

**Western Technical College**

**10150101 IT Hardware and Software Fundamentals**

**Course Outcome Summary**

**Course Information**

<b>Description</b>	Participants will set up a computer installing a motherboard, floppy drives, hard drives, CD-ROM and video cards. A Windows operating system is installed and managed. Additional peripherals such as printers are installed and multimedia capabilities are explored. Networking architectures and protocols are introduced using the OSI and TCP/IP models. A local area network (LAN) is configured and installed. Assists participants preparing for CompTIA A+ certification exam.
<b>Career Cluster</b>	Information Technology
<b>Instructional Level</b>	Associate Degree Courses
<b>Total Credits</b>	3
<b>Total Hours</b>	90

**Textbooks**

No textbook required.

**Program Outcomes**

1. Implement computer networks.
2. Implement client systems.
3. Implement network security components.
4. Develop technical documentation.
5. Troubleshoot network systems.
6. Maintain the network infrastructure

**Course Competencies**

**1. Identify major hardware components of a computer.**

**Criteria**

*You will know you are successful when*

- 1.1. you identify all the ports associated with a computer.
- 1.2. you label components inside a computer.
- 1.3. you diagram a motherboard.
- 1.4. you install and test various types of memory.

- 1.5. you demonstrate proper use of static packaging, static mats and wrist bands.
- 1.6. you identify various form factors such as ATX/BTX, micro ATX, NLX.
- 1.7. you identify bus slots, such as PCI, AGP, PCMCIA.
- 1.8. you explain the purpose of the BIOS, CMOS and firmware.

#### **Learning Objectives**

- 1.a. Identify the names, purposes and characteristics of system modules.
- 1.b. Demonstrate proper safety procedures when handling electrical components.
- 1.c. Describe proper usage of ESD techniques.
- 1.d. Identify various types of memory used by computer.

## **2. Analyze components of laptop type devices.**

#### **Criteria**

*You will know you are successful when*

- 2.1. you install expansion devices PCMCIA and PCI express cards.
- 2.2. you explain usage of a docking station.
- 2.3. you describe the communication connections: bluetooth, infrared, ethernet, modem, cellular.
- 2.4. you differentiate between various types of batteries.
- 2.5. you use input devices stylus and digitizer.
- 2.6. you review the function keys on a laptop type device.

#### **Learning Objectives**

- 2.a. Demonstrate use of laptops, PDAs, tablets, cell phones.
- 2.b. Identify various batteries used in laptop devices.
- 2.c. Install modules designed for laptop devices.

## **3. Analyze various storage devices functionality.**

#### **Criteria**

*You will know you are successful when*

- 3.1. you describe how a hard drive organizes and stores data.
- 3.2. you install a primary and secondary hard drive.
- 3.3. you install adapter for SCSI, serial, parallel, SATA, SSD.
- 3.4. you format a hard drive.
- 3.5. you partition a hard drive.

#### **Learning Objectives**

- 3.a. Analyze hard drive technology.
- 3.b. Describe the usage of USB storage devices.
- 3.c. Describe the usage of multimedia storage devices such as CD, DVD, digital camera MP3 players.

## **4. Identify the fundamental principles of peripheral equipment.**

#### **Criteria**

*You will know you are successful when*

- 4.1. you install multimedia devices.
- 4.2. you install a DVD drive.
- 4.3. you install a printer and printer drivers.
- 4.4. you describe the LCD resolutions: XGA, SXGA, UXGA.
- 4.5. you recognize the connector types VGA, HDMI, S-Video.
- 4.6. you adjust setting for resolution, refresh rates, degauss.
- 4.7. you connect: a mouse, keyboard, biometric device, multimedia devices.
- 4.8. you distinguish between USB, Firewire, and other connection media.

#### **Learning Objectives**

- 4.a. Identify basic procedures for adding and removing I/O devices.
- 4.b. Identify typical IRQ's, DMA, and I/O addresses used by devices.
- 4.c. Identify printer technologies and interfaces.
- 4.d. Distinguish between display devices.
- 4.e. Install input devices.

## **5. Explore various operating systems and software.**

### **Criteria**

*You will know you are successful when*

- 5.1. you install a Windows OS.
- 5.2. you set up boot process from CD, DVD, USB.
- 5.3. you boot to a restore point.
- 5.4. you boot in safe mode.
- 5.5. you create files structures.
- 5.6. you do an install repair of an OS.
- 5.7. you compare the CPU types AMD, Intel.
- 5.8. you recognize the usage of multi core processors.
- 5.9. you explain the differences between 32bit and 64bit processors.
- 5.10. you describe the function of a heat sink, fan, liquid cooling.

