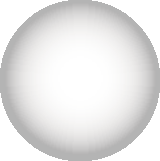


**IOWA**

**CAREER AND TECHNICAL**

EDUCATION STANDARDS

**FINAL REPORT 2019**



BUSINESS, MANAGEMENT & ADMINISTRATION • AGRICULTURE, FOOD & NATURA L RESOURCE S • INFORMATION SOLUTIONS • APPLIED SCIENCES, TECHNOLOGY , ENGINEERING &MANUFACTURING • HEALTH SCIENCES • HUMAN SERVICE S

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| **Foundational Standards for Information Technology** |
| **Cluster Topic 1: IT 1 Core-Business Skills** |
| IT 1 Core-Business Skills Cluster Knowledge and Skill Statement: **Understand business concepts, tools, and creativity necessary in the workplace.** |
| **Performance Elements:** |
| **IT 1.1 Demonstrate ability to utilize computing devices (e.g., printers, phone, digital cameras, multi- media equipment, video and scanners).** |
| **Measurement Criteria:** |
| IT 1.1.1 Demonstrate touch keyboarding and use computer functions to create documents and visualizations/tables. (3A-DA-11) |
| IT 1.1.2 Select and use appropriate digital tools for solving problems. |
| IT 1.1.3 Demonstrate the functionality of computing devices and identify proper usage. |
| **IT 1.2 Demonstrate workplace expectations (e.g. dress, promptness, attendance, interpersonal skills, completion of assigned tasks).** |
| **Measurement Criteria:** |
| IT 1.2.1 Identify and list workplace expectations. |
| IT 1.2.2 Compare school expectations to work expectations. |
| IT 1.2.3 Demonstrate punctuality. |
| IT 1.2.4 Demonstrate teamwork skills. |
| IT 1.2.5 Explain the relationship between team and individual performance. |
| IT 1.2.6 Demonstrate appropriate electronic etiquette. |
| **IT 1.3 Identify IT organizational structures and roles.** |
| **Measurement Criteria:** |
| IT 1.3.1 Identify the organizational structure of an IT department. |
| IT 1.3.2 Identify various roles in IT (e.g. help desk, system administrator, programmers, analyst, project managers). |
| IT 1.3.3 Identify examples of chains of command and the communication channels within an Organization. |
| **IT 1.4 Describe current trends in technology.** |
| **Measurement Criteria:** |
| IT 1.4.1 Discuss new technologies (e.g. cloud computing outsourcing, mobile, artificial intelligence, data analytics, digital currency). |
| IT 1.4.2 Describe how artificial intelligence drives many software and physical systems. (3B- AP-09) |
| IT 1.4.3 Describe types of businesses and how technology impacts their operations. |
| IT 1.4.4 Compare and contrast online vs. brick and mortar enterprises. |
| IT 1.4.5 Explain the importance of security. |
| **IT 1.5 Discuss and understand challenges and opportunities facing the IT Industry.** |
| **Measurement Criteria:** |
| IT 1.5.1 Discuss the pace of change in technology and how it affects business. |
| IT 1.5.2 Understand the difference between in-house IT and outsourced IT and how to work with removed workers. |
| IT 1.5.3 Understand the IT employment opportunities and job growth and how it affects the IT student futurereadyiowa.gov. |

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| **Foundational Standards for Information Technology** |
| IT 1.5.4 Demonstrate an awareness of potential government compliance requirements (e.g. patient privacy, confidentiality, security). |
| **IT 1.6 Demonstrate the ability to understand business information.** |
| **Measurement Criteria:** |
| IT 1.6.1 Demonstrate understanding of core business processes (marketing, finance, sales, and operations). |
| IT 1.6.2 Demonstrate understanding of reporting tools (dashboards, spreadsheets, and charts). |
| **IT 1.7 Recognize legal, social, cultural and ethical issues related to information technology. (3A-IC- 24)** |
| **Measurement Criteria:** |
| IT 1.7.1 Research the Code of Ethics for a professional IT organization such as Association for Information Technology Professionals. |
| IT 1.7.2 Identify illegal and unethical activities and practices. |
| IT 1.7.3 Research the penalties for software copyright violations and intellectual property laws. (3A- IC-28) |
| IT 1.7.4 Understand ownership of information. (3A-AP-20) |
| IT 1.7.5 Debate laws and regulations that impact the development and use of software. (3B-IC-28) |
| **IT 1.8 Demonstrate an understanding of the need for security from a workplace standpoint.** |
| **Measurement Criteria:** |
| IT 1.8.1 Research recent security events that have affected the workplace and discuss their impact. |
| IT 1.8.2 Identify common security threats such as hacking, viruses, phishing, malware, and physical Security. (3A-NI-05) |
| IT 1.8.3 Demonstrate best practices as a user to prevent security breaches. |
| IT 1.8.4 Understand privacy concerns (social media, online banking, passwords, confidential information). (3A-IC-29) (3A-IC-30) |
| IT 1.8.5 Compare various security measures, considering tradeoffs between the usability and security of a computer system. (3A-NI-06) |
| IT 1.8.6 Explain tradeoffs when selecting and implementing cybersecurity recommendations. (3A-NI- 07) (3A-NI-08) |
| IT 1.8.7 Compare ways software developers protect devices and information from unauthorized access. (3B-NI-04) |
| **IT 1.9 Understand basic software applications** |

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| **Foundational Standards for Information Technology** |
| **Measurement Criteria:** |
| IT 1.9.1 Demonstrate operation of e-mail, word processing, spreadsheets, presentation software, and database application software. |
| IT 1.9.2 Show working knowledge of collaborative tools and online resources. |
| IT 1.9.3 Demonstrate a working knowledge of different search engines. |
| **Cluster Topic 2: IT 2 Core-Technical Skills** |
| IT 2 Core-Technical Skills Cluster Knowledge and Skill Statement: **Understand the basic skills necessary to work in the IT industry.** |
| **Performance Elements:** |
| **IT 2.1 Demonstrate an understanding of the role and functions of an operating system.** |
| **Measurement Criteria:** |
| IT 2.1.1 Demonstrate the understanding of directory structures (folders, files, etc.). |
| IT 2.1.2 Demonstrate an understanding how to configure devices. |
| IT 2.1.3 Understand the roles of users in an operating system. |
| IT 2.1.4 Demonstrate knowledge of the different types of operating systems (e.g. Windows, Apple, Linux, IOS, Android, Chrome). (3B-CS-01) |
| IT 2.1.5 Describe the difference between applications and operating systems and how the dependencies of each work. |
| IT 2.1.6 Evaluate the scalability and reliability of networks by describing the relationship between routers, switches, servers, topology, and addressing network functionality. (3A-NI-04) (CB-NI-03) |
| IT 2.1.7 Translate between different bit representations of real-world phenomena, such as characters, numbers and images. (3A-DA-09) |
| IT 2.1.8 Evaluate the tradeoffs in how data elements are organized and where data is stored. (3A-DA-10) |
| **IT 2.2 Use logic to solve problems and demonstrate trouble-shooting skills. (3A-CS-03)** |
| **Measurement Criteria:** |
| IT 2.2.1 Develop a plan to troubleshoot an identified technical issue. |
| IT 2.2.2 Demonstrate initiative to independently solve problems and trouble-shoot. |
| IT 2.2.3 Understand the resources available to troubleshoot an issue. |
| IT 2.2.4 Demonstrate the ability to obtain information from a user to identify the root cause of an issue. |
| IT 2.2.5 Implement steps to prevent the issue from happening in the future. |
| **IT 2.3 Demonstrate knowledge of the hardware components associated with Information Systems. (3A-CS-02)** |
| **Measurement Criteria:** |
| IT 2.3.1 Demonstrate a knowledge of the difference between hardware and software. |

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| **Foundational Standards for Information Technology** |
| IT 2.3.2 Compare and contrast the difference between a virtual machine and a physical machine. |
| IT 2.3.3 Define the different components of a computing device (CPU, memory, hard drive). |
| IT 2.3.4 Identify common peripherals (printers, cameras, back-up devices, scanners). |
| IT 2.3.5 Discuss the basic elements of cloud computing. |
| IT 2.3.6 Demonstrate the ability to create a virtual machine (VMWare, Xen). |
| **IT 2.4 Demonstrate math skills.** |
| **Measurement Criteria:** |
| IT 2.4.1 Demonstrate the relationship between different numbering systems (binary, decimal, hex). |
| IT 2.4.2 Demonstrate the ability to use a spreadsheet to create formulas and graphical representations of the data. |
| **IT 2.5 Demonstrate the ability to use technical documents.** |
| **Measurement Criteria:** |
| IT 2.5.1 Demonstrate the ability to use the internet to research and find answers to technical issues. |
| IT 2.5.2 Assess the reliability of online documentation. |
| IT 2.5.3 Demonstrate the working knowledge of a flow chart or decision tree documentation. |
| IT 2.5.4 Evaluate the ability of models and simulations to test and support and make predictions on selected processes to test the hypotheses. (3A-DA-12) |
| IT 2.5.5 Use data sets to support a claim or communicate information. (3B-DA-06) |
| IT 2.5.6 Use tools to identify patterns in data representing complex systems. (3A-DA-10) (3B- DA-05) (3B-AP-15) |
| **IT 2.6 Demonstrate the basic design process of a project.** |
| **Measurement Criteria:** |
| IT 2.6.1 Create a prototype that uses algorithms to solve computational problems by leveraging prior student knowledge and personal interests. (3A-AP-13) |
| IT 2.6.2 With a team, design, and develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions and with working as a  team. (3A-AP-16) (3A-AP-18) (3A-AP-22) |
| IT 2.6.3 Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables. (3A-AP-14) |
| IT 2.6.4 Demonstrate the function and purpose of the project you are designing using constructs such as procedures, modules, and/or objects. (3A-AP-17) (3B-AP-14) |
| IT 2.6.5 Evaluate and refine computational artifacts to make them more usable and accessible. (3A- AP-21) |
| IT 2.6.6 Document design decisions using text, graphics, presentations, and/or demonstration in the development of complex programs. (3A-AP-23) |
| IT 2.6.7 Demonstrate the ability to describe the business requirements and how the solution satisfies the |

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| **Foundational Standards for Information Technology** |
| business theme and how it could possibly be used in other disciplines. |
| IT 2.6.8 Describe a methodology of testing your project. (3B-DA-07) |
| IT 2.6.9 Describe how improvements or user feedback would be incorporated in the project. |
| IT 2.6.10 Understand the unique needs of accessibility to all users. |
| **IT 2.7 Understand computational systems.** |
| **Measurement Criteria:** |
| IT 2.7.1 Understand the integration of a computer system within other devices and discuss how they work together. |
| **IT 2.8 Utilize algorithms to understand computer programming and processes.** |
| **Measurement Criteria:** |
| IT 2.8.1 Illustrate the flow of execution of a recursive algorithm. |
| IT 2.8.2 Construct solutions to problems using student-created components such as procedures, modules and or objects. |
| IT 2.8.3 Demonstrate code reuse by creating programming solutions using libraries and APIs. (3B-AP-16) |
| IT 2.8.4 Justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices. (3A-AP-15) |
| IT 2.8.5 Plan and develop programs for broad audiences using a software life cycle process. (3B- AP- 17) |
| IT 2.8.6 Develop programs for multiple computing problems. (3B-AP-10) (3B-AP-19) |
| IT 2.8.7 Use version control systems, integrated development environment (IDEs), and collaborative tools and practices (code documentation) in a group software project. (3B- AP-20) |
| IT 2.8.8 Compare multiple programming languages and discuss how their features them suitable for solving different types of problems. (3A-IC-26) (3B-AP-24) |
| IT 2.8.9 Implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem. (3B-AP-09) |
| IT 2.8.10 Evaluate algorithms in terms of their efficiency, correctness and clarity. (3B-AP-11) |
| IT 2.8.11 Compare and contrast fundamental data structures and their uses. (3B-AP-12) |
| IT 2.8.12Illustrate the flow of execution of a recursive algorithm. (3B-AP-13) |
| **Cluster Topic: IT 3 Core-Communication Skills** |
| **IT 3 Core-Communication Skills Knowledge and Skill Statement: Understand concepts, strategies and methods needed to interact and collaborate with others.** |
| **Performance Elements:** |
| **IT 3.1 Understand customer interaction requirements.** |
| **Measurement Criteria:** |
| IT 3.1.1 Explain the importance of maintaining communication with the customer. |

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| **Foundational Standards for Information Technology** |
| IT 3.1.2 Identify customer expectations in a given situation. |
| IT 3.1.3 Create a basic requirements document and technical response document that addresses the user needs. |
| IT 3.1.4 Demonstrate the ability to prioritize tasks. |
| IT 3.1.5 Demonstrate the ability to plan according to people and resource needs and constraints and follow through to ensure you have met customer expectations. |
| **IT 3.2 Demonstrate the ability to communicate technical issues in a non-technical manner.** |
| **Measurement Criteria:** |
| IT 3.2.1 Create concise documentation and reports. |
| IT 3.2.2 Explain the importance of obtaining feedback from your audience and adjust presentation accordingly. (3A-AP-19) |
| IT 3.2.3 Describe a technical topic to a non-technical person. |
| **IT 3.3 Demonstrate ability to train users.** |
| **Measurement Criteria:** |
| IT 3.3.1 Understand the different learning styles of your audience. |
| IT 3.3.2 Identify user’s knowledge level and plan training accordingly. |
| IT 3.3.3 Demonstrate ability of how to use various technologies. |
| IT 3.3.4 Assess training outcomes. |
| **IT 3.4 Demonstrate the ability to work as a team member.** |
| **Measurement Criteria:** |
| IT 3.4.1 Offer contrasting viewpoints. |
| IT 3.4.2 Define and communicate workload limits. |
| IT 3.4.3 Understand the importance of communicating with others. |
| IT 3.4.4 Understand conflict resolution in a team setting. |
| IT 3.4.5 Understand cultural differences in communication. (3A-IC-27) |
| IT 3.4.6 Test and refine computational artifacts to reduce bias and equity deficits. (3A-IC-25) (3B-IC- 25)(3B-IC-26) |
| IT 3.4.7 Predict how computational innovations that have revolutionized aspects of our culture might evolve. (3B-IC-27) |
| **IT 3.5 Demonstrate ability to communicate professionally both verbally in writing (e.g. resumes, cover letters, reports, interviews, e-mails).** |
| **Measurement Criteria:** |
| IT 3.5.1 Role play interviews for requirements gathering for a project. |

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| **Foundational Standards for Information Technology** |
| IT 3.5.2 Write a short report covering the issues, gathered requirements requiring solutions, with a cover  letter asking for approval to proceed with the project, and resumes of team members participating in the project. |
| IT 3.5.3 Recognize when to or not to use an e-mail for communication. |
| IT 3.5.4 Demonstrate the ability to write a professional e-mail. |

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| **Networking Systems** |
| **Cluster Topic 4: IT 4-Networking Systems Pathway** |
| **IT 4-Networking Systems Pathway Cluster Knowledge and Skill Statement: Use information technology tools specific to the career cluster to access, manage, integrate, and create information.** |
| **Performance Elements:** |
| **IT 4.1 Demonstrate an understanding of common operating systems used in the industry.** |
| **Measurement Criteria:** |
| IT 4.1.1 Understand the history of operating systems and their progression. |
| IT 4.1.2 Understand basic commands of different systems. |
| IT 4.1.3 Understand the types of software that runs on each operating system. |
| IT 4.1.4 Explain how the operating system should be configured to maximize performance. (3B-NI-03) |
| **IT 4.2 Use operating system principles to ensure optimal system function.** |
| **Measurement Criteria:** |
| IT 4.2.1 Apply basic commands of operating system software. |
| IT 4.2.2 Apply appropriate file and disk management techniques. |
| IT 4.2.3. Employ desktop operating skills. |
| IT 4.2.4 Handle materials and equipment in a responsible manner. |
| IT 4.2.5 Follow power-up and log-on procedures. |
| IT 4.2.6 Interact with/respond to system messages using console device. |
| IT 4.2.7 Run applications/jobs in accordance with processing procedures. |
| IT 4.2.8 Follow log-off and power-down procedure(s). |
| **IT 4.3 List network devices and functions (e.g. repeater, bridge, switch, router).** |
| **Measurement Criteria:** |
| IT 4.3.1 Define the difference between a router and a firewall. |
| IT 4.3.2 Define the difference between a hub and a switch. |
| IT 4.3.3 Define what a host intrusion prevention system does. |
| IT 4.3.4 Define what a network intrusion prevention system does. |
| IT 4.3.5 Define the difference between Intrusion Detection vs. Intrusion Prevention. |
| IT 4.3.6 Define the differences between a layer 2 and a layer 3 switch. |
| **IT 4.4 Identify types of networks and their capabilities (e.g. LAN, WAN, MAN, Wi-Fi).** |
| **Measurement Criteria:** |
| IT 4.4.1 Demonstrate understanding of types of networks deployed in a home, small office, office  buildings, industrial settings, schools, college campus, multi-site organizations and the primary difference between each. |

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| **Networking Systems** |
| IT 4.4.2 Demonstrate an understanding of the costs associated with each type of network and what drives the cost differences. |
| IT 4.4.3 Identify the different types of risks associated with each type of network. |
| **IT 4.5 Summarize basic data communications components and trends to maintain and update IT Systems.** |
| **Measurement Criteria:** |
| IT 4.5.1 Explain data communications procedures, equipment and media. |
| IT 4.5.1.a Demonstrate knowledge of key communications procedures. |
| IT 4.5.1.b Demonstrate knowledge of the uses of data communication equipment. |
| IT 4.5.1.c Demonstrate knowledge of types of communications media. |
| IT 4.5.2 Explain data transmission codes and protocols. |
| IT 4.5.2.a Demonstrate knowledge of data transmission codes and protocols. |
| IT 4.5.3 Explain the differences between local and wide area networks. |
| IT 4.5.3.a Distinguish between local area networks and wide-area networks. |
| IT 4.5.4 Summarize data communication trends and issues. |
| IT 4.5.4.a Identify data communication trends. |
| IT 4.5.4.b Identify major current issues in data communications. |
| **IT 4.6 Explain the importance of security of data (e.g. privacy of information, confidentiality, restricted use by authorized personnel).** |
| **Measurement Criteria:** |
| IT 4.6.1 Demonstrate an awareness of technological advances and availability of resources. |
| IT 4.6.2 Understand the need for confidentiality. |
| IT 4.6.3 Identify sources of security problems with data. (3B-AP-18) |
| IT 4.6.4 Identify methods of data protection. |
| IT 4.6.5 Understand the lifecycle of data protection (e.g. the creation of data, management of data, storage of data). |
| IT 4.6.6 Understanding the different methods to encrypt data (e.g. volume level encryption, file encryption, or database encryption). |
| **IT 4.7 Identify network topologies and protocols.** |
| **Measurement Criteria:** |
| IT 4.7.1 Demonstrate knowledge of the OSI layers 1, 2, and 3. |
| IT 4.7.2 Define what Internet Protocol is. |
| IT 4.7.3 Define what TCP is. |
| IT 4.7.4 Define what UDP is. |
| IT 4.7.5 Define what the different is between a switched network and a hub network. |

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| **Networking Systems** |
| IT 4.7.6 Define what the difference is between Telnet and SSH. |
| IT 4.7.7 Define what the difference is between FTP and SFTP. |
| **IT 4.8 Identify and list networking media.** |
| **Measurement Criteria:** |
| IT 4.8.1 Define what an RJ 45 connection is. |
| IT 4.8.2 Define what a co-ax connection is. |
| IT 4.8.3 Define the differences between cat 5, 5E and6. |
| IT 4.8.4 Define what a “point to point circuit” is and how that differs from the internet. |
| IT 4.8.5 Define what the difference is between WiFi and leased line circuits. |
| IT 4.8.6 Define the difference between WiFi and Satellite technology. |
| **IT 4.9 Demonstrate technical knowledge of the Internet to develop and maintain IT systems.** |
| **Measurement Criteria:** |
| IT 4.9.1 Describe Internet protocols. |
| IT 4.9.1.a Demonstrate knowledge of the Transmission Control Protocol/Internet Protocol (TcP/IP) suite. |
| IT 4.9.1.b Demonstrate knowledge of management protocols, applications and procedures (e.g., SNMP, intrusion detection, and reporting issues). |
| IT 4.9.1.c Explain the concept of routing. |
| IT 4.9.2 Demonstrate a basic understanding of Domain Name System(DNS). |
| **IT 4.10 Access and use Internet services when completing IT related tasks to service and update IT systems.** |
| **Measurement Criteria:** |
| IT 4.10.1 Demonstrate the use of an Internet connection. |
| IT 4.10.1.a Configure a small home office Internet connection using cable, DSL, wireless or satellite connection. |
| IT 4.10.1.b Test Internet connection using tools such as ping, trace route, net stat, host, dig, and DNS lookup. |
| IT 4.10.2 Troubleshoot Internet connection problems. |
| IT 4.10.3 Explain the functions of the Internet software components. |
| IT 4.10.3.a Demonstrate knowledge of the components of Internet software. |
| IT 4.10.4 Install Internet software for use on an operating system. |
| IT 4.10.4.a Identify common browser features. |
| IT 4.10.4.b Install Internet software. |
| IT 4.10.4.c Differentiate between Web-based applications and applications installed on a local computer. |
| IT 4.10.4.d Download software upgrades and shareware from the Internet. |

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| **Networking Systems** |
| IT 4.10.4.e Unpack files using compression software. |
| IT 4.10.5 Describe virus protection procedures. |
| IT 4.10.5a Demonstrate acute awareness of virus protection techniques. |
| IT 4.10.5b Identify types and capabilities of popular virus protection software. |
| IT 4.10.5c Explain spyware, adware, and malware. |
| IT 4.10.5d Identify how to avoid spyware, adware, and malware and how to recover from infection. |
| IT 4.10.6 Explain cookies and adware on an Internet connected computer system. |
| IT 4.10.6.a Demonstrate knowledge of cookies and their use on an internet-connected computer system. |
| IT 4.10.6.b Identify types and consequences of pop-ups and adware. |
| **IT 4.11 Install and configure software programs to maintain and update IT systems.** |
| **Measurement Criteria:** |
| IT 4.11.1 Verify that software to be installed is licensed prior to performing installation. |
| IT 4.11.1.a Verify conformance to licensing agreement. |
| IT 4.11.1.b Understand the concept of an End User License Agreement (EULA). |
| IT 4.11.1.c Differentiate between open source and proprietary licenses. |
| IT 4.11.1.d Explain the concept of open source. |
| IT 4.11.1.e Identify common characteristics of open source licensing agreements, including the GNU General Public License (GPL). |
| **IT 4.12 Recognize and analyze potential IT security threats to develop and maintain security Requirements.** |
| **Measurement Criteria:** |
| IT 4.12.1 Describe potential security threats to information systems. |
| IT 4.12.2 Identify the range of security needs and the problems that can occur due to security lapses. |
| IT 4.12.3 Assess security threats. |
| IT 4.12.3.a Maximize threat reduction. |
| IT 4.12.3.b Assess exposure to security issues. |
| IT 4.12.3.c Implement countermeasures. |
| IT 4.12.3.d Ensure compliance with security rules, regulations, and codes. |
| IT 4.12.3.e Demonstrate knowledge of virus protection strategy. |
| IT 4.12.3.f Implement security procedures in accordance with business ethics. |
| IT 4.12.4 Develop plans to address security threats. |
| IT 4.12.5 Implement plans to address security procedures. |
| IT 4.12.5.a Maintain confidentiality. |
| IT 4.12.5.b Load virus detection and protection software. |
| IT 4.12.5.c Identify sources of virus infections. |
| IT 4.12.5.d Remove viruses. |
| IT 4.12.5.e Report viruses in compliance with company standards. |
| IT 4.12.5.f Implement backup and recovery procedures. |
| IT 4.12.5.g Follow disaster plan. |
| IT 4.12.5.h Provide for user authentication and restricted access (e.g., assign passwords, access level). |

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| **Networking Systems** |
| (3B-NI-04) |

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| **Programming and Software Development** |
| **IT Cluster Topic 5: IT 5-Programming and Software Development Pathway** |
| **IT 5 Programming and Software Development Pathway Knowledge and Skill Statement: Understand the concept of design, development, implementation, and maintenance of computer software.** |
| **Performance Elements:** |
| **IT 5.1 Demonstrate a fundamental understanding of programming.** |
| **Measurement Criteria:** |
| IT 5.1.1 Write a small modular program using variables. |
| IT 5.1.2 Describe a class and objects. |
| IT 5.1.3 Describe the key differences between procedural programming, object-oriented programming, event driven programming and functional programming. |
| IT 5.1.4 List the key differences between a Waterfall life cycle and an Agile lifecycle. |
| **IT 5.2 Demonstrate the ability to design an application.** |
| **Measurement Criteria:** |
| IT 5.2.1 Gather data to identify customer requirements. |
| IT 5.2.2 Design a process map to illustrate a decision flow end to end. |
| IT 5.2.3 Demonstrate the ability to storyboard a user experience of the application. |
| **IT 5.3 Demonstrate an understanding of how to create and develop software.** |
| **Measurement Criteria:** |
| IT 5.3.1 Demonstrate the ability to code a program/application. |
| IT 5.3.2 Understand the difference between development, quality assurance and production. |
| IT 5.3.3 Demonstrate the ability to develop documentation and incorporate comments within the code. |
| IT 5.3.4 Develop a minimum viable product to obtain end-user feedback. |
| IT 5.3.5 Use Peer Review to assess application code. |
| **IT 5.4 Demonstrate the ability to test an application for functionality.** |
| **Measurement Criteria:** |
| IT 5.4.1 Demonstrate the ability to edit for any invalid data/input. |
| IT 5.4.2 Demonstrate an application/program will successfully with both valid and invalid data/input. (CB-CS-02) |
| IT 5.4.3 Demonstrate the ability of the application to recover after invalid data has been input or processed (exception testing). |
| IT 5.4.4 Explain the development of test data necessary to run tests on software. |
| IT 5.4.5 Apply test data to program code. |
| IT 5.4.6 Demonstrate knowledge of user acceptance testing. |
| IT 5.4.7 Develop end-user training plan and documentation. |
| **IT 5.5 Understand the concepts regarding secure application design.** |
| **Measurement Criteria:** |
| IT 5.5.1 Research programming standards (i.e. OWASP). |
| IT 5.5.1 Demonstrate knowledge of SQL injections. |

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| **Programming and Software Development** |
| IT 5.5.3 Demonstrate knowledge of cross-site scripting (XSS). |
| IT 5.5.4 Demonstrate knowledge of how to intercept, capture and change HTML pages. |
| **IT 5.6 Understand the concepts of version and change control.** |
| **Measurement Criteria:** |
| IT 5.6.1 Demonstrate an understanding of Change Management. |
| IT 5.5.2 Research tools that are available to assist with version control and repositories. |
| **IT 5.7 Understand the concepts of future improvements and upgrades to software.** |
| **Measurement Criteria:** |
| IT 5.7.1 Prioritize change requests. |
| IT 5.7.2 Explain the risks and benefits of incorporating changes into the existing codebase. |
| IT 5.7.3 Develop a plan for ongoing maintenance and support. |

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| **Information Support and Services** |
| **IT Cluster Topic 6: IT 6-Information Support and Services Pathway** |
| **IT 6 Information Support and Services Pathway Cluster Knowledge and Skill Statement: Understand hardware and software support issues that affect the company.** |
| **Performance Elements:** |
| **IT 6.1 Explain the cost of implementing day-to-day information support and services operations and how it affects the company’s bottom-line.** |
| **Measurement Criteria:** |
| IT 6.1.1 Estimate the cost to run a small help desk with 3 employees for a year. |
| IT 6.1.2 Design a help desk service in your local school and support costs associated with the start-up of a help desk. |
| IT 6.1.3 Observe an existing help desk in the community or online. |
| IT 6.1.4 Evaluate the current help desk service provided in the district. |
| **IT 6.2 Explain the importance of backing up data and maintaining data integrity.** |
| **Measurement Criteria:** |
| IT 6.2.1 Identify possible sources of data lost. |
| IT 6.2.2 Identify methods and technologies for preserving data. |
| IT 6.2.3 List the steps required for effective backup and recovery. |
| IT 6.2.4 Design a recovery plan for what happens if there is a disaster and how you would get everything back up and running. |
| **IT 6.3 Understand how changes that are made in one part of the system affects the others.** |
| **Measurement Criteria:** |
| IT 6.3.1 Explain the importance of preserving the privacy of data. |
| IT 6.3.2 Predict how changes to one area might impact another area. |
| IT 6.3.3 Understand the concept of regression testing. |
| **IT 6.4 Explain the importance of security of data (e.g. privacy of information, confidentiality, encryption, and restricted access by authorized personnel).** |
| **Measurement Criteria:** |

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| **Information Support and Services** |
| IT 6.4.1 Demonstrate an awareness of technological advances in securing data. |
| IT 6.4.2 Understand the requirement for confidentiality. |
| IT 6.4.3 Identify methods of data protection. |
| IT 6.4.4 Understand the importance of user roles. |
| IT 6.4.5 Explain the difference between Admin and non-Admin roles. |
| **IT 6.5 Understand best practices in regards to cyber security.** |
| **Measurement Criteria:** |
| IT 6.5 1 Explain why hacks happen. |
| IT 6.5.2 Understand the consequences of Cyber Security breaches. |
| IT 6.5.3 Understand the tools available to minimize the risks for Cyber Security breaches. |
| IT 6.5.4 Explain a process that could be used in response to a breach. |
| **IT 6.6 Be able to install and support applications commonly used in the district.** |
| **Measurement Criteria:** |
| IT 6.6.1 Understand how to properly install applications. |
| IT 6.6.2 Understand the difference between network installations and local installations. |
| IT 6.6.3 Understand Cloud based applications and how they differ from local applications. |
| **IT 6.7 Demonstrate effective customer services skills (e.g., patience, courtesy, identify customer expectations, promptness).** |
| **Measurement Criteria:** |
| IT 6.7.1 Role play customer help-desk scenarios. |
| IT 6.7.2 Understand the importance of a positive attitude. |
| IT 6.7.3 Understand the different types of personalities and how to communicate with each. |
| IT 6.7.4 Explore the support ticket systems available for use by help desks. |
| IT 6.7.5 Demonstrate a conflict-resolution strategy to de-escalate an unsatisfied customer. |
| **IT 6.8 Demonstrate the ability to convey information regarding technical material (non-technical explanations for technical terms).** |
| **Measurement Criteria:** |
| IT 6.8.1 Explain clearly the instructions for a computer task to another individual. |
| IT 6.8.2 Conduct task specific training and coach others to apply related concepts. |
| IT 6.8.3 Demonstrate ability to train others to use common applications. |
| IT 6.8.4 Demonstrate ability to document a process or solution. |

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| **Web and Digital Communications: Web Design** |
| **Cluster Topic 7: IT 7-Web and Digital Communications Sub Topic: Web Design** |
| **IT 7-1 Web and Digital Communications/Web Design Pathway - Knowledge and Skill Statement: Iterate through the design and development process to create a uniform Web/digital product.** |
| **Performance Elements:** |
| **IT 7-1.1 Participate in iterative development with clients and team members.** |
| **Measurement Criteria:** |
| IT 7-1.1.1 Manage the change control process. |
| IT 7-1.1.2 Identify and track critical milestones. |
| IT 7-1.1.3 Report project status. |
| IT 7-1.1.4 Identify optimal strategies for successful interactions with clients and team members. |
| **IT 7-2** Web and Digital Communications/Web Design Pathway - **Cluster Knowledge and Skill Statement:**  **Participate in a user focused design and development process to produce Web and digital communications solutions.** |
| **Performance Elements:** |
| **IT 7-2.1 Analyze Usability and Accessibility as it pertains to customer needs.** |
| **Measurement Criteria:** |
| IT 7-2.1.1 Demonstrate knowledge of 508 ADA Compliance. |
| IT 7-2.1.2 Demonstrate knowledge of web metrics and governance (policies and stylebooks). |
| IT 7-2.1.3 Demonstrate knowledge of cultural implications on design and deployment of digital communication products. |
| IT 7-2.1.4 Engage in user testing throughout the design and development process. (3B-AP-21) |
| **IT 7-3** Web and Digital Communications/Web Design Pathway - **Cluster Knowledge and Skill Statement: Design and employ the use of graphics to create a visual Web/digital design.** |
| **Performance Elements:** |
| **IT 7-3.1 Implement functional design criteria.** |
| **Measurement Criteria:** |
| IT 7-3.1.1 Identify, utilize and create reusable components. |
| IT 7-3.1.2 Create and produce content. |
| IT 7-3.1.3 Create and refine design concepts. |
| **IT 7-3.2 Create product visual design.** |
| **Measurement Criteria:** |
| IT 7-3.2.1 Apply principles and elements of design. |
| IT 7-3.2.2 Apply color theory to select appropriate colors. |
| IT 7-3.2.3 Create and/or implement the look and feel of the product. |
| IT 7-3.2.4 Create graphical images and videos. |
| IT 7-3.2.5 Apply knowledge of typography. |
| IT 7-3.2.6 Alter digitized images using an image manipulation program. |
| IT 7-3.2.7 Evaluate visual appeal. |
| **IT 7-4** Web and Digital Communications/Web Design Pathway - **Cluster Knowledge and Skill Statement: Gather and analyze digital communication customer requirements to best meet consumer needs.** |
| **Performance Elements:** |
| **IT 7-4.1 Gather data to identify customer requirements.** |

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| **Web and Digital Communications: Web Design** |
| **Measurement Criteria:** |
| IT 7-4.1.1 Gather information using interviewing strategies. |
| IT 7-4.1.2 Determine client’s needs and expected outcomes. |
| **IT 7-4.2 Collect requirements data from customers and competing Web sites.** |
| **Measurement Criteria:** |
| IT 7-4.2.1 Determine purpose of the digital communication project. |
| IT 7-4.2.2 Determine the target audience. |
| IT 7-4.2.3 Determine the digital communication elements to be used. |
| IT 7-4.2.4 Determine client’s privacy policy and expectations. |
| **IT 7-4.3 Evaluate requirements data that has been collected.** |
| **IT 7-4.4 Demonstrate how to create sand receive approval for a Web Site Plan.** |
| **IT 7-4. 5 Convey technical concepts from Web design to anon-technical audience.** |
| **IT 7-5 Web and Digital Communications/Web Design Pathway - Cluster Knowledge and Skill**  **Statement: Define the scope of digital communication work in a written form to summarize and meet customer requirements.** |
| **Performance Elements:** |
| **IT 7-5.1 Define scope of work to meet customer requirements.** |
| **Measurement Criteria:** |
| IT 7-5.1.1 Develop a design brief. |
| IT 7-5.1.2 Determine the target audience requirements (such as web accessibility). |
| IT 7-5.1.3 Identify available media and content sources. |
| IT 7-5.1.4 Develop timeline for completion. |
| IT 7-5.1.5 Determine staffing resources – internal and external – required to complete project. |
| IT 7-5.1.6 Develop preliminary project budget. |
| IT 7-5.1.7 Write scope of work document. |
| IT 7-5.1.8 Obtain client approval on scope of work. |
| **IT 7-6** Web and Digital Communications/Web Design Pathway - **Cluster Knowledge and Skill Statement: Prepare digital communication product specifications to communicate specifications with various audiences.** |
| **Performance Elements:** |
| **IT 7-6.1 Prepare functional specifications.** |
| **Measurement Criteria:** |
| IT 7-6.1.1 Develop flowchart/navigational blueprints. |
| IT 7-6.1.2 Develop storyboards. |
| IT 7-6.1.3 Determine delivery platform(s). |
| IT 7-6.1.4 Design user interface. |
| IT 7-6.1.5 Design navigational schema. |

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| **Web and Digital Communications: Web Design** |
| **IT 7-6.2 Prepare visual design specifications.** |
| **Measurement Criteria:** |
| IT 7-6.2.1 Apply principles of design (color theory and schemes, proximity, alignment, repetition, web graphics, optimization, typography). |
| IT 7-6.2.2 Identify technical constraints. |
| IT 7-6.2.3 Create sample design showing placement of content, buttons, graphics and suggested color Scheme. |
| **IT 7-6.3 Create final project plan.** |
| **Measurement Criteria:** |
| IT 7-6-3.1 Identify and obtain tools and resources to do the job. |
| IT 7-6-3.2 Identify and evaluate risks. |
| IT 7-6-3.3 Develop detailed task list. |
| IT 7-6-3.4 Identify critical milestones. |
| IT 7-6-3.5 Identify interdependencies. |
| **IT 7-7** Web and Digital Communications/Web Design Pathway - **Cluster Knowledge and Skill Statement: Demonstrate the effective use of tools for digital communication production, development and**  **project management to complete web/digital communication projects.** |
| **Performance Elements:** |
| **IT 7-7.3 Select and use appropriate software tools.** |
| **Measurement Criteria:** |
| IT 7-7.3.1 Demonstrate proficiency in use of digital imaging, digital video techniques, and equipment. |
| IT 7-7.3.2 Demonstrate knowledge of available graphics, video, motion graphics, web software programs. |
| IT 7-7.3.3 Demonstrate knowledge of available project management and collaborative tools. |
| IT 7-7.3.4 Demonstrate knowledge of integrated development environments. |
| IT 7-7.3.5 Demonstrate use of image altering software. |
| IT 7-7.3.6 Identify how different user agents (browsers, devices) affect the digital communication product. |
| **IT 7-8** Web and Digital Communications/Web Design Pathway - **Cluster Knowledge and Skill Statement: Employ knowledge of Web design, programming, and administration to develop and maintain Web applications.** |
| **Performance Elements:** |
| **IT 7-8.1 Implement functional design criteria.** |
| **Measurement Criteria:** |
| IT 7-8.1.1 Identify, utilize and create reusable components. |
| IT 7-8.1.2 Create and produce content. |
| IT 7-8.1.3 Create and refine design concepts. |
| **IT 7-8.2 Create product visual design.** |
| **Measurement Criteria:** |
| IT 7-8.2.1 Apply principles and elements of design. |
| IT 7-8.2.2 Apply color theory to select appropriate colors. |

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| **Web and Digital Communications: Web Design** |
| IT 7-8.2.3 Create and/or implement the look and feel of the product. |
| IT 7-8.2.4 Create graphical images and/or video elements. |
| IT 7-8.2.5 Apply knowledge of typography. |
| IT 7-8.2.6 Alter digitized images using an image manipulation program. |
| IT 7-8.2.7 Evaluate visual appeal. |
| **IT 7-8.3 Use basic Web development skills.** |
| **Measurement Criteria:** |
| IT 7-8.3.1 Demonstrate knowledge of HTM, HTML and CSS. |
| IT 7-8.3.2 Demonstrate knowledge of version control and why it is important. |
| IT 7-8.3.3 Demonstrate knowledge of basic web application security. |
| IT 7-8.3.4 Demonstrate that website meets the validation process and is compatible across multiple browsers and devices. |
| **IT 7-8.4 Summarize Internet architecture elements.** |
| **Measurement Criteria:** |
| IT 7-8.4.1 Demonstrate knowledge of transfer protocols (FTP, WebDAV). |
| IT 7-8.4.2 Demonstrate knowledge of Internet standards bodies. |
| IT 7-8.4.3 Keep up-to-date with new and emerging trends related to the Internet. |
| **IT 7-8.5 Employ basic web programming knowledge.** |
| **Measurement Criteria:** |
| IT 7-8.5.1 Demonstrate knowledge of client-side processing and its advantages/disadvantages. |
| IT 7-8.5.2 Identify standards scripting languages such as JavaScript. |
| IT 7-8.5.3 Demonstrate knowledge of website testing. |
| IT 7-8.5.4 Demonstrate knowledge of the uses and advantages/disadvantages of various scripting Languages. |
| **IT 7-9** Web and Digital Communications/Web Design Pathway - **Cluster Knowledge and Skill Statement: Test a digital communication product to evaluate its functionality.** |
| **Performance Elements:** |
| **IT 7-9.1 Develop a test plan for the digital communication product.** |
| **Measurement Criteria:** |
| IT 7-9.1.1 Perform usability tests. |
| IT 7-9.1.2 Modify an existing program to add additional functionality and discuss intended and unintended implications. (3B-AP-22) |
| IT 7-9.1.3 Assess product effectiveness. |
| IT 7-9.1.4 Test product for reliability using code review and other methods. (3B-AP-23) |
| IT 7-9.1.5 Plan and coordinate customer acceptance testing. |
| **IT 7-9.2 Implement a test plan for the digital communication product.** |
| **Measurement Criteria:** |
| IT 7-9.2.1 Define the problem. |
| IT 7-9.2.2 Identify/test possible solutions. |
| IT 7-9.2.3 Develop resolution plan. |

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| **Web and Digital Communications: Web Design** |
| IT 7-9.2.4 Implement solution. |
| IT 7-9.2.5 Evaluate problem-solving processes and outcomes. |
| **IT 7-9.3 Resolve product problems.** |
| **IT 7-10 Web and Digital Communications/Web Design Pathway - Cluster Knowledge and Skill Statement: consider intellectual property issues when creating Web pages.** |
| **Performance Elements:** |
| IT 7-10.1 Explain the concept of intellectual property. |
| IT 7-10.2 Differentiate between copyright and trademarks. |
| IT 7-10.3 Describe the function of non-disclosure agreement(NDA). |

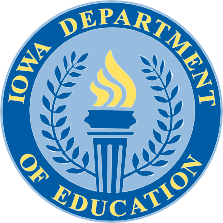
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| **Web and Digital Communications: Graphic Design** |
| **IT Cluster Topic 8: IT 8-Web and Digital Communications Sub Topic: Graphic Design** |
| **IT 8-1 Web and Digital Communications/Graphic Design - Cluster Knowledge and Skill Statement: Demonstrate knowledge of the Graphics Industry.** |
| **Performance Elements:** |
| **IT 8-1.1 Demonstrate knowledge of the history of the graphic design field.** |
| **Measurement Criteria:** |
| IT 8-1.1.1 Research technologies that advanced graphic design. |
| IT 8-1.1.2 Describe past, present, and future styles in the graphic design field. |
| IT 8-1.1.3 Identify art movements that impacted graphic arts. |
| IT 8-1.1.4 Describe the importance of graphic design’s influence on society. |
| IT 8-1.1.5 Identify factors that contribute to the success of media businesses and freelance/contract providers. |
| IT 8-1.1.6 Examine how the relationship among marketing, sales and production affects profitability. |
| **IT 8-1.2 Communicate ideas using appropriate industry terminology.** |
| **Measurement Criteria:** |
| IT 8-1.2.1 Formulate written and verbal communications using industry standard terms. |
| IT 8-1.2.2 Prepare and deliver a visual presentation utilizing appropriate Cluster Knowledge. |
| **IT 8-2 Web and Digital Communications/Graphic Design - Cluster Knowledge and Skill Statement: Apply elements and principles of design to communicate visually.** |
| **Performance Elements:** |
| **IT 8-2.1 Utilize computer applications to manage media.** |
| **Measurement Criteria:** |
| IT 8-2.1.1 Use appropriate electronic publishing software and output devices. |
| IT 8-2.1.2 Apply essential commands and knowledge of computer operating systems. |
| IT 8-2.1 3 Apply computer file management techniques. |
| IT 8-2.1.4 Use the internet for file transfer. |
| IT 8-2.1.5 Select the format for digital delivery. |
| IT 8-2.1.6 Use and care for equipment and related accessories. |
| IT 8-2.1.7 Describe the functionality of the internet, intranet, and extranet in the media environment. |
| IT 8-2.1.8 Explain methods of protecting a computer against computer threats. |

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| **Web and Digital Communications: Graphic Design** |
| **IT 8-2.2 Apply knowledge of data capture and manipulation.** |
| **Measurement Criteria:** |
| IT 8-2.2.1 Identify software that supports data capture for media devices (i.e. digital camera, video input device, graphics tablet, graphics expansion boards). |
| IT 8-2.2.2 Select appropriate resolutions for data capture. |
| IT 8-2.2.3 Capture and transfer still image, audio, and moving image content. |
| IT 8-B.2.4 Archive and manage data for media applications. |
| **IT 8-2.3 Identify and apply the elements of design.** |
| **Measurement Criteria:** |
| IT 8-2.3.1 Identify the applications of color, line, shape, texture, size, and value in samples of graphic work. |
| IT 8-2.3.2 Analyze the use of color, line, shape, texture, size and value in samples of graphic work. |
| IT 8-2.3.3 Incorporate color, line, shape, texture, size and value in student-generated graphic work. |
| IT 8-2.3.4 Demonstrate the elements of design through manual sketching. |
| IT 8-2.3.5 Demonstrate the elements of design through digital sketching. |
| **IT 8-2.4 Identify and apply the principles of design.** |
| Measurement Criteria: |
| IT 8-2.4.1 Analyze the principles of balance, contrast alignment, rhythm, repetition, movement, harmony, emphasis, and unity in samples of graphic works. |
| IT 8-2.4.2 Incorporate principles of balance, contrast, alignment, rhythm, repetition, movement, harmony, emphasis and unity in student-generated graphic works. |
| IT 8-2.4.3 Demonstrate the principles of design through various drawing techniques. |
| **IT 8-2.5 Identify and apply the principles of typography.** |
| **Measurement Criteria:** |
| IT 8-2.5.1 Identify the anatomical components and qualities of type (i.e., x-height, ascenders, descenders, counters, etc.). |
| IT 8-2.5.2 Apply and adjust formatting to type. |
| IT 8-2.5.3 Construct graphic works utilizing and manipulating type. |
| **IT 8-2.6 Apply principles and elements of design to layout.** |
| **Measurement Criteria:** |
| IT 8-2.6.1 Apply effective use of negative space, composition, message structure, graphics, etc. to graphic works. |
| IT 8-2.6.2 Create graphic works utilizing grids. |
| IT 8-2.6.3 Create graphic works utilizing templates. |
| IT 8-2.6.4 Demonstrate layout skills for print collaterals (i.e. business cards, newspapers, packaging, etc.). |
| IT 8-2.6.5 Demonstrate layout skills for digital media. |
| IT 8-2.6.6 Explain the importance of consistency of design. |
| IT 8-2.6.7 Explain the importance of usability. |
| IT 8-2.6.8 Explain the importance of core messaging. |
| IT 8-2.6.9 Apply measurement tools and ratio analysis to image positioning in graphic works. |
| IT 8-2.6.10 Solve aspect ratio proportion measurement in video and animation development. |
| **IT 8-3 Web and Digital Communications/Graphic Design - Cluster Knowledge and Skill Statement: Demonstrate knowledge of the key aspects of production using industry standard software.** |

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| **Web and Digital Communications: Graphic Design** |
| **Performance Elements:** |
| **IT 8-3.1 Demonstrate knowledge of concept development.** |
| **Measurement Criteria:** |
| IT 8-3.1.1 Generate project ideas through the use of thumbnails, roughs, mock-ups, wireframes, etc. |
| IT 8-3.1.2 Create a storyboard for a project. |
| **IT 8-3.2 Demonstrate knowledge of image creation and manipulation.** |
| **Measurement Criteria:** |
| IT 8-3.2.1 Analyze differences and appropriate applications of vector-based and bitmap images. |
| IT 8-3.2.2 Use a variety of input devices to import photos, images, and other content. |
| IT 8-3.2.3 Incorporate the use of image manipulation and illustration software into final products. |
| IT 8-3.2.4 Apply nondestructive image editing techniques such as layering and masking. |
| IT 8-3.2.5 Practice using different selection tools and techniques to manipulate images. |
| IT 8-3.2.6 Practice in-camera composition and cropping. |
| **IT 8-3.3 Demonstrate applications of media outputs.** |
| **Measurement Criteria:** |
| IT 8-3.3.1 Use appropriate resolution, compression, and file formats for various media outputs including web, video, and print. |
| IT 8-3.3.2 Incorporate appropriate color modes in graphic works including but not limited to RGB and CMYK. |
| **IT 8-3.4 Demonstrate knowledge of the graphic design workflow to increase success and productivity.** |
| **Measurement Criteria:** |
| IT 8-3.4.1 Develop a workflow for a project. |
| IT 8-3.4.2 Synthesize information collected from communications with various stakeholders. |
| IT 8-3.4.3 Describe project management. |
| IT 8-3.4.4 Create projects that define core message. |
| IT 8-3.4.5 Work in a team to plan a larger project. |
| IT 8-3.4.6 Identify the target audience for a project. |
| **IT 8-3.5 Identify and apply the design process.** |
| **Measurement Criteria:** |
| IT 8-3.5.1 Explain the design process. |
| IT 8-3.5.2 Apply the design process to generate graphic works. |
| **IT 8-3.6 Demonstrate knowledge of branding and corporate identity.** |
| **Measurement Criteria:** |
| IT 8-3.6.1 Analyze branding and corporate identity, its purpose and constituents. |
| IT 8-3.6.2 Create a visual that contains all the richness of the brand. |
| **IT 8-4 Web and Digital Communications/Graphic Design - Cluster Knowledge and Skill Statement: Demonstrate knowledge of ethical and legal issues related to graphic design.** |
| **Performance Elements:** |
| **IT 8-4.1 Demonstrate knowledge of copyright and intellectual property law.** |
| **Measurement Criteria:** |
| IT 8-4.1.1 Research laws governing copyright, intellectual property (including font usage, photography, illustration, audio and video rights), and software licensing. |
| IT 8-4.1.2 Research laws governing brand issues, trademark, and other proprietary rights). |

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| **Web and Digital Communications: Graphic Design** |
| IT 8-4.1.3 Discuss consequences of violating copyright, privacy, and data security laws. |
| IT 8-4.1.4 Define and debate fair use including authorships, rights of use for work and likeness, and credit lines. |
| IT 8-4.1.5 Model fair use in production of graphic works. |
| IT 8-4.1.6 Describe how diversity (cultural, ethnic, multigenerational) and ethics affect the selecti0n of projects and programs. |
| **Performance Elements:** |
| **IT 8-4.2 Demonstrate knowledge of ethical behavior as it relates to the industry.** |
| **Measurement Criteria:** |
| IT 8-4.2.1 Research and discuss censorship as it applies to the graphic design industry. |
| IT 8-4.2.2 Research the purpose of non-disclosure agreements (NDA). |
| IT 8-4.2.3 Incorporate cultural sensitivity and diversity awareness into the design process. |
| IT 8-4.2.4 Debate legal versus ethical behaviors. |
| IT 8-4.2.5 Incorporate ethical behaviors in graphic projects. |
| **IT 8-5 Web and Digital Communications/Graphic Design - Cluster Knowledge and Skill Statement: Create and maintain a personal portfolio.** |
| **Performance Elements:** |
| **IT 8-5.1 Create and maintain a personal portfolio.** |
| **Measurement Criteria:** |
| IT 8-5.1.1 Research and compare the various types of personal portfolios. |
| IT 8-5.1.2 Develop graphics portfolios that include traditional and digital works). |
| IT 8-5.1.3 Recognize that portfolios are dynamic and require maintenance. |
| **IT 8-5.2 Demonstrate the process of evaluating portfolios.** |
| **Measurement Criteria:** |
| IT 8-5.2.1 Conduct peer and self-evaluations using rubrics. |
| IT 8-5.2.2 Understand the elements of the critique process, including a respect for peer work and the ability to give and receive dispassionate criticism. |

*For additional information:* [*https://educateiowa.gov/documents/service-areas-business-*](https://educateiowa.gov/documents/service-areas-business-marketing/2013/05/it-critical-standards-and-benchmarks)[*marketing/2013/05/it-critical-standards-and-benchmarks*](https://educateiowa.gov/documents/service-areas-business-marketing/2013/05/it-critical-standards-and-benchmarks)



**COMMUNITY COLLEGES & WORKFORCE PREPARATION** *PROSPERITY THROUGH EDUCATION*

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