Subject	**Chapter 130. Career and Technical Education, Subchapter K. Information Technology**
Course Title	**§130.302 Principles of Information Technology (One Credit), Adopted 2015**

(a) General Requirements. This course is recommended for students in Grades 9 and 10. Students shall be awarded one credit for successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on Building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia and systems integration services.

(3) In Principles of Information Technology, students will develop computer literacy skills to adapt to emerging technologies used in the global marketplace. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. Students enhance reading, writing, computing, communication, and reasoning skills and apply them to the information technology environment.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(i) identify work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(ii) identify work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(iii) identify qualities that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(iv) identify qualities that enhance job advancement

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(v) demonstrate work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(vi) demonstrate work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(vii) demonstrate qualities that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(viii) demonstrate qualities that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(ii) employ effective writing skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) solve problems and think critically	(i) solve problems
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) solve problems and think critically	(ii) think critically
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) identify and implement proper safety procedures	(i) identify proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) identify and implement proper safety procedures	(ii) implement proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project	(i) demonstrate planning skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project	(ii) demonstrate time-management skills
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(i) identify job opportunities
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(ii) identify [job opportunities'] accompanying job duties

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(iii) identify [job opportunities'] accompanying job tasks
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(i) research careers of personal interest
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(ii) research the education required to achieve personal career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(iii) research the job skills required to achieve personal career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(iv) research the experience required to achieve personal career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(C) describe the functions of resumes and portfolios	(i) describe the functions of resumes
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(C) describe the functions of resumes and portfolios	(ii) describe the functions of portfolios

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(A) identify and describe functions of various evolving and emerging technologies	(i) identify functions of various evolving technologies
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(A) identify and describe functions of various evolving and emerging technologies	(ii) identify functions of various emerging technologies
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(A) identify and describe functions of various evolving and emerging technologies	(iii) describe functions of various evolving technologies
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(A) identify and describe functions of various evolving and emerging technologies	(iv) describe functions of various emerging technologies
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(B) send and receive text information and file attachments using electronic methods such as email, electronic bulletin boards, and instant message services	(i) send text information using electronic methods
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(B) send and receive text information and file attachments using electronic methods such as email, electronic bulletin boards, and instant message services	(ii) send file attachments using electronic methods

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(B) send and receive text information and file attachments using electronic methods such as email, electronic bulletin boards, and instant message services	(iii) receive text information using electronic methods
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(B) send and receive text information and file attachments using electronic methods such as email, electronic bulletin boards, and instant message services	(iv) receive file attachments using electronic methods
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(C) demonstrate effective Internet search strategies, including keywords and Boolean logic, using various available search engines	(i) demonstrate effective Internet search strategies, including keywords, using various available search engines
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(C) demonstrate effective Internet search strategies, including keywords and Boolean logic, using various available search engines	(ii) demonstrate effective Internet search strategies, including Boolean logic, using various available search engines
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(D) identify the various components of a Uniform Resource Locator	(i) identify the various components of a Uniform Resource Locator
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(E) demonstrate ability to effectively test acquired information from the Internet for accuracy, relevance, and validity	(i) demonstrate ability to effectively test acquired information from the Internet for accuracy

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(E) demonstrate ability to effectively test acquired information from the Internet for accuracy, relevance, and validity	(ii) demonstrate ability to effectively test acquired information from the Internet for relevance
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(E) demonstrate ability to effectively test acquired information from the Internet for accuracy, relevance, and validity	(iii) demonstrate ability to effectively test acquired information from the Internet for validity
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(F) explain issues concerning computer-based threats such as computer viruses, malware, and hacking	(i) explain issues concerning computer-based threats
(3) The student uses evolving and emerging technologies to exchange information. The student is expected to:	(G) explain issues concerning Internet safety such as identity theft, online predators, cyber-bullying, and phishing	(i) explain issues concerning Internet safety
(4) The student demonstrates knowledge of the hardware components associated with information systems. The student is expected to:	(A) identify major hardware components and their functions	(i) identify major hardware components
(4) The student demonstrates knowledge of the hardware components associated with information systems. The student is expected to:	(A) identify major hardware components and their functions	(ii) identify [major hardware components'] functions
(4) The student demonstrates knowledge of the hardware components associated with information systems. The student is expected to:	(B) use available reference tools as appropriate	(i) use available reference tools as appropriate

