INFORMATION TECHNOLOGY CAREER CLUSTER DESIGN

Information Support and Services Pathway

CIP CODE 11.0301

APPROVED PATHWAY:

1. Includes a minimum of three secondary-level credits.
2. Includes a work-based element.
3. Consist of a sequence:
   - Introductory-level course.
   - Technical-level course.
   - Application-level course.
4. Supporting documentation includes:
   - Articulation Agreement(s).
   - Certification.
   - Program Improvement Plan.
   - Program of Study.
5. Technical-level and Application-level courses receive.5 state weighted funding in an approved CTE pathway.

INTRODUCTORY LEVEL

Title	Code	Credit
Computing Systems	10002/60002	1
Computer Applications	10004/60004	1

TECHNICAL LEVEL

Title	Code	Credit
* Foundations of Information Technology	10001	1

APPLICATION LEVEL

Title	Code	Credit
CyberSecurity I	10020	1
# CyberSecurity II	10900	1
#Information Support and Services I	10052	1
#Information Support and Services II	10097	1
Work-based Learning in Information Support and Services	10098	1

* Required course for pathway approval.

\# Has prerequisite course(s): Courses comprising a sequence are numbered consecutively. See Competency Profile for details.

Course	Computing Systems	Course #	10002/60002	Credit	1.0
Pathways & CIP Codes:	Information Support & Services (11.0301); Network Systems (11.090); Programming & Software Development (11.0201); Web & Digital Communications (11.1004)				
Course Description:	Computing Systems courses offer a broad exploration of the use of computers in a variety of fields. These courses have a considerable range of content, but typically include the introduction of robotics and control systems, computer-assisted design, computer-aided manufacturing systems, and other computer technologies as they relate to industry applications.				

Directions: *The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.*

Rating Scale:

4. Exemplary Achievement: Student possesses outstanding knowledge, skills, or professional attitude.

3. Proficient Achievement: Student demonstrates good knowledge, skills, or professional attitude. Requires limited supervision.

2. Limited Achievement: Student demonstrates fragmented knowledge, skills, or professional attitude. Requires close supervision.

1. Inadequate Achievement: Student lacks knowledge, skills, or professional attitude.

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Instructor Signature: _____

Benchmark 1.0: Overview of Systems

	Competencies					
1.1	Identify computer classifications and hardware. i. Identify types of computer storage devices. ii. Identify major hardware components and their functions. iii. Identify the different types of computing devices.	4	3	2	1	0
1.2	Identify new IT technologies and assess their potential importance and impact on the future.	4	3	2	1	0
1.3	Identify new & emerging drivers and inhibitors of information technology change.	4	3	2	1	0
1.4	Operate computer-driven equipment and machines.	4	3	2	1	0
1.5	Apply knowledge of operating systems principles to ensure optimal functioning of system.	4	3	2	1	0
1.6	Understand data communications trends and issues.	4	3	2	1	0
1.7	Demonstrate knowledge of data transmission codes and protocols.	4	3	2	1	0
1.8	Understand elements and types of information processing. (i.e., input, process, output). (e.g., batch, interactive, event- driven, object-oriented).	4	3	2	1	0

Benchmark 2.0: Computer Operations

	Competencies					
2.1	Identify and understand the fundamentals of operating systems and their components.	4	3	2	1	0
2.2	Configure systems to provide optimal system interfaces	4	3	2	1	0

2.3	Clearly document step-by-step installation procedures for future use and configuration.	4	3	2	1	0
2.4	Apply concepts of privileged instructions and protected mode programming.	4	3	2	1	0
2.5	Configure peripheral device drivers (e.g., disk, display, printer, modem, keyboard, and mouse).	4	3	2	1	0
2.6	Allocate disk space, non-sharable resources, and I/O devices.	4	3	2	1	0
2.7	Interface peripheral devices/controllers in the computer system (e.g., software and hardware interrupts, exceptions, Direct Memory Addressing [DMA], bus structures).	4	3	2	1	0
2.8	Identify standards and issues related to I/O programming and design of I/O interfaces.	4	3	2	1	0
2.9	Define hardware-software interface issues for a computer system.	4	3	2	1	0
2.10	Review automated scheduling software and Identify scheduling priority in programming.	4	3	2	1	0
2.11	Document procedures and actions through development of audit trails.	4	3	2	1	0
Benchmark 3.0: Hardware						
	Competencies					
3.1	Ensure that hardware and software system components are compatible and licensed prior to performing installation.	4	3	2	1	0
3.2	Evaluate systems engineering considerations.	4	3	2	1	0
3.3	Demonstrate knowledge of how bandwidths affect data transmission and on-screen image.	4	3	2	1	0
3.4	Evaluate information systems problem-solving techniques and approaches.	4	3	2	1	0
3.5	Determine the accuracy and completeness of the information gathered.	4	3	2	1	0
3.6	Explain data communications procedures, equipment and media.	4	3	2	1	0
3.7	Explain measurement techniques for increased productivity due to information systems implementation.	4	3	2	1	0
3.8	Explain the differences between local and wide area networks.	4	3	2	1	0
3.9	Explain the benefits of hosting a web site on a local server vs. at an ISP (Internet Service Provider).	4	3	2	1	0
3.10	Troubleshoot computer-driven equipment and machines and access support as needed (e.g. Test system using diagnostic tools/software, repair/replace malfunctioning hardware and reinstall software as needed, recover data and/or files and restore system to normal operating standards.)	4	3	2	1	0
Benchmark 4.0: Software						
	Competencies					
4.1	Determine software design process, from specification to implementation and appraise software process and product life cycle models.	4	3	2	1	0
4.2	Explain new and emerging classes of software.	4	3	2	1	0
4.3	Explain the key functions and applications of software.	4	3	2	1	0
4.4	Demonstrate knowledge of the function and operation of compilers and interpreters.	4	3	2	1	0

