use a mouse and keyboard
- Install and run programs
- Use basic productivity software including word processing applications
- Save files created by common applications
- Browse the Internet

The PC Pro Certification addresses the following knowledge domains:

- Basic Hardware Components
- Video
- Audio
- External Devices
- Storage
- Networking
- Printing
- Mobile Devices
- System Management
- Security

In addition to covering everything you need to know in order to become certified, this course has been designed to help you gain real-world skills that you will use every day as a PC technician. By the time you are done with this course, you 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 your 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

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Video/Demo		Time
1.1.1 PC Pro Introduction		6:42
	Total Video Time	**6:42**

Total Time

About 7 minutes

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1.2: Using the Simulator

Summary

After finishing this section, you should be able to complete the following tasks:

- 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 in the Workspace
- Move objects to and from the Shelf
- Use the simulation interface to connect components to the appropriate cables
- Use the simulated Windows desktop to complete software configuration tasks

Video/Demo	Time
1.2.1 Using the Simulator	20:23
1.2.3 Working with Internal Components	12:30
Total Video Time	**32:53**

Lab/Activity

- 1.2.2 Explore the Lab Interface
- 1.2.4 Connect Internal Components

Total Time

About 43 minutes

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1.3: Hardware Basics

Lecture Focus Questions:

- What is the difference between hardware, software, and firmware?
- Which 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?

After finishing this section, you should be able to complete the following tasks:

- Identify common I/O ports by sight
- Connect common peripherals to standard ports

This section covers the following PC Pro exam objective:

- 4.0 External Devices
  - Connect external devices using the appropriate connectors and cables

Video/Demo	**Time**
1.3.1 Computing Basics	10:52
1.3.3 External Components	5:51
1.3.7 Internal Components	3:09
Total Video Time	**19:52**

Lab/Activity

- 1.3.6 Set Up a Computer

Fact Sheets

- 1.3.2 Computing Facts
- 1.3.4 Port and Connector Facts
- 1.3.5 Adapter and Converter Facts

Number of Exam Questions

14 questions

Total Time

About 54 minutes

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1.4: Windows Basics

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 My 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?
- How does an index improve searching on your computer?

After finishing this section, you should be able to complete the following tasks:

- Navigate the Windows 7, 8, and 10 interfaces.

Video/Demo	Time
1.4.1 Windows Operating Systems	5:17
1.4.3 Using the Windows 7 Interface	10:53
1.4.4 Using the Windows 8 Interface	8:29
1.4.5 Using the Windows 10 Interface	9:27
Total Video Time	**34:06**

Fact Sheets

- 1.4.2 Windows Operating System Facts
- 1.4.6 Windows Interface Facts

Number of Exam Questions

10 questions

Total Time

About 55 minutes

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1.5: Linux Basics

Lecture Focus Questions:

- Why do many administrators choose to use a command line interface on a Linux server?
- What is a Linux distribution?
- What common commands are used to navigate through shells?
- What types of items can Tab be used to complete once you start typing the entities' name?
- What is the difference between free software and open source software?

After finishing this section, you should be able to complete the following tasks:

- Use shell commands.
- Shutdown a Linux system.

Video/Demo	Time
1.5.1 Linux Operating Systems	7:31
1.5.2 Using Linux Shell Commands	14:55
Total Video Time	**22:26**

Lab/Activity

- 1.5.4 Using Shell Commands
- 1.5.5 Shutdown a Linux System

Fact Sheets

- 1.5.3 Linux Facts

Number of Exam Questions

6 questions

Total Time

About 44 minutes

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1.6: Mac OS Basics

Lecture Focus Questions:

- What are some characteristics that are unique to Apple or Mac OS systems?
- Which keyboard key is used for most keyboard shortcuts in Mac OS?
- Which Mac OS feature is used to install Windows on an Apple system?
- What file system does Mac OS use?
- What is the Finder's primary purpose?
- What are the different components of the Mac OS user interface?
- How do you access the multiple desktop feature?

After finishing this section, you should be able to complete the following tasks:

- Navigate the Mac OS interface.
- Identify the different elements of the Mac OS GUI.
- Change Mac OS system configuration settings.
- Add multiple desktops and navigate between them.

Video/Demo	Time
1.6.1 Mac OS Introduction	5:58
1.6.2 Using the Mac OS Interface	8:39
1.6.3 Mac OS Features and Settings	7:04
Total Video Time	**21:41**

Fact Sheets

1.6.4 Mac OS Facts

Number of Exam Questions

5 questions

Total Time

About 32 minutes

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2.1: Protection and Safety

Lecture Focus Questions:

- Which specific computer components require special care that will protect your safety when handling them?
- 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 that it provides be important?

After finishing this section, you should be able to complete the following tasks:

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

Video/Demo	Time
2.1.1 Safety	4:53
2.1.3 Electrostatic Discharge	5:21
2.1.4 Protecting Against ESD	4:08
2.1.6 Environmental Concerns	5:27
Total Video Time	**19:49**

Fact Sheets

- 2.1.2 Safety Measures
- 2.1.5 ESD Facts
- 2.1.7 Environmental Facts

Number of Exam Questions

10 questions

Total Time

About 45 minutes

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2.2: Professionalism

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?

After finishing this section, you should be able to complete the following tasks:

- Use proper communication techniques and exhibit professionalism when interacting with clients.

Video/Demo		Time
2.2.1 Professionalism		4:20
	Total Video Time	**4:20**

Fact Sheets

2.2.2 Professionalism Facts

Number of Exam Questions

12 questions

Total Time

About 22 minutes

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2.3: PC Tools

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		Time
2.3.1 PC Toolkit		5:21
	Total Video Time	**5:21**

Fact Sheets

2.3.2 Tool Facts

Number of Exam Questions

11 questions

Total Time

About 22 minutes

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2.4: PC Maintenance

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?
- 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?

After finishing this section, you should be able to complete the following tasks:

- Install a UPS
- Configure UPS settings

Video/Demo	Time
2.4.1 PC Maintenance Best Practices	3:22
2.4.3 Protecting Power	10:38
2.4.4 Configuring UPS Settings	12:11
Total Video Time	**26:11**

Lab/Activity

- 2.4.6 Install a UPS

Fact Sheets

- 2.4.2 PC Maintenance Facts
- 2.4.5 Power Protection Facts

Number of Exam Questions

9 questions

Total Time

About 51 minutes

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2.5: Troubleshooting Overview

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 can user education be a beneficial step in the troubleshooting process?
- How does good documentation help in the troubleshooting process?

Video/Demo	Time
2.5.1 Troubleshooting Process	7:00
Total Video Time	**7:00**

Fact Sheets

2.5.2 Troubleshooting Process Facts

Number of Exam Questions

12 questions

Total Time

About 24 minutes

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3.1: Cases and Form Factors

Lecture Focus Questions:

- Why must the case be matched to the motherboard?
- How does the ATX form factor differ from the ITX form factor?
- What are the characteristics of the ATX form factor?
- What is the main difference between a Micro-ATX tower and a Micro-ATX slim tower case?
- What is the most common ITX form factor?

After finishing this section, you should be able to complete the following tasks:

- Identify the form factor of motherboards and cases.
- Select the appropriate motherboard and case combination.

This section covers the following PC Pro exam objectives:

- 1.0 Basic Hardware Components
  - Given scenarios with system specifications and end-user requirements, select and install appropriate power supplies, motherboards, CPUs, memory modules, and expansion cards.
  - Identify power supply connectors, motherboard components, CPU features, memory module form factors, and expansion bus types.

Video/Demo	Time
3.1.1 Cases and Form Factors	6:23
Total Video Time	**6:23**

Fact Sheets

3.1.2 System Case Facts

Number of Exam Questions

6 questions

Total Time

About 18 minutes

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3.2: Power Supplies

Lecture Focus Questions:

- How does the case form affect the type of power supply you purchase?
- What is the function of the red toggle switch on a power supply? Why is this important?
- What rating determines the number of internal components a computer can handle?
- What is soft power?
- Why must you be careful when using a proprietary power supply?

After finishing this section, you should be able to complete the following tasks:

- Select a compatible power supply for a computer system.
- Install a power supply and connect it to various internal components.

This section covers the following PC Pro exam objectives:

- 1.0 Basic Hardware Components
  - Identify power supply connectors, motherboard components, CPU features, memory module form factors, and expansion bus types.
  - Given scenarios with system specifications and end-user requirements, select and install appropriate power supplies, motherboards, CPUs, memory modules, and expansion cards.

Video/Demo	Time
3.2.1 Power Supplies	4:10
3.2.3 Identifying Power Supply Components	6:00
3.2.4 Changing the Power Supply	8:28
Total Video Time	**18:38**

Lab/Activity

- 3.2.5 Install a Power Supply

Fact Sheets

- 3.2.2 Power Supply Facts

Number of Exam Questions

15 questions

Total Time

About 44 minutes

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3.3: Motherboards and Buses

Lecture Focus Questions:

- What factors should you consider when selecting a motherboard?
- What is the difference between the northbridge and southbridge chipsets on a motherboard?
- What chipset functionalities have moved to the CPU on newer systems?
- What are the basic steps of installing a motherboard?
- How can you add peripheral devices to a system?
- How are PCI and PCIe different?

After finishing this section, you should be able to complete the following tasks:

- Identify the various connection areas on a motherboard.
- Select an appropriate motherboard and install it in a desktop computer.

This section covers the following PC Pro exam objectives:

- 1.0 Basic Hardware Components
  - Identify power supply connectors, motherboard components, CPU features, memory module form factors, and expansion bus types.
  - Given scenarios with system specifications and end-user requirements, select and install appropriate power supplies, motherboards, CPUs, memory modules, and expansion cards.

Video/Demo	Time
3.3.1 Motherboard Components	4:43
3.3.3 Installing a Motherboard	6:20
Total Video Time	**11:03**

Lab/Activity

- 3.3.5 Choose and Install a Motherboard

Fact Sheets

- 3.3.2 Motherboard Facts
- 3.3.4 Motherboard Installation Facts

Number of Exam Questions

9 questions

Total Time

About 36 minutes

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3.4: Motherboard Troubleshooting

Lecture Focus Questions:

- What are the symptoms of system power problems? How do you troubleshoot system power problems?
- How do you interpret BIOS/UEFI 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?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objectives:

- 1.0 Basic Hardware Components
  - View BIOS/UEFI settings for basic hardware components.
  - Troubleshoot basic hardware components and resolve issues.

Video/Demo	Time
3.4.1 Motherboard Troubleshooting	8:19
Total Video Time	**8:19**

Lab/Activity

- 3.4.3 Troubleshoot System Power
- 3.4.4 Troubleshoot Power Supply Problems

Fact Sheets

- 3.4.2 Motherboard Troubleshooting Facts

Number of Exam Questions

9 questions

Total Time

About 33 minutes

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3.5: Processors

Lecture Focus Questions:

- What is the difference between the four 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 processor 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?
- Which components are used with a CPU to dissipate heat?

After finishing this section, you should be able to complete the following tasks:

- 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.

This section covers the following PC Pro exam objectives:

- Domain 1.0 Basic Hardware Components
  - Identify power supply connectors, motherboard characteristics, CPU features, memory module attributes, and expansion bus types.
  - Given scenarios with system specifications and end-user requirements, select and install appropriate power supplies, motherboards, CPUs, memory modules, and expansion cards.
  - View BIOS/UEFI settings for basic hardware components.
  - Configure the settings of basic hardware components.

Video/Demo	Time
3.5.1 Processor Concepts	17:03
3.5.5 Installing a Processor	6:35
Total Video Time	**23:38**

Lab/Activity

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

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Fact Sheets

- 3.5.2 CPU Facts
- 3.5.3 CPU Performance Facts
- 3.5.4 CPU Socket Facts
- 3.5.6 CPU Installation Facts

Number of Exam Questions

11 questions

Total Time

About 65 minutes

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3.6: Processor Troubleshooting

Lecture Focus Questions:

- How can you protect a CPU from electrostatic discharge?
- What could cause a system to not boot after installing a new CPU?
- What could cause a system to spontaneously shut down after it has been running for a period of time?
- What causes CPUs to fail prematurely?

After finishing this section, you should be able to complete the following tasks:

- Protect CPUs from electrostatic discharge
- Determine whether a CPU is compatible with a given motherboard
- Correct overclocking errors
- Correct CPU installation errors
- Configure proper CPU cooling
- Replace a failed CPU

The following TestOut PC Pro objective is covered in this section:

- 1.0 Basic Hardware Components: Troubleshoot basic hardware components and resolve issues.

Video/Demo	Time
3.6.1 Processor Troubleshooting	6:18
Total Video Time	**6:18**

Lab/Activity

- 3.6.3 Troubleshoot Processor Installation 1
- 3.6.4 Troubleshoot Processor Installation 2

Fact Sheets

- 3.6.2 Processor Troubleshooting Facts

Number of Exam Questions

11 questions

Total Time

About 33 minutes

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3.7: Memory

Lecture Focus Questions:

- What is the difference between SRAM and DRAM?
- What are two advantages of using DDR3 memory over DDR2 memory?
- What is the difference between SODIMM and UniDIMM?
- How does DDR4 differ from DDR3?
- What does the IMC do?

This section covers the following PC Pro exam objective:

- Domain 1.0 Basic Hardware Components
  - Identify power supply connectors, motherboard characteristics, CPU features, memory module attributes, and expansion bus types

Video/Demo	Time
3.7.1 Random Access Memory	4:13
3.7.2 DRAM Types	6:18
3.7.4 Memory Speed	13:16
Total Video Time	**23:47**

Fact Sheets

- 3.7.3 RAM Facts
- 3.7.5 Memory Speed Facts

Number of Exam Questions

12 questions

Total Time

About 46 minutes

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3.8: Memory Installation

Lecture Focus Questions:

- 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?
- How does a triple-channel configuration and a quad-channel configuration differ?
- After installing the memory, what should you do?

After finishing this section, you should be able to complete the following tasks:

- Select and install the correct memory module.
- Install triple channel memory.

This section covers the following PC Pro exam objectives:

- Domain 1.0 Basic Hardware Components
  - Identify power supply connectors, motherboard characteristics, CPU features, memory module attributes, and expansion bus types.
  - Given scenarios with system specifications and end-user requirements, select and install appropriate power supplies, motherboards, CPUs, memory modules, and expansion cards.

Video/Demo	Time
3.8.1 Memory Characteristics	15:15
3.8.4 Selecting the Correct Memory Module	10:41
3.8.5 Installing Memory	7:52
Total Video Time	**33:48**

Lab/Activity

- 3.8.3 Select Memory by Sight
- 3.8.7 Install Triple Channel Memory

Fact Sheets

- 3.8.2 Memory Facts
- 3.8.6 Memory Installation Facts

Number of Exam Questions

11 questions

Total Time

About 65 minutes

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3.9: Memory Troubleshooting

Lecture Focus Questions:

As you study this section, answer the following questions:

- What does a memory error indicate?
- What are the symptoms of memory errors? How do you troubleshoot memory problems?
- What has happened when the system boots, but the memory count is incorrect?
- At which times might a memory problem manifest itself?

After finishing this section, you should be able to complete the following task:

- Troubleshoot memory

This section covers the following PC Pro exam objectives:

- 1.0 Basic Hardware Components
  - View BIOS/UEFI settings for basic hardware components
  - Troubleshoot basic hardware components and resolve issues

Video/Demo	Time
3.9.1 Memory Troubleshooting	6:36
3.9.2 Testing Memory	4:36
Total Video Time	**11:12**

Lab/Activity

- 3.9.4 Troubleshoot Memory 1
- 3.9.5 Troubleshoot Memory 2

Fact Sheets

- 3.9.3 Memory Troubleshooting Facts

Number of Exam Questions

11 questions

Total Time

About 38 minutes

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3.10: BIOS/UEFI

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?

After finishing this section, you should be able to complete the following tasks:

- Find and edit BIOS settings.
- Flash the BIOS.
- Clear CMOS settings.

This section covers the following PC Pro exam objectives:

- Domain 1.0 Basic Hardware Components
  - View BIOS/UEFI settings for basic hardware components.

- Domain 5.0 Storage
  - Configure BIOS/UEFI settings for hard disks.

Video/Demo	Time
3.10.1 BIOS/UEFI	12:03
3.10.2 PC Boot Process	4:06
3.10.4 Editing BIOS/UEFI Settings	14:36
3.10.5 Using Built-In System Diagnostics	1:40
3.10.6 Flashing the BIOS/UEFI	10:28
Total Video Time	**42:53**

Lab/Activity

- 3.10.7 Find BIOS/UEFI Settings
- 3.10.8 Clear CMOS Settings

Fact Sheets

- 3.10.3 BIOS/UEFI Facts

Number of Exam Questions

14 questions

Total Time

About 72 minutes

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3.11: Expansion Cards

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 bus type is commonly used by graphics cards?
- What type of slot can a PCIe x1 expansion card be placed in?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objectives:

- 1.0 Basic Hardware Components
  - Identify power supply connectors, motherboard components, CPU features, memory module form factors, and expansion bus types.
  - Given scenarios with system specifications and end-user requirements, select and install appropriate power supplies, motherboards, CPUs, memory modules, and expansion cards.

Video/Demo	Time
3.11.1 Expansion Buses and Slots	4:30
3.11.3 Installing an Expansion Card	4:18
Total Video Time	**8:48**

Lab/Activity

- 3.11.4 Install Expansion Cards

Fact Sheets

- 3.11.2 Expansion Bus Types

Number of Exam Questions

10 questions

Total Time

About 29 minutes

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3.12: Video

Lecture Focus Questions:

- How does the video card affect the quality of the image on the monitor?
- Which type of DVI connector sends digital signals only?
- How does the GPU increase the video performance?
- What are the differences between integrated graphics and dedicated video cards?
- 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?

After finishing this section, you should be able to complete the following tasks:

- Select the appropriate video card for a computer system.
- Disable an integrated graphics solution.
- Install and configure a video card.

This section covers the following PC Pro exam objectives:

- 2.0 Video
  - Identify video adapter components, features, connectors, and cables.
  - Given a scenario with system specifications and end-user requirements, select and install the appropriate video adapters.
  - Configure display and video adapter settings.

Video/Demo	Time
3.12.1 Video Cards	5:32
3.12.3 Installing a Video Card	6:12
Total Video Time	**11:44**

Lab/Activity

- 3.12.5 Upgrade a Video Card

Fact Sheets

- 3.12.2 Video Card Facts
- 3.12.4 Video Card Installation Facts

Number of Exam Questions

11 questions

Total Time

About 38 minutes

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3.13: Audio

Lecture Focus Questions:

- 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?
- Which encoding techniques are used for surround sound audio?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objectives:

- 3.0 Audio
  - Identify sound card components, features, connectors, and cables.
  - Given a scenario with system specifications and end-user requirements, select and install the appropriate sound cards.
  - Identify audio device types.
  - Given a scenario with system specifications and end-user requirements, select and install appropriate audio devices.

