

Appendix K

INFORMATION TECHNOLOGY (IT) YOUTH APPRENTICESHIP

GENERAL IT PATHWAY IT ESSENTIALS UNIT 3

Unit 3: ALL Pathways IT Essentials

Competency

1. Apply applicable IT industry knowledge

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Demonstrates IT systems understanding based on *current training and learning*
- Navigates the basic operating system
- Manages electronic files and folders

Learning Objectives

SYSTEMS, PRINCIPLES, CONCEPTS

- Define Information Technology (IT) and Information Systems (IS)
- Compare IT to IS
- Describe the life cycle of an information system
- Describe the various components of the IT industry
- Explain the importance of the IT industry in meeting human needs
- Explain how hardware and software communicate to accomplish tasks
- Describe elements and types of information processing
- Identify the elements of the information processing cycle (i.e., input, process, output, and storage)
- Compare internet based computing models (such in as cloud computing) to standard computing models

TERMS

- Discuss the different file extension codes and their meanings such as .exe, .ini, .doc, .jpg, .gif, .txt, .dll, etc.
- Define common terms and acronyms used in the IT industry such as:
- PC, monitor, CRT, LCD, port, peripherals, portable devices, PDA
- Hard drive, driver, interface, CPU, O/S, BIOS
- Memory, RAM
- Boot, format, configure, upgrade, file, partition

COMPONENTS

- Identify types of computing platforms and how they process information
- Explain the purpose of the following computer components and how they work together as a system:
- Motherboard/CPU
- Chipsets/BIOS and their drivers
- Memory modules (RIMM, Dimm, SDRAM, DDR, DDR2, etc)

- Hard drive technologies (IDE, EIDE, SATA, SCSI, etc)
- Video cards and slots (VGA, XVGGA, VESA, SLI, etc)
- I/O ports (serial, parallel, USB, PS/2, Firewire, etc)
- Modem/NIC ports
- INPUT devices (keyboard, mouse, touchpad, cameras, scanners, midis, barcode scanners, etc)
- OUTPUT devices (printers, CRTs, LCD monitors, network devices)
- PDAs and Phones and how they connect to and share data with computers
- Power and power supplies

HISTORY & TRENDS

- Define the role of the binary and hexadecimal system in the development of information systems
- Report on historical evolution of IT in the US and globally
- Identify significant trends that impact IT locally and globally

ROLE & IMPACT

- Examine economic, social and technological changes to the IT industry
- Identify and discuss use of new technologies and communication systems and their impact on IT

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

2. Schedule appointments

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Schedules customer appointments
- Creates and maintains calendars/schedules
- Processes requests for appointments
- Verifies appointments
- Notifies customers of changes in schedule
- Manages scheduling conflicts
- Documents results of customer appointments

Learning Objectives

- Explain your organization's protocols and systems to fulfill service requirements
- Discuss how customer service is facilitated through scheduling appointments
- List items that internal and external customers consider important when scheduling appointments

Comments:

Unit 3: ALL Pathways

IT Essentials

Competency

3. Process customer requests

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Answers the phone or greet the customer professionally
- Projects a professional business image (e.g., appearance, voice, grammar, word usage, enunciation, nonverbal communication)
- Interacts with customers and colleagues in a professional manner (e.g., prompt, friendly, courteous, respectful, helpful, knowledgeable, understandable)
- Answers customer questions within the realm **of current training & learning** OR refer to worksite professional
- Handles equipment returns in accordance with customer service policy
- Compares equipment to order sheets to prepare for delivery to users
- **Performs common technical requests**
- **Assists to resolve customer requests**
- Ensures customer needs are met
- Follows through on commitments made to customers (e.g., special orders, delivery specifications, new items)
- Documents customer requests and resolution

Learning Objectives

- Describe your organization's IT services/offerings
- Identify the internal and external customers within your organization
- Discuss the process for documenting customer requests and their resolution or referral
- Explain the importance of documenting customer requests

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

4. Query, view, and extract data

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Accesses needed information using appropriate reference materials
- Enters data and edit fields and records
- Sorts and retrieves data from databases
- Queries to extract information from a file
- Queries to extract information from multiple files
- Creates reports from queries as needed
- Creates and use logical files

Learning Objectives

- Define basic database terms such as database, field, record, query, table
- Identify the appropriate database for a particular situation (e.g., flat, relational)
- Identify the variety of data types that are stored in database management systems (DMS)
- Explain the interrelationships between bytes, fields, records and databases

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

5. Perform common technical requests

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Obtains technical request
- Verifies appropriate authorization for request
- Ensures appropriate security and access protocols are observed
 - Sets up and edits user accounts such as for email, internet access, etc.
 - Enters and updates specific account data
- Documents request and action taken as required

Learning Objectives

- Outline the computer systems at your facility and how they work together
- List common technical requests that your customers request
- Describe the process and procedures for handling common technical requests at your facility
- Explain the purpose of security and access to files
- Describe the security levels and access for different types of accounts and files

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

6. Assist to resolve customer problems

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Defines the problem or needs based on request
 - Uses good triage questioning techniques
 - Pre-troubleshoots by working through basic user & equipment errors first
- Troubleshoots the problem
 - Refers to technical manuals, manufacturer information, or troubleshooting posts
 - Confers with users and other worksite professionals
 - Conducts computer diagnostics
 - Uses appropriate hardware/software tools to perform troubleshooting
 - Applies information and data analysis techniques
 - Refers major hardware or software problems or defective products to vendors or technicians for service
- Diagnoses the problem
 - Systematically runs through power, connection, hardware and software checks as required by your facility
- Fixes the problem
 - Repairs/replaces malfunctioning hardware
 - Reinstalls software as needed
 - Performs backup and recovery
 - Restores system to various states (safe modes, previous date, etc.)
- Defines scope of additional work required to meet customer needs
 - Identifies skill, time, and equipment resources needed
 - Formulates a resolution plan with the customer
- Documents technical support and resolution provided **thoroughly**
- Evaluates the problem-solving resolution to determine whether the problem was solved as intended
- Determines any needed follow-up actions
- Documents problem, diagnosis, resolution, and follow up

Learning Objectives

- Describe a systematic process and steps for basic troubleshooting
- Explain how the following common problems are found and resolved:
 - Startup sequence and beep codes
 - Priorities and interrupts at system level