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student demonstrates knowledge of the hardware components associated with information systems. The student is expected to:	(C) connect and use a variety of peripheral devices such as mouse, keyboard, microphone, digital camera, and printer	(i) connect a variety of peripheral devices
(4) The student demonstrates knowledge of the hardware components associated with information systems. The student is expected to:	(C) connect and use a variety of peripheral devices such as mouse, keyboard, microphone, digital camera, and printer	(ii) use a variety of peripheral devices
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(A) differentiate between systems and application software	(i) differentiate between systems and application software
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(B) identify and explain major operating system fundamentals and components such as disk operations, graphical user interface components, and hardware drivers	(i) identify major operating system fundamentals
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(B) identify and explain major operating system fundamentals and components such as disk operations, graphical user interface components, and hardware drivers	(ii) identify major operating system components
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(B) identify and explain major operating system fundamentals and components such as disk operations, graphical user interface components, and hardware drivers	(iii) explain major operating system fundamentals

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(B) identify and explain major operating system fundamentals and components such as disk operations, graphical user interface components, and hardware drivers	(iv) explain major operating system components
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(C) explain the purpose of file types across software products	(i) explain the purpose of file types across software products
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(D) demonstrate use of computer numbering systems and internal data representation such as identifying the hexadecimal value of a color	(i) demonstrate use of computer numbering systems
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(D) demonstrate use of computer numbering systems and internal data representation such as identifying the hexadecimal value of a color	(ii) demonstrate use of internal data representation
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(E) compare and contrast open source and proprietary software	(i) compare and contrast open source and proprietary software
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(F) explain use of system management tools	(i) explain use of system management tools
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(G) apply proper file management techniques such as creating, naming, organizing, copying, moving, and deleting files	(i) apply proper file management techniques

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(H) use appropriate file protection and security	(i) use appropriate file protection
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(H) use appropriate file protection and security	(ii) use appropriate file security
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(I) explain the process for discovering,quarantining, and removing viruses from a computer system	(i) explain the process for discovering viruses
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(I) explain the process for discovering,quarantining, and removing viruses from a computer system	(ii) explain the process for quaraintining viruses
(5) The student demonstrates knowledge of the different software associated with information systems. The student is expected to:	(I) explain the process for discovering,quarantining, and removing viruses from a computer system	(iii) explain the process for removing viruses from a computer system
(6) The student analyzes network systems. The student is expected to:	(A) identify hardware associated with telecommunications and data networking such as servers, routers, switches, and network connectors	(i) identify hardware associated with telecommunications
(6) The student analyzes network systems. The student is expected to:	(A) identify hardware associated with telecommunications and data networking such as servers, routers, switches, and network connectors	(ii) identify hardware associated with data networking

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student analyzes network systems. The student is expected to:	(B) identify and describe various types of networks such as peer-to-peer, local area networks, wide area networks, wireless and Ethernet	(i) identify various types of networks
(6) The student analyzes network systems. The student is expected to:	(B) identify and describe various types of networks such as peer-to-peer, local area networks, wide area networks, wireless and Ethernet	(ii) describe various types of networks
(6) The student analyzes network systems. The student is expected to:	(C) identify functions of network operating systems	(i) identify functions of network operating systems
(6) The student analyzes network systems. The student is expected to:	(D) explain troubleshooting techniques for various network connection issues	(i) explain troubleshooting techniques for various network connection issues
(7) The student applies word-processing technology. The student is expected to:	(A) identify the terminology associated with word-processing software	(i) identify the terminology associated with word-processing software
(7) The student applies word-processing technology. The student is expected to:	(B) edit a variety of text documents using functions such as pagination, appropriate white space, tab settings, and font style, size, and color	(i) edit a variety of text documents using functions
(7) The student applies word-processing technology. The student is expected to:	(C) create professional documents such as memorandums, technical manuals, or proposals using advanced word-processing features	(i) create professional documents using advanced word-processing features
(8) The student applies spreadsheet technology. The student is expected to:	(A) identify the terminology associated with spreadsheet software	(i) identify the terminology associated with spreadsheet software