Video/Demo	Time
3.13.1 Digital Audio	9:07
3.13.2 Sound Cards	3:38
3.13.4 Managing Audio Devices	12:41
Total Video Time	**25:26**

Lab/Activity

- 3.13.7 Select and Install a Sound Card

Fact Sheets

- 3.13.3 Sound Card Facts
- 3.13.5 Sound Card Installation Facts
- 3.13.6 Sound Card Connectors

Number of Exam Questions

11 questions

Total Time

About 57 minutes

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3.14: Cooling

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?
- Why is it important that case fans are installed properly?
- When might you want to add liquid cooling to a computer?
- What is the difference between an active heat sink and a passive heat sink?
- What is the function of thermal paste? When should it be used?

After finishing this section, you should be able to complete the following tasks:

- Select an appropriate cooling system for a given scenario.
- Identify the essential cooling components in a computer case.

This section covers the following PC Pro exam objectives:

- 1.0 Basic Hardware Components
  - Identify power supply connectors, motherboard components, CPU features, memory module form factors, and expansion bus types.
  - View BIOS/UEFI settings for basic hardware components.

Video/Demo		Time
3.14.1 System Cooling		7:55
	Total Video Time	**7:55**

Fact Sheets

3.14.2 System Cooling Facts

Number of Exam Questions

14 questions

Total Time

About 27 minutes

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4.1: Peripheral Devices

Lecture Focus Questions:

- What are the three types of peripheral devices?
- Which connector is used by most peripheral devices?
- Which peripheral devices require little to no configuration?
- How can you verify that a device is compatible with a particular computer?
- Which peripheral devices require special software or drives to function?
- What is the difference between an input device? an output device?

After finishing this section, you should be able to complete the following tasks:

- Understand the various functions of different peripheral devices.
- Connect a KVM to multiple computers.
- Connect peripheral devices using the appropriate cables and connectors.

Video/Demo	Time
4.1.1 Peripheral Devices	3:27
Total Video Time	**3:27**

Lab/Activity

- 4.1.3 Connect a KVM Switch

Fact Sheets

- 4.1.2 Peripheral Device Facts

Number of Exam Questions

5 questions

Total Time

About 19 minutes

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4.2: USB

Lecture Focus Questions:

- What are the differences between USB 2.0 and 3.0?
- Which types of devices are typically self-powered? Bus-powered?
- What are the power requirements for low- and high-powered bus powered devices?
- What is the difference between a microUSB and a miniUSB connector?
- How can you identify a USB 3.0 port and connector?

After finishing this section, you should be able to complete the following tasks:

- Identify typical USB connectors and ports.
- Connect USB peripheral devices (e.g., storage devices, printers, smartphones).
- Select and install USB devices based on customer requirements.

This section covers the following PC Pro exam objectives:

- 4.0 External Devices
  - Identify external device components, features, connectors and cables.
  - Connect external devices using the appropriate connectors and cables.
- 7.0 Printing
  - Identify printer types and connectors.

Video/Demo	Time
4.2.1 Universal Serial Bus (USB)	7:18
Total Video Time	**7:18**

Lab/Activity

- 4.2.3 Install USB Devices
- 4.2.4 Install a USB Adapter

Fact Sheets

- 4.2.2 USB Facts

Number of Exam Questions

10 questions

Total Time

About 33 minutes

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4.3: IEEE 1394 (FireWire)

Lecture Focus Questions:

- What are some of the differences between FireWire 400 and FireWire 800?
- What is the maximum cable length of a FireWire 400 cable? A FireWire 800 cable?
- In what ways does IEEE 1394 differ from USB?

After finishing this section, you should be able to complete the following tasks:

- Connect peripheral devices to a FireWire port.

This section covers the following PC Pro exam objectives:

- 4.0 External Devices
  - Identify external device components, features, connectors and cables.
  - Connect external devices using the appropriate connectors and cables.

Video/Demo		Time
4.3.1 FireWire		4:49
	Total Video Time	**4:49**

Lab/Activity

4.3.3 Connect FireWire Devices

Fact Sheets

4.3.2 FireWire Facts

Number of Exam Questions

7 questions

Total Time

About 22 minutes

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4.4: Display Devices

Lecture Focus Questions:

- What are some of the specifications used by display devices?
- Which LCD type typically has the fastest response time? Why is a monitor with a slow response time a poor choice?
- Which LCD type has the best color representation and viewing angle?
- What are two methods used to backlight an LCD?
- Which aspect ratio is used by high definition movies and television?
- What are the benefits of a higher resolution?
- 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?
- What are the benefits and drawbacks of an LCD? Plasma display? OLED display? Projector?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objectives:

- 2.0 Video
  - Identify display device types.
  - Given a scenario with system specifications and end-user requirements, select and install appropriate display devices.
  - Configure display and video adapter settings.
- 4.0 External Devices
  - Install drivers for external devices.

Video/Demo	Time
4.4.1 Display Devices	12:43
4.4.3 Display Specifications	9:19
4.4.5 Configuring Display Settings in Windows	10:17
4.4.6 Configuring Advanced Display Settings in Windows	11:37
4.4.8 Configuring Display Settings in Linux	3:37
4.4.9 Configuring Display Settings in Mac OS	5:41
Total Video Time	**53:14**

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Lab/Activity

- 4.4.7 Select and Configure Dual Monitors

Fact Sheets

- 4.4.2 Display Device Facts
- 4.4.4 Display Specification Facts

Number of Exam Questions

12 questions

Total Time

About 81 minutes

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4.5: Video Troubleshooting

Lecture Focus Questions:

- What components comprise the video system in a PC?
- What can cause no output on a video monitor?
- 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?
- What can cause the output of an LCD to look pixilated and chunky?
- What are some causes of a dim LCD screen?
- What setting can be changed to stop an LCD from flickering?
- How can you remove image retention on a plasma display?
- An LCD monitor has dead and stuck pixels. How can you fix this?
- What setting can affect the size of images and icons?

After finishing this section, you should be able to complete the following tasks:

- 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.
- Reduce or remote image retention (burn-in).

This section covers the following PC Pro exam objectives:

- 1.0 Basic Hardware Components
  - Troubleshoot basic hardware components and resolve issues.
- 2.0 Video
  - Configure display and video adapter settings.

Video/Demo	Time
4.5.1 Video Troubleshooting	9:44
Total Video Time	**9:44**

Lab/Activity

- 4.5.3 Optimize Video Settings

Fact Sheets

- 4.5.2 Video Troubleshooting Facts

Number of Exam Questions

8 questions

Total Time

About 28 minutes

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4.6: Device Driver Management

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 function 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?
- Where is the best place to obtain the most up-to-date version of a driver for a Windows system? Mac OS system? Linux system?

After finishing this section, you should be able to complete the following tasks:

- 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.
- Install and configure drivers on a Linux and Mac OS system.

This section covers the following PC Pro exam objectives:

- 4.0 External Devices
  - Install drivers for external devices.
  - Manage device driver updates, roll back drivers, and enable or disable devices.
- 9.0 System Management
  - Configure Windows Update settings.
  - Configure User Access Control (UAC) settings in Windows.

Video/Demo	Time
4.6.1 Device Installation	4:11
4.6.2 Installing Device Drivers	11:20
4.6.3 Managing Device Drivers on Windows	12:36
4.6.4 Managing Devices on Linux	12:24
4.6.5 Managing Devices on Mac OS	2:38
Total Video Time	**43:09**

Lab/Activity

- 4.6.8 Manage Devices

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Fact Sheets

- 4.6.6 Hardware Device Facts
- 4.6.7 Device Driver Installation Facts

Number of Exam Questions

8 questions

Total Time

About 67 minutes

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4.7: Device Driver Troubleshooting

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?

After finishing this section, you should be able to complete the following tasks:

- 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.

This section covers the following PC Pro exam objectives:

- 9.0 System Management
  - Manage device driver updates, roll back drivers, and enable or disable devices.

Video/Demo	Time
4.7.1 Device Driver Troubleshooting	4:57
4.7.2 Troubleshooting Devices	9:34
Total Video Time	**14:31**

Lab/Activity

- 4.7.4 Manage Devices 1
- 4.7.5 Manage Devices 2

Fact Sheets

- 4.7.3 Device Troubleshooting Facts

Number of Exam Questions

11 questions

Total Time

About 41 minutes

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5.1: Storage Devices

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 hard disk?
- Which storage device types are magnetic media? Which are optical? Solid state?

After finishing this section, you should be able to complete the following tasks:

- Select the appropriate storage solution.

This section covers the following PC Pro exam objective:

- Domain 5.0 Storage
  - Given scenarios with specifications and end-user requirements, select and install appropriate storage solutions.

Video/Demo		Time
5.1.1 Storage Devices		11:42
	Total Video Time	**11:42**

Fact Sheets

5.1.2 Storage Device Facts

Number of Exam Questions

9 questions

Total Time

About 26 minutes

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5.2: SATA

Lecture Focus Questions:

- What enhancements does SATA2 provide over the original SATA specifications?
- What is eSATA and when would you use it?
- What are two possible ways to configure a SATA2 drive into a system that only supports SATA1?
- How does SATA2 differ from SATA3?
- What advantage does eSATAp have over eSATA?

After finishing this section, you should be able to complete the following task:

- Install SATA devices.

This section covers the following PC Pro exam objectives:

- Domain 5.0 Storage
  - Identify storage device components, features, connectors, and cables.

Video/Demo	Time
5.2.1 SATA	7:34
5.2.2 Installing a SATA Device	6:03
Total Video Time	**13:37**

Lab/Activity

5.2.4 Install SATA Devices

Fact Sheets

5.2.3 SATA Installation Facts

Number of Exam Questions

7 questions

Total Time

About 31 minutes

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5.3: Optical Media

Lecture Focus Questions:

- How much data does a CD typically hold? DVD? Blu-ray disc?
- 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?
- How are Blu-ray drives made compatible with CD, DVD, and Blu-ray discs?
- What is the difference between BD-R and BD-RE discs?
- Which type of connector attaches an optical drive to the motherboard?

This section covers the following PC Pro exam objectives:

- Domain 5.0 Storage
  - Given scenarios with specifications and end-user requirements, select and install appropriate storage solutions.

Video/Demo	Time
5.3.1 CD Drives	5:24
5.3.2 DVD Drives	5:32
5.3.3 Blu-ray	3:49
Total Video Time	**14:45**

Fact Sheets

- 5.3.4 Optical Media Facts

Number of Exam Questions

5 questions

Total Time

About 25 minutes

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5.4: RAID

Lecture Focus Questions:

- How do striping and mirroring differ?
- What is parity?
- 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?
- How do RAID 5 and RAID 10 differ?

After finishing this section, you should be able to complete the following tasks:

- Create RAID arrays.
- Implement a RAID solution.

This section covers the following PC Pro exam objective:

- Domain 5.0 Storage
  - Configure common RAID arrays.

Video/Demo	Time
5.4.1 RAID	11:05
5.4.3 Configuring a RAID Array	9:23
Total Video Time	**20:28**

Lab/Activity

- 5.4.5 Create RAID Arrays
- 5.4.6 Implement a RAID Solution

Fact Sheets

- 5.4.2 RAID Facts
- 5.4.4 RAID Configuration Facts

Number of Exam Questions

11 questions

Total Time

About 52 minutes

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5.5: File Systems

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?

After finishing this section, you should be able to complete the following tasks:

- Create volumes.
- Format and convert drives.

This section covers the following PC Pro exam objective:

- Domain 5.0 Storage
  - Manage the file system type on an existing drive by converting a file system type or reformatting a partition.

Video/Demo	Time
5.5.1 Partitions, Volumes, and File Systems	3:58
5.5.2 Viewing File System Components	10:24
5.5.4 MBR Partitioning	14:43
5.5.6 GPT Partitioning	4:04
Total Video Time	**33:09**

Fact Sheets

- 5.5.3 File System Facts
- 5.5.5 MBR Partitioning Facts
- 5.5.7 GPT Partitioning Facts

Number of Exam Questions

10 questions

Total Time

About 59 minutes

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5.6: File System Creation

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?

After finishing this section, you should be able to complete the following tasks:

- Create volumes.
- Format and convert drives.

This section covers the following PC Pro exam objective:

- Domain 5.0 Storage
  - Manage the file system type on an existing drive by converting a file system type or reformatting a partition.

Video/Demo	Time
5.6.1 Creating Volumes with Disk Management	14:57
5.6.2 Creating Volumes with Diskpart	7:49
5.6.4 Converting Volumes	10:17
Total Video Time	**33:03**

Lab/Activity

- 5.6.3 Create Volumes
- 5.6.5 Format Drives

Fact Sheets

- 5.6.6 Disk Status Facts

Number of Exam Questions

6 questions

Total Time

About 55 minutes

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5.7: Storage Management

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?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objective:

- Domain 5.0 Storage
  - Add space to an existing volume.

Video/Demo	Time
5.7.1 Adding Storage	6:30
5.7.2 Creating Mount Points and Extending Volumes	11:49
5.7.3 Shrinking and Splitting Partitions	3:03
Total Video Time	**21:22**

Lab/Activity

- 5.7.5 Add Space to Existing Volumes

Fact Sheets

- 5.7.4 Storage Management Facts

Number of Exam Questions

8 questions

Total Time

About 40 minutes

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5.8: Storage Spaces

Lecture Focus Questions:

- What components are used to create storage spaces?
- What is the difference between a *storage pool* and a *storage space*?
- Which hardware devices can be used to make storage pools?
- What are the benefits of using storage pools?
- You are comparing the hardware required for *two-way mirroring* and *three-way mirroring.* What is the minimum number of disks required for each data resiliency type?
- How does thin provisioning allow you to allocate more storage space to users than is available in the pool?

After finishing this section, you should be able to complete the following task:

- Implement Storage Spaces

This section covers the following PC Pro exam objectives:

- 5.0 Storage
  - Given scenarios with specifications and end-user requirements, select and install appropriate storage solutions.

Video/Demo	**Time**
5.8.1 Storage Spaces	9:31
5.8.2 Creating Storage Spaces	11:09
Total Video Time	**20:40**

Lab/Activity

5.8.4 Implement Storage Spaces

Fact Sheets

5.8.3 Storage Space Facts

Number of Exam Questions

5 questions

Total Time

About 36 minutes

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5.9: Disk Optimization

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?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objective:

- Domain 11.0 Storage
  - Schedule and run Disk Cleanup and Disk Defragmentation in Windows.

Video/Demo	Time
5.9.1 Storage Optimization	13:26
5.9.2 Optimizing Disks in Windows	14:01
5.9.3 Optimizing Disks in Linux	8:13
5.9.4 Optimizing Disks in Mac OS	4:33
Total Video Time	**40:13**

Lab/Activity

5.9.6 Perform Disk Maintenance

Fact Sheets

5.9.5 Disk Optimization Facts

Number of Exam Questions

6 questions

Total Time

About 57 minutes

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5.10: Storage Troubleshooting

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 could be causing this?
- A hard disk connected to the motherboard is not recognized by the BIOS/UEFI firmware. What is causing this?
- A hard disk is making noise. What should you do?
- A computer system has an SSD drive installed. What should you do to optimize the useable lifespan of this device?

After finishing this section, you should be able to complete the following tasks:

- Optimize hard disk performance
- Troubleshoot boot failures
- Troubleshoot problems with storage device boot priority in the BIOS/UEFI firmware
- Troubleshoot SATA drive issues
- Optimize SSD storage devices

The following TestOut PC Pro objective is covered in this section:

- 5.0 Storage:
  - Given scenarios with specifications and end-user requirements, select and install appropriate storage solutions.
  - Configure BIOS/UEFI settings for hard disks.

Video/Demo	Time
5.10.1 Storage Troubleshooting	8:51
5.10.3 SSD Storage Issues	4:26
Total Video Time	**13:17**

Lab/Activity

- 5.10.5 Troubleshoot SATA Devices

Fact Sheets

- 5.10.2 Storage Troubleshooting Facts
- 5.10.4 SSD Maintenance Facts

Number of Exam Questions

10 questions

Total Time

About 39 minutes

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6.1: Networking Overview

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?

This section covers the following PC Pro exam objective:

- Domain 6.0 Networking
  - Understand the function of different network devices.

Video/Demo	Time
6.1.1 Networking	5:23
6.1.2 Network Types	7:47
6.1.3 Networking Terms	10:58
6.1.5 Networking Topologies	7:09
Total Video Time	**31:17**

Fact Sheets

- 6.1.4 Networking Facts
- 6.1.6 Topology Facts

Number of Exam Questions

10 questions

Total Time

About 52 minutes

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6.2: Network Hardware

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?
- Which device would you use to connect two network segments with different subnet addresses?
- Which device connects hosts using different transmission media on the same subnet?
- Which type of server handles user authentications?
- What is the role of a DHCP server?
- What are the benefits of using Internet appliances?

After finishing this section, you should be able to complete the following tasks:

- Given a scenario and networking requirements, select the necessary connectivity hardware (such as wired network adapters, wireless network adapters, and networking devices).
- Identify the different types of network devices and their roles.

This section covers the following PC Pro exam objectives:

- 6.0 Networking
  - Identify Ethernet wired and wireless network adapter components, features, and connectors.

Video/Demo	Time
6.2.1 Network Infrastructure	8:33
6.2.2 Network Devices	7:37
Total Video Time	**16:10**

Lab/Activity

- 6.2.5 Select and Install a Network Adapter

Fact Sheets

- 6.2.3 Networking Infrastructure and Device Facts
- 6.2.4 Network Adapter Facts

Number of Exam Questions

11 questions

Total Time

About 43 minutes

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6.3: Networking Media

Lecture Focus Questions:

- What are the advantages of using coaxial cable? Disadvantages?
- Why are wires twisted together in twisted pair cables?
- What is the difference between STP and UTP cabling?
- What is the difference between Cat5 and Cat5e 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?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objectives:

- 6.0 Networking
  - Identify Ethernet wired network cable features and connectors.
  - Given a scenario with specifications and networking requirements, select and install the necessary Ethernet adapters, access points, or cables.

Video/Demo		Time
6.3.1 Cable Media		11:38
	Total Video Time	**11:38**

Fact Sheets

- 6.3.2 Coaxial Cable Facts
- 6.3.3 Twisted Pair Facts
- 6.3.4 Twisted Pair Connector Facts
- 6.3.5 Fiber Optic Facts

Number of Exam Questions

13 questions

Total Time

About 45 minutes

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6.4: Ethernet

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?

After finishing this section, you should be able to complete the following task:

- Select devices and media to create an Ethernet network.