- Discuss common error messages and symptoms of hardware failures
- Hardware versus software failure
- Need update of flash memory (BIOS)
- Need for hard drive maintenance procedures (defrag/scan (2) clear caches, etc)
- Practice questioning and troubleshooting skills with common hardware and software problems
- Explain the importance of documentation and follow up of problem resolutions
- Explain the impact of IT/IS problems on organizational costs (e.g., productivity, downtime)
- Classify IT/IS quality costs (e.g., prevention, evaluation, pre-delivery failure, post-delivery failure)

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

7. Perform basic back up procedures

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Loads or runs backup application(s) as required on a regular basis
- Backs up all data, data changes, etc, as required by organizational policy
- Once back up is complete, ensures appropriate storage of backed up data
- Secures storage “area” of backed up data

Learning Objectives

- Explain the need for regular backup procedures
- Identify the different types of backups (differential, complete, incremental)
- Compare different methods of backing up data and systems
- Describe the recovery process from backed up data
- Identify hot and warm site backup concepts
- Discuss the impact of secure storage of backed up data
- Describe the use of surge suppression protection and battery backup equipment
- Differentiate between disaster recovery and business continuance
- Identify the steps in a disaster recovery plan and a business resumption plan
- Identify methods for avoiding common computer system disasters
- Identify common backup devices
- Explain the purpose of archiving files

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

8. Monitor systems to ensure optimal functioning

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Monitors system status and performance regularly as required
- Runs regular performance diagnostics
- Enters commands and observe system functioning to verify correct operations and detect errors
- Refers system messages to worksite professional
- Performs preventive maintenance procedures on system, computers, & peripheral devices
- Reviews automated scheduling software
- **Assists to resolve problems**
- Documents monitoring, performance and any errors/malfunctions
- **Prepares required reports** of system operations and functioning

Learning Objectives

- Describe the purpose of regular system monitoring
- Compare types of monitoring performed at your facility and their purpose
- Explain the impact of downtime on business functions and productivity

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

9. Prepare required reports

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Identifies type of report needed
- Accesses needed data and information
- Compiles data into appropriate report
- Checks report for data parameters and information required\
- Analyzes report with worksite professional to ascertain needs, trends or problems

Learning Objectives

- List common reports your department/facility produces for customers
- Explain the purpose of regular report documentation
- Describe record retention of common reports

Comments:

Unit 3: ALL Pathways

IT Essentials

Competency

10. Install a desktop system and peripheral equipment

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Obtains technical request for task
- Verifies appropriate authorization for request
- Obtains or orders applicable equipment hardware, software, cables, operating systems, etc.
- Reviews procedure and safety requirements for appropriate installation and order of connection
- Documents actions taken once completed

DESKTOP

- Connects the power cable to the power outlet. NOTE: Do not plug the power cable into an outlet until the entire computer is set up
- Attaches the monitor cables to the back of the monitor and then to the computer
- Secures the monitor's power cable to the back of the monitor
- Attaches the mouse or wireless mouse receiver to the USB port OR mouse port on the computer
- Plugs the keyboard or wireless keyboard receiver into another USB port OR mouse/keyboard ports on the computer
- Plugs all power cords into a outlet or power strip
- Turns on the computer and the monitor
- Checks the connections and power again if any component fails to power on
- Checks that the mouse and keyboard work once the computer turns on

PERIPHERAL EQUIPMENT

- Obtains peripheral devices required such as a printer, scanner, web cam, etc.
- Verifies connection requirements with peripheral equipment manufacturer information
- Verifies power need (cord or battery) of peripheral equipment
- Connects peripheral equipment into the appropriate ports on the computer(USB, Network, Firewire, etc) as indicated
- Connects peripheral to the power source if required
- Verifies operation of the device once connected
- Checks the connections, and line-of-sight for wireless peripherals, if the peripheral fails to power on
- **Configures the operating system and drivers** for the desktop system and peripheral equipment

Learning Objectives

- Identify the function of computer hardware components
- Explain the proper handling of static-sensitive devices
- Describe the safety issues for installing electrical equipment
- Explain the effect of power and power surges on computer hardware and systems
- Discuss how a power strip works
- Identify primary PC components and the functions of each
- Describe the function of CPUs
- Explain how hardware components interact with each other
- Discuss how conflicts arise between hardware component interaction
- Explain how to access needed information using manufacturers' references (e.g., procedural manuals, documentation, standards, work flowcharts)
- Compare advantages and disadvantages between wired and wireless components

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

11. Install & configure an operating system (O/S) and/or drivers

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Obtains technical request for task
- Selects appropriate tools for installation & configuration
- Confirms enough random-access memory (RAM) is installed on the computer device to run the O/S
- Reviews procedure and safety requirements for appropriate installation
- Inserts and installs the O/S from the file location source
- Follows the instructions on the screen to install the O/S
- Configures the operating system for the required facility identification & control functions, such as security, design look, system information, etc
- Configures peripheral device drivers (e.g., disk, display, printer, modem, keyboard, mouse, network)
- Connects computer device to the Internet
- Connects computer device to peripheral devices, especially printers
- Installs security programs to protect computer device from viruses, malwares, adwares, security breaches, etc
- Selects and **installs applications** software
- Tests integrity and drivers of all devices recognized by O/S
- Refers system errors to worksite professional
- Tests all applications loaded
- Documents system installation activities

Learning Objectives

- Explain how to prepare a hard drive
- Define the purpose of an operating system
- Explain how an O/S works
- Identify differences between O/Ss (Windows/Linux/Mac/DOS)
- Explain the typical components of an O/S (explorer, Control panel, etc)
- Describe the startup sequence of O/Ss
- Describe features of operating systems that can be personalized
- Explain how to manipulate the O/S environment
 - Desktop, files, and disks
 - Identify how to change system settings, install, and remove software
 - Explain how to start and exit a Windows application

- Describe how to utilize sources of online help
- Compare operating system utilities (e.g., open source, mobile, proprietary)
- Describe how interfaces work between applications and hardware to be “user-friendly”
- Define API, CLI, and GUI and their use in computers
- Define the purpose of a driver
- List common examples of driver programs
- Define hardware-software interface issues for a computer system
- List common facility identification and control functions configured on computers
- Describe the licensing and copy write requirements and restrictions for operating systems, drivers, interfaces, and applications installed on a computer

