

COMPUTER TECHNOLOGY 30

Description

This course will cover the purchasing, installing, maintaining, upgrading and repairing of computer hardware and software. MS DOS, Windows 2000, Windows XP, Windows 7 and Mac OS computers will be discussed. Topics will include: Microchips, Data Storage, Input/Output Devices, Networks, Printers, Software and the internet.

Course Overview

Course Objectives

- Students should be able to:
- explain the role of computers.
 - explain what a computer is.
 - describe computer data.
 - identify the major components of a typical PC.
 - explain how the major components interact with each other.
 - identify various computer operating systems.
 - define electrical energy.
 - identify major parts of a motherboard.
 - identify the operation, function, and purpose of the CPU.
 - identify major issues concerning memory upgrades and replacement.
 - know how to modify input device properties.
 - explain how to install, configure and test video displays, audio devices, and printers.
 - explain the operation of a modem.
 - identify common virus characteristics.
 - state commonly practiced troubleshooting steps.
 - list and describe common network systems.

Essential Questions

- Why are there different operating systems used in computers today?
- What is the importance of following the manufactures' instructions when changing settings?
- Why should a technician understand the relationships of application software, operating systems, BIOS, and system hardware components?
- How do the developed skills of a technician impact the successful installation, configuration, and upgrading of computer systems?
- What are major issues concerning memory upgrade and replacement?
- What are memory map areas and functions?
- What is the importance of understanding hard drive replacement and their function?
- Why are there different disk formats?
- How are input devices used to communicate with a PC system?
- How has the computer video system changed over time?
- How has digital signal transformed both video and audio multimedia experiences?
- What is the importance of modems in communication utilizing computer systems?
- What kind of damage can viruses do to a computer system?
- What is the importance of keeping vigilant at defending a system from attack?
- How do networks communicate?
- How has the increase in data flow impacted networks?

Assessments

- Quizzes and Test on Unit material
- Lab Activities in Computer Service and Repair Curriculum

Content Outline

Standards

<p>I. Unit 1 - Introduction to a PC</p> <p>II. Unit 2 - Operating Systems</p> <p>III. Unit 3 - Motherboards , CPU's, Power Supplies</p> <p>IV. Unit 4 - Memory, Magnetic Storage Devices, and CD Technology</p> <p>V. Unit 5 - Input Devices</p> <p>VI. Unit 6 - Video Display, Audio Systems, Printers</p> <p>VII. Unit 7 - Modems and Transceivers</p> <p>VIII. Unit 8 - PC Troubleshooting</p> <p>IX. Unit 9 - Introduction to Networking</p>	<p>A+ Correlation Chart Authorized Curriculum Program</p> <ul style="list-style-type: none"> • <i>Core Hardware</i> • <i>OS Technologies</i> 	
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Pacing Guide				
1 st Marking Period		2 nd Marking Period		
Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
<u>Introduction to a PC</u>	<u>Operating Systems</u>	<u>Motherboards , CPU's, Power Supplies</u>	<u>Memory, Magnetic Storage Devices, and CD Technology</u>	<u>Input Devices</u>
2 weeks	5 weeks	5 weeks	4 weeks	2 weeks

Pacing Guide			
3 rd Marking Period		4 th Marking Period	
Unit 6	Unit 7	Unit 8	Unit 9
<u>Video Display, Audio Systems, Printers</u>	<u>Modems and Transceivers</u>	<u>PC Troubleshooting</u>	<u>Introduction to Networking</u>
3 weeks	2 weeks	5 weeks	8 weeks

Unit 1, Introduction to a PC, 2 weeks [top](#)

Standards

Core Hardware

Domain 1.0 Installation, Configuration, and Upgrading

1.1 Identify the names, purpose, and characteristics of system modules. Recognize these modules by sight or definition.

1.5 Identify the names, purposes, and performance characteristics of standardized/common peripheral ports, associated cabling, and their connectors. Recognize ports, cabling, and connectors, by sight.

OS Technologies

Domain 1.0 Operating System Fundamentals

1.1 Identify the major desktop components and interfaces, and their functions. Differentiate the characteristics of Windows 9x/Me, Windows NT 4.0 Workstation, Windows 2000 Professional, and Windows XP

1.5 Identify the names, locations, purposes, and contents of major system files.

Unit Objectives

Students will be able to:

- explain the role of computers.
- explain what a computer is.
- describe computer data.
- explain how the major components interact with each other.
- identify common tools used to service a PC.
- differentiate between serial and parallel data transmission.
- examine and describe all typical computer cable end connectors.