This section covers the following PC Pro exam objectives:

- 6.0 Networking
  - Identify Ethernet wired network cable features and connectors.
  - Identify common network connectivity devices and their roles.
  - Understand the function of different network devices.
  - Given a scenario with specifications and networking requirements, select and install the necessary Ethernet adapters, access points, or cables.

Video/Demo		Time
6.4.1 Ethernet		4:31
	Total Video Time	**4:31**

Fact Sheets

- 6.4.2 Ethernet Facts
- 6.4.3 Ethernet Standards

Number of Exam Questions

8 questions

Total Time

About 23 minutes

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6.5: IP Networking

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 host 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?

After finishing this section, you should be able to complete the following tasks:

- Determine the host and the network address of an IP address based on its default subnet mask.
- Identify the port number of common protocols used by the TCP/IP suite.

This section covers the following PC Pro exam objective:

- 6.0 Networking
  - Given basic IPv4 configuration settings or a network diagram, configure a wired or wireless network connection.

Video/Demo		Time
6.5.1 Device Addressing		6:47
6.5.2 IP Addressing		8:07
	Total Video Time	**14:54**

Fact Sheets

- 6.5.3 Addressing Facts
- 6.5.4 TCP/IP Protocol Facts

Number of Exam Questions

15 questions

Total Time

About 40 minutes

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6.6: IP Configuration

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?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objectives:

- 6.0 Networking
  - Given basic IPv4 configuration settings or a network diagram, configure a wired or wireless network connection.
  - Use appropriate networking utilities to view, test, and troubleshoot basic network configuration, communication, and connectivity problems.

Video/Demo	Time
6.6.1 IP Configuration	7:14
6.6.2 TCP/IP Configuration Methods	4:22
6.6.3 Configuring TCP/IP Properties	12:53
Total Video Time	**24:29**

Lab/Activity

- 6.6.5 Configure TCP/IP Settings
- 6.6.6 Configure Alternate TCP/IP Settings

Fact Sheets

- 6.6.4 IP Configuration Facts

Number of Exam Questions

11 questions

Total Time

About 51 minutes

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6.7: IP version 6

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 0's?
- What information is included within the IPv6 address *prefix*?
- How many numbers are used for the interface ID?

After finishing this section, you should be able to complete the following tasks:

- Determine the prefix and the interface ID of an IPv6 address.
- Identify an abbreviated IPv6 address.

This section covers the following PC Pro exam objective:

- 6.0 Networking
  - Given basic IPv4 configuration settings or a network diagram, configure a wired or wireless network connection.

Video/Demo		Time
6.7.1 IP Version 6		5:21
	Total Video Time	**5:21**

Fact Sheets

6.7.2 IPv6 Facts

Number of Exam Questions

8 questions

Total Time

About 19 minutes

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6.8: 802.11 Wireless

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 802.11g?
- 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?
- What happens to the speed of a wireless connection as you move away from the access point?
- Which authentication and security method should be used on a wireless network?
- Why should default security settings be changed when dealing with wireless networking?

After finishing this section, you should be able to complete the following task:

- Set up a wireless network and connect hosts.

This section covers the following PC Pro exam objectives:

- 6.0 Networking
  - Identify Ethernet wireless access point components, features, connectors, and cables.
  - Given basic IPv4 configuration settings or a network diagram, configure a wired or wireless network connection.

Video/Demo	Time
6.8.1 Wireless Networking	6:13
6.8.2 Installing a Wireless Network Adapter	2:56
6.8.4 Wireless Security	6:50
6.8.6 Configuring a Wireless Connection	9:26
Total Video Time	**25:25**

Lab/Activity

- 6.8.7 Connect to a Wireless Network
- 6.8.8 Configure a Wireless Profile

Fact Sheets

- 6.8.3 Wireless Networking Facts
- 6.8.5 Wireless Security Facts

Number of Exam Questions

15 questions

Total Time

About 61 minutes

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6.9: Infrared, Bluetooth, and NFC

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?
- Which types of devices use NFC transmissions?
- How is NFC different from Bluetooth?

After finishing this section, you should be able to complete the following tasks:

- 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.

This section covers the following PC Pro exam objective:

- 6.0 Networking
  - Identify common network connectivity devices and their roles.

Video/Demo	Time
6.9.1 Infrared, Bluetooth, and NFC	5:14
6.9.2 Configuring Bluetooth Connections	9:56
Total Video Time	**15:10**

Fact Sheets

6.9.3 Infrared, Bluetooth, and NFC Facts

Number of Exam Questions

9 questions

Total Time

About 30 minutes

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6.10: Internet Connectivity

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?
- What are the different ways a device can connect to a cellular Internet connection?

After finishing this section, you should be able to complete the following task:

- Select the best Internet service for a particular scenario.

This section covers the following PC Pro exam objective:

- 6.0 Networking
  - Identify common network connectivity devices and their roles.

Video/Demo	Time
6.10.1 Internet Services	11:51
6.10.5 Creating a Dial-up Internet Connection	4:24
Total Video Time	**16:15**

Lab/Activity

- 6.10.3 Configure a Cable Internet Connection
- 6.10.4 Configure a DSL Internet Connection
- 6.10.6 Configure a Dial-up Internet Connection

Fact Sheets

- 6.10.2 Internet Connection Facts

Number of Exam Questions

13 questions

Total Time

About 50 minutes

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6.11: SOHO Configuration

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?

After finishing this section, you should be able to complete the following tasks:

- 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.

This section covers the following PC Pro exam objectives:

- 6.0 Networking
  - Understand the function of different network devices.
  - Given a scenario with specifications and networking requirements, select and install the necessary Ethernet adapters, access points, or cables.
  - Given basic IPv4 configuration settings or a network diagram, configure a wired or wireless network connection.

Video/Demo	Time
6.11.1 SOHO Configuration	9:40
6.11.3 Configuring a SOHO Router	13:13
6.11.4 Configuring a Wireless Access Point	13:49
Total Video Time	**36:42**

Lab/Activity

- 6.11.7 Configure a Wireless Infrastructure

Fact Sheets

- 6.11.2 SOHO Configuration Facts
- 6.11.5 Access Point Configuration Facts
- 6.11.6 Windows Network Profile Facts

Number of Exam Questions

11 questions

Total Time

About 68 minutes

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6.12: Network Utilities

Lecture Focus Questions:

- What are the similarities and differences between **ping** and **tracert**?
- When would you use **traceroute** instead of **tracert**?
- What information can you get from the **netstat** command?
- Which utilities can be used to perform remote management of servers?
- What is the difference between the **ifconfig** and **iwconfig** commands?
- Why should you use SSH over Telnet?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objective:

- 6.0 Networking
  - Use appropriate networking utilities to view, test, and troubleshoot basic network configuration, communication, and connectivity problems.

Video/Demo	Time
6.12.1 Network Utilities	6:17
6.12.2 Using ipconfig and ifconfig	13:09
6.12.7 Using ping and tracert	11:52
6.12.8 Using nslookup	5:53
Total Video Time	**37:11**

Lab/Activity

- 6.12.3 Find Configuration Information 1
- 6.12.4 Find Configuration Information 2
- 6.12.5 Find Configuration Information 3
- 6.12.6 Use ifconfig

Fact Sheets

- 6.12.9 TCP/IP Utilities

Number of Exam Questions

7 questions

Total Time

About 70 minutes

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6.13: HomeGroup Networking

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?

After finishing this section, you should be able to complete the following tasks:

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

Video/Demo	Time
6.13.1 Implementing HomeGroups	10:10
Total Video Time	**10:10**

Fact Sheets

6.13.2 HomeGroup Facts

Number of Exam Questions

5 questions

Total Time

About 21 minutes

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6.14: Network Troubleshooting

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?
- What are some of the issues unique to wireless networks?

After finishing this section, you should be able to complete the following tasks:

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

This section covers the following PC Pro exam objective:

- 6.0 Networking
  - Use appropriate networking utilities to view, test, and troubleshoot basic network configuration, communication, and connectivity problems.

Video/Demo	Time
6.14.1 Wired Network Troubleshooting	12:57
6.14.3 Wireless Network Troubleshooting	9:31
6.14.5 Troubleshooting Network Connectivity	13:51
Total Video Time	**36:19**

Lab/Activity

- 6.14.7 Fix a Network Connection 1
- 6.14.8 Fix a Network Connection 2

Fact Sheets

- 6.14.2 Wired Network Troubleshooting Tool Facts
- 6.14.4 Wireless Network Troubleshooting Tool Facts
- 6.14.6 Network Troubleshooting Facts

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Number of Exam Questions
15 questions

Total Time
About 77 minutes

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7.1: Printers

Lecture Focus Questions:

- Which printer type is ideal for printing carbon-copy documents?
- What is a common application for a thermal printer?
- Why does a laser printer use heat in the printing process?
- What are the two most common printer types?
- In the laser printing process, how does the primary corona prepare the photosensitive drum for writing?

After finishing this section, you should be able to complete the following task:

- Choose a printer to fulfill the requirements for a given situation.

This section covers the following PC Pro exam objectives:

- Domain 7.0 Printers
  - Identify printer types and connectors.

Video/Demo	Time
7.1.1 Printer Types	10:25
7.1.3 Laser Printing Process	7:46
Total Video Time	**18:11**

Lab/Activity

- 7.1.7 Choose a Printer

Fact Sheets

- 7.1.2 Printer Type Facts
- 7.1.4 Laser Printing Facts
- 7.1.5 Printer Connection Facts
- 7.1.6 Printer Characteristics Facts

Number of Exam Questions

10 questions

Total Time

About 54 minutes

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7.2: Printer Configuration

Lecture Focus Questions:

- What is the function of the print driver? Of 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?
- Which virtual printing option allows you to create an .xps file?
- Which printing option allows you to convert a Word document into a .jpg file?

After finishing this section, you should be able to complete the following task:

- Select and install a printer

This section covers the following PC Pro exam objectives:

- Domain 7.0 Printers
  - Given a scenario with system specifications and end-user requirements, select and install the appropriate printer
  - Use Windows utilities to configure a local printer, set the default printer, manage print jobs, start and stop the print spooler, and print a test page
  - Connect and configure a network printe.

Video/Demo	**Time**
7.2.1 Printing Configuration	8:41
7.2.2 Installing a Local Printer	15:06
7.2.3 Configuring Virtual Printing	5:56
Total Video Time	**29:43**

Lab/Activity

7.2.5 Select and Install a Printer

Fact Sheets

7.2.4 Printer Configuration Facts

Number of Exam Questions

5 questions

Total Time

About 45 minutes

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7.3: Network Printing

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 device 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?
- Which services allow you to print wirelessly to a remote printer?

After finishing this section, you should be able to complete the following tasks:

- Configuring a wireless network printer
- Configure network printing

This section covers the following PC Pro exam objectives:

- Domain 7.0 Printers
  - Use Windows utilities to configure a local printer, set the default printer, manage print jobs, start and stop the print spooler, and print a test page
  - Connect and configure a network printer

Video/Demo	Time
7.3.1 Network Printing	9:42
7.3.2 Sharing a Printer	12:35
7.3.3 Configuring a Wireless Network Printer	3:44
Total Video Time	**26:01**

Lab/Activity

- 7.3.5 Configure Network Printing

Fact Sheets

- 7.3.4 Network Printing Facts

Number of Exam Questions

5 questions

Total Time

About 42 minutes

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7.4: Printing Management

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?

After finishing this section, you should be able to complete the following tasks:

- Configure printer properties
- Manage printing

This section covers the following PC Pro exam objectives:

- Domain 7.0 Printers
  - Use Windows utilities to configure a local printer, set the default printer, manage print jobs, start and stop the print spooler, and print a test page
  - Connect and configure a network printer

Video/Demo	Time
7.4.1 Configuring Printer Properties	13:42
7.4.2 Managing Print Jobs	8:35
Total Video Time	**22:17**

Lab/Activity

- 7.4.4 Configure Printer Properties
- 7.4.5 Manage Printing

Fact Sheets

- 7.4.3 Printing Management Facts

Number of Exam Questions

5 questions

Total Time

About 43 minutes

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7.5: Printer Maintenance

Lecture Focus Questions:

- How do you clean an ink jet printer head?
- What is the best way to clean up a toner spill?
- If you hear a grinding noise as the printer attempts to move the carriage, what should you do?
- At what page count should printer components be replaced?

After finishing this section, you should be able to complete the following task:

- Maintain a laser printer

Video/Demo	Time
7.5.1 Maintaining Laser Printers	10:31
Total Video Time	**10:31**

Fact Sheets

7.5.2 Printer Preventative Maintenance Facts

Number of Exam Questions

6 questions

Total Time

About 22 minutes

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7.6: Printer Troubleshooting

Lecture Focus Questions:

- How do you clean an inkjet printer head?
- 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?

After finishing this section, you should be able to complete the following task:

- Troubleshoot and resolve common printing problems

This section covers the following PC Pro exam objectives:

- Domain 7.0 Printers
  - Given a scenario with system specifications and end-user requirements, select and install the appropriate printer
  - Use Windows utilities to configure a local printer, set the default printer, manage print jobs, start and stop the print spooler, and print a test page
  - Connect and configure a network printer

Video/Demo	Time
7.6.1 Printer Troubleshooting	9:49
7.6.2 Troubleshooting Printing	14:46
Total Video Time	**24:35**

Fact Sheets

7.6.3 Printer Troubleshooting Facts

Number of Exam Questions

10 questions

Total Time

About 40 minutes

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8.1: Notebook Computers

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?

After finishing this section, you should be able to complete the following task:

- Identify notebook external ports and functions.

This section covers the following PC Pro exam objective:

- Domain 8.0 Mobile Devices
  - Identify notebook computer types, features, and special keys.

Video/Demo	Time
8.1.1 Notebook Computers	8:46
8.1.2 External Notebook Ports and Functions	5:36
Total Video Time	**14:22**

Fact Sheets

- 8.1.3 Notebook Facts
- 8.1.4 Notebook Special Keys Facts

Number of Exam Questions

7 questions

Total Time

About 32 minutes

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8.2: 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?

After finishing this section, you should be able to complete the following tasks:

- 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

This section covers the following PC Pro exam objectives:

- Domain 8.0 Mobile Devices
  - Install and configure basic hardware components on notebook computers

Video/Demo	Time
8.2.1 Changing a Notebook Hard Drive	2:37
8.2.2 Installing Notebook Memory	3:33
8.2.3 Changing a Notebook Keyboard	3:20
8.2.4 Replacing LCD Components	7:15
8.2.5 Replacing Internal Notebook Components	16:32
Total Video Time	**33:17**

Fact Sheets

8.2.6 Notebook Upgrade and Repair Facts

Number of Exam Questions

15 questions

Total Time

About 54 minutes

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8.3: Notebook Power Management

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?
- What can happen if you use a power adapter that is not compatible with your laptop?
- 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?

After finishing this section, you should be able to complete the following tasks:

- Edit power options.
- Create a power plan.

This section covers the following PC Pro exam objectives:

- Domain 8.0 Mobile Devices
  - Install and configure basic hardware components on notebook computers.
  - Maintain notebook computers and troubleshoot common issues.

Video/Demo	Time
8.3.1 Portable Power	5:02
8.3.3 Configuring Power Options	8:54
Total Video Time	**13:56**

Lab/Activity

- 8.3.5 Edit Power Options
- 8.3.6 Create a Power Plan

Fact Sheets

- 8.3.2 Notebook Power Facts
- 8.3.4 Power Management Facts

Number of Exam Questions

6 questions

Total Time

About 40 minutes

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8.4: Notebook Troubleshooting

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?
- How do you fix common problems with a notebook touchpad?

After finishing this section, you should be able to complete the following tasks:

- 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

This section covers the following PC Pro exam objectives:

- Domain 8.0 Mobile Devices
  - Maintain notebook computers and troubleshoot common issues

Video/Demo	Time
8.4.1 Common Notebook Issues	11:15
Total Video Time	**11:15**

Fact Sheets

- 8.4.2 Notebook Maintenance Facts
- 8.4.3 Battery Recalibration Facts
- 8.4.4 Notebook Troubleshooting Facts

Number of Exam Questions

15 questions

Total Time

About 42 minutes

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8.5: Mobile Devices

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 tablets and phablets differ?
- In what ways do Android, iOS, and Windows differ?

This section covers the following PC Pro exam objectives:

- Domain 8.0 Mobile Devices
  - Identify and configure mobile device features and accessories.

Video/Demo	Time
8.5.1 Mobile Device Overview	9:58
Total Video Time	**9:58**

Fact Sheets

- 8.5.2 Mobile Device Facts
- 8.5.3 Mobile Communications Facts
- 8.5.4 Mobile Device Accessory Facts

Number of Exam Questions

10 questions

Total Time

About 35 minutes

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8.6: Mobile Device Networking

Lecture Focus Questions:

- 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?

After finishing this section, you should be able to complete the following tasks:

- Network mobile devices
- Synchronize mobile devices
- Configure email on mobile devices

This section covers the following PC Pro exam objective:

- Domain 8.0 Mobile Devices
  - Configure mobile device connection, data synchronization, email, and security settings.

Video/Demo	Time
8.6.1 Networking Mobile Devices	8:54
8.6.3 Synchronizing Mobile Devices	6:22
8.6.5 Configuring Email on Mobile Devices	3:03
Total Video Time	**18:19**

Lab/Activity

- 8.6.7 Manage Mobile Devices

Fact Sheets

- 8.6.2 Mobile Device Connection Facts
- 8.6.4 Data Synchronization Facts
- 8.6.6 Mobile Email Configuration Facts

Total Time

About 39 minutes

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8.7: Mobile Device Security

Lecture Focus Questions:

- What is biometric authentication?
- What is multifactor authentication?
- What is the set number of failed login attempts allowed on a mobile device?
- If you lost your mobile device, how could you find it?
- Which type of device encryption does not encrypt deleted files?

After finishing this section, you should be able to complete the following task:

- Securing mobile devices

This section covers the following PC Pro exam objective:

- Domain 8.0 Mobile Devices
  - Configure mobile device connection, data synchronization, email, and security settings.

Video/Demo	Time
8.7.1 Mobile Device Security	7:08
8.7.3 Securing Mobile Devices	8:22
Total Video Time	**15:30**

Fact Sheets

8.7.2 Mobile Device Security Facts

Number of Exam Questions

5 questions

Total Time

About 26 minutes

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8.8: Mobile Device Troubleshooting

Lecture Focus Questions:

- What are some of the tools you can use to troubleshoot mobile devices?
- What are some common causes of touchscreen issues?
- What should you do if a mobile device's battery is swollen?
- What can cause a mobile device to perform poorly?
- What is the difference between a cell tower analyzer and a Wi-Fi analyzer?