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student applies spreadsheet technology. The student is expected to:	(B) use numerical content to perform mathematical calculations	(i) use numerical content to perform mathematical calculations
(8) The student applies spreadsheet technology. The student is expected to:	(C) use student-created and preprogrammed functions to produce documents such as budget, payroll, statistical tables, and personal checkbook register	(i) use student-created functions to produce documents
(8) The student applies spreadsheet technology. The student is expected to:	(C) use student-created and preprogrammed functions to produce documents such as budget, payroll, statistical tables, and personal checkbook register	(ii) use preprogrammed functions to produce documents
(8) The student applies spreadsheet technology. The student is expected to:	(D) identify, generate, and describe the function of comma separated value files	(i) identify comma separated value files
(8) The student applies spreadsheet technology. The student is expected to:	(D) identify, generate, and describe the function of comma separated value files	(ii) generate comma separated value files
(8) The student applies spreadsheet technology. The student is expected to:	(D) identify, generate, and describe the function of comma separated value files	(iii) describe the function of comma separated value files
(8) The student applies spreadsheet technology. The student is expected to:	(E) create and analyze spreadsheets incorporating advanced features such as lookup tables, nested IF statements, subtotals, cell protection conditional formatting, charts, and graphs	(i) create spreadsheets incorporating advanced features

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student applies spreadsheet technology. The student is expected to:	(E) create and analyze spreadsheets incorporating advanced features such as lookup tables, nested IF statements, subtotals, cell protection conditional formatting, charts, and graphs	(ii) analyze spreadsheets incorporating advanced features
(8) The student applies spreadsheet technology. The student is expected to:	(F) perform sorting, searching, and data filtering in documents	(i) perform sorting in documents
(8) The student applies spreadsheet technology. The student is expected to:	(F) perform sorting, searching, and data filtering in documents	(ii) perform searching in documents
(8) The student applies spreadsheet technology. The student is expected to:	(F) perform sorting, searching, and data filtering in documents	(iii) perform data filtering in documents
(9) The student explores computer programming concepts. The student is expected to:	(A) identify the function of compilers and interpreters	(i) identify the function of compilers
(9) The student explores computer programming concepts. The student is expected to:	(A) identify the function of compilers and interpreters	(ii) identify the function of interpreters
(9) The student explores computer programming concepts. The student is expected to:	(B) explain the difference between the operation of compilers and interpreters	(i) explain the difference between the operation of compilers and interpreters
(9) The student explores computer programming concepts. The student is expected to:	(C) identify various computer languages and how the languages are used in software development	(i) identify various computer languages

Knowledge and Skill Statement	Student Expectation	Breakout
(9) The student explores computer programming concepts. The student is expected to:	(C) identify various computer languages and how the languages are used in software development	(ii) identify how the [computer] languages are used in software development
(9) The student explores computer programming concepts. The student is expected to:	(D) recognize data representation in software development such as string, numeric, character, integer, and date	(i) recognize data representation in software development
(9) The student explores computer programming concepts. The student is expected to:	(E) identify and explain the concept of algorithms	(i) identify algorithms
(9) The student explores computer programming concepts. The student is expected to:	(E) identify and explain the concept of algorithms	(ii) explain the concept of algorithms
(9) The student explores computer programming concepts. The student is expected to:	(F) describe the flow of a structured algorithm, including linear and iterative instructions such as using a flow chart	(i) describe the flow of a structured algorithm, including linear instructions
(9) The student explores computer programming concepts. The student is expected to:	(F) describe the flow of a structured algorithm, including linear and iterative instructions such as using a flow chart	(ii) describe the flow of a structured algorithm, including iterative instructions
(10) The student explores database technology. The student is expected to:	(A) identify the terminology associated with database software and database functions	(i) identify the terminology associated with database software
(10) The student explores database technology. The student is expected to:	(A) identify the terminology associated with database software and database functions	(ii) identify the terminology associated with database functions