4.5	Demonstrate knowledge of widely used software applications (e.g., word processing, database management, spreadsheet development, publishing software)	4	3	2	1	0
4.6	Demonstrate an understanding of various programming paradigms (OO, functional, logic) in software development	4	3	2	1	0
4.7	Demonstrate knowledge of how data is organized in software development: source version data, project progress data, etc. to increase individual efficiency and respect team member data.	4	3	2	1	0
4.8	Explain the features and functions of how web browsing software affects the look of a web page, consider the characteristics and uses of plug- ins and examine role of browsers in reading files on the World Wide Web (text-only, hypertext).	4	3	2	1	0
4.9	Explain the role of number systems in information systems and internal data representation.	4	3	2	1	0
4.10	Identify the role the binary system in information systems.	4	3	2	1	0
Benchmark 5.0: Serving the needs of the end user						
	Competencies					
5.1	Communicate to understand the problem the user wants to solve independent of the technology (empathy). Consider develop context awareness -- consider the context of the user and the problem before proposing a solution.	4	3	2	1	0
5.2	Perform software customization as requested to meet the needs of the end user.	4	3	2	1	0
5.3	Perform installation accurately and completely, using available resources as needed.	4	3	2	1	0
5.4	Resolve problems with installation if they occur.	4	3	2	1	0
5.5	Test and maintain products /services.	4	3	2	1	0
5.6	Initiate predictive maintenance procedures.	4	3	2	1	0
5.7	Consider customer satisfaction in determining product characteristics (e.g., usefulness, price, operation, life, reliability, safety, and cost of operation)	4	3	2	1	0
5.8	Use available reference tools (e.g., procedural manuals, documentation, standards, and work flowcharts) as appropriate to access needed information.	4	3	2	1	0
5.9	Use installation/operation manuals to access needed information using appropriate reference materials	4	3	2	1	0
5.10	Use reliability factors (e.g., cost, human, productivity) to plan for and create products/ services; with consideration of maintainability, good design, design simplification, and design redundancy.	4	3	2	1	0
5.11	Demonstrate knowledge of critical thinking skills, decision-making skills and develop a plan using data-oriented techniques.	4	3	2	1	0

Course	Computer Applications	Course #	10004/60004	Credit	1.0
Pathways & CIP Codes:	Digital Media (09.0499); Graphic Design (50.0499); Information Support & Services (11.0301); Network Systems (11.0901); Programming & Software Development (11.0201); Web & Design Communications (11.1004); Biochemistry (14.1401); Biomedical (14.0501)				
Course Description:	In Computer Applications courses, students acquire knowledge of and experience in the proper and efficient use of previously written software packages. These courses explore a wide range of applications, including (but not limited to) word-processing, spreadsheet, graphics, and database programs, and they may also cover the use of electronic mail and desktop publishing.				

Directions: *The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.*

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Benchmark 1.0: Personal Information Management

	Competencies					
1.1	Identify PIM applications (e.g., Essential PIM, MS Outlook, Lotus Notes...) and maintain safe and secure user profiles.	4	3	2	1	0
1.2	Manage daily/weekly/monthly schedule using applications such as. (e.g., Notes, MS Outlook, calendars/schedules.)	4	3	2	1	0
1.3	Create reminder for oneself and send notes/ informal memos using PIM applications.	4	3	2	1	0
1.4	Access email system using login and password functions. Access email messages received	4	3	2	1	0
1.5	Create and send e-mail messages in accordance with established business standards (e.g., grammar, word usage, spelling, sentence structure, clarity) demonstrating knowledge of email etiquette.	4	3	2	1	0
1.6	Attach files to send with messages and access and save received attachments	4	3	2	1	0
1.7	Demonstrate knowledge of contamination protection strategies for email.	4	3	2	1	0
1.8	Maintain shared database of contact information.	4	3	2	1	0
1.9	Participate in virtual group discussions and meetings.	4	3	2	1	0