After finishing this section, you should be able to complete the following task:

- Troubleshoot problems with mobile devices.

This section covers the following PC Pro exam objective:

- 8.0 Mobile Devices
  - Maintain mobile devices and troubleshoot common issues.

Video/Demo	Time
8.8.1 Mobile Device Troubleshooting	7:23
8.8.2 Maintaining Mobile Devices	7:06
Total Video Time	**14:29**

Fact Sheets

8.8.3 Mobile Device Troubleshooting Facts

Number of Exam Questions

5 questions

Total Time

About 25 minutes

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9.1: Windows System Tools

Lecture Focus Questions:

- What configuration tasks can you perform using Control Panel?
- Which tool lets you view running tasks and current memory use?
- 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?
- What commands can be used from the command prompt to shut down the system, manage processes, and establish a Remote Desktop session?

After finishing this section, you should be able to complete the following tasks:

- Use Task Manager to view current performance statistics.
- Use Control Panel to configure your system.
- Use system tools to view configuration information for your computer.
- Use prebuilt and custom management consoles to manage your computer.
- View and edit registry settings.
- Manage files, processes, and system settings from the command prompt.

The following TestOut PC Pro objective is covered in this section:

- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
9.1.1 Using Task Manager	19:06
9.1.2 Using Control Panel	4:44
9.1.3 Using Management Consoles	10:28
9.1.4 Viewing System Information	11:10
9.1.5 System Configuration and DirectX	8:13
9.1.6 Using Regedit	8:30
9.1.8 Using System Commands	15:40
Total Video Time	**1:17:51**

Fact Sheets

- 9.1.7 Windows Utilities Facts
- 9.1.9 System Command Facts

Number of Exam Questions

10 questions

Total Time

About 98 minutes

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9.2: Preferences and Settings

Lecture Focus Questions:

- How can the look and feel of the Windows desktop environment be customized?
- How does indexing optimize the process for finding files on Windows?
- What types of changes do Region and Language Settings make on your computer?

After finishing this section, you should be able to complete the following tasks:

- Download and install a Windows theme.
- Add and remove file locations for indexing.
- Configure locales, regional settings, and alternate input languages.

The following TestOut PC Pro objective is covered in this section:

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

Video/Demo	Time
9.2.1 Personalizing Windows	10:27
9.2.2 Configuring Region and Language Options	4:12
9.2.3 Indexing Files	6:13
Total Video Time	**20:52**

Fact Sheets

- 9.2.4 Preferences Facts

Number of Exam Questions

7 questions

Total Time

About 33 minutes

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9.3: Performance Monitoring

Lecture Focus Questions:

- Which system components are commonly monitored to troubleshoot system performance?
- When examining system performance statistics, what is the difference between *counters* and *objects*?
- What should be done if the processor utilization in a system is consistently over 90%?
- What should be done if the amount of memory being utilized in a system is close to the amount of RAM installed?
- What should be done if the page file utilization in a system is near 100%?
- What causes *thrashing*? Which performance statistic might be examined to identify thrashing?
- Which statistics should be examined to diagnose a network adapter bottleneck?

After finishing this section, you should be able to complete the following tasks:

- Monitor system performance using Task Manager
- Monitor system performance using Performance Monitor
- Monitor system performance using Resource Monitor
- Monitor system performance using Reliability Monitor

The following TestOut PC Pro objectives are covered in this section:

- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
9.3.1 Performance Monitoring	6:22
9.3.2 Monitoring System Performance	13:19
Total Video Time	**19:41**

Fact Sheets

9.3.3 Performance Monitoring Facts

Number of Exam Questions

6 questions

Total Time

About 31 minutes

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9.4: Users and Groups

Lecture Focus Questions:

- How can groups simplify security administration?
- How are the rights assigned to the Users group different than the rights assigned to the Administrator group?
- What is the purpose of the Backup Operators group?
- Which group must a user must be a member of 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*?

After finishing this section, you should be able to complete the following tasks:

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

The following TestOut PC Pro objectives are covered in this section:

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

Video/Demo	Time
9.4.1 Users and Groups	6:30
9.4.2 Managing Local Users and Groups	14:57
9.4.4 Authenticating with Online User Accounts	7:20
9.4.7 Managing UAC Settings	12:50
Total Video Time	**41:37**

Lab/Activity

- 9.4.6 Manage Users and Groups

Fact Sheets

- 9.4.3 User and Group Facts
- 9.4.5 Online Authentication Facts
- 9.4.8 UAC Facts

Number of Exam Questions

13 questions

Total Time

About 75 minutes

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9.5: Remote Services

Lecture Focus Questions:

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

After finishing this section, you should be able to complete the following tasks:

- Configure a host computer to accept Remote Desktop connections.
- Specify which users are allowed to establish a Remote Desktop session.
- Open the Remote Desktop port in the Windows Firewall.
- Establish a guest Remote Desktop connection.

The following TestOut PC Pro objectives are covered in this section:

- 9.0 System Management: Configure local users and groups for a Windows system.
- 10.0 Security: Configure the basic Windows Firewall.

Video/Demo	Time
9.5.1 Remote Desktop	5:53
9.5.2 Using Remote Desktop	15:18
9.5.4 Remote Assistance	3:10
9.5.6 Using Remote Assistance	9:10
9.5.8 Using Screen Sharing	5:36
Total Video Time	**39:07**

Lab/Activity

- 9.5.7 Configure Remote Services

Fact Sheets

- 9.5.3 Remote Desktop Facts
- 9.5.5 Remote Assistance Facts
- 9.5.9 Screen Sharing Facts

Number of Exam Questions

9 questions

Total Time

About 69 minutes

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9.6: Windows Application Management

Lecture Focus Questions:

- What is the difference between a traditional desktop application and a Metro app from the Windows Store?
- How is a shortcut different than an executable 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 is required for a user to install or uninstall applications?
- How can older applications be configured to run on newer versions of Windows?
- Which tool should be used to schedule an application to run automatically in the future?

After finishing this section, you should be able to complete the following tasks:

- Install, uninstall, and repair desktop applications.
- Install and uninstall apps.
- Run an application as an administrator.
- Configure compatibility mode for an application.
- Schedule a task to run automatically.

The following TestOut PC Pro objectives are covered in this section:

- 9.0 System Management: Configure local users and groups for a Windows system.
- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
9.6.1 Windows Desktop Applications	4:34
9.6.2 Managing Windows Desktop Applications	12:22
9.6.4 Configuring Application Compatibility	7:36
9.6.6 Scheduling Tasks	5:19
9.6.7 Windows Store Applications	2:43
9.6.8 Managing Windows Store Apps	7:15
Total Video Time	**39:49**

Lab/Activity

- 9.6.9 Manage Applications

Fact Sheets

- 9.6.3 Desktop Application Management Facts
- 9.6.5 Application Compatibility Facts

Number of Exam Questions

9 questions

Total Time

About 64 minutes

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9.7: Linux Application Management

Lecture Focus Questions:

- What is a software *package*?
- Which Linux distributions use the yum command to manage software? Which use apt-get?
- Which yum command searches online repositories for a particular package, downloads it, and installs it?
- Which yum command downloads and installs the latest updates for packages installed on the system?
- Which apt-get command uninstalls a package from the system?
- Which apt-get command updates all of the installed packages on a system?
- Which option can be used with the ps command to view all processes running on the system?
- How can you get help with a Linux command?

After finishing this section, you should be able to complete the following tasks:

- Install, uninstall, and update software packages with yum
- Install, uninstall, and update software packages with apt-get
- Monitor running processes with the ps command

Video/Demo	Time
9.7.1 Installing Linux Software	6:32
9.7.2 Managing Apps on Linux	2:28
9.7.3 Managing Processes on Linux	6:43
Total Video Time	**15:43**

Lab/Activity

- 9.7.5 Manage Linux Processes

Fact Sheets

- 9.7.4 Linux Application Management Facts

Number of Exam Questions

5 questions

Total Time

About 31 minutes

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9.8: Digital Content Management

Lecture Focus Questions:

- What is the difference between a personal software license and an enterprise (sometimes called *volume*) software license?
- What does the EULA contain?
- How does Open Source software differ from software protected by a proprietary license agreement?
- How are Open Source development projects funded?
- How do DRM mechanisms protect media files from illegal copying?

After finishing this section, you should be able to complete the following tasks:

- Select the correct software license for a specific implementation
- Explain the benefits and drawbacks of Open Source software

Video/Demo	Time
9.8.1 Software Licensing	8:00
9.8.2 Digital Rights Management (DRM)	8:07
Total Video Time	**16:07**

Fact Sheets

9.8.3 Digital Content Management Facts

Number of Exam Questions

5 questions

Total Time

About 27 minutes

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9.9: Updates

Lecture Focus Questions:

- What is the difference between a *hotfix* and a *service pack*?
- 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 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?
- How are updates applied on Linux and Mac OS operating systems?

After finishing this section, you should be able to complete the following tasks:

- Configure Windows Updates.
- Update a Linux distribution.
- Update a Macintosh system.
- Update the firmware on a network device.

The following TestOut PC Pro objectives are covered in this section:

- 9.0 System Management: Configure Windows Update settings.
- 9.0 System Management: Manage device driver updates, roll back drivers, and enable or disable devices.

Video/Demo	Time
9.9.1 Updates	6:43
9.9.2 Using Windows Update	12:23
9.9.5 Updating Linux	4:18
9.9.6 Updating Mac OS	2:59
9.9.7 Performing a Firmware Update	4:01
Total Video Time	**30:24**

Lab/Activity

- 9.9.4 Configure Windows Update

Fact Sheets

- 9.9.3 Update Facts

Number of Exam Questions

7 questions

Total Time

About 48 minutes

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9.10: System Backup

Lecture Focus Questions:

- What type of data is backed up with a system image backup?
- Which tools could you use to back up user data on different versions of Windows?
- What types of media can Backup and Restore write to?
- Where should backup media be stored for maximum security?
- Why should you test your restore methods?
- What is the difference between Backup and Restore and File History?

After finishing this section, you should be able to complete the following tasks:

- Create a system image backup
- Schedule automatic backups of user data
- Protect user data with File History
- Back up user data on Linux and Mac OS

The following TestOut PC Pro objectives are covered in this section:

- 9.0 System Management: Use Windows Backup and Restore to configure a full system or file backup schedule
- 9.0 System Management: Troubleshoot common Windows operating system and software issues

Video/Demo	Time
9.10.1 System Backup	6:35
9.10.3 Creating Backups in Windows	13:55
9.10.4 Creating Backups in Linux	4:37
9.10.5 Using Time Machine on Mac OS	4:47
9.10.7 Configuring File History in Windows	8:47
Total Video Time	**38:41**

Lab/Activity

- 9.10.6 Back Up the Computer
- 9.10.8 Configure File History

Fact Sheets

- 9.10.2 Backup Facts

Number of Exam Questions

15 questions

Total Time

About 69 minutes

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9.11: System Protection

Lecture Focus Questions:

- What is contained in a restore point?
- When should restore points be created?
- How are Previous Versions related to System Restore?
- How can you revert a running system to an earlier restore point?
- How can you revert a non-bootable system to an earlier restore point?

After finishing this section, you should be able to complete the following tasks:

- Configure System Protection.
- Manually create a restore point.
- Revert a system to an earlier restore point.
- Recover files using Previous Versions.

The following TestOut PC Pro objectives are covered in this section:

- 9.0 System Management: Enable system restore and configure a restore point.
- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
9.11.1 System Protection	4:53
9.11.2 Using Restore Points	13:13
9.11.3 Using Previous Versions	10:02
Total Video Time	**28:08**

Lab/Activity

- 9.11.5 Create a Restore Point

Fact Sheets

- 9.11.4 System Protection Facts

Number of Exam Questions

6 questions

Total Time

About 45 minutes

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9.12: System Recovery

Lecture Focus Questions:

- What system recovery methods can you use 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 components does Startup Repair inspect to fix Windows boot problems?
- When should a system image backup be restored 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 advantages of using the Reset Your PC or Refresh Your PC options to recover a system? Disadvantages?
- What methods can you use to recover lost data files?

After finishing this section, you should be able to complete the following tasks:

- Boot using a Windows installation disc and repair an installation
- Revert the system to an earlier restore point
- Restore user data using previous versions, File History, or from backup
- Restore a system using a system image
- Refresh or reset the system

The following TestOut PC Pro objectives are covered in this section:

- 9.0 System Management: Enable system restore and configure a restore point
- 9.0 System Management: Use Windows Backup to configure a full system or file backup schedule
- 9.0 System Management: Troubleshoot common Windows operating system and software issues

Video/Demo	Time
9.12.1 Windows 7 System Recovery	5:51
9.12.2 Windows 8.x and 10 System Recovery	6:54
9.12.3 Using Windows System Recovery Tools	7:52
9.12.4 Using File Recovery Tools	8:31
9.12.6 Restoring Data on Linux	3:27
9.12.7 Restoring Data on Mac OS	4:34
Total Video Time	**37:09**

Lab/Activity

- 9.12.5 Restore Data from File History

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Fact Sheets

- 9.12.8 System Recovery Facts

Number of Exam Questions

7 questions

Total Time

About 55 minutes

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9.13: Virtual Memory

Lecture Focus Questions:

- What is the benefit of using virtual memory?
- How does virtual memory work? What is the purpose of swapping?
- What is the benefit of using a separate hard disk for the paging file?
- What condition causes *disk thrashing*? How can you reduce its effects?

After finishing this section, you should be able to complete the following tasks:

- Monitor system memory utilization in Task Manager.
- Configure page file settings.
- Move the paging file to a different hard disk.
- Create multiple paging files.
- Troubleshoot disk thrashing.

The following TestOut PC Pro objectives are covered in this section:

- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
9.13.1 Windows Virtual Memory	6:57
9.13.2 Managing the Paging File	8:00
Total Video Time	**14:57**

Lab/Activity

- 9.13.4 Configure Virtual Memory

Fact Sheets

- 9.13.3 Virtual Memory Facts

Number of Exam Questions

6 questions

Total Time

About 31 minutes

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9.14: Operating System Troubleshooting

Lecture Focus Questions:

- An application displays an error message about missing files when you try to start it. What should you do?
- An application displays an error message about insufficient privileges when you try to start it. What should you do?
- A service fail to start when Windows loads. What should you do?
- An application running on the system has hung. What should you do?
- A process requires a higher priority level than the other processes running on the system. What should you do?
- The Windows system generates a BSOD error. What should you do?

After finishing this section, you should be able to complete the following tasks:

- Troubleshoot application crashes.
- Run an application with elevated privileges on the system.
- Troubleshoot hung applications.
- Configure application priority and processor affinity.
- Troubleshoot services and devices that fail to start on boot.
- Troubleshoot system crashes.

The following TestOut PC Pro objective is covered in this section:

- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
9.14.1 Windows Operating System Issues	10:23
9.14.2 Troubleshooting Windows Applications	12:42
9.14.3 Troubleshooting Windows Services	6:25
9.14.5 System Lockups	6:02
Total Video Time	**35:32**

Fact Sheets

- 9.14.4 Application Troubleshooting Facts
- 9.14.6 System Errors Facts

Number of Exam Questions

10 questions

Total Time

About 56 minutes

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9.15: Windows Boot Errors

Lecture Focus Questions:

- What are the general stages of the Windows startup process?
- What should you do if you hear a series of beeps when the system powers on and there is nothing on the monitor?
- How would you correct a corrupt MBR or partition table?
- What symptoms might indicate a corrupt or missing boot sector?
- If you receive an error about corrupt or missing system files, how can you replace the damaged or missing files?

After finishing this section, you should be able to complete the following tasks:

- Diagnose and correct errors with system power
- Diagnose and correct system component errors
- Recover from partition and boot record errors
- Access the Advanced Startup Options menu to customize how the system starts and to correct problems
- Edit the device priority list in the BIOS/UEFI to include and exclude device types from the boot order
- Modify the hard drive list to identify the order that the BIOS/UEFI should search when booting from a hard disk
- Troubleshoot failure to boot issues

The following TestOut PC Pro objective is covered in this section:

- 9.0 System Management: Troubleshoot common Windows operating system and software issues

Video/Demo	Time
9.15.1 Windows Boot Process	5:24
9.15.3 Modifying the Boot Order	8:43
9.15.5 Using Advanced Boot Options	10:27
9.15.7 Using the bootrec Command	6:55
Total Video Time	**31:29**

Lab/Activity

- 9.15.4 Configure the Boot Order
- 9.15.9 Troubleshoot System Startup 1
- 9.15.10 Troubleshoot System Startup 2
- 9.15.11 Troubleshoot System Startup 3
- 9.15.12 Troubleshoot System Startup 4

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Fact Sheets

- 9.15.2 Boot Process Facts
- 9.15.6 Windows Boot Options
- 9.15.8 Startup Error Facts

Number of Exam Questions

12 questions

Total Time

About 84 minutes

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10.1: Component Selection

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?

After finishing this section, you should be able to complete the following tasks:

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

The following TestOut PC Pro objective is covered in this section:

- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
10.1.1 Component Selection	7:56
Total Video Time	**7:56**

Fact Sheets

10.1.2 Component Selection Facts

Number of Exam Questions

8 questions

Total Time

About 21 minutes

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10.2: Windows Pre-installation

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) can run Hyper-V virtual machines?
- Which operating system architectures (32-bit or 64-bit) could you install on a computer with an x64 CPU?
- What are the advantages of using a 64-bit version of the operating system over a 32-bit version?
- What are the potential problems when moving from a 32-bit operating system to a 64-bit operating system?
- 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?
- How would you upgrade a Windows 7 computer to Windows 10?
- What tasks should you perform prior to starting an operating system upgrade?

After finishing this section, you should be able to complete the following tasks:

- Select the correct version and edition of Windows for a given implementation.
- Verify system compatibility before upgrading to a newer version of Windows.

The following TestOut PC Pro objective is covered in this section:

- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
10.2.1 Windows Versions	7:02
10.2.3 Pre-installation Planning	16:37
10.2.5 Verifying System Compatibility	3:03
Total Video Time	**26:42**

Fact Sheets

- 10.2.2 Windows Versions Facts
- 10.2.4 Installation Planning Facts

Number of Exam Questions

11 questions

Total Time

About 48 minutes

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10.3: Windows Installation

Lecture Focus Questions:

- What SATA disk setting would you choose when defining a mirrored set?
- During a Windows installation, your RAID array is not detected. What should you do?
- How can you copy a Windows installation DVD to a flash drive?
- 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?
- What are the requirements for using disk imaging to clone a Windows system?
- What components are required to set up a network installation server?

After finishing this section, you should be able to complete the following tasks:

- 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/UEFI firmware.
- Install Windows.