Knowledge and Skill Statement	Student Expectation	Breakout
(10) The student explores database technology. The student is expected to:	(B) explore the application of databases	(i) explore the application of databases
(10) The student explores database technology. The student is expected to:	(C) identify and explain the purpose and elements of a query language	(i) identify the purpose of a query language
(10) The student explores database technology. The student is expected to:	(C) identify and explain the purpose and elements of a query language	(ii) identify the elements of a query language
(10) The student explores database technology. The student is expected to:	(C) identify and explain the purpose and elements of a query language	(iii) explain the purpose of a query language
(10) The student explores database technology. The student is expected to:	(C) identify and explain the purpose and elements of a query language	(iv) explain the elements of a query language
(10) The student explores database technology. The student is expected to:	(D) identify and explain the purpose of fields and records	(i) identify the purpose of fields
(10) The student explores database technology. The student is expected to:	(D) identify and explain the purpose of fields and records	(ii) identify the purpose of records
(10) The student explores database technology. The student is expected to:	(D) identify and explain the purpose of fields and records	(iii) explain the purpose of fields
(10) The student explores database technology. The student is expected to:	(D) identify and explain the purpose of fields and records	(iv) explain the purpose of records

Knowledge and Skill Statement	Student Expectation	Breakout
(10) The student explores database technology. The student is expected to:	(E) describe the process of constructing a query, including multiple search parameters	(i) describe the process of constructing a query, including multiple search parameters
(11) The student applies presentation management technology. The student is expected to:	(A) identify the terminology and functions of presentation software	(i) identify the terminology of presentation software
(11) The student applies presentation management technology. The student is expected to:	(A) identify the terminology and functions of presentation software	(ii) identify the functions of presentation software
(11) The student applies presentation management technology. The student is expected to:	(B) create, save, edit, and produce presentations incorporating advanced features such as links, hyperlinks, audio, and graphics	(i) create presentations incorporating advanced features
(11) The student applies presentation management technology. The student is expected to:	(B) create, save, edit, and produce presentations incorporating advanced features such as links, hyperlinks, audio, and graphics	(ii) save presentations incorporating advanced features
(11) The student applies presentation management technology. The student is expected to:	(B) create, save, edit, and produce presentations incorporating advanced features such as links, hyperlinks, audio, and graphics	(iii) edit presentations incorporating advanced features
(11) The student applies presentation management technology. The student is expected to:	(B) create, save, edit, and produce presentations incorporating advanced features such as links, hyperlinks, audio, and graphics	(iv) produce presentations incorporating advanced features
(12) The student applies design and web publishing techniques. The student is expected to:	(A) identify the terminology associated with web page development and interactive media	(i) identify the terminology associated with web page development