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

12. Upgrade an operating system (O/S)

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Obtains technical request for task
- Selects appropriate tools for the upgrade
- Confirms enough random-access memory (RAM) is installed on the computer device to run the new O/S
- Reviews procedure and safety requirements for appropriate installation
- Backs up your files and data if required
- Inserts and accesses the upgrade file location source
- Installs the upgraded O/S
- Follows the instructions to install the upgraded O/S
- ONLY if directed by worksite professional- Wipe all previous data and re-format the hard drive IF required for a completely new system or for a problem resolution
- Re-boots the system if needed
- Configures the operating system for the required facility identification & control functions, such as security, design look, system information, etc
- Connects computer device to the Internet
- Allows the computer device to seek and install any updates according to facility policy
- Connects computer device to peripheral devices, especially printers if needed
- Installs security programs to protect computer from viruses, malwares, adwares, security breaches, etc, if required
- Selects and **installs applications** software if needed from wiping computer clean
- Tests integrity and drivers of all devices recognized by O/S
- Refers any system errors to worksite professional
- Tests all applications loaded
- Documents O/S upgrade activities

Learning Objectives

- Describe circumstances when it is necessary to reformat a hard drive
- Compare the processes for a simple manufacturer O/S upgrade to a complete re-formatting of the computer
- Define partitioning of a hard drive and when it is indicated

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

13. Install and uninstall an application

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner:

- Obtains technical request for task
- Documents actions taken once completed

INSTALL

- Ensures the computer device configuration meets the requirements needed for the application
- Reviews procedure and safety requirements for appropriate installation
- Closes down all other programs running
- Inserts and installs the application from the file location source
- Follows onscreen prompts during the installation
- If there are no prompts, installs the program from the “set up” or “install” file under the drive where the program is inserted
- Installs any other programs, files, utilities required to run the application
- Reboots the computer if required

UNINSTALL

- Uninstalls the application under Control Panel- Add/Remove Programs
 - If not listed, verifies if application has already been removed
 - If application still loaded, manually uninstalls **ONLY If** directed by worksite professional
- MANUAL UNINSTALL (WITH WORKSITE PROFESSIONAL)**
- Backs up system first
 - Renames to break the shortcuts OR deletes the application’s program group directory
 - Checks with worksite professional regarding registry information
 - Deletes any shortcut folders to application
 - Disables application startup/login if it ran at startup

Learning Objectives

- Identify how software and hardware work together to perform computing tasks
- Explain how software is developed and upgraded
- Identify different types of software
- Give some reasons why applications are uninstalled
- Describe reasons for renaming an application rather than deleting it
- Explain the process for removing applications in your facility
- Explain how installed software versions on company computers are managed and controlled

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

14. Install operating system (O/S) service packs and security patches

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner

- Obtains technical request for task
- Selects appropriate tools for the upgrade
- Confirms computer device meets prerequisites of the service pack or security patch
- Reviews procedure and safety requirements for appropriate installation
- Backs up your files and data if required
- Inserts and accesses the pack or patch file source
- Installs the O/S service pack or security patch
- Follows any prompts to complete the installation
- Refers error messages to worksite professional and check installation directions/information
- Documents installation

Learning Objectives

- Explain the purpose and function of service packs and security patches

Comments:

Unit 3: ALL Pathways IT Essentials

Competency

15. Ghost a computer

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner

- Sets up 2 hard drives- one to ghost and new one onto which the cloned files will be placed
- Checks to ensure that the destination hard drive can accommodate all the software to be ghosted
- Checks that the two hard drives are compatible
- Selects the proper software to use for ghosting
- Installs ghosting software onto the hard drive to ghost
- Checks software to ensure that it is running properly before ghosting
- Boots up the ghosting software and select the drive with the partition or files to be ghosted
- Selects a destination hard drive
- Chooses the size of the partition or files, compression choice, and name
- Confirms that files selected to ghost, and click "Proceed" and "OK" or yes
- Waits for the software to ghost the files
- Documents ghosting process

Learning Objectives

- Define "ghosting" a computer
- Compare ghosting to copying
- Explain when ghosting is indicated
- Describe how partitioning is related to ghosting a computer

Comments:

Unit 3: ALL Pathways

IT Essentials

Competency

16. Participate on a system project team

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting. Simulation should ONLY be used IF there is no possibility of skill performance at the worksite.
- ONLY up to FOUR skill competencies in this unit can be performed and assessed in simulation

Performance Standard Criteria

Performance will be successful when the learner

- Reviews the scope and phases of the system project
- Reviews the evaluation of the problem and the decision evidence for the system project
- Participates in the following system project team activities as able
- Identifies the cross-functional/departmental team required for the project
 - Take part in technical training or orientation for the system project
 - Develop task list
 - Evaluate project requirements
 - Identify required resources and budget
 - Estimate time requirements
 - Develop initial project management flowchart
 - Identify interdependencies
 - Identify critical milestones
 - Evaluate risks
 - Prepare contingency plan
 - Track critical milestones
 - Participate in project phase review
 - Report project status
 - Evaluate implementation
- Periodically reviews system project activities completed during the course of the project and their results

Learning Objectives

- Determine how business activities interface with data processing functions
- Explain how increases in productivity are realized by the implementation of information systems
- Summarize the importance of cross-functional teams in achieving IT project goals
- Describe strategies for maximizing productivity in a high tech environment
- Classify costs (e.g., direct and indirect, fixed and variable, methods and standards)
- Define the purpose of common quality tools used during IT projects

Comments:

Unit 4: Network and Support & Services Pathway Hardware

Competency

3. Perform basic technical network support duties

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- ***Assists to resolve customer problems***
- Provides technical support via telephone, E-mail, Web and onsite as needed
- Responds to user questions within realm of ***current training and learning***
- Chooses correct technical and computer tools to perform task
- Documents technical support provided
- Performs routine tasks as directed by worksite professional
 - Load computer tapes and disks onto network
 - Install software and printer paper/forms
 - Perform routine network startup and shutdown procedures
 - Help users with common operating systems, applications, and network-related procedures

Learning Objectives

- Identify computer classifications and hardware
- Identify major hardware components and their functions
- Identify the hardware associated with telecommunications functions
- Identify types of computer storage devices
- Identify how the four components of a network operating system support network operations (server platform, network services software, network redirection software, communications software)
- Compare and contrast local area networks (LANs), metro area networks (MANs), wide area networks (WANs), the Internet, intranets, and other data communications systems
- Trace the evolution of networks
- Analyze current trends and development in LANs
- Describe basic network classifications, topologies and network operating systems (NOS)
- Interpret basic networking terminology
- Identify the basic point-to-point network topologies (e.g., star, ring, tree, network, irregular)
- Differentiate between point-to-point and point-to-multipoint network topologies
- Identify the basic broadcast topologies (e.g., star, ring, bus)

