COMPUTER MAINTENANCE, 15.1200.20

These technical knowledge and skill standards were validated by a Skill Standards Validation Committee on March 24, 2015. First testing date using the new standards will be Fall 2015.

STANDARD 1.0 APPLY PROBLEM-SOLVING AND CRITICAL THINKING SKILLS TO COMPUTER/ ELECTRONIC DEVICE MAINTENANCE

1.1 Describe methods to determine priorities in establishing and maintaining computers/electronic devices
1.2 Apply problem-solving processes to troubleshoot computers and electronic devices (i.e. define problem, identify cause, research problem, select and test solution, prevent the problem)
1.3 Identify common project management concepts (e.g. project management triangle, goals, Gantt charts) and their limitations
1.4 Document the results of the problem-solving process

STANDARD 2.0 MAINTAIN A SAFE AND ENVIRONMENTALLY CONCIOUS TECHNOLOGY WORK ENVIRONMENT

2.1 Demonstrate personal responsibility for developing and maintaining a safe and healthy technology work environment
2.2 Use the tools, materials, and equipment commonly used in the field of technology maintenance
2.3 Identify ergonomics and repetitive strain injuries commonly experienced in technology maintenance occupations
2.4 Determine safe working practices to avoid or eliminate electrical hazards
2.5 Explain environmental considerations when disposing of computer/electronic device components
2.6 Explain various safety measures and procedures including electrostatic discharge and how inadequate measures can damage equipment
2.7 Identify proper safety procedures relating to high voltage and other electrical equipment
2.8 Identify environmental protection measures, procedures, and guidelines

STANDARD 3.0 RECOGNIZE SECURITY ISSUES RELATED TO COMPUTERS/ELECTRONIC DEVICES

3.1 Explain policies to maintain data integrity and security
3.2 Identify security issues related to computer hardware, software, data, and mobile devices
3.3 Explain the importance of physical security of computer hardware and electronic devices
3.4 Define concepts such as phishing, viruses, email attachments, social engineering, spoofing, identify theft, and spamming
3.5 Identify methods to protect computers/electronic devices from malware
3.6 Identify methods to safely remove malware
3.7 Explain concepts such as denial of service, hacking/cracking, intrusion, and intellectual property

STANDARD 4.0 EXPLORE LEGAL AND ETHICAL ISSUES RELATED TO INFORMATION TECHNOLOGY

4.1 Explore issues regarding intellectual property rights including copyright, software licensing, patents, and software duplication
4.2 Identify issues and trends affecting computers and information privacy
4.3 Differentiate between ethical and unethical uses of information technology
4.4 Examine the relationship between ethics and the law in relation to information technology
4.5 Identify workers' rights regarding workplace issues including safety, harassment, discrimination, monitoring, and privacy

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STANDARD 5.0 DEMONSTRATE THE USE OF BINARY AND OTHER NUMERIC SYSTEMS IN COMPUTER APPLICATIONS

5.1 Explain the function of base number systems in mathematics as they relate to computer/electronic device technology

5.2 Perform decimal to binary and binary to decimal conversions

5.3 Perform decimal to hexadecimal and hexadecimal to decimal conversions

5.4 Perform hexadecimal to binary and binary to hexadecimal conversions

5.5 Determine appropriate method to perform conversions (e.g. paper/pencil, electronic resources)

5.6 Explain the relationship of bits to common hard drive capacities

5.7 Explain the relationship of hertz to process and bus speed

5.8 Apply basic electronics theories (i.e. Ohm's Law, calculation of wattage, voltage, amperage, resistance, capacitance)

5.9 Distinguish differences between direct current and alternating current and how they apply to electronic devices

5.10 Explain basic transformer theory

STANDARD 6.0 DESCRIBE THE DEVELOPMENT/EVOLUTION OF COMPUTERS/ELECTRONIC DEVICES

6.1 Explain the historical evolution of the computer and computer networks

6.2 Explain how the development of computers has impacted modern life

6.3 Discuss future trends in computer/portable device technology

STANDARD 7.0 INSTALL, CONFIGURE, UPGRADE, AND MAINTAIN COMPUTERS/ELECTRONIC DEVICES

7.1 Identify the purpose and characteristics of common system components (e.g. tower, storage devices, power supply, removable media, expansion cards)

7.2 Demonstrate the basic procedures for adding and removing common system components and recognizing associated cable connections