Knowledge and Skill Statement	Student Expectation	Breakout
(12) The student applies design and web publishing techniques. The student is expected to:	(A) identify the terminology associated with web page development and interactive media	(ii) identify the terminology associated with interactive media
(12) The student applies design and web publishing techniques. The student is expected to:	(B) identify and explain design elements such as typeface, color, shape, texture, space, and form	(i) identify design elements
(12) The student applies design and web publishing techniques. The student is expected to:	(B) identify and explain design elements such as typeface, color, shape, texture, space, and form	(ii) explain design elements
(12) The student applies design and web publishing techniques. The student is expected to:	(C) identify and explain design principles such as unity, harmony, balance, scale, and contrast	(i) identify design principles
(12) The student applies design and web publishing techniques. The student is expected to:	(C) identify and explain design principles such as unity, harmony, balance, scale, and contrast	(ii) explain design principles
(12) The student applies design and web publishing techniques. The student is expected to:	(D) identify and explain common elements of Hyper Text Markup Language (HTML) such as tags, stylesheets, and hyperlinks	(i) identify common elements of Hyper Text Markup Language (HTML)
(12) The student applies design and web publishing techniques. The student is expected to:	(D) identify and explain common elements of Hyper Text Markup Language (HTML) such as tags, stylesheets, and hyperlinks	(ii) explain common elements of Hyper Text Markup Language (HTML)
(12) The student applies design and web publishing techniques. The student is expected to:	(E) create a web page containing links, graphics, and text using appropriate design principles	(i) create a web page containing links, graphics, and text using appropriate design principles

Knowledge and Skill Statement	Student Expectation	Breakout
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(i) explain ethical use of technology
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(ii) explain ethical use of online resources
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(iii) demonstrate ethical use of technology
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(iv) demonstrate ethical use of online resources
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(B) adhere to intellectual property laws	(i) adhere to intellectual property laws
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(i) explain the concept of intellectual property laws, including copyright
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(ii) explain the concept of intellectual property laws including, trademarks

Knowledge and Skill Statement	Student Expectation	Breakout
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(iii) explain the concept of intellectual property laws, including patents
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(iv) explain the consequences of violating [copyright] law
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(v) explain the consequences of violating [trademark] law
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(vi) explain the consequences of violating [patent] law
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(D) examine the consequences of plagiarism	(i) examine the consequences of plagiarism
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(E) identify and explain unethical practices such as hacking, online piracy, and data vandalism	(i) identify unethical practices
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(E) identify and explain unethical practices such as hacking, online piracy, and data vandalism	(ii) explain unethical practices

Knowledge and Skill Statement	Student Expectation	Breakout
(13) The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. The student is expected to:	(F) demonstrate ethical use of online resources, including citation of source	(i) demonstrate ethical use of online resources, including citation of source

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	§130.303. Computer Maintenance (One Credit), Adopted 2015.

(a) General Requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Principles of Information Technology. Recommended corequisite: Computer Maintenance Lab. Students shall be awarded one credit for successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Computer Maintenance, students will acquire knowledge of computer maintenance and creating appropriate documentation. Students will analyze the social responsibility of business and industry regarding the significant issues relating to the environment, ethics, health, safety, and diversity in society and in the workplace as related to computer maintenance. Students will apply technical skills to address the IT industry and emerging technologies.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) employ effective reading and writing skills	(ii) employ effective writing skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) solve problems and think critically	(i) solve problems
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) solve problems and think critically	(ii) think critically

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) identify and implement proper safety procedures	(i) identify proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) identify and implement proper safety procedures	(ii) implement proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(i) demonstrate an understanding of legal responsibilities in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(ii) demonstrate an understanding of ethical responsibilities in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring, controlling, and closing a project	(i) demonstrate planning skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring, controlling, and closing a project	(ii) demonstrate time-management skills
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(i) identify job opportunities
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(ii) identify accompanying job duties
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(iii) identify accompanying job tasks
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) examine the role of certifications, resumes, and portfolios in the IT profession	(i) examine the role of certifications in the IT profession
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) examine the role of certifications, resumes, and portfolios in the IT profession	(ii) examine the role of resumes in the IT profession
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) examine the role of certifications, resumes, and portfolios in the IT profession	(iii) examine the role of portfolios in the IT profession