Essential Questions

- Why are there different operating systems used in computers today?
- What is the importance of following the manufactures' instructions when changing settings?

Focus Questions

- What is the meaning of the cable end connection identification coding and why are they important to know?
- What is the difference between serial and parallel data transmission?
- Why do I need to check for hardware compatibility?
- What kind of safety is involved in working with electrical devices?

Assessments

- Quizzes and Test on Unit material
- Lab Activity 1

Skill Objectives

Students will:

- identify various connectors and cables including; DB-9, DB-25, RJ-11, PS/2 or mini-DIN, IEEE-1394, USB.
- identify Key Acronyms: ASCII IC, BIOS, POST, CMOS, RAM, CPU, ROM, ESD, USB.
- identify the major components of a typical PC.
- describe the power-on sequence of a typical PC.
- interpret the common prefixes associated with a computer's size and speed.
- define electrostatic discharge.

Unit 2-Operating Systems , 5 weeks [top](#)

Standards

OS Technologies

Domain 1.0 Operating System Fundamentals

1.2 Identify the names, locations, purposes, and contents of major system files.

1.3 Demonstrate the ability to use command-line functions and utilities to manage the operating system, including the proper syntax and switches

1.4 Identify basic concepts and procedures for creating, viewing, and managing disks, directories, and files. This includes procedures for changing file attributes and the ramifications of those changes (for example, security issues).

1.5 Identify the major operating system utilities, their purpose, location, and available switches.

Unit Objectives

Students will be able to:

- explain minimum requirements of an operating system.
- explain the differences between the various versions of the Windows operating system.
- describe the relationship of application software, operating systems, BIOS, and system hardware components.
- describe the common characteristics of different operating systems.

Essential Questions

- Why should a technician understand the relationships of application software, operating systems, BIOS, and system hardware components?

Focus Questions

- What is the value of a boot disk?
- What are the differences between Windows operating systems?
- What is the value of knowing and understanding basic text line commands in the Windows operating system?
- What is a graphical user interface?

Assessments

- Lab Activities 2 - 25
- Quizzes and Tests on Unit material

Skill Objectives

Students will:

- recall the basic text line commands such as **ver**, **dir**, **attrib**, **mem**, **scandisk**, **defrag**, **edit**, **copy**, **xcopy**, **format**, and **fdisk**.
- describe the three core DOS files.
- identify DOS limitations.
- describe the boot process.
- describe how to create a DOS boot disk.
- identify various computer operating systems.

Unit 3- Motherboards , CPU's, Power Supplies, 5 weeks [top](#)

Standards

Core Hardware

Domain 1.0 Installation, Configuration, and Upgrading

- 1.1 Identify the names, purpose, and characteristics of system modules. Recognize these modules by sight or definition.
- 1.2 Identify basic procedures for adding and removing field replaceable modules for desktop systems.

Domain 4.0 Motherboard/Processor/Memory

- 4.1 Distinguish between the popular CPU chips in terms of their basic characteristics.
- 4.3 Identify the most popular types of motherboards, their components, and their architecture (bus structures).

Unit Objectives

Students will be able to:

- identify major parts of a motherboard.
- describe the traits of the form factor and point out the mounts that separate the motherboard circuitry from the metallic chassis.
- identify the operation, function, and purpose of the CPU.
- differentiate between the internal and external bus system.
- identify and explain the major portions of a CPU.
- briefly review the evolution of the CPU.
- identify sockets and SEC connections associated with the CPU.
- identify and explain the purpose of a voltage regulator.
- explain real and protected modes of operation.
- define the term multiple branch prediction, superscalar technology, and MMX technology as it applies to the CPU.
- explain the wattage rating of a power supply unit.
- determine power supply requirements for a PC.

Essential Question

- How do the developed skills of a technician impact the successful installation, configuration, and upgrading of computer systems?

Focus Questions

- Why is it important to know the names, purpose, and characteristics of system modules?
- Why must one follow the basic procedures for adding and removing field replaceable modules for desktop systems?
- What are the essentials to determine power supply requirements for a PC?
- Why must you be careful when upgrading the BIOS?
- What does CMOS set-up allow you to do?
- What kind of problems does POST check for and what do “beeps” mean?
- What is the purpose of a digital multimeter?