Comments:

Unit 4: Network and Support & Services Pathway Hardware

Competency

4. Assist to monitor network performance

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Monitors system status and performance regularly as required
- Follows power-up and log-on procedures
- Monitors network center dust, temperature, and humidity controls
- Monitors system status and performance via reports and diagnostic monitoring systems
- Operates master consoles to monitor the performance of computer systems and networks
- Identifies required service level
- Identifies abnormal system performance
- Recognizes system alerts
- Recognizes security problems
- Recognizes environmental problems
- Identifies patterns of failure
- Refers any noted issues to worksite professional
- Follows log-off and power-down procedures
- Documents monitoring activities and results

Learning Objectives

- List general characteristics of network operating systems
- Compare network operating systems (i.e., Windows XP, LINUX, UNIX, etc.)
- Discuss the difference between stand-alone, peer-to-peer and client-server networks and software
- Explain how information traffic priorities are determined and monitored
- Identify components and characteristics of public networks (e.g., telephone, cable, satellite, wireless)
- Describe server functions including specialized servers (e.g., Web, DHCP, DNS, mail, proxy)
- Identify hardware and software requirements for specialized servers

Comments:

Unit 4: Network and Support & Services Pathway Hardware

Competency

5. Perform routine network system maintenance

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Follows preventive maintenance plan
- Runs diagnostics as required
- Refer system messages to worksite professional
- Performs preventive maintenance procedures on network, computers and peripheral devices
- Identifies new or replacement networking components needed
- Evaluates maintenance processes and outcomes with worksite professional
- Documents maintenance activities and results

Learning Objectives

- Describe the basic elements of network maintenance
- Identify available diagnostic tools used for network system maintenance
- Identify maintenance procedures and processes
- Explain the purpose and function of a routing protocol
- List characteristics and uses of network components (e.g., hub, switches, routers, firewall)
- Differentiate between a physical and logical topology
- Explain LAN transmission methods, standards and protocols
- Explain the difference between types of inputs such as DVI & VGA video and eSATA & USB & Firewire inputs
- Identify types of processing (e.g., batch, interactive, event-driven, object-oriented)
- Explain network architecture frame types and formats
- Explain the principles and operation of wire (coaxial, fiber optics, etc.) and wireless systems
- Explain the principles and operation of fiber optics, analog and digital circuits

Comments:

Unit 4: Network and Support & Services Pathway Hardware

Competency

6. Assist to apply network upgrades, service packs, and patches

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Obtains technical request for task
- Selects appropriate tools for the upgrade
- Reviews procedure and safety requirements for appropriate installation
- Backs up your files and data if required
- Inserts and accesses the pack or patch file source
- Installs and configures Internet software packages
- Upgrades network system software
- Follows any prompts to complete the installation
- Refers any error messages to worksite professional and refer to the installation directions/information
- Documents installation

Learning Objectives

- Explain the need for upgrades, packs & patches
- Discuss the benefits and drawbacks of custom configuration of network applications

Comments:

Unit 4: Network and Support & Services Pathway Hardware

Competency

7. Upgrade portable devices

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Obtains technical request for task
- Selects appropriate tools for the upgrade
- Obtains portable device
- Verifies upgrade requirements with upgrade technical information
- Reviews procedure and safety requirements for appropriate installation
- Backs up files and data if required
- Inserts and accesses the upgrade file location source
- Follows the instructions to install the upgraded software
- Re-boots the device if needed
- Re-configures the device if needed
- Verifies operation of the device once upgraded
- Refers any errors to worksite professional
- Documents upgrade activities

Learning Objectives

- Give examples of emerging hardware technologies
- Identify hardware devices appropriate for specific tasks
- Compare processes of upgrading devices to upgrading desktop systems

Comments:

Unit 4: Network and Support & Services Pathway Hardware

Competency

8. Replace inoperable computer components

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Obtains technical request for task
- Selects appropriate tools for the task
- Reviews procedure and safety requirements for appropriate replacement
- Backs up files and data
- Removes power source and cables
- Opens up computer device
- Cleans the internal components using appropriate procedures, if needed
- Labels all connections that attach to the damaged part
- Removes cables & connections from part to be replaced
- Removes old part
- Replaces with new hard drives, motherboards, and/or network cards as needed
- Ensures new part is securely fastened
- Reattaches all connections and cables as required for new part
- Closes up computer device
- Powers on the machine
- Reconfigures the settings
- Reboots and tests the new part as required
- Documents parts replacement
- Maintains the inventory of spare parts for emergency repairs

Learning Objectives

- Identify different pieces of hardware based on input/output; e.g., Identify if a card is PCI or if a hard drive is IDE/SATA
- Identify hardware components from the back end of the component or its connection
- Explain the required care for hardware components
- Discuss the danger from static when working with computer components
- Describe the preventive measures and protective equipment needed to work on internal computer components
- Explain the cleaning process for internal computer devices
- Describe visual inspection points for internal computer devices

Comments:

Unit 4: Network and Support & Services Pathway Hardware

Competency

9. Assist to troubleshoot network system and data communication problems

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Detects problem
- Identifies available diagnostic tools used for system maintenance
- Performs appropriate analysis to identify problem cause
- Isolates system faults in hardware and various types of networks, cables, data modems, and networking carrier systems
- Identifies areas of operation that need upgraded equipment such as modems, fiber optic cables, and telephone wires
- Identifies criticality of problem
- Develops resolution plan
- Identifies possible solutions
- Tests identified solutions
- Documents troubleshooting results and solutions

Learning Objectives

- Define bandwidth
- Explain the concept of bandwidth as it pertains to network data communication problems
- Define packet-switching techniques
- Compare characteristics of connection-oriented and connectionless networks
- Identify emerging networks and technologies
- Describe basic telephony (analog vs. digital signals)
- Explain how analog speech is converted to digital
- Demonstrate knowledge of Voice over IP (VoIP) concepts
- Explain convergence issues, including codec choice, jitter, wander, and connecting analog telephone adapter equipment
- Explain the benefits of implementing convergence
- Identify standard high-speed networks (e.g., broadband, ISDN, SMDS, ATM, FDDI)
- Explain the purpose and function of the TCP/IP protocol suite
- Discuss interconnecting LANs using WAN services
- Explain the impact of wireless technologies on data communication
- Describe common wireless problems

Comments:

Unit 4: Network and Support & Services Pathway Hardware

Competency

10. Assist to install or upgrade network equipment

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Obtains technical request for task
- Selects appropriate tools for installation, configuration & upgrade
- Confirms prerequisites for the new equipment or upgrade
- Reviews procedure and safety requirements for appropriate installation
- Inserts and installs the equipment at the correct locations in the correct manner
- Inserts and installs software from the file location source
- Installs and configures network cabling, modems, routers, mail servers, etc.
- Installs and configures network management software
- Accesses needed technical information using software help facilities if needed
- Loads software with minimum disruption of process flow
- Tests integrity of all devices and software added or upgraded
- Resolves any system errors or compatibility issues
- Documents network system installation or upgrade activities

Learning Objectives

- Describe the design of the network system at your facility
- List the purpose and function of the necessary components that make up the network design
- Identify principles governing software acquisition and upgrades
- Discuss how data is commonly converted between different software packages and between software and the O/S
- Distinguish between routing and routed protocols
- Explain how to install and configure routers to simulate a LAN/WAN environment
- Describe server virtualization and its impact
- Discuss distributed storage technologies (e.g., SAN, NAS)

Comments:

Unit 4: Network and Support & Services Pathway Hardware

Competency

11. Participate on a networking systems evaluation project team

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Reviews the scope and phases of the network systems evaluation project
- Reviews the needs analysis and decision evidence for the project
- Participates in the following network systems evaluation team activities as able:
 - Retrieve data for analysis of system capabilities and requirements
 - Analyze equipment performance records to determine the need for repair or replacement
 - Gather data pertaining to customer needs
 - Identify, predict, interpret, and evaluate system and network requirements
 - Confer with network team and users to solve existing system problems
 - Identify costs and benefits for networking solutions
 - Recommend changes to improve systems and network configurations
 - Determine hardware or software requirements related to such changes
 - Order, install or upgrade, and test changes
 - Monitor changes to ensure they brought about expected results
- Periodically reviews system project activities and completed results

Learning Objectives

- Identify site and network system constraints that impact your facility
- Identify power and power supplies
- Define power conversion
- Analyze a facilities' network capacity planning (power cable/wire conduit)
- Identify security requirements and the need for data protection
- Identify specific access levels that need to be accommodated
- Explain how a security system design is matched to identified security requirements
- Demonstrate knowledge of the role that routers, firewalls, intrusion detection systems, and VPNs play in security

Comments:

Appendix M

INFORMATION TECHNOLOGY (IT) YOUTH APPRENTICESHIP

PROGRAMMING & SOFTWARE DEVELOPMENT AND INFORMATION SUPPORT & SERVICES PATHWAY SOFTWARE UNIT UNIT 5

Unit 5: Programming & Software Development and Support & Services Pathway

Software

Competency

1. Use basic office software applications

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Accesses software application
- Utilizes basic features of Spreadsheet, Word Processing, Internet and Email applications as required for job tasks
- Changes application settings
- Manages files within an application
- Performs common editing and formatting functions
- Performs common printing functions
- Queries, adds, deletes, edits, saves, and prints information as applicable using these software applications

SPREADSHEETS

- Modifies worksheet data and structure
- Formats data in a worksheet
- Sorts data, manipulates data using formulas and functions
- Adds and modifies charts in a worksheet

WORD PROCESSING

- Formats text and documents Including the use of automatic formatting tools
- Inserts, edits, and formats tables in a document

INTERNET

- Uses search engines and URLs to locate valid information

EMAIL

- Creates, edits, saves, sends, and prints email communications

PUBLISHING/PRESENTATION APPLICATIONS

- Creates, edits, saves, and prints a document or presentation using these kinds of applications

Learning Objectives

- Identify new data technologies relevant to information technology
- Identify data communication trends and major current issues
- Explain how computing/networking hardware and software architecture interact
- List types of widely used software applications (e.g., word processing, database management, spreadsheet development)
- Identify new and emerging classes of software
- Identify common on-screen elements of Windows software applications
- Identify how electronic mail works

- Identify different types of information sources on the Internet
- Describe how to evaluate internet web sites and information for validity and reliability
- Explain appropriate and inappropriate uses of email and internet while at work
- Describe how to develop effective presentations using appropriate technologies (e.g., tables, charts, and visual graphics)
- Explain the use of writing/publishing/presentation applications
- Describe how database and spreadsheet technology is used at your worksite to manage worksite operations

Comments:

Unit 5: Programming & Software Development and Support & Services Pathway

Software

Competency

2. Assist to maintain database security measures

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Follows all security protocols for access, addition and deletion of access to databases
- Maintains confidentiality
- Loads virus detection and protection software
- Identifies sources of virus infections
- Removes viruses
- Reports viruses in compliance with company standards
- Provides for user authentication and restricted access (e.g., assign passwords, access level)
 - Obtain technical request as required to security requests
 - Verify security authorization
 - Set up new user accounts
 - Delete old user accounts
 - Modify current user accounts
- Documents request and action taken as required

Learning Objectives

- Identify and evaluate industry trends in database systems
- Discuss security needs for a database
- Explain the purpose of security and access to files
- Describe the security levels and access for different types of accounts and files
- Specify users and user access levels for each segment of a database
- Analyze legal and ethical dilemmas (e.g., virus development, hacking, phishing)
- Describe the role of computer forensic investigators
- List common internet crimes
- List some prevention actions related to cyber crime
- Describe techniques to identify criminal activity

Comments:

Unit 5: Programming & Software Development and Support & Services Pathway Software

Competency

3. Monitor and maintain data integrity

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Identifies maintenance requirements
- Performs monitoring and maintenance activities regularly as required
- Verifies that all possible security safeguards are in place
- Selects and enters codes to monitor database performance
- Performs database queries to analyze database functionality
- Measures changes in productivity using metrics
- ***Assists to troubleshoot application and database problems***
- Communicates and documents maintenance activities and results

Learning Objectives

- Identify the elements of the information processing cycle (i.e., input, process, output, and storage)
- Describe the information system life cycle
- Identify current information life cycle models
- Explain the key functions of database system software
- Explain measurement techniques for performance
- Explain primary reasons for the need for data conversion
- Explain the basic concepts and potential for loss of data in data conversions

Comments:

Unit 5: Programming & Software Development and Support & Services Pathway Software