### **Learning Objectives**

- 5.a. Install and configure Windows OS.
- 5.b. Compare various Windows OS features.
- 5.c. Observe the basics of a boot sequence and startup utilities.
- 5.d. Describe how operating systems manage hardware.
- 5.e. Examine various CPS's and their features.
- 5.f. Explain various cooling methods and devices.

## **6. Examine basic networking concepts and technologies.**

### **Criteria**

*You will know you are successful when*

- 6.1. you set up a basic LAN.
- 6.2. you categorize various types of media, such as fiber, wireless, ethernet, coaxial.
- 6.3. you use IP addresses.
- 6.4. you identify the ports numbers for HTTP, FTP, POP, SMTP, TELNET.
- 6.5. you explain the function of a hub, switch, and router.
- 6.6. you explain the differences between IPv4 and IPv6.

### **Learning Objectives**

- 6.a. Compare different network topologies.
- 6.b. Compare basic media such as fiber, coaxial, wireless, and ethernet.
- 6.c. Identify basic communicates ports.
- 6.d. Identify network devices.

## **7. Examine basic security concepts and technologies.**

### **Criteria**

*You will know you are successful when*

- 7.1. you install malicious protection software.
- 7.2. you develop a password management policy.
- 7.3. you explain the concept of a firewall.
- 7.4. you describe social engineering.
- 7.5. you configure an SSID.
- 7.6. you install wireless encryption WEP and WPA.
- 7.7. you define the terms: SPAM, Trojans, Spyware, Adware, Viruses.

### **Learning Objectives**

- 7.a. Explain the need for security in IT.
- 7.b. Explain the usage of encryption in IT security.
- 7.c. Explain authentication technologies.
- 7.d. Explain the need for compliance issues regarding data security.

## **8. Demonstrate professional procedures in the work place.**

### **Criteria**

*You will know you are successful when*

- 8.1. you explain how to deal with a difficult customer situation.
- 8.2. you listen to a customer scenario.
- 8.3. you maintain a positive attitude.
- 8.4. you explain the use of Material Safety Data Sheet (MSDS).
- 8.5. you recognize the importance of physical safety.
- 8.6. you select environmental locations to properly dispose of equipment.

#### **Learning Objectives**

- 8.a. Demonstrate uses of communications skills.
- 8.b. Demonstrate professionalism as an IT professional.
- 8.c. Outline the purpose of appropriate safety and environmental procedures.

### **9. Develop repair and maintenance strategies.**

#### **Criteria**

*You will know you are successful when*

- 9.1. you demonstrate proper usage of power strips and UPS devices.
- 9.2. you create a preventive maintenance schedule.
- 9.3. you explain why repairs are not done on power supplies and monitors.
- 9.4. you use a voltage/ohm meter to diagnose power issues.

#### **Learning Objectives**

- 9.a. Integrate common maintenance techniques.
- 9.b. Create a preventive maintenance schedule.
- 9.c. Recognize the dangers of electrical computer components .

### **10. Develop troubleshooting strategies.**

#### **Criteria**

*You will know you are successful when*

- 10.1. you establish a theory of probable cause.
- 10.2. you establish a plan of action to resolve the problem and implement the solution.
- 10.3. you document findings, actions, and outcomes.
- 10.4. you correct OS related problems, such as bluescreens, system lock-up, driver issues.
- 10.5. you correct Hardware related problems, such as noise, odors, alerts, status lights.
- 10.6. you manage print jobs, print spoolers, settings.
- 10.7. you correct laptop issues such as power conditions, video, battery, WI-FI.
- 10.8. you perform preventive maintenance techniques such as defrags, scandisk.
- 10.9. you use compressed air, link free cloth for cleaning.
- 10.10. you use ping, telnet, ipconfig to solve network problems.
- 10.11. you use the cmd line for troubleshooting.
- 10.12. you monitor performance, event viewer, services and computer management.

#### **Learning Objectives**

- 10.a. Explain troubleshooting theory.
- 10.b. Determine methods and tools to repair printer problems.
- 10.c. Recognize common hardware and operating systems errors.
- 10.d. Interpret common laptop issues.
- 10.e. Identify common network troubleshooting utilities.
- 10.f. Utilize administrative tools to solve performance issues.

### **11. Complete practice tests A+ certification.**

#### **Criteria**

*You will know you are successful when*

- 11.1. you take A+ practice test.
- 11.2. you complete the domains required for the A+ certification.
- 11.3. you apply the process of getting a discount voucher.
- 11.4. you register with Compia in order to schedule a test.

**Learning Objectives**

- 11.a. Recognize the value of having a certification.
- 11.b. Explore the value of having an A+ certification.
- 11.c. Analyze the content of the A+ domains.
- 11.d. Complete practice tests related to current A+ certification