The following TestOut PC Pro objective is covered in this section:

- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
10.3.1 Windows Installation	8:34
10.3.2 Preparing Disks for Installation	8:44
10.3.4 Installing Windows	10:11
Total Video Time	**27:29**

Lab/Activity

10.3.3 Prepare Disks for Installation

Fact Sheets

10.3.5 Installation Facts

Number of Exam Questions

12 questions

Total Time

About 50 minutes

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10.4: Post Installation

Lecture Focus Questions:

- Why should you enable Windows Update immediately after installation?
- How is Windows activated after installation?
- What tools can you use to transfer user accounts, data, and settings from an old Windows system to a new one?
- What should you do to secure a system after installing Windows?
- What should you do to protect system data after installing Windows?

After finishing this section, you should be able to complete the following tasks:

- Update a newly installed system.
- Activate a new Windows installation.
- Migrate user settings and data using Windows Easy Transfer and USMT.
- Secure a newly installed Windows system.
- Protect system data after installing Windows.

The following TestOut PC Pro objective is covered in this section:

- 9.0 System Management: Troubleshoot common Windows operating system and software issues.

Video/Demo	Time
10.4.1 Post Installation	6:38
10.4.3 Migrating User Data with WET	9:28
10.4.4 Migrating User Data with USMT	13:08
Total Video Time	**29:14**

Fact Sheets

10.4.2 Post Installation Facts

Number of Exam Questions

8 questions

Total Time

About 43 minutes

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10.5: Virtualization

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 secure a virtual machine after it has been deployed?
- What is the difference between a hybrid cloud and a community cloud?
- What is the difference between IaaS and PaaS?
- What two implementations are available for SaaS?
- What services does cloud computing provide?
- Which cloud computing model allows the client to run software without purchasing servers, data center space, or network equipment?

After finishing this section, you should be able to complete the following tasks:

- Create a virtual machine.
- Install an operating system within a virtual machine.
- Configure a virtual machine to communicate with other hosts on the network.
- Secure a virtual machine.

Video/Demo	Time
10.5.1 Virtualization Overview	13:39
10.5.3 Creating a Virtual Machine	11:52
10.5.5 Cloud Computing Overview	12:09
Total Video Time	**37:40**

Lab/Activity

- 10.5.4 Enable VT in the BIOS

Fact Sheets

- 10.5.2 Virtualization Facts
- 10.5.6 Cloud Computing Facts

Number of Exam Questions

6 questions

Total Time

About 59 minutes

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11.1: Windows File Locations

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	Time
11.1.1 System File Locations	11:08
11.1.3 Using Libraries	7:44
Total Video Time	**18:52**

Fact Sheets

- 11.1.2 File Location Facts
- 11.1.4 Library Facts

Number of Exam Questions

10 questions

Total Time

About 39 minutes

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11.2: Managing Files on Windows

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 that 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 in order 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?

After finishing this section, you should be able to complete the following task:

- Manage files and folder

Video/Demo	Time
11.2.1 Windows File and Folder Properties	7:48
11.2.4 Managing Files on Windows	15:00
11.2.6 Managing Directories from the Command Prompt	15:31
11.2.7 Managing Files from the Command Prompt	14:15
Total Video Time	**52:34**

Lab/Activity

- 11.2.5 Manage Files
- 11.2.9 Manage Files and Folders

Fact Sheets

- 11.2.2 File Extension Facts
- 11.2.3 Attribute Facts
- 11.2.8 File Management Commands

Number of Exam Questions

14 questions

Total Time

About 92 minutes

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11.3: NTFS Permissions

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 must you have to the destination location?

After finishing this section, you should be able to complete the following task:

- Configure NTFS permissions

Video/Demo	Time
11.3.1 NTFS Permissions	6:03
11.3.2 Configuring NTFS Permissions	18:00
Total Video Time	**24:03**

Lab/Activity

11.3.4 Configure NTFS Permissions

Fact Sheets

11.3.3 NTFS Permission Facts

Number of Exam Questions

11 questions

Total Time

About 46 minutes

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11.4: Shared Folders

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?

After finishing this section, you should be able to complete the following task:

- Share and secure folders

Video/Demo	Time
11.4.1 Shared Folders	3:18
11.4.2 Configuring Basic Folder Sharing on Windows	13:45
11.4.3 Configuring Advanced Folder Sharing on Windows	13:38
11.4.4 Configuring Share and NTFS Permissions	17:07
Total Video Time	**47:48**

Lab/Activity

- 11.4.6 Share and Secure Folders

Fact Sheets

- 11.4.5 Shared Folder Facts

Number of Exam Questions

9 questions

Total Time

About 67 minutes

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11.5: Linux File Management

Lecture Focus Questions:

- Which Linux command can be used to display the current working directory?
- Which Linux command can be used to display a listing of all files and subdirectories in the current directory?
- Which Linux command can be used to navigate between directories?
- Which Linux commands can be used to copy and move data?
- Which Linux commands can be used to delete data?
- Which Linux commands can be used to view the contents of files?
- Which Linux commands can be used to edit a text file?
- Which Linux commands can be used to manage file and folder ownership and permissions?
- Which Linux commands can be used to power off the system?

After finishing this section, you should be able to complete the following tasks:

- View the current directory.
- View the contents of a directory.
- Navigate between directories.
- Copy and move files and folders.
- View the contents of files.
- Edit the contents of a text file.
- Manage file and folder ownership and permissions.
- Shutdown the system.
- Back up a disk partition to a file.

Video/Demo	Time
11.5.1 Managing the Linux File System	11:05
11.5.2 Viewing File Contents	7:49
11.5.3 Editing File Contents	10:52
11.5.4 Managing Ownership and Permissions	8:30
Total Video Time	**38:16**

Lab/Activity

- 11.5.6 Manage the Linux File System
- 11.5.7 Manage Linux File Ownership

Fact Sheets

- 11.5.5 Linux File Management Facts

Number of Exam Questions

6 questions

Total Time

About 60 minutes

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12.1: Best Practices

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?
- How does an Acceptable Use Policy increase system security?
- What role does user awareness play in system security?

After finishing this section, you should be able to complete the following tasks:

- Apply the Principle of Least Privilege to increase the security of a Windows workstation.
- Implement strong passwords.
- Disable high-risk user accounts, such as Guest, on a Windows workstation.
- Disable autorun on a Windows workstation.
- Identify the key characteristics of an Acceptable Use Policy.
- Identify the role of user awareness in preventing security breaches.

The following TestOut PC Pro objective is covered in this section:

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

Video/Demo	Time
12.1.1 Best Practices for Securing Workstations	8:15
12.1.3 Security Policies	6:01
Total Video Time	**14:16**

Fact Sheets

- 12.1.2 Workstation Security Facts
- 12.1.4 Security Policy Facts

Number of Exam Questions

8 questions

Total Time

About 33 minutes

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12.2: Incident Response

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?

After finishing this section, you should be able to complete the following tasks:

- Use proper communication techniques and exhibit professionalism when interacting with clients.

Video/Demo	Time
12.2.1 First Responder	5:21
12.2.2 Basic Forensic Procedures	10:56
Total Video Time	**16:17**

Fact Sheets

12.2.3 Incident Response Facts

Number of Exam Questions

6 questions

Total Time

About 28 minutes

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12.3: Physical Security

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 are the best ways to securely dispose of magnetic media? Optical media?
- How can data be scrubbed from a hard disk drive?

After finishing this section, you should be able to complete the following tasks:

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

The following TestOut PC Pro objective is covered in this section:

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

Video/Demo	Time
12.3.1 Physical Security	8:34
12.3.2 Data Disposal and Destruction	6:35
12.3.3 Wiping a Disk	8:11
12.3.4 Configuring a Screen Saver Password	3:58
Total Video Time	**27:18**

Lab/Activity

- 12.3.6 Require a Screen Saver Password

Fact Sheets

- 12.3.5 Physical Security Facts

Number of Exam Questions

9 questions

Total Time

About 47 minutes

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12.4: 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?
- How can you prevent unauthorized persons from entering your facility?
- What are the characteristics of a phishing attack?
- What kind of information is classified as personally identifiable information?
- What is the best defense against a social engineering attack?

After finishing this section, you should be able to complete the following tasks:

- Identify areas of your organization that are vulnerable to social engineering exploits.
- Implement anti-phishing measures.
- Protect personally identifiable information.
- Train users to recognize social engineering attacks.

Video/Demo		Time
12.4.1 Social Engineering		11:07
	Total Video Time	**11:07**

Fact Sheets

12.4.2 Social Engineering Facts

Number of Exam Questions

9 questions

Total Time

About 26 minutes

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12.5: BIOS/UEFI Security

Lecture Focus Questions:

- What is the difference between a user and an administrator password in the BIOS/UEFI configuration?
- How can BIOS/UEFI passwords be circumvented on some systems?
- How does chassis intrusion detection help to secure the BIOS?
- How does a hard disk password differ from a BIOS/UEFI 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?
- Which UEFI security feature ensures firmware updates for the motherboard do not contain malware?
- Which UEFI security feature prevents the system from booting an operating system without a valid digital signature?

After finishing this section, you should be able to complete the following tasks:

- Configure BIOS/UEFI configuration passwords.
- Set a hard disk password.
- Enable and reset chassis intrusion detection.
- Initialize a TPM.
- Manage SecureBoot settings.

The following TestOut PC Pro objective is covered in this section:

- 10.0 Security: Configure BIOS/UEFI security settings.

Video/Demo	Time
12.5.1 BIOS/UEFI Security	8:28
12.5.2 Configuring BIOS/UEFI Security Settings	8:04
Total Video Time	**16:32**

Lab/Activity

- 12.5.4 Configure BIOS/UEFI Security

Fact Sheets

- 12.5.3 BIOS/UEFI Security Facts

Number of Exam Questions

7 questions

Total Time

About 34 minutes

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12.6: Malware Protection

Lecture Focus Questions:

- What is the role of a *signature file* when using anti-malware software to protect a system?
- How often should the signature files be updated?
- Why does showing file extensions 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 could you take?
- What happens when a file is quarantined?
- Why is user education often the best protection against malware?

After finishing this section, you should be able to complete the following tasks:

- Install and configure malware protection software.
- Update malware definition files.
- Scan and repair infected files and systems.
- Train users to recognize malware exploits.

Video/Demo	Time
12.6.1 Malware	9:31
12.6.3 Malware Protection	8:32
12.6.4 Implementing Malware Protection on Windows	11:19
12.6.5 Implementing Malware Protection on Linux	7:34
12.6.6 Implementing Malware Protection on Mac OS	6:34
Total Video Time	**43:30**

Fact Sheets

- 12.6.2 Malware Facts
- 12.6.7 Malware Protection Facts

Number of Exam Questions

10 questions

Total Time

About 64 minutes

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12.7: Authentication

Lecture Focus Questions:

- What is the difference between local authentication and domain authentication?
- What are the key characteristics of a strong password?
- Which 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 policies can you configure on a Windows workstation to defend against a brute-force password attack?
- What authentication mechanisms can be used to log on to a Windows workstation?

After finishing this section, you should be able to complete the following tasks:

- Log on to a remote computer.
- Configure password policies.
- Configure account lockout policies.
- Unlock a locked user account.
- Reset a user's password.
- Implement multifactor authentication.

The following TestOut PC Pro objective is covered in this section:

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

Video/Demo	Time
12.7.1 Authentication	8:41
12.7.2 Elevating Privileges on Linux	6:04
12.7.3 Configuring Password Policies on Windows	11:54
12.7.7 Managing Authentication on Windows	6:23
12.7.8 Using a Biometric Scanner	3:11
12.7.9 Using a Smart Card Reader	3:24
Total Video Time	**39:37**

Lab/Activity

- 12.7.5 Enforce Password Settings
- 12.7.6 Manage Linux Passwords

Fact Sheets

- 12.7.4 Password Facts
- 12.7.10 Authentication Management Facts

Number of Exam Questions

13 questions

Total Time

About 73 minutes

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12.8: File Encryption

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?
- Which editions of Windows provide BitLocker support?
- How can BitLocker be implemented on Windows systems lacking a TPM chip on the motherboard?
- 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?

After finishing this section, you should be able to complete the following tasks:

- Encrypt files using EFS and add authorized users.
- Encrypt a hard disk using BitLocker.

The following TestOut PC Pro objective is covered in this section:

- 10.0 Security: Encrypt files and folders.

Video/Demo	Time
12.8.1 File Encryption	5:23
12.8.3 Encrypting Files	9:16
12.8.5 Bitlocker	5:44
12.8.7 Using Bitlocker	6:42
Total Video Time	**27:05**

Lab/Activity

- 12.8.4 Encrypt Files

Fact Sheets

- 12.8.2 File Encryption Facts
- 12.8.6 Bitlocker Facts

Number of Exam Questions

9 questions

Total Time

About 52 minutes

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12.9: Network Security

Lecture Focus Questions:

- How can you secure physical access to computer systems?
- What configuration changes could you make to prevent data loss on a Windows system?
- What are the characteristics of a strong password?
- How can you limit wired network connectivity to only authorized systems?
- How can you make it more difficult for an unauthorized person to connect to a wired network.
- Which network devices should be put in a DMZ? Which systems should not?
- What is the role of a content filter?
- What can you do to obscure a wireless network?
- How can you prevent data emanation from a wireless network?

After finishing this section, you should be able to complete the following tasks:

- Physically secure computer systems.
- Protect user accounts and passwords.
- Change default usernames and passwords on network hardware devices.
- Disable SSID broadcast on a wireless network.
- Configure wireless network encryption and authentication.
- Manage antenna placement and power levels to prevent data emanation from a wireless network.

The following TestOut PC Pro objectives are covered in this section:

- 6.0 Networking:
  - Given basic IPv4 configuration settings or a network diagram, configure a wired or wireless network connection.
  - Use appropriate networking utilities to view, test, and troubleshoot basic network configuration, communication, and connectivity problems.
- 10.0 Security:
  - Configure password and account lockout settings in a local security policy.
  - Configure a screen saver and require a password to unlock a Windows workstation.

Video/Demo	Time
12.9.1 Wired Network Security Best Practices	11:16
12.9.3 Wireless Network Security Best Practices	9:50
Total Video Time	**21:06**

Fact Sheets

- 12.9.2 Wired Network Security Facts
- 12.9.4 Wireless Network Security Facts

Number of Exam Questions

14 questions

Total Time

About 46 minutes

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12.10: Firewalls

Lecture Focus Questions:

- Why is using a firewall important when connecting your computer to the Internet?
- What is the difference between a host-based and a network-based firewall solution?
- What information does the firewall use to allow or prevent communication?
- How would you configure Windows Firewall to allow network traffic generated by a specific application installed on the system? For a specific IP port number?
- What capabilities does configuring *port forwarding* provide?
- How would you configure *port triggering*?
- What are the advantages of implementing an all-in-one security appliance? What are the disadvantages?

After finishing this section, you should be able to complete the following tasks:

- Enable the Windows firewall.
- Open and close ports in the Windows firewall.

The following TestOut PC Pro objective is covered in this section:

- 10.0 Security: Configure the basic Windows Firewall.

Video/Demo	Time
12.10.1 Firewalls	9:58
12.10.2 Configuring Windows Firewall	7:06
12.10.5 Network Appliances	3:01
Total Video Time	**20:05**

Lab/Activity

12.10.4 Configure the Windows Firewall

Fact Sheets

12.10.3 Firewall Facts
12.10.6 Network Appliance Facts

Number of Exam Questions

9 questions

Total Time

About 45 minutes

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12.11: Proxy Servers

Lecture Focus Questions:

- What is the function of a proxy server and how can it be used to control Internet traffic?
- What other functions can a proxy server perform?
- What should you do if Internet Explorer doesn't automatically detect a proxy server?

After finishing this section, you should be able to complete the following tasks:

- Configure Internet Explorer to use a proxy server.

Video/Demo	Time
12.11.1 Configuring Proxy Settings	5:38
12.11.2 Configuring Proxy Settings	5:11
Total Video Time	**10:49**

Lab/Activity

12.11.4 Use a Proxy Server

Fact Sheets

12.11.3 Proxy Server Facts

Number of Exam Questions

8 questions

Total Time

About 29 minutes

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12.12: VPN

Lecture Focus Questions:

- How does a remote access VPN differ from a host-to-host VPN?
- With a site-to-site VPN, which devices are configured as the VPN tunnel endpoints?
- What does PPTP use for encryption? What does L2TP use?
- What is the difference between AH and ESP used with IPsec?
- Why would you want to use SSL VPNs when creating VPNs?

After finishing this section, you should be able to complete the following tasks:

- Configure a VPN connection on a desktop system.
- Configure a VPN connection on a mobile device.

Video/Demo	Time
12.12.1 Virtual Private Networks (VPN)	9:01
12.12.2 Configuring a VPN Connection	6:44
Total Video Time	**15:45**

Lab/Activity

12.12.4 Configure a VPN Connection

Fact Sheets

12.12.3 VPN Facts

Number of Exam Questions

8 questions

Total Time

About 34 minutes

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12.13: Security Troubleshooting

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?

After finishing this section, you should be able to complete the following tasks:

- Employ preventative measures to reduce security incidents.
- Identify security issues associated with email hijacking, pharming, 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.