Competency

4. Assist to troubleshoot application and database problems

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Detects problem
- Identifies available diagnostic tools used for application and database system maintenance
- Performs appropriate analysis to identify problem cause
 - Identify function affected
 - Identify what changed
 - Identify how it's supposed to work
 - Identify what doesn't match up
- Rules out hardware equipment issues
- Isolates system faults in database and applications
- Identifies criticality of problem
- Develops resolution plan
- Identifies possible solutions
- Modifies existing databases and database management systems or reports to programmers and analysts to make changes
- **Assists to test software programming changes or modification**
- Documents troubleshooting results and solutions

Learning Objectives

- List common issues or concerns with database applications
- Describe search strategies
- Explain how search queries are used to extract useful information
- Describe how application and database issues are documented and hard-coded for future reference

Comments:

Unit 5: Programming & Software Development and Support & Services Pathway

Software

Competency

5. Create a database

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Creates a database from model specifications using both program code and Graphic User Interface (GUI) processes when provided by the database software
- Verifies that all possible security safeguards are in place
- Plans and develops record specifications
- Modifies record structures
- Populates the database created with test data
- Performs database queries to analyze database functionality and diagnose problems
- Performs database troubleshooting and system-tuning functions

Learning Objectives

- Explain database development processes
- Define database model
- Compare types of database models
- Describe a brief history of database management systems
- Review a data model describing data elements and how they are used
- Compare advantages and disadvantages of data centralization and data decentralization and its impact on computing processes
- Describe application development tools used with a database system to create solutions for an organization
- Define database schema
- Explain the purpose and function of database normalization
- Discuss industry standards for platform interface development (e.g., XML, ASP, PHP)
- Explain the process of data mining

Comments:

Unit 5: Programming & Software Development and Support & Services Pathway

Software

Competency

6. Acquire and install new software

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Verifies the *application package has been evaluated*
- Researches the compatibility of the hardware and software
- Identifies hardware requirements (e.g., processor, memory, disk space, communications, printers, monitors) required
- Verifies that software to be installed is licensed prior to performing installation
- Installs given application/system software in accordance with manufacturer's procedures
- Selects appropriate installation options (e.g., default, customized)
- Configures software to appropriate operating system and user application settings
- **Converts data files** if required
- **Assists to test new software**
- Refers unexpected results to worksite professional
- Documents installation, settings and testing of new software

Learning Objectives

- Identify common system processing requirements
- Explain the concept of an End User License Agreement (EULA)
- Differentiate between open source, single-user, multiple and proprietary licenses
- Explain the concept of open source
- Identify common characteristics of open source licensing agreements, including the GNU General Public License (GPL)
- Differentiate between procedures for an upgrade and for a new installation
- Differentiate between stand-alone and network software installation procedures

Comments:

Unit 5: Programming & Software Development and Support & Services Pathway Software

Competency

7. Assist to test software programming changes or modifications

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Follows defined test procedures
- Accesses and runs test cases using requirements and design specification
- Helps with unit testing, integration, and regression testing as required
- Helps with user-acceptance testing
- Documents testing results and any errors discovered

Learning Objectives

- Define the purpose and principle of unit testing
- Define the purpose and principles of integration testing
- Define the purpose and principles of regression testing
- Define the purpose and principles of user-acceptance testing
- Explain how to resolve program implementation issues (e.g., debugging, documentation, auditing)
- List common software development issues (e.g., audit ability, correctness, reliability, and productivity)
- Explain how programming control structures are used to verify correctness

Comments:

Unit 5: Programming & Software Development and Support & Services Pathway Software

Competency

8. Evaluate application software packages

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting

Performance Standard Criteria

Performance will be successful when the learner:

- Performs work flow analysis to determine user needs
- Evaluates appropriateness of software for specific projects
- Prepares a cost-benefit analysis for a software package
- Documents results of the software evaluation
- Performs a software configuration audit
- Performs a physical configuration audit

Learning Objectives

- Identify common system processing requirements
- Describe how to conduct work flow analysis
- Describe how to conduct a cost-benefit analysis
- List elements to evaluate in a software configuration audit
- List elements to evaluate in a physical configuration audit

Comments:

Unit 5: Programming & Software Development and Support & Services Pathway

Software

Competency

9. Write code

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting

Performance Standard Criteria

Performance will be successful when the learner:

- Analyzes and prepares logic using a program flowchart
- Analyzes and prepares logic using at least one alternative to flowcharting such as pseudo-coding
- Reviews design (e.g., peer and/or user walkthrough)
- Uses appropriate programming language
- Compiles and debugs code
- Prepares code documentation
- Prepares unit testing plan
- Conducts unit testing and bug fixes

Learning Objectives

- Identify and define object-oriented programming terminology
- List current key programming languages and the environment they are used in
- Compare languages used in software development
- Identify the use of program design tools in a software development process
- Explain programming language concepts
- Describe the necessary hardware-software connections for programming
- Explain the concepts of data and procedural representations
- Discuss the basic principles for analyzing a programming language
- Explain programming structures
- Compare source and object code
- List the basics of structured, object-oriented language
- Explain how a programming language can support multitasking and exception-handling
- Describe how data structure and program design is translated into code in an appropriate language
- Describe the function and operation of compilers and interpreters
- Summarize how data is organized in software development
- List common key constructs and commands specific to a language you will be using
- Define structured/modular programming

Comments:

Unit 5: Programming & Software Development and Support & Services Pathway

Software

Competency

10. Participate on a software development or customization project team

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Reviews the scope and phases of the software development project
- Reviews the needs analysis and decision evidence for the software development project
- Participates in the following software development team activities as able:
 - Perform workflow analysis to determine user needs
 - Analyze existing procedures
 - Define business problem to be solved by the application
 - Develop networking, hardware, and software requirements and specifications
 - Access needed information using company and manufacturers' references (e.g., procedural manuals, documentation, standards, word flowcharts)
 - Divide design specifications into logical process blocks
 - Identify constraints
 - Identify key functions and subsystems of the software product
 - Identify software development process and issues
 - Design project plan
 - **Write code** using appropriate programming language
 - Use code development tools (e.g. debugger, integrated development environments)
 - **Assist to test software programming**
- Periodically reviews system project activities and completed results

Learning Objectives

- Identify roles of team members/customers in the software development process
- Describe software development processes and methodology
- Discuss key elements of functional requirements for software development
- Discuss nonfunctional requirements for a software development plan (e.g., security, integrity response time, reliability, support, and documentation)
- Explain the use, structure, and contents of a requirements specification document
- Explain how to use modeling and analyze functional requirements (e.g., dataflow diagrams, process specifications, and a data dictionary)
- Explain how to use modeling and analyze data requirements (e.g., Jackson diagrams, entity relationship diagrams, and relations)
- Describe common system analysis issues related to design, testing, implementation, and maintenance
- Identify standards and issues related to I/O programming and design of I/O interfaces

