COMPUTER REPAIR AND SERVICE / ADVANCED COMPUTER REPAIR AND SERVICE

COURSE CODES: 5320, 5321

PROGRAM DESCRIPTION: The Information Support and Service program prepares students to perform tasks related to computer repair and service. Students receive instruction in the installation, operation, maintenance, and repair of computer-based technology including mobile peripheral, and networked devices, and laptops. Laboratory activities provide hands-on instruction in installation, configuration, troubleshooting, component replacement, operating systems, security, networking devices, and upgrades in accordance with industry certification standards.

The most current listing of standards for this course/program can be found at an industry site such as the CompTIA Web site at http://certification.comptia.org/getCertified/certifications/a.aspx.

OBJECTIVE: Given the necessary equipment, supplies, and facilities, the student will complete all of the following core standards successfully.

COURSE CREDITS:	1 Carnegie unit (120 hours), 2 (240 hours) units per course code
PREREQUISITE(S):	None
COMPUTER ACCESS REQUIRED:	1 Computer per student with Internet access
RECOMMENDED MAXIMUM ENROLLMENT:	18
RESOURCES:	Instructional Materials
RECOMMENDED GRADE LEVELS:	10-12

A. SAFETY

Effective professionals know the academic subject matter, including safety as required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Review school safety policies and procedures.
2. Review classroom safety rules and procedures.
3. Review safety procedures for using equipment in the classroom.
4. Identify major causes of work-related accidents in office environments.

5. Demonstrate safety skills in an office/work environment.

B. STUDENT ORGANIZATIONS

Effective professionals know the academic subject matter, including professional development, required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

C. TECHNOLOGY KNOWLEDGE

Effective professionals know the academic subject matter, including the ethical use of technology as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation.
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., piracy; cyberbullying, illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).
5. Discuss legal issues and the terms of use related to copyright laws, fair use laws, Creative Commons, and ethics pertaining to downloading of images, photographs, documents, video, sounds, music, trademarks, and other elements for personal use.
6. Describe ethical and legal practices of safeguarding the confidentiality of business-related information.
7. Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks.

D. PERSONAL QUALITIES AND EMPLOYABILITY SKILLS

Effective professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate punctuality.
2. Demonstrate self-representation.
3. Demonstrate work ethic.
4. Demonstrate respect.
5. Demonstrate time management.
6. Demonstrate integrity.
7. Demonstrate leadership.
8. Demonstrate teamwork and collaboration.
9. Demonstrate conflict resolution.
10. Demonstrate perseverance.
11. Demonstrate commitment.
12. Demonstrate a healthy view of competition.
13. Demonstrate a global perspective.
14. Demonstrate health and fitness.
15. Demonstrate self-direction.
16. Demonstrate lifelong learning.

E. PROFESSIONAL KNOWLEDGE

Effective professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate effective speaking and listening skills.
2. Demonstrate effective reading and writing skills.
3. Demonstrate mathematical reasoning.
4. Demonstrate job-specific mathematics skills.
5. Demonstrate critical-thinking and problem-solving skills.
6. Demonstrate creativity and resourcefulness.
7. Demonstrate an understanding of business ethics.
8. Demonstrate confidentiality.
9. Demonstrate an understanding of workplace structures, organizations, systems, and climates.
10. Demonstrate diversity awareness.
11. Demonstrate job acquisition and advancement skills.
12. Demonstrate task management skills.
13. Demonstrate customer-service skills.

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LEVEL 1

F. MOBILE DEVICES

Proficient IT professionals demonstrate knowledge and skills in repairing and servicing mobile devices as needed in their role. The following accountability criteria are considered essential for students in the Information Support and Service program of study.

1. Identify, install, and configure the laptop hardware and components.
2. Install components within the display of a laptop, (e.g., webcam, microphone, inverter, digitizer/touchscreen etc.)
3. Demonstrate appropriate use of laptop features, (i.e., special function keys, docking station, port replicator, physical laptop lock and cable lock, rotating/removable screens.)
4. Compare and contrast various types of other mobile devices (i.e., tablets, smart phones, wearable technology devices, e-readers, GPS.)
5. Connect and configure accessories and ports of other mobile devices.
6. Configure basic mobile device network connectivity and application support, (e.g., wireless/cellular data network, Bluetooth, email configuration).
7. Sync mobile devices, (e.g., devices to synchronize, types of data to synchronize, software requirements, authentication, connection types).

G. NETWORKING

Proficient IT professionals demonstrate knowledge and skills in repairing and servicing networks as needed in their role. The following accountability criteria are considered essential for students in the Information Support and Service program of study.

1. Compare and contrast TCP and UDP ports, protocols, and their purposes.
2. Compare and contrast common networking hardware devices, (i.e., routers, switches, access points, cloud-based network controller, firewall, network interface card, repeater, hub, cable/DSL modem, bridge, patch panel, Power over Ethernet (PoE), Ethernet over Power).
3. Install and configure a basic wired/wireless SOHO network.
4. Compare and contrast wireless networking protocols.
5. Summarize the properties and purposes of services provided by network hosts (e.g., server roles, internet appliance, and legacy/embedded systems).
6. Explain common network configuration concepts (e.g., IP addressing, DNS, DHCP, IPv4 vs. IPv6).
7. Compare and contrast internet connection types, network types, and their features.
8. Use appropriate networking tools (i.e., crimper, cable stripper, multimeter, tone generator and probe, cable tester, loopback plug, punchdown tool, WiFi analyzer.)