Benchmark 2.0: Research & Internet

	Competencies

2.1	Test Internet connection.	4	3	2	1	0
2.2	Navigate web sites using software functions. (e.g., Forward, Back, Go To, Bookmarks). Utilize online tools	4	3	2	1	0
2.3	Explore the multimedia capabilities of the World Wide Web.	4	3	2	1	0
2.4	Bookmark web addresses (URLs).	4	3	2	1	0
2.5	Locate information using appropriate search procedures and approaches through a variety of search engines and Boolean logic.	4	3	2	1	0
2.6	Access, evaluate accuracy, and compile Internet resource information for a variety of purposes. (e.g., library catalogs, business, technical, commercial, government, educational).	4	3	2	1	0
2.7	Unpack files using compression software. Organize and archive files.	4	3	2	1	0
Benchmark 3.0: Word Processing & Presentations						
	Competencies					
3.1	Create/Open Edit and Save documents (e.g., letters, memos, reports) and presentations using existing forms and templates.	4	3	2	1	0
3.2	Employ word processing utility tools (e.g., spell checker, grammar checker, Locate/replace data using search and replace functions).	4	3	2	1	0
3.3	Format text using basic formatting functions.	4	3	2	1	0
3.4	Enhance publications using different fonts, styles, attributes, justification, etc.	4	3	2	1	0
3.5	Enhance publications using paint/draw functions.	4	3	2	1	0
3.6	Format new desktop publishing files and recognize the advantages and disadvantages of export options.	4	3	2	1	0
3.7	Place graphics (e.g., graph, clip art, table) in a document or slide in accordance with basic principles of graphics design and visual communication.	4	3	2	1	0
3.8	Prepare publications using desktop and cloud publishing applications.	4	3	2	1	0
Benchmark 4.0: Spreadsheets						
	Competencies					
4.1	Create/Open Edit and Save spreadsheets.	4	3	2	1	0
4.2	Create charts and graphs from spreadsheets.	4	3	2	1	0
4.3	Group worksheets.	4	3	2	1	0
4.4	Input/process data using spreadsheet functions.	4	3	2	1	0
4.5	Perform calculations using simple formulas.	4	3	2	1	0
4.6	Locate/replace data using search and replace functions.	4	3	2	1	0
4.7	Process data using database functions (e.g., structure, format, attributes, relationships, keys).	4	3	2	1	0
4.8	Perform single- and multiple-table queries (e.g., create, run, save).	4	3	2	1	0
4.9	Verify accuracy of output.	4	3	2	1	0

4.10	Maintain shared database of contact information.	4	3	2	1	0
Benchmark 5.0: Ethics & Security						
	Competencies					
5.1	Demonstrate knowledge of potential internal and external threats to security. Maximize threat reduction.	4	3	2	1	0
5.2	Assess exposure to security issues.	4	3	2	1	0
5.3	Demonstrate knowledge of virus protection strategy and ability to load virus detection/protection software.	4	3	2	1	0
5.4	Identify sources of virus infections and how to remove viruses.	4	3	2	1	0
5.5	Report viruses in compliance with company standards.	4	3	2	1	0
5.6	Ensure compliance with security rules, regulations, and codes.	4	3	2	1	0
5.7	Explore ways to implement countermeasures.	4	3	2	1	0
5.8	Implement security procedures in accordance with business ethics.	4	3	2	1	0
5.9	Document security procedures.	4	3	2	1	0
5.10	Understand how to follow a disaster plan.	4	3	2	1	0
5.11	Understand how to utilize backup and recovery procedures.	4	3	2	1	0
5.12	Maintain confidentiality.	4	3	2	1	0
5.13	Understand how to provide for user authentication (e.g., assign passwords, access level).	4	3	2	1	0
Benchmark 6.0: History/Quality Assurance						
	Competencies					
6.1	Demonstrate knowledge of the diverse continuous improvement cycles within industry and their characteristics. (e.g., Baldridge Performance Excellence, Demming, ISO 9000, Six Sigma)	4	3	2	1	0
Benchmark 7.0: Personal Attributes for Success.						
	Competencies					
7.1	Act as a responsible and contributing citizen and employee	4	3	2	1	0
7.2	Demonstrate effective professional communication skills and practices that enable positive customer relationships.	4	3	2	1	0
7.3	Apply appropriate academic and technical skills	4	3	2	1	0
7.4	Attend to personal health and financial well-being.	4	3	2	1	0
7.5	Communicate clearly, effectively and with reason	4	3	2	1	0
7.6	Consider the environmental, social and economic impacts of decisions	4	3	2	1	0
0.7	Demonstrate the use of cross-functional teams in achieving IT project goals.	4	3	2	1	0
7.8	Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.	4	3	2	1	0

Course	Foundations of Information Technology	Course # 10001	Credit 1.0
Pathways & CIP	Information Support & Services (11.0301); Network Systems (11.0901)		
Course Description:	Technical Level: a course intended to provide students with exposure to various information technology occupations and the information technology pathways available: Network Systems, Information Support and Services, and Programming and Software Development. Students will demonstrate core competencies in safety, electronics and basic digital theory, overview of the internet and operating systems, basic IT terminology and concepts, organization of data and materials, and basic programming. At the conclusion of the course, students should be prepared to make an informed decision about which Information Technology program(s) of study they would like to pursue in conjunction with their IPS.		

Directions: *The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.*

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Benchmark 1.0: Knowledge of Equipment & lab safety standards.

	Competencies					
1.1	Accurately read, interpret, and demonstrate adherence to safety rules, including Internet safety, Occupational Safety and Health Administration (OSHA) guidelines, and state and national code requirements. Be able to distinguish between rules and explain why certain rules apply.	4	3	2	1	0
1.2	Identify and explain the intended use of safety equipment available in the classroom. Demonstrate how to properly inspect, use, and maintain safe operating procedures with tools and equipment.	4	3	2	1	0

Benchmark 2.0: Working knowledge of basic computer components and the digital theory behind their operation.

	Competencies					
2.1	Demonstrate understanding of electrical circuits and devices, and relate to the physical laws (such as Ohm's Law and power laws) that govern behaviors of electrical circuits and devices. Accurately apply these physical laws to solve problems. For example, calculate the resistance of a DC circuit with a given DC voltage and current.	4	3	2	1	0

2.2	Assemble the required connections of electronic test equipment to properly test the operation of basic electronic circuit behavior and performance, using equipment such as a digital multimeter. For example, demonstrate the proper use of a digital multimeter by measuring resistance of a circuit in a typical computer system; compare this finding by calculating the resistance given the voltage and current.	4	3	2	1	0
2.3	Distinguish between the binary and hexadecimal counting systems. Using appropriate units, provide examples of each system and identify specific instances when IT professionals rely on them.	4	3	2	1	0
2.4	Explain the functions of gates in logic circuits (e.g., AND, OR, NOT).	4	3	2	1	0
Benchmark 3.0: Career Awareness in Information Technology						
	Competencies					
3.1	Research various occupations in information technology industries, such as programmers, web designers, webmasters, networking administrators, computer systems administrators, telecommunications line installers, and informational security analysts.	4	3	2	1	0
3.2	Explore various professional societies related to information technology and identify the services and benefits provided by each member.	4	3	2	1	0
Benchmark 4.0: Understanding of the history behind the internet and operating systems.						
	Competencies					
4.1	Drawing on multiple sources, research the history of the Internet. Discuss both the benefits and disadvantages of the Internet to society, as well as potential implications for the future.	4	3	2	1	0
4.2	Drawing on multiple sources (i.e., internet, textbooks, videos, and journals), research the history and development of operating systems (e.g., Microsoft Windows, Linux, UNIX).	4	3	2	1	0
Benchmark 5.0: Working knowledge of Information Technology terminology and related concepts.						
	Competencies					
5.1	Demonstrate an understanding of basic web terminology and concepts. Practice explaining these terminologies and concepts by creating methods to help students learn and remember the information.	4	3	2	1	0
5.2	Demonstrate a basic understanding of computer hardware components. Identify these components using pictures or actual models and briefly explain the function of each. Components should include, but are not limited to: a. Hardware used for input and output, b. Hardware inside the computer case, c. Motherboard, d. Processor and the chipset, e. Storage devices (e.g., primary, secondary), f. Expansion cards, and g. Electrical system.	4	3	2	1	0
5.3	Demonstrate a basic understanding of computer networking. For example, explain the types of networks and what a client-server environment is.	4	3	2	1	0

Benchmark 6.0: Understand the importance of proper organization of materials in Information Technology.						
	Competencies					
6.1	Understand and demonstrate the effective use of file and folder management techniques to maintain directory structure for a web site. Describe the most efficient methods for digital file management, including the use of site root and subfolders for assets (e.g. images, templates, CSS).	4	3	2	1	0
Benchmark 7.0: Working knowledge of programming languages, their development, and various implementations						
	Competencies					
7.1	Explore and identify various languages, such as Python, HTML, PHP, C++, Visual Basic, Java, JavaScript, and C #. Explain how programmers use these languages to solve a variety of IT problems, furnishing examples of how they are applied.	4	3	2	1	0
7.2	Using various resources, research, identify, and explain the steps involved in the software development life cycle, including but not limited to: planning, designing, coding, testing, deployment, and maintenance. Explain why it is an iterative process and always involves refinement.	4	3	2	1	0
7.3	Demonstrate an understanding of how batch files function within a programming environment. Identify common commands to create code for batch files (e.g. title, echo, echo off, pause, CLS, ipconfig, and ping).	4	3	2	1	0

Course	Cybersercurity I	Course # 10020	Credit 1.0
Pathways & CIP	Programming & Software Development (11.0201); Network Systems (11.0901); Information Support & Services (114.0301)		
Course Description:	Application Level: a course intended to teach students the basic concepts of cybersecurity. The course places an emphasis on security integration, application of cybersecurity practices and devices, ethics, and best practices management. The fundamental skills in this course cover both in-house and external threats to network security and design, how to enforce network level security policies, and how to safeguard an organization's information. This should be a dual enrollment course with the student completing post-secondary credit hours in the Computer Support Specialist certification track (KBOR). Students should be completing preparatory competencies toward successful completion of the CompTIA Security+ exam and attainment of certification.		

Directions: *The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.*

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Benchmark 1.0: Foundations

	Competencies					
1.1	Analyze ethical security practices, including but not limited to the issues of data security, confidentiality, integrity, availability, authentication, nonrepudiation, physical security, HIPPA Laws, Payment Card Industry (PCI) Compliance, and the importance of ISO27000 standards.	4	3	2	1	0
1.2	Analyze security threats, vulnerabilities, and exploits. Research common ways that threats, vulnerabilities, and exploits impact an organization.	4	3	2	1	0
1.3	Preform a simulated risk assessment by using the common industry framework from ISO. Analyze and describe the risk mitigation techniques of acceptance, mitigation, avoidance, and transfer.	4	3	2	1	0
1.4	Explain the core concepts of access control as they relate to authentication and authorization and describe the core principles of access controls.	4	3	2	1	0
1.5	Research and describe the most common various methods and technology used to secure networks. Investigate and distinguish among the following common methods to secure a network. This can include but is not limited to: a. VPNs for remote access, b. Firewalls, c. Perimeter network designs, and d. Preventative technologies.	4	3	2	1	0

Benchmark

	Competencies					
2.1	Research and describe the most common security threats to computer systems, such as social engineering, malware, phishing, viruses, etc. Investigate and distinguish among the following common prevention methods to secure a computer system. For a given scenario, identify the most applicable best practice to secure a workstation as well as describe methods for data destruction and disposal. Implement these practices and write a justification for each scenario solution. Provide supporting evidence for each solution, drawing on technical texts and industry standards. Prevention methods include but are not limited to: a. Physical security (e.g., lock doors, tailgating, biometrics, badges, key fobs, retinal, etc.), b. Digital security (e.g., antivirus, firewalls, antispyware, user authentication, etc.), c. User education, and d. Principles of least privilege.	4	3	2	1	0
2.2	Differentiate between threats and vulnerabilities and what constitutes a network attack and identify how to differentiate between the different types of application attacks.	4	3	2	1	0
2.3	Identify and describe the differences among various methods to create baseline security measures. Utilizing existing tools on a system, such as the Microsoft Baseline Security Analyzer, outline the steps taken to create a security measure.	4	3	2	1	0
2.4	Demonstrate the methods used to protect against unauthorized use of files. Configure file and folder permissions using both Windows and Linux environments.	4	3	2	1	0
2.5	Analyze common methods and use of cryptology to protect data. Compare and contrast general methods used, and explain how their designs and functionalities support the security of data.	4	3	2	1	0
Benchmark						
	Competencies					
3.1	Assess the security posture of an enterprise environment and recommend and implement appropriate security solutions.	4	3	2	1	0
3.2	Monitor and secure hybrid environments, including cloud, mobile, and IoT.	4	3	2	1	0
3.3	Operate with an awareness of applicable laws and policies, including principles of governance, risk, and compliance.	4	3	2	1	0
3.4	Identify, analyze, and respond to security events and incidents.	4	3	2	1	0

Course	Cybersecurity II	Course # 10900	Credit 1.0
Pathways & CIP	Programming & Software Development (11.0201); Network Systems (11.0901); Information Support & Services (11.0301)		
Course Description:	Application Level: a course that challenges students to develop advanced skills in concepts and terminology of cybersecurity. This course builds on previous concepts introduced in Cybersecurity I while expanding the content to include malware threats, cryptography, wireless technologies and organizational security. This should be a dual enrollment course with the student completing post-secondary credit hours in the Computer Support Specialist certification track (KBOR). Students should be completing preparatory competencies toward successful completion of the CompTIA Security+ exam and attainment of certification. **Prerequisite Cybersecurity I or demonstration of all competencies therein.		

Directions: *The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.*

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Benchmark 1.0: Working knowledge of the types of malware and methods of cyberattack.

	Competencies					
1.1	Conduct research to determine various forms of malware and analyze methods to handle malware, such as how to control access to secured resources and computer resources.	4	3	2	1	0
1.2	Analyze and differentiate among various types of attacks on systems and networks. Different types of attacks can include but are not limited to: a. Virus; b. Worms, c. Trojans, d. Unpatched software, e. Password cracking, f. Advanced persistent threat, g. Reconnaissance/foot printing, h. Infiltration, i. Network breach, j. Network exploitation, k. Attack for effects (e.g. deceive, disrupt, degrade, and destroy), l. DoS/DDoS, session hijacking, m. HTTP spoofing, n. DNS attacks, o. Switch attacks, p. Man-in-the middle (MITM) attacks, q. cross site scripting, and r. Drive-by-attack.	4	3	2	1	0

Benchmark 2.0: Basic knowledge of cryptography and its role in cybersecurity.

	Competencies					
2.1	Analyze cryptographic tools, procedures for use, and products including but not limited to: PKI, Certificates, PGP, and Certificate authorities.	4	3	2	1	0

Benchmark 3.0: Working knowledge of cybersecurity protocols and security awareness.						
	Competencies					
3.1	Analyze attack methods on wireless networks and demonstrate the use of wireless security protocols. Evaluate the capabilities of WPA, WPA-2, and WEP and the effectiveness of the security protocols and demonstrate how to use them appropriately.	4	3	2	1	0
3.2	Research and analyze security awareness in an organization. Demonstrate knowledge of the mitigation of the following, including but not limited to: a. Security policy training and procedures, b. Personally identifiable information, c. Information classifications, d. Data labeling, handling, and disposal, e. Compliance with laws, best practices, and standards, f. User habits, g. Threat awareness, and h. Use of social networking.	4	3	2	1	0
3.3	Analyze and define the impact of security incidents on an organization. Define what a disaster recovery (DR) plan is and how to develop one.	4	3	2	1	0
3.4	Explore and identify various assessment methods including but not limited to network penetration and vulnerability testing.	4	3	2	1	0
3.5	Identify and explain the uses for security testing tools. Demonstrate and compare the effectiveness of Nessus and Nmap.	4	3	2	1	0
3.6	Demonstrate each of the following concepts: a. Evaluate the patch status of a machine, b. Demonstrate knowledge of packet-level analysis in order to install and view packets, and c. Perform secure data destruction (e.g., Secure Erase, BCWipe).	4	3	2	1	0
3.7	Utilizing prior fundamentals, demonstrate proper secure network configuration and administration. Use common tools and design a network utilizing secure protocols, and evaluate the network upon completion. The plan should address, but is not limited, to the following: a. Applying and implementing secure network administration principles, b. Demonstrating knowledge of how network services and protocols interact to provide network communications in order to securely implement and use common protocols, c. Identifying commonly used default network ports, d. Setting up a Network Address Translation (NAT) device, e. Configuring a Virtual Private Network (VPN), f. Configuring a remote access policy Layer 2 Tunneling Protocol (L2TP) and Point-to Point Tunneling Protocol (PPTP), g. Demonstrating knowledge of network protocols (e.g., Transmission Control Protocol and Internet Protocol (TCP/IP), Dynamic Host Configuration Protocol (DHCP) and directory services (e.g., Domain Name System (DNS) by setting up common protocols, e.g., Secure Shell (SSH), netstat, Simple Mail Transfer Protocol (SMTP), lookup, Telnet, DNS/Bind, FTP, IIS/Web Pages, DHCP/DNS server, h. Locating open ports by completing a port scan, and i. Demonstrating the knowledge and use of network statistics (netstat).	4	3	2	1	0
Benchmark 4.0: Working toward CompTIA Security+ certification.						
	Competencies					
4.1	Assess the security posture of an enterprise environment and recommend and implement appropriate security solutions.	4	3	2	1	0

4.2	Monitor and secure hybrid environments, including cloud, mobile, and IoT.	4	3	2	1	0
4.3	Operate with an awareness of applicable laws and policies, including principles of governance, risk, and compliance.	4	3	2	1	0
4.4	Identify, analyze, and respond to security events and incidents	4	3	2	1	0

Course	Information Support & Services I	Course # 10052	Credit 1.0
Pathways & CIP	Information Support & Services (11.0301)		
Course Description:	Technical Level: a course designed for students who have chosen to pursue an Information Support and Services program of study to introduce the basic conceptual and practical skills necessary to identify, install, and manage relevant hardware and software in a server/client environment. **Prerequisite Information Support & Services I or demonstration of all competencies therein.		

Directions: *The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.*

Rating Scale:

4. Exemplary Achievement: Student possesses outstanding knowledge, skills, or professional attitude.

3. Proficient Achievement: Student demonstrates good knowledge, skills, or professional attitude. Requires limited supervision.

2. Limited Achievement: Student demonstrates fragmented knowledge, skills, or professional attitude. Requires close supervision.

1. Inadequate Achievement: Student lacks knowledge, skills, or professional attitude.

0. No Instruction / Training: Student has not received instruction or training in this area.

Student: _____

Graduation Date: _____

I certify that the student has received training in the areas indicated.

Instructor Signature: _____

Benchmark 1.0: Working knowledge of information systems foundations.

	Competencies					
1.1	Demonstrate knowledge of the history, use, and general characteristics of different servers including basic information systems terminology.	4	3	2	1	0
1.2	Identify the major components of an information systems infrastructure: Computer Hardware, Computer Software, Databases, Network, and Human Resources.	4	3	2	1	0
1.3	Describe data storage and management in general and within the context of different information systems, including any of, but not limited to, the following: Transaction Processing Systems, Office Automation Systems, Knowledge Management Systems, Management Information Systems, Decision Support Systems, and Executive Support Systems.	4	3	2	1	0

Benchmark 2.0: Working knowledge of the Open Systems Interconnection (OSI) Model and its basic functions.

	Competencies					
2.1	Explain the Open Systems Interconnection (OSI) Model and the flow of data through it, define the functions, and identify the associated hardware components.	4	3	2	1	0

2.2	Identify the basic functions of a network operating system (NOS), research various types (e.g. Microsoft Windows server, Linux enterprise server, UNIX, etc.), and synthesize findings to demonstrate knowledge that includes, but is not limited to: Optimal software requirements, Client support features, Organization of network elements, Sharing applications, Managing system resources (e.g., memory, multitasking, multiprocessing), and The importance of considering future needs.	4	3	2	1	0
Benchmark 3.0: Working knowledge of building an information system						
	Competencies					
3.1	Identify the basic steps involved in building a data warehouse, including but not limited to: Extracting the transactional data from the data sources into a staging area, Transforming the transactional data, Loading the transformed data into a dimensional database, Building pre-calculated summary values to speed up report generation, and Building a front-end reporting tool.	4	3	2	1	0
3.2	Configure and build a basic information system with a corresponding data warehouse using available materials, hardware, and software.	4	3	2	1	0
Benchmark 4.0: Troubleshooting and Life Cycle						
	Competencies					
4.1	Research and describe the most common information systems security risks associated with: people; data transmission and hardware; protocols and software; and internet access. Investigate and distinguish among the following common prevention methods to secure an information system: Authentication, Access Control, Backups, Encryption, Firewalls, and Intrusion Detection Systems. Synthesize findings to identify security requirements for your information system/data warehouse while also discussing the balance of client usability.	4	3	2	1	0
4.2	Illustrate the seven phases of the systems development life cycle in general and in the context of information systems and data warehousing: Planning, Systems Analysis & Requirements, Systems Design, Development, Integration & Testing, Implementation, and Operations & Maintenance. Synthesize findings to refine, build, create, or expand existing or new information systems and data warehouses. E.g. systems/data to serve student run businesses, school events, or faculty support.	4	3	2	1	0

Course	Information Support & Services II	Course # 10097	Credit 1.0
Pathways & CIP	Information Support & Services (11.0301)		
Course Description:	Technical Level: a course designed for students who have chosen to pursue an Information Support and Services program of study to emphasize more advanced conceptual and practical skills necessary to identify, install, and manage relevant hardware and software in information systems. This should be a dual enrollment course with the student completing post-secondary credit hours in the Computer Support Specialist certification track (KBOR). Students should be completing preparatory competencies toward successful completion of the CompTIA Server+ or CompTIA A+ exams and attainment of certification. **Prerequisites Foundatins of Information Technology and Information Support & Services I or demonstration of all competencies therein.		

Directions: *The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.*

Rating Scale:

4. Exemplary Achievement: Student possesses outstanding knowledge, skills, or professional attitude.

3. Proficient Achievement: Student demonstrates good knowledge, skills, or professional attitude. Requires limited supervision.

2. Limited Achievement: Student demonstrates fragmented knowledge, skills, or professional attitude. Requires close supervision.

1. Inadequate Achievement: Student lacks knowledge, skills, or professional attitude.

0. No Instruction / Training: Student has not received instruction or training in this area.

Student: _____

Graduation Date: _____

I certify that the student has received training in the areas indicated.

Instructor Signature: _____

Benchmark 1.0: Advanced study of Information Support & Services with CompTIA+ certification.

	Competencies					
1.1	Install, configure, and manage server hardware and server operating systems	4	3	2	1	0
1.2	Implement proper server hardening and security controls	4	3	2	1	0
1.3	Successfully troubleshoot common server problems	4	3	2	1	0
1.4	Demonstrate an understanding of key disaster recovery, high availability, and backup concepts	4	3	2	1	0

Benchmark 2.0: Advanced study of Information Support & Services and/or other Information Technology programs of study with CompTIA+ certification.

	Competencies					
2.1	Configure, install and upgrade operating systems, including: Windows, Apple OS X, Linux, iOS, Android and Windows Mobile.	4	3	2	1	0
2.2	Install and image virtual machines	4	3	2	1	0
2.3	Set up and troubleshoot peripheral devices	4	3	2	1	0
2.4	Assemble and disassemble computing hardware	4	3	2	1	0
2.5	Set up and support basic home and small office networks	4	3	2	1	0

2.6	Implement cybersecurity controls appropriate to helpdesk and technical support roles	4	3	2	1	0
2.7	Troubleshoot and support end-user access to applications and data	4	3	2	1	0

Course	Work-Based Learning in Information Support & Services	Course # 10098	Credit 1.0
Pathways & CIP	Information Support & Services (11.0301)		
Course Description:	Application Level: a capstone course intended to provide students with opportunities to apply the skills and knowledge learned in previous CTE and general education courses within a professional work environment. The course allows students to earn high school credit for select models of work-based learning, which allow students to interact with industry professionals in order to extend and deepen classroom work and support the development of postsecondary and career readiness knowledge and skills. Competencies during the experience, verified by the WBL coordinator or district representative, should continue to align with attainment of appropriate CompTIA certification(s).		

Directions: *The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.*

Rating Scale:

4. Exemplary Achievement: Student possesses outstanding knowledge, skills, or professional attitude.

3. Proficient Achievement: Student demonstrates good knowledge, skills, or professional attitude. Requires limited supervision.

2. Limited Achievement: Student demonstrates fragmented knowledge, skills, or professional attitude. Requires close supervision.

1. Inadequate Achievement: Student lacks knowledge, skills, or professional attitude.

0. No Instruction / Training: Student has not received instruction or training in this area.

Student: _____

Graduation Date: _____

I certify that the student has received training in the areas indicated.

Instructor Signature: _____

Benchmark 1.0: Knowledge of relevant employability skills.

	Competencies					
1.1	Understand and demonstrate all appropriate work-based personal and professional expectations, including but not limited to: Demonstrate information literacy, Use technology effectively and appropriately, Communicate clearly and	4	3	2	1	0
1.2	Understand and demonstrate adherence to appropriate professional safety standards.	4	3	2	1	0
1.3	Plan and navigate education and career paths aligned with personal goals.	4	3	2	1	0
1.4	Develop and implement a personalized learning plan (e.g. within the IPS) and reflect on experiences with an electronic, exportable portfolio.	4	3	2	1	0

Benchmark 2.0: Advanced study of Information Support & Services, in cooperation with their work-based learning site, toward CompTIA Server+ certification .

	Competencies					
2.1	Install, configure, and manage server hardware and server operating systems	4	3	2	1	0
2.2	Implement proper server hardening and security controls	4	3	2	1	0
2.3	Successfully troubleshoot common server problems	4	3	2	1	0
2.4	Demonstrate an understanding of key disaster recovery, high availability, and backup concepts	4	3	2	1	0

Benchmark 3.0: Advanced study of Information Support & Services, in cooperation with their work-based learning site, toward CompTIA A+ certification.						
	Competencies					
3.1	Configure, install and upgrade operating systems, including: Windows, Apple OS X, Linux, iOS, Android and Windows Mobile.	4	3	2	1	0
3.2	Install and image virtual machines.	4	3	2	1	0
3.3	Set up and troubleshoot peripheral devices.	4	3	2	1	0
3.4	Assemble and disassemble computing hardware.	4	3	2	1	0
3.5	Set up and support basic home and small office networks.	4	3	2	1	0
3.6	Implement cybersecurity controls appropriate to helpdesk and technical support roles.	4	3	2	1	0
3.7	Troubleshoot and support end-user access to applications and data.	4	3	2	1	0
Benchmark 4.0: Advanced study of cybersecurity in Information Support & Services, in cooperation with their work-based learning site, toward CompTIA Security+ certification.						
	Competencies					
4.1	Assess the security posture of an enterprise environment and recommend and implement appropriate security solutions.	4	3	2	1	0
4.2	Monitor and secure hybrid environments, including cloud, mobile, and IoT.	4	3	2	1	0
4.3	Operate with an awareness of applicable laws and policies, including principles of governance, risk, and compliance.	4	3	2	1	0
4.4	Identify, analyze, and respond to security events and incidents	4	3	2	1	0