

Course Description

CTS1131 | A+ Computer Essentials & Support | 4.00 credits

This is an intermediate level course designed for students preparing for A+ certification as a support technician. Students will learn how to install, configure, upgrade and replace computer system components; how to troubleshoot processors, memory, storage devices, adapter cards, peripherals and other system components; how to install, configure and troubleshoot operating systems, laptops, portable devices, printers, scanners, network devices, security measures and virtualization and cloud computing; and how to provide professional IT support and customer service. Prerequisite: CGS1560.

Course Competencies:

Competency 1: The student will demonstrate an understanding of computer fundamentals by:

- 1. Describing the architecture and operation of a typical computer system
- 2. Describing the use of binary numbers to represent instructions and data and the hardware implications thereof
- 3. Converting numbers into decimal, binary, and hexadecimal representation
- 4. Identifying and manipulating various coding schemes, including ASCII and other data types
- 5. Drawing a schematic of a typical computer system and describing components on a block diagram
- 6. Discussing issues that affect system standards and designs, form factors, and construction
- 7. Describing the principles of the supply chain, system procurement and deployment, end-of-life cycle, field replaceable unit, and replacement, repair, and disposal procedures
- 8. Identifying emerging computer technologies and discussing their impacts on computer standards

Competency 2: The student will demonstrate an understanding of how computers are designed and how computers function by:

- 1. Describing the fundamental principles of computer architecture
- 2. Compare and contrast the types, functions, and characteristics of computer components, including:
 - a. Motherboards, BIOS, processors, and memory
 - b. Storage devices
 - c. Adapter cards, expansion, and peripheral devices
 - d. Displays, input, and output devices
 - e. ports, interfaces, connectors, and cables
 - f. Power supplies, cooling systems, cases, and enclosures; and vii. SOHO
- 3. Constructing and configuring a computer system from individual components
- 4. Installing, replacing, upgrading, and adding components to a computer system
- 5. Testing, optimizing, and documenting a computer system

Competency 3: The student will demonstrate the ability to troubleshoot and restore computer systems by:

- 1. Identifying tools, diagnostic equipment, procedures, and troubleshooting techniques for computer systems and their components
- 2. Describing common problems with computer systems, displays, video, projectors, power supplies, I/O devices, peripherals, storage devices, RAID arrays, memory, processor, BIOS/UEFI, and system boards
- 3. Performing system checks and troubleshooting to isolate computer system problems, including thermal issues, error codes, power problems, connectivity and compatibility issues, reduced
- 4. functionality, device driver problems, intermittent faults, and component failures
- 5. Disassembling a computer system, replacing improperly functioning components, and tagging the failed parts for transport to the repair depot
- 6. Performing preventive maintenance on computer systems, components, and peripheral devices

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7. Performing system management tasks, component inventory, system validation, and documentation

Competency 4: The student will demonstrate an understanding of laptops and portable devices by:

- 1. Describing the operating principles of laptops and portable devices
- 2. Installing, configuring, optimizing, and upgrading laptops and portable devices
- 3. Identifying and discussing the tools, diagnostic procedures, and troubleshooting techniques for laptops and portable devices
- 4. Performing preventive maintenance on laptops and portable devices
- 5. Performing system management tasks, component inventory, and system documentation
- 6. Compare and contrast accessories and ports of other mobile devices, including:
 - a. NFC, Proprietary vendor-specific ports
 - b. Micro USB / mini-USB, Lightning, Bluetooth, IR, Memory/MicroSD, iii. Hotspot/tethering
 - c. Iv. Credit card readers

Competency 5: The student will demonstrate an understanding of operating systems by:

- 1. Describing the operating systems currently in use, including architecture, feature set, user interface, system components, and function
- 2. Installing, configuring, optimizing, and upgrading operating systems
- 3. Performing file and system management tasks, system imaging, data backup, and documentation
- 4. Using tools to inventory installed utilities, etc
- 5. Using Windows programs and command-line utilities to manage and maintain a computer, its partitions, directories, and files
- 6. Installing system updates, device drivers, anti-virus and anti-spyware software, and other management and monitoring software to the operating system
- 7. Describing and using tools, utilities, diagnostic procedures, and troubleshooting techniques for operating systems
- 8. Performing preventive maintenance on operating systems applications, Sideloaded applications, device drivers

Competency 6: The student will demonstrate an understanding of printers and scanners by:

- 1. Describing the operating principles of printers and scanners
- 2. Performing the installation, configuration, optimization, and upgrading of printers and scanners
- 3. Describing the tools and diagnostic procedures for troubleshooting printers and scanners
- 4. Performing basic troubleshooting for printer and scanner problems

Competency 7: The student will demonstrate an understanding of computer networks by:

- 1. Describing the fundamental principles, protocols, topologies, technologies, devices, and media of computer networks
- 2. Installing, configuring, optimizing, and connecting Computers to a local area network
- 3. Configuring the TCP/IP protocol stack
- 4. Explain standard TCP and UDP ports, protocols, and their purpose
- 5. Installing, configuring, optimizing, and connecting local area network devices
- 6. Installing and configuring a router to access an Internet Service Provider
- 7. Describing tools, diagnostic procedures, and troubleshooting techniques for maintaining computers on a local area network

Competency 8: The student will demonstrate an understanding of computer and network security by:

- 1. Describing the fundamental principles of computer and network security
- 2. Installing, configuring, upgrading, and optimizing security measures

3. Describing the hardware and software tools, diagnostic procedures, and troubleshooting techniques for Updated: Fall 2025

securing computers and networks

- 4. Applying access controls and security policies to users and groups
- 5. Scanning systems for malicious software and suspicious activity
- 6. Performing preventive maintenance and activity monitoring for computer and network security
- 7. Compare and contrast various Wi-Fi networking standards and encryption types

Competency 9: The student will demonstrate an understanding of safety and environmental issues by:

- 1. Discussing safety and environmental concerns regarding the use of computer systems
- 2. Identify potential hazards and implement proper safety procedures, including electrostatic discharge (ESD) precautions and procedures, a safe work environment, and equipment handling.
- 3. Describing proper disposal procedures for batteries, display devices, system components, chemical solvents, cans, and other materials connected with computer systems

Competency 10: The student will demonstrate an understanding of communication skills and professionalism by:

- 1. Applying good communication skills when listening and communicating with customers and colleagues in person, in correspondence, and over the telephone
- 2. Discussing methods of handling difficult customer situations and achieving high customer satisfaction
- 3. Practicing job-related professional behavior, including notation of privacy, confidentiality, and respect for the customer and customers' property
- 4. Maintaining customer and system documentation, resource libraries, and databases
- 5. Performing research on computer support issues using Internet and database resources

Competency 11: The student will demonstrate an understanding of user support and workplace skills by:

- 1. Describing the role of the IT support specialist in a business enterprise
- 2. Describing methods of understanding and managing users' needs and expectations
- 3. Describing methods of logging incidents and problem resolution
- 4. Presenting and complying with oral and written instructions
- 5. Participating in group discussions as an IT support team specialist
- 6. Demonstrating self-motivation and responsibility to complete an assigned task
- 7. Choosing appropriate actions in situations requiring effective time management
- 8. Applying principles and techniques for being a productive, contributing member of a team
- 9. Describing and discussing intellectual property rights and licensing issues
- 10. Describing and discussing issues contained within professional codes of conduct
- 11. Preparing, outlining, and delivering a short IT training presentation with visual materials to other support specialists
- 12. Using appropriate communication skills, courtesy, manners, and dress in the workplace

Learning Outcomes

- Communicate effectively using listening, speaking, reading, and writing skills
- Solve problems using critical and creative thinking and scientific reasoning
- Use computer and emerging technologies effectively