Assessments

- Lab Activities 26, 27, 28
- Quizzes and Tests on Unit material

Skill Objectives

Students will:

- demonstrate how to access Device Manager and point out all the information that it reveals about the computer system.
- access the system BIOS and explain the features that are available.
- open a different BIOS system on another machine and compare the similarities and differences.
- demonstrate how Plug and Play is disabled in the BIOS Setup program.
- demonstrate a Device Manager error symbol.
- use a multimeter to demonstrate continuity between slots on a motherboard.
- completely remove and reinstall a motherboard.
- identify common motherboard form factors.
- explain motherboard bus architecture.
- identify expansion slot architectures.
- identify the important system resources and explain what they are used for.
- identify and explain IRQs.
- explain the role of a chipset.
- explain the purpose of the CMOS Setup program.

<ul style="list-style-type: none">• define electrical energy.• describe the terms ampere, volt, and ohm in relation to electrical energy.• explain the use of UPS and power protection devices.		<ul style="list-style-type: none">• explain the procedure for upgrading flash BIOS.• demonstrate how to remove and insert a CPU into a ZIF-type socket.• demonstrate how to remove and reinstall a SEC-type CPU.• demonstrate CPU activity with a utility such as System monitor.• identify possible commercial power problems.• use a digital multimeter to troubleshoot a power supply.• apply wattage values when selecting the proper power supply and computer devices.• identify various power supply form factors.
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Unit 4 –Memory, Magnetic Storage Devices, and CD Technology, 4 weeks [top](#)

Standards

Core Hardware

Domain 1.0 Installation, Configuration, and Upgrading

1.3 Identify basic procedures for adding and removing field-replaceable modules for portable systems.

1.4 Identify typical IRQs, DMAs, and I/O addresses, and devices procedures for altering these settings when installing and configuring.

Domain 4.0 Motherboard/Processor/Memory

4.2 Identify the types of RAM (Random Access Memory), form factors, and operational characteristics.

4.4 Identify the purpose of CMOS (Complementary Metal-Oxide Semiconductor) memory, what it contains, and how and when to change its parameters.

OS Technologies

Domain 2.0 Installation, Configuration, and Upgrading

2.5 Identify procedures necessary to optimize the operating system and major operating system subsystems.

Unit Objectives

Students will be able to:

- identify major issues concerning memory upgrades and replacement.
- identify and classify the various types of memory available.
- identify memory map areas and functions.
- explain how magnetic principles are used for data storage.
- understand disk geometry.
- explain how disk fragmentation occurs.
- explain the purpose of using ScanDisk.
- identify major parts of common disk storage units.
- explain how data is stored and retrieved using optical storage devices.
- describe how CD and DVD discs are constructed.
- discuss the compatibility of different CD and DVD formats.
- explain the CD file systems, ISO 9660, and UDF.

Essential Questions

- What are major issues concerning memory upgrade and replacement?
- What are memory map areas and functions?
- What is the importance of understanding hard drive replacement and their function?
- Why are there different disk formats?

Focus Questions

- What is the amount of RAM accessible by various processors?
- What is the importance of knowing the DOS commands related to memory?
- Why is knowing memory map areas as well as DOS file and BIOS locations in memory critical?
- Why are commands of fdisk and format so essential in hard drive repair?
- What are the differences between CD formats such as CD-ROM, CD-R, CD-RW and DVD-RW?

Assessments

- Lab Activities 31-34, 38-46
- Quizzes and Tests on Unit material

Skill Objectives

Students will:

- demonstrate how to remove and install memory
- boot a typical PC with memory, without memory, and with insufficient memory to launch the operating system
- demonstrate data recovery
- transfer all the files from an old hard drive to a new hard drive
- download utilities from the hard drive manufacturer.
- identify typical memory problems.
- upgrade system memory.
- select the appropriate file storage system.
- explain how to install a second hard drive.
- explain different CD formats such as CD-ROM, CD-R, CD-RW, and DVD-RW.
- describe major parts of a CD and DVD storage device.
- define Sierra format.
- explain the steps for installing an optical drive.

		<ul style="list-style-type: none">• describe how to properly replace and/or upgrade RAM• practice using the fdisk command and its menu options.• install more than one operating system on the hard drive• remove the existing hard drive from the assigned PC and install the practice hard drive.• create at least two partitions on the drive, and install an operating system.• install an additional hard drive in a system that already has one hard drive.• demonstrate how to load the drivers necessary to support the CD drive so the new operating system can be installed from the CD.
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Unit 5 –Input Devices, 2 weeks [top](#)

Standards

Core Hardware

Domain 1.0 Installation, Configuration, and Upgrading

1.7 Identify proper procedures for installing and configuring common SCSI devices. Recognize the associated cables.

1.8 Identify proper procedures for installing and configuring common peripheral devices.

Domain 2.0 Diagnosing and Troubleshooting

2.1 Recognize common problems associated with each module and their symptoms, and identify steps to isolate and troubleshoot the problems.

Unit Objectives

Students will be able to:

- explain how a keyboard scan code is generated.
- know how to modify input device properties of a keyboard or mouse using DOS.
- know how to modify input device properties of a keyboard or mouse using Windows Control Panel.

Essential Question

- How are input devices used to communicate with a PC system?

Focus Questions

- What are IRQ assignments?
- What is a scan code and how is it used to communicate?
- What is the universal peripheral interface?
- Why are connectors important to communication?
- What is the function of the device manager?
- What other input devices are used besides a keyboard and mouse?

Assessments

- Lab Activities 35, 36
- Quizzes and Tests on Unit material

Skill Objectives

Students will:

- demonstrate proper keyboard and mouse cleaning techniques.
- explain how devices such as the keyboard, mouse, joystick, scanner, and digital camera operate.
- explain how to access input device information using Device Manager.

Unit 6 –Video Display, Audio Systems, Printers, 3 weeks [top](#)

Standards

Core Hardware

Domain 1.0 Installation, Configuration, and Upgrading

1.8 Identify proper procedures for installing and configuring common peripheral devices.

1.9 Identify procedures to optimize PC operations in specific situations.

Domain 5.0 Printers

5.1 Identify printer technologies, interfaces, and options/upgrades.

5.2 Recognize common printer problems and techniques used to resolve them.

Unit Objectives

Students will be able to:

- describe the basic operation of an LCD panel.
- explain the major steps for installation of a video adapter board.
- explain how to install additional memory to a video adapter board.
- explain the major steps to install a sound card.
- explain how data compression works.
- explain how MIDI produces sound.
- explain how sampling rate and number of bits determine the quality of analog to digital conversion.
- explain the operating principles of a laser printer.
- explain the operating principles of an inkjet printer.
- explain how to install a printer.
- identify and diagnose common laser printer faults.
- explain how fonts are generated and installed.

Essential Questions

- How has the computer video system changed over time?
- How has digital signal transformed both video and audio multimedia experiences?

Focus Questions

- What is the purpose of a video adapter card?
- What types of monitors are available to communicate with a computer?
- How is upgrading a video system performed?
- What type of considerations need to be made before changing a system?
- How is an audio signal created?
- What is the difference between analog and digital signal?

Assessments

- Lab Activities 37, 47, 48
- Quizzes and Tests on Unit material

Skill Objectives

Students will:

- demonstrate the use of the multimeter to check the voltage available at the electrical outlet that provides power to the monitor.
- access the Display Properties dialog box and change the default color setting.
- explain screen resolution.
- define screen pitch.
- define different display systems such as CGA, EGA, XGA, VGA, SVGA, and UVGA.
- compare WAV file and MIDI files types.
- install software print drivers.
- complete printer setup and installation
- select a printer that will not be automatically detected by the operating system and demonstrate how to install a printer driver.
- demonstrate what happens when the incorrect printer driver is installed.
- demonstrate how to configure a printer.

Unit 7 – Modems and Transceivers, 2 weeks [top](#)

Standards

Core Hardware

Domain 1.0 Installation, Configuration, and Upgrading

1.8 Identify proper procedures for installing and configuring common peripheral devices.

Domain 6.0 Basic Networking

6.1 Identify the common types of network cables, their characteristics, and connectors.

6.2 Identify basic networking concepts including how a network works.

Unit Objectives

Students will be able to:

- identify basic features of telephone wiring systems.
- explain the operation of a modem.
- install and use Windows Communications options.
- explain how modems negotiate a connection.
- set up a standard modem.
- use the Dial-Up Properties dialog box.
- explain ISDN, DSL, cable, and T-carrier lines.
- identify several basic AT commands.
- diagnose common modem problems.

Essential Questions

- What is the importance of modems in communication utilizing computer systems?

Focus Questions

- What are the differences between ISDN, DSL, cable and telephone modem characteristics?
- What does wiring have to do with what type of modem is employed to communicate?
- How are changes made to control to communications of a modem?
- How does a modem function?

Assessments

- Lab Activity 50
- Quizzes and Tests on Unit material

Skill Objectives

Students will:

- demonstrate how to install and set up a modem.
- demonstrate how to test a modem.
- demonstrate how to set up an ISDN, DSL, cable, or T-1 line.
- use modems and two outside phone lines to connect two computers in the lab.

Unit 8 – PC Troubleshooting, 5 weeks [top](#)

Standards

Core Hardware

Domain 2.0 Diagnosing and Troubleshooting

2.1 Recognize common problems associated with each module and their symptoms, and identify steps to isolate and troubleshoot the problems.

2.2 Identify basic troubleshooting procedures and tools, and how to elicit problem symptoms from customers.

OS Technologies

Domain 3.0 Diagnosing and Troubleshooting

3.1 Recognize and interpret the meaning of common error codes and startup messages from the boot sequence, and identify steps to correct the problems.

3.2 Recognize when to use common diagnostic utilities and tools. Given a diagnostic scenario involving one of these utilities or tools, select the appropriate steps needed to resolve the problem.

3.3 Recognize common operational and usability problems and determine how to resolve them.

Unit Objectives

Students will be able to:

- identify common virus characteristics.
- explain virus detection.
- explain how viruses are spread.
- explain the prevention of virus infection.
- define virus signature.
- classify viruses by their action or description.
- state commonly practiced troubleshooting steps.
- recognize common startup problems and understand their causes.
- use the tools found in the Microsoft system Information dialog box.
- restart a PC in a variety of troubleshooting modes.
- step through a PC's boot sequence.
- explain how to access, repair, and back up the system registry files.
- access and use troubleshooting log files.
- explain basic data recovery methods.

Essential Questions

- What kind of damage can viruses do to a computer system?
- What is the importance of keeping vigilant at defending a system from attack?

Focus Questions

- How can a PC be protected from attack?
- Once infected, how can a system be cleaned and restored?
- What kinds of software are available to aid in keeping a computer protected?
- How are viruses and worms different in how they attack a system?

Assessments

- Lab Activities 51, 53, 54, 55, 56, 57, 66, 68, 69, 70
- Quizzes and Tests on Unit material

Skill Objectives

Students will:

- download a copy of the virus check program.
- explain why you disable the virus program before installing an operating system upgrade.
- install EICAR and demonstrate how a virus is detected.
- research one of the latest worms and the methods used to disable and remove it.
- describe the use of msinfo32.exe and msconfig.exe.
- demonstrate the recovery feature available in Windows.
- demonstrate how to restore the registry
- demonstrate how to make a set of Windows startup disks.
- demonstrate how to use the set of Windows startup disks to recover after a Windows boot failure.

Unit 9 –Introduction to Networking, 8 weeks [top](#)

Standards

Core Hardware

Domain 6.0 Basic Networking

6.2 Identify basic networking concepts including how a network works.

6.3 Identify common technologies available for establishing Internet connectivity and their characteristics.

OS Technologies

Domain 4.0 Networks

4.1 Identify the networking capabilities of Windows. Given configuration parameters, configure the operating system to connect to a network.

4.2 Identify the basic Internet protocols and terminologies. Identify procedures for establishing Internet connectivity.

Unit Objectives

Students will be able to:

- identify and describe network topologies.
- describe the communication theory of a network system.
- describe the communication principles of Ethernet and Token Ring systems.
- list and describe the layers of the OSI model.
- describe the installation of a typical network adapter.
- identify a network’s basic hardware devices.

Essential Questions

- How do networks communicate?
- How has the increase in data flow impacted networks?

Focus Questions

- How do the network classifications of LAN, MAN, WAN differ from each other?
- What is meant by the term Topologies?
- How do networks function differently in bus topology, ring topology , star topology, hybrid topology, mesh topology and wireless topology?
- What is meant by passive hub versus active hub?
- What are nodes and how do they function?
- How do Ethernet networks and token ring networks differ?
- How does network media(cables, connectors) impact communication?
- What is the function of a network card?

Assessments

- Lab Activities 58, 59
- Quizzes and Tests on Unit material

Skill Objectives

Students will:

- demonstrate how to install a NIC.
- demonstrate the use of the winipcfg and ipconfig utilities, what is revealed, and how to tell if an Internet connection has been established.
- list and describe common network protocols.
- list and describe common network systems.
- identify common network cabling materials.
- construct a network.