Video/Demo	Time
12.13.1 Common Security Issues	15:32
Total Video Time	**15:32**

Fact Sheets

- 12.13.2 Network Security Threat Facts
- 12.13.3 Security Troubleshooting Facts

Number of Exam Questions

14 questions

Total Time

About 40 minutes

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13.0: Capstone Exercises

Lab/Activity

- 13.1 Build a Computer From Scratch
- 13.2 Troubleshoot a Malfunctioning Computer
- 13.3 Troubleshoot System Startup
- 13.4 Create a Home Office Network
- 13.5 Configure the Windows Operating System
- 13.6 Troubleshoot a Mobile Device
- 13.7 Configure Linux
- 13.8 Lab Sandbox

Total Time

About 40 minutes

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Practice Exams

A.0: PC Pro Certification Practice Exams

PC Pro Domain 1: Basic Hardware Components (15 questions)
PC Pro Domain 2: Video (4 questions)
PC Pro Domain 3: Audio (2 questions)
PC Pro Domain 4: External Devices (6 questions)
PC Pro Domain 5: Storage (9 questions)
PC Pro Domain 6: Networking (14 questions)
PC Pro Domain 7: Printing (5 questions)
PC Pro Domain 8: Mobile Devices (2 questions)
PC Pro Domain 9: System Management (9 questions)
PC Pro Domain 10: Security (11 questions)
PC Pro Certification Practice Exam (18 questions)

B.0: CompTIA 220-901 Practice Exams

Domain 1: Hardware, All Questions (268 questions)
Domain 2: Networking, All Questions (158 questions)
Domain 3: Mobile Devices, All Questions (27 questions)
Domain 4: Hardware and Network Troubleshooting, All Questions (159 questions)
CompTIA 220-901 Certification Practice Exam (90 questions)

C.0: CompTIA 220-902 Practice Exams

Domain 1: Windows Operating Systems, All Questions (235 questions)
Domain 2: Other Operating Systems and Technologies, All Questions (46 questions)
Domain 3: Security, All Questions (134 questions)
Domain 4: Software Troubleshooting, All Questions (32 questions)
Domain 5: Operational Procedures, All Questions (63 questions)
CompTIA 220-902 Certification Practice Exam (90 questions)

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Appendix A: PC Pro Certification Exam Objectives

The PC Pro course covers the following PC Pro objectives:

#	Exam Objective	Module.Section
1.0	Basic Hardware Components • Identify power supply connectors, motherboard characteristics, CPU features, memory module attributes, and expansion bus types. • Given scenarios with system specifications and end-user requirements, select and install appropriate power supplies, motherboards, CPUs, memory modules, and expansion cards. • View BIOS/UEFI settings for basic hardware components. • Configure the settings of basic hardware components. • Troubleshoot basic hardware components and resolve issues.	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8 3.10, 3.11
2.0	Video • Identify video adapter components, features, connectors, and cables. • Given a scenario with system specifications and end-user requirements, select and install the appropriate video adapters. • Identify display device types. • Given a scenario with system specifications and end-user requirements, select and install appropriate display devices. • Configure display and video adapter settings.	3.12 4.4, 4.5
3.0	Audio • Identify sound card components, features, connectors, and cables. • Given a scenario with system specifications and end-user requirements, select and install the appropriate sound cards. • Identify audio device types. • Given a scenario with system specifications and end-user requirements, select and install appropriate audio devices. • Manage sound card and audio device settings.	3.13
4.0	External Devices • Identify external device component, features, connectors and cables. • Connect external devices using the appropriate connectors and cables. • Manage device driver updates, roll back drivers, and enable or disable devices. • Install drivers for external devices. • Prepare devices for safe removal.	4.1, 4.2, 4.3 4.6, 4.7

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5.0	Storage • Identify storage device components, features, connectors, and cables. • Given scenarios with specifications and end-user requirements, select and install appropriate storage solutions. • Configure BIOS/UEFI settings for hard disks. • Configure common RAID arrays. • Install and configure a new storage device with volumes, partitions, a drive letter, and format it with an appropriate file system. • Add space to an existing volume. • Manage the file system type on an existing drive by converting a file system type or reformatting a partition. • Schedule and run Disk Cleanup and Disk Defragmentation in Windows.	5.1, 5.2, 5.3, 5.4 5.5, 5.6, 5.7, 5.8
6.0	Networking • Identify Ethernet wired and wireless network adapter components, features, and connectors. • Identify Ethernet wired network cable features and connectors. • Identify Ethernet wireless access point components, features, connectors, and cables. • Identify common network connectivity devices and their roles. • Understand the function of different network devices. • Given a scenario with specifications and networking requirements, select and install the necessary Ethernet adapters, access points, or cables. • Given basic IPv4/IPv6 configuration settings or a network diagram, configure a wired or wireless network connection. • Use appropriate networking utilities to view, test, and troubleshoot basic network configuration, communication, and connectivity problems.	6.1, 6.2, 6.3, 6.4 6.5, 6.6, 6.8, 6.9 6.10, 6.11, 6.12
7.0	Printing • Identify printer types and connectors. • Given a scenario with system specifications and end-user requirements, select and install the appropriate printer. • Use Windows utilities to configure a local printer, set the default printer, manage print jobs, start and stop the print spooler, and print a test page. • Connect and configure a network printer.	7.1, 7.2, 7.3, 7.4 7.6
8.0	Mobile Devices • Identify notebook computer types, features, and special keys. • Install and configure basic hardware components on notebook computers. • Maintain notebook computers and troubleshoot common issues. • Identify and configure mobile device features and accessories.	8.1, 8.2, 8.3 8.5, 8.6, 8.7, 8.8

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	• Configure mobile device connection, data synchronization, email, and security settings. • Maintain mobile devices and troubleshoot common issues.	
9.0	System Management • Use Windows Backup to configure a full system or file backup schedule. • Enable system restore and configure a restore point. • Configure Windows Update settings. • Configure local users and groups for a Windows system. • Configure User Access Control (UAC) settings in Windows. • Troubleshoot common Windows operating system and software issues.	9.2, 9.4, 9.5 9.9, 9.10, 9.14
10.0	Security • Configure BIOS/UEFI security settings. • 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. • Encrypt files and folders.	12.1, 12.3, 12.5 12.7, 12.8, 12.10

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Appendix B: CompTIA A+ 220-901 Exam Objectives

A+ (2015 Edition) Exam: 220-901

Before taking the certification exam, you should be proficient in the tasks listed below:

#	Exam Objective	Module.Section
1.0	**Hardware**	

1.1	Given a scenario, configure settings and use BIOS/UEFI tools on a PC.
	• Firmware upgrades - flash BIOS
	• BIOS component information
	  ○ RAM
	  ○ Hard drive
	  ○ Optical drive
	  ○ CPU
	• BIOS configurations
	  ○ Boot sequence
	  ○ Enabling and disabling devices
	  ○ Date/time
	  ○ Clock speeds
	  ○ Virtualization support
	  ○ BIOS security (passwords, drive encryption: TPM, lo-jack)
	• Built-in diagnostics
	• Monitoring
	• Temperature monitoring
	• Fan speeds
	• Intrusion detection/notification
	• Voltage
	• Clock
	• Bus speed
		3.7, 3.10

1.2	Explain the importance of motherboard components, their purpose, and properties.
	• Sizes
	  ○ ATX
	  ○ Micro-ATX
	  ○ Mini-ITX
	  ○ ITX
	• Expansion slots
	  ○ PCI
	  ○ PCI-X
	  ○ PCIe
	  ○ miniPCI
	• RAM slots
		3.3, 3.8, 3.11

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	• CPU sockets
	• Chipsets
	  ○ North Bridge
	  ○ South Bridge
	• CMOS battery
	• Power connections and types
	• Fan connectors
	• Front/Top panel connectors
	  ○ USB
	  ○ Audio
	  ○ Power button
	  ○ Power light
	  ○ Drive activity lights
	  ○ Reset button
	• Bus speeds	

1.3	Compare and contrast various RAM types and their features.
	
	• Types
	  ○ DDR
	  ○ DDR2
	  ○ DDR3
	  ○ SODIMM
	  ○ DIMM
	  ○ Parity vs. non-parity
	  ○ ECC vs. non-ECC
	  ○ Single sided vs. double sided
	  ○ Buffered vs. unbuffered
	• RAM configurations
	  ○ Single channel vs. dual channel vs. triple channel
	• RAM compatibility
		3.5, 3.6

1.4	Install and configure expansion cards. • Sound cards • Video cards • Network cards • USB cards • FireWire cards • Thunderbolt cards • Storage cards • Modem cards • Wireless/cellular cards • TV tuner cards • Video capture cards • Riser cards	3.9, 3.10, 3.11 4.2, 4.3 5.7 6.2, 6.8

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1.5	Install and configure storage devices and use appropriate media.
	
	• Optical drives
	  ○ CD-ROM / CD-RW
	  ○ DVD-ROM / DVD-RW / DVD-RW DL
	  ○ Blu-Ray
	  ○ BD-R
	  ○ BD-RE
	• Magnetic hard disk drives
	  ○ 5400 rpm
	  ○ 7200 rpm
	  ○ 10,000 rpm
	• Hot swappable drives
	• Solid state/flash drives
	  ○ Compact flash
	  ○ SD
	  ○ Micro-SD
	  ○ Mini-SD
	  ○ xD
	  ○ SSD
	  ○ Hybrid
	  ○ eMMC
	• RAID types
	  ○ 0
	  ○ 1
	  ○ 5
	  ○ 10
	• Tape drive
	• Media capacity
	  ○ CD
	  ○ CD-RW
	  ○ DVD-RW
	  ○ DVD
	  ○ Blu-Ray
	  ○ Tape
	  ○ DVD DL
		4.6
		5.1, 5.3, 5.4, 5.9

1.6	Install various types of CPUs and apply the appropriate cooling methods.
	
	• Socket types
	  ○ Intel: 775, 1155, 1156, 1366, 1150, 2011
	  ○ AMD: AM3, AM3+, FM1, FM2, FM2+
	• Characteristics
	  ○ Speeds
	  ○ Cores
	  ○ Cache size/type
	  ○ Hyperthreading
	  ○ Virtualization support
	  ○ Architecture (32-bit vs. 64-bit)
	  ○ Integrated GPU
		3.5, 3.14

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	○ Disable execute bit • Cooling ○ Heat sink ○ Fans ○ Thermal paste ○ Liquid-based ○ Fanless/passive	
1.7	Compare and contrast various PC connection interfaces, their characteristics and purpose. • USB 1.1 vs. 2.0 vs. 3.0 ○ Connector types: A, B, mini, micro • FireWire 400 vs. FireWire 800 • SATA1 vs. SATA2 vs. SATA3, eSATA • Other connector types ○ VGA ○ HDMI ○ DVI ○ Audio ▪ Analog ▪ Digital (Optical connector) ○ RJ-45 ○ RJ-11 ○ Thunderbolt • Wireless connections ○ Bluetooth ○ IR ○ RF ○ NFC • Characteristics ○ Analog ○ Digital ○ Distance limitations ○ Data transfer speeds ○ Quality ○ Frequencies	1.3 4.2, 4.3 5.2 6.9, 6.10
1.8	Install a power supply based on given specifications. • Connector types and their voltages ○ SATA ○ Molex ○ 4/8-pin 12v ○ PCIe 6/8-pin ○ 20-pin ○ 24-pin • Specifications ○ Wattage ○ Dual rail	3.2, 3.3

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	○ Size ○ Number of connectors ○ ATX ○ Micro-ATX ○ Dual voltage options	
1.9	Given a scenario, select the appropriate components for a custom PC configuration, to meet customer specifications or needs. • Graphic / CAD / CAM design workstation ○ Multicore processor ○ High-end video ○ Maximum RAM • Audio/Video editing workstation ○ Specialized audio and video card ○ Large fast hard drive ○ Dual monitors • Virtualization workstation ○ Maximum RAM and CPU cores • Gaming PC ○ Multicore processor ○ High-end video/specialized GPU ○ High definition sound card ○ Better sound card ○ High-end cooling • Home Theater PC ○ Surround sound audio ○ HDMI output ○ HTPC compact form factor ○ TV tuner • Standard thick client ○ Desktop applications ○ Meets recommended requirements for selected OS • Thin client ○ Basic applications ○ Meets minimum requirements for selected OS ○ Network connectivity • Home Server PC ○ Media streaming ○ File sharing ○ Print sharing ○ Gigabit NIC ○ RAID array	10.1
1.10	Compare and contrast types of display devices and their features.	4.4

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	• Types
	  ○ LCD
	  ▪ TN vs. IPS
	  ▪ Fluorescent vs. LED backlighting
	  ○ Plasma
	  ○ Projector
	  ○ OLED
	• Refresh/frame rates
	• Resolution
	• Native resolution
	• Brightness/lumens
	• Analog vs. digital
	• Privacy/antiglare filters
	• Multiple displays
	• Aspect ratios
	  ○ 16:9
	  ○ 16:10
	  ○ 4:3	

1.11	Identify common PC connector types and associated cables.
	
	• Display connector types
	  ○ DVI-D
	  ○ DVI-I
	  ○ DVI-A
	  ○ Displayport
	  ○ RCA
	  ○ HD15 (i.e. DE15 or DB-15)
	  ○ BNC
	  ○ miniHDMI
	  ○ miniDin-6
	• Display cable types
	  ○ HDMI
	  ○ DVI
	  ○ VGA
	  ○ Component
	  ○ Composite
	  ○ Coaxial
	• Device cables and connectors
	  ○ SATA
	  ○ eSATA
	  ○ USB
	  ○ FireWire (IEEE1394)
	  ○ PS/2
	  ○ Audio
	• Adapters and convertors
	  ○ DVI to HDMI
	  ○ USB A to USB B
	  ○ USB to Ethernet
	  ○ DVI to VGA
		1.3
		3.9, 3.12
		4.2, 4.3
		5.2

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	○ Thunderbolt to DVI ○ PS/2 to USB ○ HDMI to VGA	
1.12	Install and configure common peripheral devices. • Input devices ○ Mouse ○ Keyboard ○ Scanner ○ Barcode reader ○ Biometric devices ○ Game pads ○ Joysticks ○ Digitizer ○ Motion sensor ○ Touch pads ○ Smart card readers ○ Digital cameras ○ Microphone ○ Webcam ○ Camcorder • Output devices ○ Printers ○ Speakers ○ Display devices • Input & Output devices ○ Touch screen ○ KVM ○ Smart TV ○ Set-Top Box ○ MIDI enabled devices	1.3 3.9, 3.10 4.1 7.2 12.7, 12.8
1.13	Install SOHO multifunction device / printers and configure appropriate settings. • Use appropriate drivers for a given operating system ○ Configuration settings ▪ Duplex ▪ Collate ▪ Orientation ▪ Quality • Device sharing ○ Wired ▪ USB ▪ Serial ▪ Ethernet ○ Wireless ▪ Bluetooth ▪ 802.11(a,b,g,n,ac)	7.2, 7.3, 7.4

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	▪ Infrastructure vs. adhoc • Integrated print server (hardware) • Cloud printing/remote printing • Public/shared devices ○ Sharing local/networked device via Operating System settings ▪ TCP/Bonjour/AirPrint • Data privacy ○ User authentication on the device ○ Hard drive caching	
1.14	Compare and contrast differences between the various print technologies and the associated imaging process. • Laser ○ Imaging drum, fuser assembly, transfer belt, transfer roller, pickup rollers, separate pads, duplexing assembly ○ Imaging process: processing, charging, exposing, developing, transferring, fusing and cleaning • Inkjet ○ Ink cartridge, print head, roller, feeder, duplexing assembly, carriage and belt ○ Calibration • Thermal ○ Feed assembly, heating element ○ Special thermal paper • Impact ○ Print head, ribbon, tractor feed ○ Impact paper • Virtual ○ Print to file ○ Print to PDF ○ Print to XPS ○ Print to image	7.1, 7.2
1.15	Given a scenario, perform appropriate printer maintenance. • Laser ○ Replacing toner, applying maintenance kit, calibration, cleaning • Thermal ○ Replace paper, clean heating element, remove debris • Impact ○ Replace ribbon, replace print head, replace paper • Inkjet	7.5

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	○ Clean heads, replace cartridges, calibration, clear jams	
2.0	**Networking**	
2.1	Identify the various types of network cables and connectors. • Fiber ○ Connectors: SC, ST and LC • Twisted Pair ○ Connectors: RJ-11, RJ-45 ○ Wiring standards: T568A, T568B • Coaxial ○ Connectors: BNC, F-connector	6.3
2.2	Compare and contrast the characteristics of connectors and cabling. • Fiber ○ Types (single-mode vs. multi-mode) ○ Speed and transmission limitations • Twisted pair ○ Types: STP, UTP, CAT3, CAT5, CAT5e, CAT6, CAT6e, CAT7, plenum, PVC ○ Speed and transmission limitations ○ Splitters and effects on signal quality • Coaxial ○ Types: RG-6, RG-59 ○ Speed and transmission limitations ○ Splitters and effects on signal quality	6.3, 6.4
2.3	Explain properties and characteristics of TCP/IP. • IPv4 vs. IPv6 • Public vs. private vs. APIPA/link local • Static vs. dynamic • Client-side DNS settings • Client-side DHCP • Subnet mask vs. CIDR • Gateway	6.6, 6.7
2.4	Explain common TCP and UDP ports, protocols, and their purpose. • Ports ○ 21–FTP	6.8

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	○ 22–SSH ○ 23–TELNET ○ 25–SMTP ○ 53–DNS ○ 80–HTTP ○ 110–POP3 ○ 143–IMAP ○ 443–HTTPS ○ 3389–RDP ○ 137–139–NetBIOS/NetBT ○ 445–SMB/CIFS ○ 427–SLP ○ 548–AFP • Protocols ○ DHCP ○ DNS ○ LDAP ○ SNMP ○ SMB ○ CIFS ○ SSH ○ AFP • TCP vs. UDP	
2.5	Compare and contrast various WiFi networking standards and encryption types. • Standards ○ 802.11 a/b/g/n/ac ○ Speeds, distances, and frequencies • Encryption types ○ WEP, WPA, WPA2, TKIP, AES	6.8, 6.9
2.6	Given a scenario, install and configure SOHO wireless/wired router and apply appropriate settings. • Channels • Port forwarding, port triggering • SSID broadcast (on/off) • DHCP (on/off) • DMZ • NAT / DNAT • Basic QoS • Firmware • UPnP	6.11
2.7	Compare and contrast Internet connection types, network types, and their features.	6.1, 6.10

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	• Internet Connection Types
	  ○ Cable
	  ○ DSL
	  ○ Dial-up
	  ○ Fiber
	  ○ Satellite
	  ○ ISDN
	  ○ Cellular
	  ▪ Tethering
	  ▪ Mobile hotspot
	  ○ Line of sight wireless internet service
	• Network Types
	  ○ LAN
	  ○ WAN
	  ○ PAN
	  ○ MAN	

2.8	Compare and contrast network architecture devices, their functions, and features. • Hub • Switch • Router • Access point • Bridge • Modem • Firewall • Patch panel • Repeaters/extenders • Ethernet over Power • Power over Ethernet injector	6.1
2.9	Given a scenario, use appropriate networking tools. • Crimper • Cable stripper • Multimeter • Tone generator & probe • Cable tester • Loopback plug • Punchdown tool • WiFi analyzer	2.3 6.14
3.0	**Mobile Devices**	
3.1	Install and configure laptop hardware and components.	8.1, 8.2

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	• Expansion options
	  ○ Express card /34
	  ○ Express card /54
	  ○ SODIMM
	  ○ Flash
	  ○ Ports/Adapters
	  ▪ Thunderbolt
	  ▪ DisplayPort
	  ▪ USB to RJ-45 dongle
	  ▪ USB to WiFi dongle
	  ▪ USB to Bluetooth
	  ▪ USB Optical Drive
	• Hardware/device replacement
	  ○ Keyboard
	  ○ Hard Drive
	  ▪ SSD vs. Hybrid vs. Magnetic disk
	  ▪ 1.8 in vs. 2.5 in
	  ○ Memory
	  ○ Smart card reader
	  ○ Optical drive
	  ○ Wireless card
	  ○ Mini-PCIe
	  ○ Screen
	  ○ DC jack
	  ○ Battery
	  ○ Touchpad
	  ○ Plastics/frames
	  ○ Speaker
	  ○ System board
	  ○ CPU	