H. HARDWARE

Proficient IT professionals demonstrate knowledge and skills in repairing and servicing hardware as needed in their role. The following accountability criteria are considered essential for students in the Information Support and Service program of study.

1. Explain basic cable types, features, and their purposes, (e.g., network cables, video cables, peripheral cables, hard drive cables, and adapters).
2. Identify common connector types.
3. Install RAM types.
4. Select, install, and configure storage devices.
5. Install and configure motherboards, CPUs, and add-on cards.
6. Explain the purposes and uses of various peripheral types.
7. Summarize power supply types and features.
8. Select and configure appropriate components for a custom PC configuration to meet customer specifications or needs.
9. Install and configure common computing devices.
10. Configure SOHO multi-function devices/printers and settings.
11. Install and maintain various print technologies (i.e., Laser, Inkjet, Thermal, Impact, Virtual, and 3D).

I. VIRTUALIZATION AND CLOUD COMPUTING

Proficient IT professionals demonstrate knowledge and skills in repairing and servicing client-side virtualization as needed in their role. The following accountability criteria are considered essential for students in the Information Support and Service program of study.

1. Compare and contrast cloud computing concepts (e.g., common cloud models, shared resources, resource pooling, measured service, cloud file storage services, cloud-based applications, and virtual desktops).
2. Set up and configure client-side virtualization.

J. HARDWARE AND NETWORK TROUBLESHOOTING

Proficient IT professionals demonstrate knowledge and skills in troubleshooting hardware and network problems as needed in their role. The following accountability criteria are considered essential for students in the Information Support and Service program of study.

1. Solve problems using industry best practice methodology.
2. Troubleshoot problems relating to computer hardware (e.g., motherboards, RAM, CPUs, power, hard drive, and RAID arrays).
3. Troubleshoot problems relating to computing peripherals (e.g., printers, video, projector and displays.)
4. Troubleshoot common mobile device issues while adhering appropriate procedures.

5. Troubleshoot common wire and wireless network problems.

LEVEL 2

K. OPERATING SYSTEMS

Proficient IT professionals demonstrate knowledge and skills for installing and configuring various operating systems as needed in their role. The following accountability criteria are considered essential for students in the Information Support and Service program of study.

1. Compare and contrast common operating system types and their purposes.
2. Compare and contrast Microsoft Windows versions.
3. Summarize general OS installation considerations and upgrade methods.
4. Use appropriate Microsoft command line tools.
5. Use Microsoft operating system features and tools.
6. Use Microsoft Windows Control Panel utilities.
7. Summarize application installation and configuration concepts.
8. Configure Microsoft Windows networking on a client/desktop.
9. Use features and tools of the Mac OS and Linux client/desktop operating systems.

L. SECURITY

Proficient IT professionals demonstrate knowledge and skills for implementing appropriate hardware and security measures as needed in their role. The following accountability criteria are considered essential for students in the Information Support and Service program of study.

1. Summarize the importance of physical security measures.
2. Explain logical security concepts.
3. Compare and contrast wireless security protocols and authentication methods.
4. Detect, remove, and prevent malware using appropriate tools and methods.
5. Compare and contrast social engineering threats and vulnerabilities.
6. Compare and contrast the differences of basic Microsoft Windows OS security settings.
7. Implement security best practices to secure a workstation.
8. Implement methods for securing mobile devices.
9. Implement appropriate data destruction and disposal methods.
10. Configure security on SOHO wireless and wired networks.

M. SOFTWARE TROUBLESHOOTING

Proficient IT professionals demonstrate knowledge and skills for troubleshooting software issues for various operating systems software as needed in their role. The following accountability criteria are considered essential for students in the Information Support and Service program of study.

1. Troubleshoot Microsoft Windows OS problems.
2. Troubleshoot and resolve PC security issues.
3. Use best practice procedures for malware removal.
4. Troubleshoot mobile OS and application issues.
5. Troubleshoot mobile OS and application security issues.

N. OPERATIONAL PROCEDURES

Proficient IT professionals demonstrate knowledge and skills in operational procedures as needed in their role. The following accountability criteria are considered essential for students in the Information Support and Service program of study.

1. Compare and contrast best practices associated with types of industry documentation.
2. Implement basic change management best practices.
3. Implement basic disaster prevention and recovery methods.
4. Explain common safety procedures, (i.e., equipment grounding, proper component handling and storage, toxic waste handling, personal safety, and compliance with government regulations.)
5. Explain environmental impacts and appropriate controls.
6. Explain the processes for addressing prohibited content/activity, and privacy, licensing, and policy concepts.
7. Use proper communication techniques and professionalism.
8. Identify the basics of scripting.
9. Use remote access technology.

Course Materials and Resources

Course Academic Standards and Indicators

SC Computer Science Academic Standards and Process Standards