- Recognize the relationship between dependability, functionality, ease of use, etc.
- Describe trade-offs involved in design choices

Comments:

Appendix N

INFORMATION TECHNOLOGY (IT) YOUTH APPRENTICESHIP

WEB & DIGITAL COMMUNICATIONS PATHWAY WEB & DIGITAL MEDIA UNIT UNIT 6

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

1. Maintain web/digital media production and progress records

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Selects appropriate forms/records
- Codes documents as required
- Files forms/records in appropriate location
- Retrieves and replaces files in correct position
- Uses appropriate computer codes, formatting, macros, charts, spreadsheets, etc.
- Verifies data prior to entry/storage
- Maintains files
- Works with team members to report project status
 - Compile information in format required
 - Identify and track critical milestones
 - Regularly, report project status to team members in a timely and accurate manner as required

Learning Objectives

- Identify the history and fundamentals of the internet and digital communications
- Explain the use on internet based communications tools such as social networking, online collaboration, online learning, and online meetings and conferences
- Describe the impact of online technologies and communications to personal, educational and business entities
- Compare features of different online social, collaboration and business tools
- Explain the process for documenting web and digital communication work
- Describe the importance of record retention in development projects

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

2. Assist to outline structural content

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Refers to client requirements and project plan
- Lists the areas of information to be disseminated
- Organizes the basic information into an outline of content to be used within each area (site map)
- Selects the media elements (e.g., sound, video, graphics, text, motion graphics) to be used with the verbal content
- Prepares draft flowcharts, navigational blueprints and/or storyboards to describe the verbal content and media elements for each page
- Finalizes the draft outline with details on layout and interface of pages

Learning Objectives

- Explain the concept of intellectual property
- Differentiate between copyright and trademarks
- Describe the function of a non-disclosure agreement (NDA)
- Explain the impact publication process and distribution method have on product development
- Explain how copy write and trademark law applies legally and ethically to the use of other source code and web page design
- Define the purpose and function of WAI (Web Accessibility Initiative) guidelines

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

3. Assist to create verbal content

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Refers to client requirements and project plan
- Collects the text documents (content information) and images that will appear on the web site or in the digital communication product from the client
- Reads through the content information
- Confers with worksite professional to determine key content pieces to include or highlight in final product
- Writes script OR arranges content from client content information
- Reviews, edits, and revises content with client & worksite professional
- Finalizes content
- Converts content into a format which can be viewed
- Works with other team members to integrate the verbal content with site design for final product

Learning Objectives

- Define the purpose and use of web metrics and governance (policies and stylebooks)
- Discuss some cultural implications on design and deployment of digital communication products
- Explain ways to manage and update verbal content on a web sites and in other digital communication methods

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

4. Create or edit images and graphics for website/digital media use

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Refers to client requirements and project plan
- Creates or edits images and graphics based on knowledge of principles of design (color theory and schemes, proximity, alignment, repetition, web graphics, optimization, typography)
 - Produce or acquire graphics content
 - Produce or acquire audio content
 - Produce or acquire video content
- Determines size and arrangement of graphics material and copy
- Selects style and size of type
- Draws and prints charts, graphs, illustrations, and other artwork, using computer
- Uses computer software to generate new images
- Evaluates visual appeal with worksite professional
- Reviews, edits, and revises images & graphics with client & worksite professional
- Makes improvements as needed
 - Alter digitized images using an image manipulation program
 - Alter digitized video using a video manipulation program
- Finalizes images and graphics
- Converts images and graphics into a format which can be viewed

Learning Objectives

- Describe principles and elements of design
- Explain how color theory is used to select appropriate colors
- Define typography
- Discuss how elements of typography are incorporated into overall design
- Explain how basic motion graphics are programmed
- Give examples of photographic special effects and how they are incorporated into interactive media presentations
- Describe how to integrate photographically derived images with hand-drawn graphic images
- Explain the use of digital imaging, digital video techniques, and equipment to obtain images
- List common graphics, video, motion graphics, and web software programs
- Describe the use of integrated development environments (such as Visual Studio, Dreamweaver, Flash, Waterproof, etc)
- Describe the basic principles of motion graphics
- Identify how different user agents (browsers, devices) affect the digital communication product

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

5. Create templates for website layout

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Refers to client requirements and project plan
- Creates the website layout template based on knowledge of principles of design (color theory and schemes, proximity, alignment, repetition, web graphics, optimization, typography)
 - Create an integrated template theme for the Portal Page, Sub Pages, etc.
- Determines size and arrangement of graphics material and copy
- Selects style and size of type
- Draws and prints charts, graphs, illustrations, and other artwork, using computer
- Uses computer software to generate new images
- Evaluates visual appeal with worksite professional
- Reviews, edits, and revises template with client & worksite professional
- Makes improvements as needed
- Finalizes template
- Converts template into a format which can be viewed

Learning Objectives

- Define reusable components and how that relates to web design
- Describe principles and elements of design
- Explain how color theory is used to select appropriate colors
- Define typography
- Discuss how elements of typography are incorporated into overall design
- List sources of web design element help
- Describe the use of integrated development environments (such as Visual Studio, Dreamweaver, Flash, Waterproof, etc)
- Identify how different user agents (browsers, devices) affect the digital communication product

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

6. Write program code for a website

Performance Standard Condition

Competence will be demonstrated

- at the worksite or in the classroom in a simulated setting

Performance Standard Criteria

Performance will be successful when the learner:

- Refers to client requirements, project plan, and site map plan
- Codes the website elements (content, links, images, graphics, specialized scripts) created using HTML or GUI design software
- Creates pages that can be used on any type of server and viewed with any type of browser
- Reviews, edits, and revises coding as needed
- Reviews draft product with client & worksite professional
- ***Performs user testing***

Learning Objectives

- Explain the features and functions of Web page design software
- Compare/contrast the features and functions of software editors available for designing web pages
- Identify standard scripting languages (e.g., JavaScript, .NET frameworks, PHP, ActiveX)
- Explain the uses and advantages/disadvantages of various scripting languages
- Explain how to use a scripting language to program a site
- Compare the web coding languages & formatting of HTML, XHTML, CSS, XML/XSL
- Describe how version control and documentation are used and managed in programming web pages
- Explain the coding elements required for basic web application security.
- Discuss the code elements needed to ensure that a website is compatible across multiple browsers and devices
- Explain importance of web standards
- Explain the purpose of web content delivery enablers (e.g., CGI, API, SSI)
- Describe how to interface client/server
- Explain advantages & disadvantages of client-side processing
- Identify security issues related to server-side processing