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(A) demonstrate effective verbal and written communication skills with individuals from varied cultures such as fellow workers, management, and customers	(i) demonstrate effective verbal communication skills with individuals from varied cultures
(3) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(A) demonstrate effective verbal and written communication skills with individuals from varied cultures such as fellow workers, management, and customers	(ii) demonstrate effective written communication skills with individuals from varied cultures
(3) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) interpret appropriate documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins.	(i) interpret appropriate documentation
(4) The student acquires an understanding of computer technologies. The student is expected to:	(A) explain the fundamentals of microprocessor theory	(i) explain the fundamentals of microprocessor theory
(4) The student acquires an understanding of computer technologies. The student is expected to:	(B) define the use of Boolean and Binary logic in computer technologies	(i) define the use of Boolean logic in computer technologies
(4) The student acquires an understanding of computer technologies. The student is expected to:	(B) define the use of Boolean and Binary logic in computer technologies	(ii) define the use of Binary logic in computer technologies
(4) The student acquires an understanding of computer technologies. The student is expected to:	(C) explain the theories of magnetism, electricity, and electronics as related to computer technologies	(i) explain the theories of magnetism as related to computer technologies

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student acquires an understanding of computer technologies. The student is expected to:	(C) explain the theories of magnetism, electricity, and electronics as related to computer technologies	(ii) explain the theories of electricity as related to computer technologies
(4) The student acquires an understanding of computer technologies. The student is expected to:	(C) explain the theories of magnetism, electricity, and electronics as related to computer technologies	(iii) explain the theories of electronics as related to computer technologies
(4) The student acquires an understanding of computer technologies. The student is expected to:	(D) explain proper troubleshooting techniques as related to computer hardware	(i) explain proper troubleshooting techniques as related to computer hardware
(4) The student acquires an understanding of computer technologies. The student is expected to:	(E) differentiate among digital and analog input and output electronics theory	(i) differentiate among digital and analog input and output electronics theory
(4) The student acquires an understanding of computer technologies. The student is expected to:	(F) explain the relationships relative to data-communications theory	(i) explain the relationships relative to data-communications theory
(4) The student acquires an understanding of computer technologies. The student is expected to:	(G) describe the architecture of various computer systems	(i) describe the architecture of various computer systems
(4) The student acquires an understanding of computer technologies. The student is expected to:	(H) describe the function of computer components such as central processing units, storage devices, and peripheral devices	(i) describe the function of computer components
(4) The student acquires an understanding of computer technologies. The student is expected to:	(I) explain computer system environmental requirements and related control devices	(i) explain computer system environmental requirements

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student acquires an understanding of computer technologies. The student is expected to:	(I) explain computer system environmental requirements and related control devices; and	(ii) explain [computer system environmental requirements'] related control devices.
(4) The student acquires an understanding of computer technologies. The student is expected to:	(J) identify new and emerging technologies that may affect the field of computer technology	(i) identify new technologies that may affect the field of computer technology
(4) The student acquires an understanding of computer technologies. The student is expected to:	(J) identify new and emerging technologies that may affect the field of computer technology	(ii) identify emerging technologies that may affect the field of computer technology
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(A) identify the purpose and function of computer components in the operation of the computer system such as central processing unit, mother board, sockets, chipsets, basic input and output system and their drivers, memory, hard drive technologies, video cards, input and output devices and ports, and modem and network interface cards (NIC)	(i) identify the purpose of computer components in the operation of the computer system
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(A) identify the purpose and function of computer components in the operation of the computer system such as central processing unit, mother board, sockets, chipsets, basic input and output system and their drivers, memory, hard drive technologies, video cards, input and output devices and ports, and modem and network interface cards (NIC)	(ii) identify the function of computer components in the operation of the computer system
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(B) identify how mobile devices such as personal data assistants and cell phones operate	(i) identify how mobile devices operate

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(C) identify how mobile devices such as personal data assistants and cell phones connect and share data	(i) identify how mobile devices connect data
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(C) identify how mobile devices such as personal data assistants and cell phones connect and share data	(ii) identify how mobile devices share data
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(D) demonstrate an understanding of the rationale behind error messages and symptoms of hardware failures	(i) demonstrate an understanding of the rationale behind error messages
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(D) demonstrate an understanding of the rationale behind error messages and symptoms of hardware failures	(ii) demonstrate an understanding of the symptoms of hardware failures
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(E) research interrupt sequences and beep codes	(i) research interrupt sequences
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(E) research interrupt sequences and beep codes	(ii) research beep codes