3.2	Explain the function of components within the display of a laptop.
	• Types
	  ○ LCD
	  ▪ TN vs. IPS
	  ▪ Fluorescent vs. LED backlighting
	  ○ OLED
	• Wi-Fi antenna connector/placement
	• Webcam
	• Microphone
	• Inverter
	• Digitizer
		8.2

3.3	Given a scenario, use appropriate laptop features.	8.1

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	• Special function keys
	  ○ Dual displays
	  ○ Wireless (on/off)
	  ○ Cellular (on/off)
	  ○ Volume settings
	  ○ Screen brightness
	  ○ Bluetooth (on/off)
	  ○ Keyboard backlight
	  ○ Touch pad (on/off)
	  ○ Screen orientation
	  ○ Media options (fast forward/rewind)
	  ○ GPS (on/off)
	  ○ Airplane mode
	• Docking station
	• Physical laptop lock and cable lock
	• Rotating / removable screens	

3.4	Explain the characteristics of various types of other mobile devices.
	
	• Tablets
	• Smart phones
	• Wearable technology devices
	  ○ Smart watches
	  ○ Fitness monitors
	  ○ Glasses and headsets
	• Phablets
	• e-Readers
	• Smart camera
	• GPS
		8.5

3.5	Compare and contrast accessories & ports of other mobile devices.
	
	• Connection types
	  ○ NFC
	  ○ Proprietary vendor specific ports (communication/power)
	  ○ microUSB/miniUSB
	  ○ Lightning
	  ○ Bluetooth
	  ○ IR
	  ○ Hotspot / tethering
	• Accessories
	  ○ Headsets
	  ○ Speakers
	  ○ Game pads
	  ○ Docking stations
	  ○ Extra battery packs/battery chargers
		8.5, 8.6

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	○ Protective covers / water proofing ○ Credit card readers ○ Memory/MicroSD	
4.0	**Hardware and Network Troubleshooting**	
4.1	Given a scenario, troubleshoot common problems related to motherboards, RAM, CPU and power with appropriate tools. • Common symptoms ○ Unexpected shutdowns ○ System lockups ○ POST code beeps ○ Blank screen on bootup ○ BIOS time and settings resets ○ Attempts to boot to incorrect device ○ Continuous reboots ○ No power ○ Overheating ○ Loud noise ○ Intermittent device failure ○ Fans spin - no power to other devices ○ Indicator lights ○ Smoke ○ Burning smell ○ Proprietary crash screens (BSOD/pin wheel) ○ Distended capacitors • Tools ○ Multimeter ○ Power supply tester ○ Loopback plugs ○ POST card / USB	3.4
4.2	Given a scenario, troubleshoot hard drives and RAID arrays with appropriate tools. • Common symptoms ○ Read/write failure ○ Slow performance ○ Loud clicking noise ○ Failure to boot ○ Drive not recognized ○ OS not found ○ RAID not found ○ RAID stops working ○ Proprietary crash screens (BSOD/pin wheel) ○ S.M.A.R.T. errors • Tools ○ Screwdriver	5.6, 5.9, 5.10

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	○ External enclosures ○ CHKDSK ○ FORMAT ○ File recovery software ○ Bootrec ○ Diskpart ○ Defragmentation tool	
4.3	Given a scenario, troubleshoot common video, projector and display issues. • Common symptoms ○ VGA mode ○ No image on screen ○ Overheat shutdown ○ Dead pixels ○ Artifacts ○ Color patterns incorrect ○ Dim image ○ Flickering image ○ Distorted image ○ Distorted geometry ○ Burn-in ○ Oversized images and icons	4.5
4.4	Given a scenario, troubleshoot wired and wireless networks with appropriate tools. • Common symptoms ○ No connectivity ○ APIPA / link local address ○ Limited connectivity ○ Local connectivity ○ Intermittent connectivity ○ IP conflict ○ Slow transfer speeds ○ Low RF signal ○ SSID not found • Hardware tools ○ Cable tester ○ Loopback plug ○ Punch down tools ○ Tone generator and probe ○ Wire strippers ○ Crimper ○ Wireless locator • Command line tools ○ PING ○ IPCONFIG/IFCONFIG ○ TRACERT ○ NETSTAT	6.12, 6.14

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	○ NBTSTAT ○ NET ○ NETDOM ○ NSLOOKUP	
4.5	Given a scenario, troubleshoot and repair common mobile device issues while adhering to the appropriate procedures. • Common symptoms ○ No display ○ Dim display ○ Flickering display ○ Sticking keys ○ Intermittent wireless ○ Battery not charging ○ Ghost cursor/pointer drift ○ No power ○ Num lock indicator lights ○ No wireless connectivity ○ No Bluetooth connectivity ○ Cannot display to external monitor ○ Touchscreen non-responsive ○ Apps not loading ○ Slow performance ○ Unable to decrypt email ○ Extremely short battery life ○ Overheating ○ Frozen system ○ No sound from speakers ○ GPS not functioning ○ Swollen battery • Disassembling processes for proper re-assembly ○ Document and label cable and screw locations ○ Organize parts ○ Refer to manufacturer documentation ○ Use appropriate hand tools	8.2, 8.4, 8.8
4.6	Given a scenario, troubleshoot printers with appropriate tools. • Common symptoms ○ Streaks ○ Faded prints ○ Ghost images ○ Toner not fused to the paper ○ Creased paper ○ Paper not feeding ○ Paper jam ○ No connectivity ○ Garbled characters on paper	7.5, 7.6

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	○ Vertical lines on page ○ Backed up print queue ○ Low memory errors ○ Access denied ○ Printer will not print ○ Color prints in wrong print color ○ Unable to install printer ○ Error codes ○ Printing blank pages ○ No image on printer display • Tools ○ Maintenance kit ○ Toner vacuum ○ Compressed air ○ Printer spooler	

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Appendix C: CompTIA A+ 220-902 Exam Objectives

A+ (2015 Edition) Exam: 220-902

Before taking the certification exam, you should be proficient in the tasks listed below:

#	Exam Objective	Module.Section
1.0	**Windows Operating Systems**	

1.1	Compare and contrast various features and requirements of Microsoft Operating Systems (Windows Vista, Windows 7, Windows 8, Windows 8.1).
	• Features:
	  ○ 32-bit vs. 64-bit
	  ○ Aero, gadgets, user account control, bit-locker, shadow copy, system restore, ready boost, sidebar, compatibility mode, virtual XP mode, easy transfer, administrative tools, defender, Windows firewall, security center, event viewer, file structure and paths, category view vs. classic view
	  ○ Side by side apps, Metro UI, Pinning, One Drive, Windows store, Multimonitor task bars, Charms, Start Screen, Power Shell, Live sign in, Action Center.
	• Upgrade paths - differences between in place upgrades, compatibility tools, Windows upgrade OS advisor
		1.4
		10.2

1.2	Given a scenario, install Windows PC operating systems using appropriate methods.
	• Boot methods
	  ○ USB
	  ○ CD-ROM
	  ○ DVD
	  ○ PXE
	  ○ Solid state/flash drives
	  ○ Netboot
	  ○ External/hot swappable drive
	  ○ Internal hard drive (partition)
	• Type of installations
	  ○ Unattended installation
	  ○ Upgrade
	  ○ Clean install
	  ○ Repair installation
	  ○ Multiboot
		5.5, 5.6
		10.3

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	○ Remote network installation ○ Image deployment ○ Recovery partition ○ Refresh/restore • Partitioning ○ Dynamic ○ Basic ○ Primary ○ Extended ○ Logical ○ GPT • File system types/formatting ○ ExFAT ○ FAT32 ○ NTFS ○ CDFS ○ NFS ○ ext3, ext4 ○ Quick format vs. full format • Load alternate third party drivers when necessary • Workgroup vs. Domain setup • Time/date/region/language settings • Driver installation, software and Windows updates • Factory recovery partition • Properly formatted boot drive with the correct partitions/format	
1.3	Given a scenario, apply appropriate Microsoft command line tools. • TASKKILL • TASKLIST • SHUTDOWN • MSTSC • DIR • EXIT • HELP • EXPAND • [command name] /? • Commands available with standard privileges vs. administrative privileges. • BOOTREC • MD • RD • CD • DEL • COPY • XCOPY • ROBOCOPY • DISKPART • SFC	3.7 5.4, 5.5, 5.6, 5.10 9.1 11.2 13.6

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	• FORMAT • CHKDSK • [command name] /? • GPUPDATE • GPRESULT	

1.4	Given a scenario, use appropriate Microsoft operating system features and tools.
	
	• Administrative
	  ○ Computer management
	  ○ Device manager
	  ○ Local users and groups
	  ○ Local security policy
	  ○ Performance monitor
	  ○ Services
	  ○ System configuration
	  ○ Task scheduler
	  ○ Component services
	  ○ Data sources
	  ○ Print management
	  ○ Windows memory diagnostics
	  ○ Windows firewall
	  ○ Advanced security
	• MSCONFIG
	  ○ General
	  ○ Boot
	  ○ Services
	  ○ Startup
	  ○ Tools
	• Task Manager
	  ○ Applications
	  ○ Processes
	  ○ Performance
	  ○ Networking
	  ○ Users
	• Disk management
	  ○ Drive status
	  ○ Mounting
	  ○ Initializing
	  ○ Extending partitions
	  ○ Splitting partitions
	  ○ Shrink partitions
	  ○ Assigning/changing drive letters
	  ○ Adding drives
	  ○ Adding arrays
	  ○ Storage spaces
	• Other
	  ○ User State Migration tool (USMT)
	  ○ Windows Easy Transfer
	  ○ Windows Upgrade Advisor
	• System utilities
		3.12
		4.6, 4.7
		5.6, 5.7, 5.8, 5.9
		7.4
		9.1, 9.3, 9.4, 9.6, 9.7, 9.10
		10.4
		11.1
		12.8, 12.11

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	○ REGEDIT ○ COMMAND ○ SERVICES.MSC ○ MMC ○ MSTSC ○ NOTEPAD ○ EXPLORER ○ MSINFO32 ○ DXDIAG ○ DEFRAG ○ System restore ○ Windows Update	
1.5	Given a scenario, use Windows Control Panel utilities. • Internet options ○ Connections ○ Security ○ General ○ Privacy ○ Programs ○ Advanced • Display/Display Settings ○ Resolution ○ Color depth ○ Refresh rate • User accounts • Folder options ○ View hidden files ○ Hide extensions ○ General options ○ View options • System ○ Performance (virtual memory) ○ Remote settings ○ System protection • Windows firewall • Power options ○ Hibernate ○ Power plans ○ Sleep/suspend ○ Standby • Programs and features • HomeGroup • Devices and Printers • Sound • Troubleshooting • Network and Sharing Center • Device Manager	3.10 4.4, 4.6 6.6, 6.10, 6.14 7.2 8.3 9.1, 9.5, 9.6, 9.10, 9.11 11.2 12.11 13.5

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1.6	Given a scenario, install and configure Windows networking on a client/desktop.
	
	• HomeGroup vs. WorkGroup
	• Domain setup
	• Network shares/administrative shares/mapping drives
	• Printer sharing vs. network printer mapping
	• Establish networking connections
	  ○ VPN
	  ○ Dialups
	  ○ Wireless
	  ○ Wired
	  ○ WWAN (Cellular)
	• Proxy settings
	• Remote Desktop Connection
	• Remote Assistance
	• Home vs. Work vs. Public network settings
	• Firewall settings
	  ○ Exceptions
	  ○ Configuration
	  ○ Enabling/disabling Windows firewall
	• Configuring an alternative IP address in Windows
	  ○ IP addressing
	  ○ Subnet mask
	  ○ DNS
	  ○ Gateway
	• Network card properties
	  ○ Half duplex/full duplex/auto
	  ○ Speed
	  ○ Wake-on-LAN
	  ○ QoS
	  ○ BIOS (on-board NIC)
		6.1, 6.2, 6.4, 6.6, 6.9, 6.11
		7.3
		9.5
		11.4
		12.10, 12.11, 12.13

1.7	Perform common preventive maintenance procedures using the appropriate Windows OS tools.
	
	• Best practices
	  ○ Schedules backups
	  ○ Scheduled disk maintenance
	  ○ Windows updates
	  ○ Patch management
	  ○ Driver/firmware updates
	  ○ Antivirus/Antimalware updates
	• Tools
	  ○ Backup
	  ○ System restore
	  ○ Recovery image
	  ○ Disk maintenance utilities
		5.8
		9.7, 9.8, 9.9, 9.10
		12.7

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2.0	Other Operating Systems and Technologies	

2.1	Identify common features and functionality of the Mac OS and Linux operating systems.
	
	• Scheduled backups
	• Scheduled disk maintenance
	• System updates/App store
	• Patch management
	• Driver/firmware updates
	• Antivirus/ Antimalware updates
	• Backup/Time Machine
	• Restore/snapshot
	• Image recovery
	• Disk maintenance utilities
	• Shell/Terminal
	• Screen sharing
	• Force Quit
	• Features
	  ○ Multiple desktops/Mission Control
	  ○ Key Chain
	  ○ Spot Light
	  ○ iCloud
	  ○ Gestures
	  ○ Finder
	  ○ Remote Disc
	  ○ Dock
	  ○ Boot Camp
	• Basic Linux commands
	  ○ ls
	  ○ grep
	  ○ cd
	  ○ shutdown
	  ○ pwd vs. passwd
	  ○ mv
	  ○ cp
	  ○ rm
	  ○ chmod
	  ○ chown
	  ○ iwconfig/ifconfig
	  ○ ps
	  ○ su/sudo
	  ○ apt-get
	  ○ vi
	  ○ dd
		1.5, 1.6
		4.6
		5.9
		9.5, 9.7, 9.9, 9.10, 9.11, 9.12
		11.5
		12.6, 12.7

2.2	Given a scenario, set up and use client-side virtualization.
	
	• Purpose of virtual machines
	  ○ Resource requirements
	  ○ Emulator requirements
		10.5

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	○ Security requirements ○ Network requirements ○ Hypervisor	
2.3	Identify basic cloud concepts. • SaaS • IaaS • Paas • Public vs. Private vs. Hybrid vs. Community • Rapid Elasticity • On-demand • Resource pooling • Measured service	10.5
2.4	Summarize the properties and purpose of services provided by networked hosts. • Server roles ○ Web server ○ File server ○ Print server ○ DHCP server ○ DNS server ○ Proxy server ○ Mail server ○ Authentication server • Internet appliance ○ UTM ○ IDS ○ IPS • Legacy / embedded systems	4.6 6.11 12.10
2.5	Identify basic features of mobile operating systems. • Android vs. iOS vs. Windows ○ Open source vs. closed source/vendor specific ○ App source (play store, app store and store) ○ Screen orientation (accelerometer/gyroscope) ○ Screen calibration ○ GPS and geotracking ○ Wi-Fi calling ○ Launcher/GUI ○ Virtual assistant ○ SDK/APK	8.5

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	○ Emergency notification ○ Mobile payment service	
2.6	Install and configure basic mobile device network connectivity and email. • Wireless / cellular data network (enable/disable) ○ Hotspot ○ Tethering ○ Airplane mode • Corporate and ISP email configuration ○ POP3 ○ IMAP ○ Port and SSL settings ○ Exchange, S/MIME • Integrated commercial provider email configuration ○ Google/Inbox ○ Yahoo ○ Outlook.com ○ iCloud • PRI updates/PRL updates/Baseband updates • Radio firmware • IMEI vs. IMSI • VPN	8.5, 8.6
2.7	Summarize methods and data related to mobile device synchronization. • Types of data to synchronize ○ Contacts ○ Programs ○ Email ○ Pictures ○ Music ○ Videos ○ Calendar ○ Bookmarks ○ Documents ○ Location data ○ Social media data ○ eBooks • Synchronization methods ○ Synchronize to the Cloud ○ Synchronize to the Desktop ○ Mutual authentication for multiple services (SSO) ○ Software requirements to install the application on the PC	8.6

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	○ Connection types to enable synchronization	
3.0	**Mobile Devices**	
3.1	Identify common security threats and vulnerabilities. • Malware ○ Spyware ○ Viruses ○ Worms ○ Trojans ○ Rootkits ○ Ransomware • Phishing • Spear phishing • Spoofing • Social engineering • Shoulder surfing • Zero day attack • Zombie/botnet • Brute forcing • Dictionary attacks • Non-compliant systems • Violations of security best practices • Tailgating • Man-in-the-middle	12.6
3.2	Establish basic network connectivity and configure email. • Physical security ○ Lock doors ○ Mantrap ○ Cable locks ○ Securing physical documents/passwords/shredding ○ Biometrics ○ ID badges ○ Key fobs ○ RFID badge ○ Smart card ○ Tokens ○ Privacy filters ○ Entry control roster • Antivirus/Antimalware • Firewalls ○ User authentication/strong passwords ○ Multifactor authentication ○ Directory permissions ○ DLP	12.1, 12.3, 12.4, 12.6, 12.7, 12.10, 12.13

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	○ Disabling ports ○ Access control lists ○ VPN ○ Smart card ○ Email filtering ○ Trusted/untrusted software sources • User education/AUP • Principle of least privilege	
3.3	Compare and contrast differences of basic Windows OS security settings. • User and groups ○ Administrator ○ Power user ○ Guest ○ Standard user • NTFS vs. Share permissions ○ Allow vs. deny ○ Moving vs. copying folders and files ○ File attributes • Shared files and folders ○ Administrative shares vs. local shares ○ Permission propagation ○ Inheritance • System files and folders • User authentication ○ Single sign-on • Run as administrator vs. standard user • Bitlocker • Bitlocker-To-Go • EFS	9.1, 9.4 11.2, 11.3, 11.4 12.7, 12.8
3.4	Given a scenario, deploy and enforce security best practices to secure a workstation. • Password best practices ○ Setting strong passwords ○ Password expiration ○ Changing default user names/passwords ○ Screensaver required password ○ BIOS/UEFI passwords ○ Requiring passwords • Disable autorun • Data encryption • Patch/update management	9.9 12.1, 12.5, 12.7, 12.8

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3.5	Compare and contrast various methods for securing mobile devices.
	
	• Screen locks
	  ○ Fingerprint lock
	  ○ Face lock
	  ○ Swipe lock
	  ○ Passcode lock
	• Remote wipes
	• Locator applications
	• Remote backup applications
	• Failed login attempts restrictions
	• Antivirus/Antimalware
	• Patching/OS updates
	• Biometric authentication
	• Full device encryption
	• Multifactor authentication
	• Authenticator applications
	• Trusted sources vs. untrusted sources
	• Firewalls
	• Policies and procedures
	  ○ BYOD vs. corporate owned
	  ○ Profile security requirements
		8.7
		12.1

3.6	Given a scenario, use appropriate data destruction and disposal methods.
	
	• Physical destruction
	  ○ Shredder
	  ○ Drill / Hammer
	  ○ Electromagnetic (Degaussing)
	  ○ Incineration
	  ○ Certificate of destruction
	• Recycling or repurposing best practices
	  ○ Low level format vs. standard format
	  ○ Overwrite
	  ○ Drive wipe
		12.3

3.7	Given a scenario, secure SOHO wireless and wired networks.
	
	• Wireless specific
	  ○ Changing default SSID
	  ○ Setting encryption
	  ○ Disabling SSID broadcast
	  ○ Antenna and access point placement
	  ○ Radio power levels
	  ○ WPS
	• Change default user-names and passwords
		12.9

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	• Enable MAC filtering • Assign static IP addresses • Firewall settings • Port forwarding/mapping • Disabling ports • Content filtering / parental controls • Update firmware • Physical security	
4.0	**Software Troubleshooting**	

4.1	Given a scenario, troubleshoot PC operating system problems with appropriate tools.
	
	• Common symptoms
	  ○ Proprietary crash screens (BSOD/pin wheel)
	  ○ Failure to boot
	  ○ Improper shutdown
	  ○ Spontaneous shutdown/restart
	  ○ Device fails to start/detected
	  ○ Missing dll message
	  ○ Services fails to start
	  ○ Compatibility error
	  ○ Slow system performance
	  ○ Boots to safe mode
	  ○ File fails to open
	  ○ Missing NTLDR
	  ○ Missing Boot Configuration Data
	  ○ Missing operating system
	  ○ Missing Graphical Interface
	  ○ Missing GRUB/LILO
	  ○ Kernel panic
	  ○ Graphical Interface fails to load
	  ○ Multiple monitor misalignment/orientation
	• Tools
	  ○ BIOS/UEFI
	  ○ SFC
	  ○ Logs
	  ○ System Recovery Options
	  ○ Repair disks
	  ○ Pre-installation environments
	  ○ MSCONFIG
	  ○ DEFRAG
	  ○ REGSRV32
	  ○ REGEDIT
	  ○ Event viewer
	  ○ Safe mode
	  ○ Command prompt
	  ○ Uninstall/reinstall/repair
		4.4, 4.5
		5.10
		9.13, 9.14, 9.15, 9.16

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4.2	Given a scenario, troubleshoot common PC security issues with appropriate tools and best practices.
	
	• Common symptoms
	  ○ Pop-ups
	  ○ Browser redirection
	  ○ Security alerts
	  ○ Slow performance
	  ○ Internet connectivity issues
	  ○ PC/OS lock up
	  ○ Application crash
	  ○ OS updates failures
	  ○ Rogue antivirus
	  ○ Spam
	  ○ Renamed system files
	  ○ Files disappearing
	  ○ File permission changes
	  ○ Hijacked email
	  ○
	  ▪ Responses from users regarding email
	  ▪ Automated replies from unknown sent email
	  ○ Access denied
	  ○ Invalid certificate (trusted root CA)
	• Tools
	  ○ Antivirus software
	  ○ Antimalware software
	  ○ Recovery console
	  ○ Terminal
	  ○ System restore/Snapshot
	  ○ Pre-installation environments
	  ○ Event viewer
	  ○ Refresh/restore
	  ○ MSCONFIG/Safe boot
	• Best practice procedure for malware removal
	  1. Identify malware symptoms
	  2. Quarantine infected system
	  3. Disable system restore (in Windows)
	  4. Remediate infected systems
	  a. Update antimalware software
	  b. Scan and removal techniques (safe mode, pre-installation environment)
	  5. Schedule scans and run updates
	  6. Enable system restore and create restore point (in Windows)
	  7. Educate end user
		12.6, 12.13

4.3	Given a scenario, troubleshoot common mobile OS and application issues with appropriate tools.	8.8

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	• Common symptoms
	  ○ Dim display
	  ○ Intermittent wireless
	  ○ No wireless connectivity
	  ○ No Bluetooth connectivity
	  ○ Cannot broadcast to external monitor
	  ○ Touchscreen non-responsive
	  ○ Apps not loading
	  ○ Slow performance
	  ○ Unable to decrypt email
	  ○ Extremely short battery life
	  ○ Overheating
	  ○ Frozen system
	  ○ No sound from speakers
	  ○ Inaccurate touch screen response
	  ○ System lockout
	• Tools
	  ○ Hard reset
	  ○ Soft reset
	  ○ Close running applications
	  ○ Reset to factory default
	  ○ Adjust configurations/settings
	  ○ Uninstall/reinstall apps
	  ○ Force stop	

4.4	Given a scenario, troubleshoot common mobile OS and application security issues with appropriate tools.
	
	• Common symptoms
	  ○ Signal drop/weak signal
	  ○ Power drain
	  ○ Slow data speeds
	  ○ Unintended Wi-Fi connection
	  ○ Unintended Bluetooth pairing
	  ○ Leaked personal files/data
	  ○ Data transmission overlimit
	  ○ Unauthorized account access
	  ○ Unauthorized root access
	  ○ Unauthorized location tracking
	  ○ Unauthorized camera/microphone activation
	  ○ High resource utilization
	• Tools
	  ○ Antimalware
	  ○ App scanner
	  ○ Factory reset/Clean install
	  ○ Uninstall/reinstall apps
	  ○ Wi-Fi analyzer
	  ○ Force stop
	  ○ Cell tower analyzer
	  ○ Backup/restore
		8.7

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	▪ iTunes/iCloud/Apple Configurator ▪ Google sync ▪ One Drive	
5.0	**Operational Procedures**	

5.1	Given a scenario, use appropriate safety procedures.
	• Equipment grounding
	• Proper component handling and storage
	  ○ Antistatic bags
	  ○ ESD straps
	  ○ ESD mats
	  ○ Self-grounding
	• Toxic waste handling
	  ○ Batteries
	  ○ Toner
	  ○ CRT
	• Personal safety
	  ○ Disconnect power before repairing PC
	  ○ Remove jewelry
	  ○ Lifting techniques
	  ○ Weight limitations
	  ○ Electrical fire safety
	  ○ Cable management
	  ○ Safety goggles
	  ○ Air filter mask
	• Compliance with local government regulations
		2.1

5.2	Given a scenario with potential environmental impacts, apply the appropriate controls.
	• MSDS documentation for handling and disposal
	• Temperature, humidity level awareness and proper ventilation
	• Power surges, brownouts, blackouts
	  ○ Battery backup
	  ○ Surge suppressor
	• Protection from airborne particles
	  ○ Enclosures
	  ○ Air filters/Mask
	• Dust and debris
	  ○ Compressed air
	  ○ Vacuums
	• Compliance to local government regulations
		2.1, 2.4

5.3	Given a scenario, troubleshoot common security issues with appropriate tools and best practices.	9.8 12.1, 12.2, 12.4

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	• Incident Response
	  ○ First response
	  ▪ Identify
	  ▪ Report through proper channels
	  ▪ Data/device preservation
	  ○ Use of documentation/documentation changes
	  ○ Chain of custody
	  ▪ Tracking of evidence/documenting process
	• Licensing / DRM / EULA
	  ○ Open source vs. commercial license
	  ○ Personal license vs. enterprise licenses
	• Personally Identifiable Information
	• Follow corporate end-user policies and security best practices	

5.4	Demonstrate proper communication techniques and professionalism.
	
	• Use proper language – avoid jargon, acronyms, slang when applicable
	• Maintain a positive attitude / Project confidence
	• Actively listen (taking notes) and avoid interrupting the customer
	• Be culturally sensitive
	  ○ Use appropriate professional titles, when applicable
	• Be on time (if late, contact the customer)
	• Avoid distractions
	  ○ Personal calls
	  ○ Texting / Social media sites
	  ○ Talking to co-workers while interacting with customers
	  ○ Personal interruptions
	• Dealing with difficult customer or situation
	  ○ Do not argue with customers and/or be defensive
	  ○ Avoid dismissing customer problems
	  ○ Avoid being judgmental
	  ○ Clarify customer statements (ask open ended questions to narrow the scope of the problem, restate the issue or question to verify understanding)
	  ○ Do not disclose experiences via social media outlets
	• Set and meet expectations/timeline and communicate status with the customer
	  ○ Offer different repair/replacement options if applicable
		2.2

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	○ Provide proper documentation on the services provided ○ Follow up with customer/user at a later date to verify satisfaction • Deal appropriately with customers confidential and private materials ○ Located on a computer, desktop, printer, etc.	
5.5	Given a scenario, explain the troubleshooting theory. • Always consider corporate policies, procedures and impacts before implementing changes. 1. Identify the problem ▪ Question the user and identify user changes to computer and perform backups before making changes 2. Establish a theory of probable cause (question the obvious) ▪ If necessary, conduct external or internal research based on symptoms 3. Test the theory to determine cause ▪ Once theory is confirmed determine next steps to resolve problem ▪ If theory is not confirmed re-establish new theory or escalate 4. Establish a plan of action to resolve the problem and implement the solution 5. Verify full system functionality and if applicable implement preventive measures 6. Document findings, actions and outcomes	2.5

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Appendix D: Approximate Time for the Course

The total time for the LabSim for TestOut PC Pro course is approximately **79 hours and 36 minutes**. Time is calculated by adding the approximate time for each section which is calculated using the following elements:

- Video/demo times
- Text Lessons (5 minutes assigned per text lesson)
- Simulations (5 minutes assigned per simulation)
- Questions (1 minute per question)

Additionally, there are approximately another **29 hours and 37 minutes** of Practice Test material at the end of the course.

The breakdown for this course is as follows:

Module	Sections	Time	Videos	Labs	Text	Exams
1.0: Computing Overview						
1.1: Course Introduction		7	7	0	0	0
1.2: Using the Simulator		43	33	10	0	0
1.3: Hardware Basics		54	20	5	15	14
1.4: Windows Basics		55	35	0	10	10
1.5: Linux Basics		44	23	10	5	6
1.6: Mac OS Basics		32	22	0	5	5
	Total	**3:55**	**2:20**	**0:25**	**0:35**	**0:35**
2.0: PC Technician						
2.1: Protection and Safety		45	20	0	15	10
2.2: Professionalism		22	5	0	5	12
2.3: PC Tools		22	6	0	5	11
2.4: PC Maintenance		51	27	5	10	9
2.5: Troubleshooting Overview		24	7	0	5	12
	Total	**2:44**	**1:05**	**0:05**	**0:40**	**0:54**
3.0: System Components						
3.1: Cases and Form Factors		18	7	0	5	6
3.2: Power Supplies		44	19	5	5	15
3.3: Motherboards and Buses		37	12	5	10	9
3.4: Motherboard Troubleshooting		33	9	10	5	9
3.5: Processors		64	24	10	20	11
3.6: Processor Troubleshooting		33	7	10	5	11
3.7: Memory		46	24	0	10	12
3.8: Memory Installation		65	34	10	10	11
3.9: Memory Troubleshooting		38	12	10	5	11
3.10: BIOS/UEFI		72	43	10	5	14
3.11: Expansion Cards		29	9	5	5	10
3.12: Video		38	12	5	10	11
3.13: Audio		57	26	5	15	11
3.14: Cooling		27	8	0	5	14
	Total	**10:01**	**4:06**	**1:25**	**1:55**	**2:35**

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Module Sections	Time	Videos	Labs	Text	Exams
4.0: Peripheral Devices					
4.1: Peripheral Devices	19	4	5	5	5
4.2: USB	33	8	10	5	10
4.3: IEEE 1394 (FireWire)	22	5	5	5	7
4.4: Display Devices	81	54	5	10	12
4.5: Video Troubleshooting	28	10	5	5	8
4.6: Device Driver Management	67	44	5	10	8
4.7: Device Driver Troubleshooting	41	15	10	5	11
Total	**4:51**	**2:20**	**0:45**	**0:45**	**1:01**
5.0: Storage					
5.1: Storage Devices	26	12	0	5	9
5.2: SATA	31	14	5	5	7
5.3: Optical Media	25	15	0	5	5
5.4: RAID	52	21	10	10	11
5.5: File Systems	59	34	0	15	10
5.6: File System Creation	55	34	10	5	6
5.7: Storage Management	40	22	5	5	8
5.8: Storage Spaces	36	21	5	5	5
5.9: Disk Optimization	57	41	5	5	6
5.10: Storage Troubleshooting	39	14	5	10	10
Total	**7:00**	**3:48**	**0:45**	**1:10**	**1:17**
6.0: Networking					
6.1: Networking Overview	52	32	0	10	10
6.2: Network Hardware	43	17	5	10	11
6.3: Networking Media	45	12	0	20	13
6.4: Ethernet	23	5	0	10	8
6.5: IP Networking	40	15	0	10	15
6.6: IP Configuration	51	25	10	5	11
6.7: IP version 6	19	6	0	5	8
6.8: 802.11 Wireless	61	26	10	10	15
6.9: Infrared, Bluetooth, and NFC	30	16	0	5	9
6.10: Internet Connectivity	50	17	15	5	13
6.11: SOHO Configuration	68	37	5	15	11
6.12: Network Utilities	70	38	20	5	7
6.13: HomeGroup Networking	21	11	0	5	5
6.14: Network Troubleshooting	77	37	10	15	15
Total	**10:50**	**4:54**	**1:15**	**2:10**	**2:31**
7.0: Printing					
7.1: Printers	54	19	5	20	10
7.2: Printer Configuration	45	30	5	5	5
7.3: Network Printing	42	27	5	5	5
7.4: Printing Management	43	23	10	5	5
7.5: Printer Maintenance	22	11	0	5	6
7.6: Printer Troubleshooting	40	25	0	5	10
Total	**4:06**	**2:15**	**0:25**	**0:45**	**0:41**

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Module Sections	Time	Videos	Labs	Text	Exams
8.0: Mobile Devices					
8.1: Notebook Computers	32	15	0	10	7
8.2: Notebook Components	54	34	0	5	15
8.3: Notebook Power Management	40	14	10	10	6
8.4: Notebook Troubleshooting	42	12	0	15	15
8.5: Mobile Devices	35	10	0	15	10
8.6: Mobile Device Networking	39	19	5	15	0
8.7: Mobile Device Security	26	16	0	5	5
8.8: Mobile Device Troubleshooting	25	15	0	5	5
Total	**4:53**	**2:15**	**0:15**	**1:20**	**1:03**
9.0: System Management					
9.1: Windows System Tools	98	78	0	10	10
9.2: Preferences and Settings	33	21	0	5	7
9.3: Performance Monitoring	31	20	0	5	6
9.4: Users and Groups	75	42	5	15	13
9.5: Remote Services	69	40	5	15	9
9.6: Windows Application Management	64	40	5	10	9
9.7: Linux Application Management	31	16	5	5	5
9.8: Digital Content Management	27	17	0	5	5
9.9: Updates	48	31	5	5	7
9.10: System Backup	69	39	10	5	15
9.11: System Protection	45	29	5	5	6
9.12: System Recovery	55	38	5	5	7
9.13: Virtual Memory	31	15	5	5	6
9.14: Operating System Troubleshooting	56	36	0	10	10
9.15: Windows Boot Errors	84	32	25	15	12
Total	**13:36**	**8:14**	**1:15**	**2:00**	**2:07**
10.0: System Implementation					
10.1: Component Selection	21	8	0	5	8
10.2: Windows Pre-installation	48	27	0	10	11
10.3: Windows Installation	50	28	5	5	12
10.4: Post Installation	43	30	0	5	8
10.5: Virtualization	59	38	5	10	6
Total	**3:41**	**2:11**	**0:10**	**0:35**	**0:45**
11.0: File Management					
11.1: Windows File Locations	39	19	0	10	10
11.2: Managing Files on Windows	92	53	10	15	14
11.3: NTFS Permissions	46	25	5	5	11
11.4: Shared Folders	67	48	5	5	9
11.5: Linux File Management	60	39	10	5	6
Total	**5:04**	**3:04**	**0:30**	**0:40**	**0:50**
12.0: Security					
12.1: Best Practices	38	15	0	10	8
12.2: Incident Response	28	17	0	5	6
12.3: Physical Security	47	28	5	5	9
12.4: Social Engineering	26	12	0	5	9

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Module Sections	Time	Videos	Labs	Text	Exams
12.5: BIOS/UEFI Security	34	17	5	5	7
12.6: Malware Protection	64	44	0	10	10
12.7: Authentication	73	40	10	10	13
12.8: File Encryption	52	28	5	10	9
12.9: Network Security	46	22	0	10	14
12.10: Firewalls	45	21	5	10	9
12.11: Proxy Servers	29	11	5	5	8
12.12: VPN	34	16	5	5	8
12.13: Security Troubleshooting	40	16	0	10	14
Total	**9:11**	**4:47**	**0:40**	**1:40**	**2:04**

Total Course Time 79:36

Practice Exams

A.0: PC Pro Certification Practice Exams	Number of Questions	Time
A.2: PC Pro Domain 1: Basic Hardware Components	15	75
A.3: PC Pro Domain 2: Video	4	20
A.4: PC Pro Domain 3: Audio	2	10
A.5: PC Pro Domain 4: External Devices	6	30
A.6: PC Pro Domain 5: Storage	9	45
A.7: PC Pro Domain 6: Networking	14	70
A.8: PC Pro Domain 7: Printing	5	25
A.9: PC Pro Domain 8: Mobile Devices	2	10
A.10: PC Pro Domain 9: System Management	9	45
A.11: PC Pro Domain 10: Security	11	55
A.12: PC Pro Certification Practice Exam	18	90
Total	**95**	**7:55**
B.0: CompTIA 220-901 Practice Exams	**Number of Questions**	**Time**
B.2: Domain 1: Hardware, All Questions	268	4:28
B.3: Domain 2: Networking, All Questions	158	2:38
B.4: Domain 3: Mobile Devices, All Questions	27	0:27
B.5: Domain 4: Hardware and Network Troubleshooting, All Questions	159	2:39
B.6: CompTIA 220-901 Certification Practice Exam	90	1:30
Total	**702**	**11:42**
C.0: CompTIA 220-902 Practice Exams	**Number of Questions**	**Time**
C.2: Domain 1: Windows Operating Systems, All Questions	235	3:55
C.3: Domain 2: Other Operating Systems and Technologies, All Questions	46	0:46
C.4: Domain 3: Security, All Questions	134	2:14
C.5: Domain 4: Software Troubleshooting, All Questions	32	0:32
C.6: Domain 5: Operational Procedures, All Questions	63	1:03
C.7: CompTIA 220-902 Certification Practice Exam	90	1:30
Total	**600**	**10:00**

Total Practice Exam Time 29:37

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