7.3 Delineate the names, purposes, and performance characteristics of common peripheral ports

7.4 Demonstrate the proper procedures for installing and configuring common peripheral devices

7.5 Identify issues that must be considered when upgrading a computer/electronic device

7.6 Establish procedures for the various types of preventive maintenance of computers and peripherals (e.g. cleaning and defragmenting drives)

STANDARD 8.0 MAINTAIN MOTHERBOARDS, PROCESSORS, AND MEMORY

8.1 Identify CPU chip types and associated sockets

8.2 Distinguish differences between surface mount technology (SMT) and socketed components

8.3 Identify the operational characteristics of RAM (e.g. speed, type, size)

8.4 Identify the responsibility of the various components of the motherboard (e.g. expansion slots, chipsets, battery)

8.5 Identify the basic compatibility guidelines of the motherboard/processors/memory

8.6 Explain the role of BIOS and CMOS in computer technology

8.7 Explain the significance of Moore's Law as it relates to computer performance

8.8 Explain how environmental factors including heat, airborne particulates, humidity, vibration, and shocks can affect equipment

STANDARD 9.0 INSTALL AND MAINTAIN PRINTERS

9.1 Compare and contrast printer technologies including laser, ink dispersion, solid ink, thermal, and dye sublimation

9.2 Determine the optimal interface option for each printer technology

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9.3　Distinguish the options to upgrade a printer (i.e. memory, hard drives, NICS, FAX, etc.)
9.4　Resolve common printer problems

STANDARD 10.0 DEMONSTRATE THE USE OF BASIC NETWORKING HARDWARE
10.1　Differentiate common types of network cables and their characteristics
10.2　Install and configure network cards
10.3　Compare common network protocols
10.4　Identify common networking topologies
10.5　Differentiate common technologies available for establishing network connectivity (e.g. routers, wireless, hubs, modem, switches)
10.6　Diagnose simple hardware problems in networking equipment

STANDARD 11.0 UNDERSTAND THE BASICS OF COMMON OPERATING SYSTEMS
11.1　Distinguish the major desktop components and interfaces and their function (e.g. taskbar, menus)
11.2　Differentiate the characteristics of common operating systems on computers/electronic devices (e.g. Windows, IOS, Android, Linux)
11.3　Compare and contrast the differences between native and virtualized operating system environments
11.4　Navigate major operating system interfaces (e.g. file management, administrative tools, command line)
11.5　Identify the function of major system files (e.g. REGEDIT, Task Manager, system utilities)
11.6　Explain command-line functions and utilities to manage the operating system including the proper syntax and switches
11.7　Demonstrate basic concepts and procedures for creating, viewing, and managing drives, directories, and files
11.8　Demonstrate the proper procedures for changing file attributes and the ramifications of those changes including security issues
11.9　Identify common hard drive redundancy options, i.e. RAID, cloud storage

STANDARD 12.0 INSTALL, CONFIGURE, UPGRADE AND TROUBLESHOOT THE OPERATING SYSTEM
12.1　Install operating systems using customized installation options
12.2　Backup and restore user data
12.3　Identify common symptoms and resolve problems encountered during installations or upgrades
12.4　Perform operating system upgrades
12.5　Demonstrate basic system boot sequences and boot methods including an emergency boot disk with utilities
12.6　Install and add a device including loading, adding, and configuring device drivers and required software
12.7　Optimize the operating system and its major subsystems
12.8　Migrate a user from one system to another, retaining all user software options and documents
12.9　Interpret the meaning of common error codes and startup messages from the boot sequence and identify steps to correct problems
12.10　Use common diagnostic utilities and tools as required
12.11　Identify common operational and usability problems and determine how to resolve them

STANDARD 13.0 CONFIGURE A NETWORK
13.1　Assess the networking capabilities of common operating systems
13.2　Configure protocols (e.g. TCP/IP, NetBIOS)
13.3　Demonstrate the ability to use network troubleshooting applications (e.g. IPCONFIG, PING, TRACERT, NSLOOKUP, DIG, NETSTAT, NBTSTAT, and ARP)
13.4　Define the basic internet protocols and terminologies (e.g. HTTP, HTTPS, FTP, SMTP, DNS, DHCP, POP)

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13.5   Identify procedures for establishing internet connectivity

13.6   Install and configure browsers including enable/disable script support, configure proxy settings, configure security settings

13.7   Configure personal firewall protection

13.8   Install and configure email applications

13.9   Install and configure secure wireless networking

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