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

7. Assist to create specialized scripts/motion graphics

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Refers to client requirements, project plan, and site map
- Coordinates with programmers to create specialized scripts
 - Use motion graphics to create a visual Web/digital designs
 - Produce or acquire the specialized script or motion graphics content
- Creates the special feature based on knowledge of principles of design (color theory and schemes, proximity, alignment, repetition, web graphics, optimization, typography)
 - Employ basic motion graphic programming knowledge demonstrating use of key frames and frames, impact of deployment device, animation techniques, security and compatibility across multiple browsers or devices
- Reviews, edits, and revises scripts/motion graphics with client & worksite professional
- Makes improvements as needed
 - Alter digitized images using an image manipulation program
 - Alter digitized video using a video manipulation program
- Finalizes script/motion graphics
- Converts script/motion graphics into a format which can be viewed

Learning Objectives

- Describe the purpose for enhanced web and digital experiences
- Compare motion graphics to other forms of media
- List common types of specialized scripts that a client may require
- Define and compare podcasts, vodcasts, and other e-business, e-commerce and e-training solutions

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

8. Perform user testing

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Performs user testing throughout the design and development process
- Implements a test plan for the web/digital communication product
- Performs usability tests
 - Assess product effectiveness
 - Test product for reliability
- Plans and coordinates customer acceptance testing
- Resolves product problems
 - Define the problem
 - Identify/test possible solutions
 - Develop resolution plan
 - Implement solution
- Documents all phases and issues of user testing

Learning Objectives

- Explain the role of browsers in reading files on the World Wide Web (text-only, hypertext)
- Identify how different browsers affect the look of a web page
- Demonstrate knowledge of the characteristics and uses of plug-ins
- Describe how bandwidth affects data transmission and on-screen image
- Demonstrate knowledge of how bandwidths affect data transmission and on-screen image
- Compare and contrast clients and servers
- Differentiate between a client and a server

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

9. Assist to finalize a website

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Establishes and registers a domain name
- Posts completed site to internet server
- Complies with TCP/IP (Transfer Control Protocol/Internet Protocol)
- Documents server environment to include specifications, passwords, and software versions
- Uses FTP software as needed to support website
- Submits completed site to search engines

Learning Objectives

- Compare domain name registries and extensions
- Explain the DNS (domain name server) hierarchy
- Identify elements of DNS (e.g., zones, server types)
- Compare the advantages and disadvantages of running your own server vs. using a server provider
- Identify hardware requirements for a server
- Identify server software options
- Evaluate server providers
- Describe issues of browser/server compatibility, including which browsers and servers work well together and which ones do not
- Describe Internet protocols
- Explain Transmission Control Protocol/Internet Protocol (TCP/IP) suite
- Explain the concept of routing
- Describe search engine management (SEM) and search engine optimization (SEO)
- Explain the use of transfer protocols (FTP, WebDav)
- Identify cross-platform issues
- Discuss new and emerging trends related to the Internet
- Define the purpose and use of Web 2.0
- Explain concepts involved in social networking
- Describe applications and services used to create rich internet applications
- Identify Web 2.0 solutions

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

10. Assist to maintain a website

Performance Standard Condition

Competence will be demonstrated

- at the worksite
- while assisting a worksite professional

Performance Standard Criteria

Performance will be successful when the learner:

- Makes changes to the site as directed by client
- Analyzes software technical support needs
 - Identify maintenance and support requirements
 - Define scope of work to meet customer support needs
- Accesses needed information using appropriate reference materials
- Provides help to first line user-support personnel to answer user questions
- Assists to troubleshoot hardware, access and usability issues
- Performs system-tuning function
- Performs product maintenance activities
 - Upload files to the server
 - Publicize the site (e.g., submit announcements to major search engines)
 - Collect/analyze usage statistics
 - Utilize back-up and restore software features
- Follows established procedures for testing, identifying problems, and tracking resolutions
 - Identify and analyze problem
 - Analyze and propose solutions
 - Implement solutions in code and documentation
- Uses customer satisfaction in determining product characteristics (e.g., cost, user-friendliness)
- Communicates and documents technical support provided

Learning Objectives

- Describe the relationship between dependability, functionality, ease of use, etc.
- Summarize Internet security issues and systems available for addressing them
- Explain data communication equipment and media
- List common uses of data communication equipment
- Compare types of communications media
- Explain data transmission codes and protocols
- Demonstrate knowledge of data transmission codes and protocols
- Explain the differences between local and wide area networks
- Summarize data communication trends and issues
- Identify major current issues in data communications
- Identify the relationship between computer networks and other communications networks (e.g., Telephone Network), and the Internet

Comments:

Unit 6: Web & Digital Media Pathway

Web & Digital Media

Competency

11. Participate on website/digital media project team

Performance Standard Condition

Competence will be demonstrated

- at the worksite

Performance Standard Criteria

Performance will be successful when the learner:

- Participates as a team member in the following website/digital media project tasks as able:
 - Meet with the client to determine purpose of project, scope, target audience requirements, time constraints, design desires, etc
 - **Outline structural content**
 - Design delivery platforms, system architecture, user interface, navigational schema, and coding requirements for site creation including: e-commerce capability, forms and specialized scripts
 - Prepare visual design specifications for layout, organization, color, images, video, etc.
 - Identify technical constraints
 - Identify available media and content sources
 - Create sample design
 - Create final project plan including time line for completion, staffing resources, preliminary project budget, detailed task list, user testing plan, critical milestones, interdependencies, etc.
 - Obtain client approval on scope of work
 - **Create content**
 - **Code website/project**
 - **Perform user testing**
 - **Finalize project**
- Periodically reviews project progress and results

Learning Objectives

- Explain the purpose and use of project management and collaborative tools
- Identify roles of team members/customers in the project process
- Describe web & media development processes and methodology
- Discuss key elements of functional requirements for web & digital media development
- Discuss nonfunctional requirements for a web & digital media development plan (e.g., security, reliability, support, and documentation)
- Explain the use, structure, and contents of a requirements specification document
- Describe common system analysis issues related to design, testing, implementation, and maintenance

Comments: