



Western Technical College

10150101 IT Hardware and Software Fundamentals

Course Outcome Summary

Course Information

Description	Participants will install, configure, and troubleshoot computer components in a Microsoft Windows operating system environment in support of learning about power supplies, motherboards, fixed/removable media, volatile memory, graphics cards and uninterruptable power supplies. A variety of software, virtual devices, and cybersecurity methods will be covered such as RAID, storage spaces, preboot execution environments, hypervisors/virtualization, file/volume encryption, and media recovery/sanitization. Portable computing, local/network print protocols, Linux and macOS operating system fundamentals—including helpdesk software and essential information security practices will also be explored.
Career Cluster	Information Technology
Instructional Level	Associate Degree Courses
Total Credits	3
Total Hours	90

Textbooks

No textbook required.

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Cultivate Passion: Increase Self-Awareness
3. Live Responsibly: Develop Resilience
4. Refine Professionalism: Improve Critical Thinking
5. Refine Professionalism: Practice Effective Communication

Program Outcomes

1. Identify security strategies
2. Implement secure infrastructures
3. Conduct security testing
4. Analyze security data
5. Mitigate risk
6. Develop security documentation

Course Competencies

1. Identify major hardware components of an information processing system.

Assessment Strategies

- 1.1. Written Objective Test
- 1.2. Skill Demonstration

Criteria

You will know you are successful when

- 1.1. you identify all the internal and external ports and components associated with a computing system.
- 1.2. you install and test various types of volatile and non-volatile storage media.
- 1.3. you demonstrate safe handling of computing components and use of antistatic packaging/tools.
- 1.4. you identify various physical and logical form factors
- 1.5. you identify local data interface bus types
- 1.6. you explain the purpose and role of 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. Identify various software components in a computing system
- 1.d. Identify various hardware components in a computing system

2. Analyze components of portable computing devices.

Assessment Strategies

- 2.1. Written Objective Test
- 2.2. Skill Demonstration

Criteria

You will know you are successful when

- 2.1. you identify miniature and micro expansion interfaces
- 2.2. you explain the role of a docking station and port replicator.
- 2.3. you explain wireless communication protocols
- 2.4. you identify various types of batteries and power adapters.
- 2.5. you review the function keys and associative firmware settings

Learning Objectives

- 2.a. Demonstrate how to disassemble a portable computing device
- 2.b. Identify field replaceable units and quantify repair costs
- 2.c. Identify unique modules designed for portable computing devices.

3. Analyze the functionality of various storage devices

Assessment Strategies

- 3.1. Written Objective Test
- 3.2. Skill Demonstration

Criteria

You will know you are successful when

- 3.1. you describe how fixed and virtual media organizes and stores data.
- 3.2. you erase and sanitize fixed media
- 3.3. you recover data from fixed media
- 3.4. you initialize, format and partition fixed media.
- 3.5. you differentiate between local and remote filesystems

Learning Objectives

- 3.a. Analyze fixed media technologies and electrical bus types
- 3.b. Describe how data is stored, retrieved, deleted and sanitized on fixed media
- 3.c. Initialize, partition and format fixed media

4. Identify the fundamental principles of peripheral equipment.

Assessment Strategies

- 4.1. Written Objective Test
- 4.2. Skill Demonstration

Criteria

You will know you are successful when

- 4.1. you install a virtual printer and printer drivers.
- 4.2. you describe display resolutions and their occupational applications
- 4.3. you describe analog and digital A/V connector types.
- 4.4. you distinguish between universal serial, Thunderbolt, and other external electrical data bus types.

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 external bus protocol standards

5. Explore administrative functions of operating systems

Assessment Strategies

- 5.1. Written Objective Test
- 5.2. Skill Demonstration

Criteria

You will know you are successful when

- 5.1. you install a Microsoft Windows and Linux OS in a hypervisor environment
- 5.2. you deploy an OS from fixed media, mounted ISO, PXE and Network Mounted Media
- 5.3. you utilize the task manager, task scheduler and system CLI.
- 5.4. you monitor and manage system resources
- 5.5. you perform boot record, kernel and driver recovery repairs to an OS.

Learning Objectives

- 5.a. Install and configure a Microsoft Windows OS
- 5.b. Install and Configure a Linux OS
- 5.c. Compare various Windows OS features.
- 5.d. Recover an OS from a boot anomaly
- 5.e. Describe how operating systems manage hardware.
- 5.f. Examine various hardware components and their features.

6. Examine basic security concepts and technologies.

Assessment Strategies

- 6.1. Written Objective Test
- 6.2. Skill Demonstration

Criteria

You will know you are successful when

- 6.1. you implement fixed media fault tolerance
- 6.2. you configure a host based firewall to allow specific network traffic

- 6.3. you perform a full system backup and restoration
- 6.4. you describe media sanitization protocols

Learning Objectives

- 6.a. Implement RAID and Fault Tolerance
- 6.b. Deploy local file sharing and configure a host-based firewall
- 6.c. Recover deleted data and sanitize fixed media
- 6.d. Backup an operating system, simulate fixed media failure and recover from a full backup

7. Demonstrate professional procedures in the work place.

Assessment Strategies

- 7.1. Written Objective Test
- 7.2. Skill Demonstration

Criteria

You will know you are successful when

- 7.1. you explain how to deal with a difficult customer situations
- 7.2. you maintain a positive attitude when working with others
- 7.3. you complete work on time and communicate delays to the project principal in a timely manner
- 7.4. you recognize the importance of physical and electrical safety.
- 7.5. you safeguard equipment and maintain data integrity when operating a computing system

Learning Objectives

- 7.a. Demonstrate safety procedures when working with computing equipment
- 7.b. Demonstrate professionalism while working with peers and the project principal
- 7.c. Demonstrate integrity while navigating internet resources and making system changes

8. Develop troubleshooting strategies.

Assessment Strategies

- 8.1. Written Objective Test
- 8.2. Skill Demonstration

Criteria

You will know you are successful when

- 8.1. you identify the problem
- 8.2. you establish a theory of probable cause.
- 8.3. you test the theory to determine cause
- 8.4. you establish a plan of action to resolve the problem and implement the solution.
- 8.5. you verify full system functionality and if applicable implement preventative measures
- 8.6. you document findings, actions, and outcomes.

Learning Objectives

- 8.a. Explain the six step CompTIA troubleshooting process
- 8.b. Identify trusted tools and methods to diagnose computing equipment
- 8.c. Utilize steps of the scientific method to identify, test and verify solutions
- 8.d. Utilize a helpdesk management system to record, document and communicate troubleshooting activities with the project principal.

9. Develop repair and maintenance strategies. --EXPIRE

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. Examine basic networking concepts and technologies. --EXPIRE

Criteria

You will know you are successful when

- 10.1. you set up a basic LAN.
- 10.2. you categorize various types of media, such as fiber, wireless, ethernet, coaxial.
- 10.3. you use IP addresses.
- 10.4. you identify the ports numbers for HTTP, FTP, POP, SMTP, TELNET.
- 10.5. you explain the function of a hub, switch, and router.
- 10.6. you explain the differences between IPv4 and IPv6.

Learning Objectives

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

11. Complete practice tests A+ certification. --EXPIRE

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 Comptia 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