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(F) identify priorities and interrupts at the system level	(i) identify priorities at the system level
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(F) identify priorities and interrupts at the system level	(ii) identify interrupts at the system level
(6) The student acquires knowledge of operating system design, including operation and maintenance. The student is expected to:	(A) explain the fundamentals of an operating system	(i) explain the fundamentals of an operating system
(6) The student acquires knowledge of operating system design, including operation and maintenance. The student is expected to:	(B) compare and contrast different operating systems	(i) compare and contrast different operating systems
(6) The student acquires knowledge of operating system design, including operation and maintenance. The student is expected to:	(C) identify the operating systems of mobile devices	(i) identify the operating systems of mobile devices
(7) The student acquires knowledge of the theory behind the installations, configuration of software programs, and updates in IT systems. The student is expected to:	(A) identify the operational features and proper terminology related to computer software systems	(i) identify the operational features related to computer software systems

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student acquires knowledge of the theory behind the installations, configuration of software programs, and updates in IT systems. The student is expected to:	(A) identify the operational features and proper terminology related to computer software systems	(ii) identify the proper terminology related to computer software systems
(7) The student acquires knowledge of the theory behind the installations, configuration of software programs, and updates in IT systems. The student is expected to:	(B) evaluate application software packages	(i) evaluate application software packages
(7) The student acquires knowledge of the theory behind the installations, configuration of software programs, and updates in IT systems. The student is expected to:	(C) verify that software is properly licensed prior to installation	(i) verify that software is properly licensed prior to installation
(7) The student acquires knowledge of the theory behind the installations, configuration of software programs, and updates in IT systems. The student is expected to:	(D) differentiate between types of software such as Software as a Service, single-user, per-seat, enterprise, freeware, shareware, and open-source licensing	(i) differentiate between types of software
(7) The student acquires knowledge of the theory behind the installations, configuration of software programs, and updates in IT systems. The student is expected to:	(E) explain proper troubleshooting techniques related to computer software	(i) explain proper troubleshooting techniques related to computer software
(8) The student acquires knowledge of the installation and configuration of network connections. The student is expected to:	(A) explain the fundamentals of network connections and interface requirements	(i) explain the fundamentals of network connections

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student acquires knowledge of the installation and configuration of network connections. The student is expected to:	(A) explain the fundamentals of network connections and interface requirements	(ii) explain the fundamentals interface requirements
(8) The student acquires knowledge of the installation and configuration of network connections. The student is expected to:	(B) explain the steps required to install and configure a computer on a network	(i) explain the steps required to install a computer on a network
(8) The student acquires knowledge of the installation and configuration of network connections. The student is expected to:	(B) explain the steps required to install and configure a computer on a network	(ii) explain the steps required to configure a computer on a network
(8) The student acquires knowledge of the installation and configuration of network connections. The student is expected to:	(C) identify the steps to troubleshoot network connectivity	(i) identify the steps to troubleshoot network connectivity

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	§130.304. Computer Maintenance Lab (One Credit), Adopted 2015

(a) General Requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Principles of Information Technology. Corequisite: Computer Maintenance. This course must be taken concurrently with Computer Maintenance and may not be taken as a stand-alone course. Districts are encouraged to offer this course in a consecutive block with Computer Maintenance to allow students sufficient time to master the content of both courses. Students shall be awarded one credit for successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Computer Maintenance Lab, students will acquire knowledge of computer maintenance and creating appropriate documentation. Students will analyze the social responsibility of business and industry regarding the significant issues relating to the environment, ethics, health, safety, and diversity in society and in the workplace as related to computer maintenance. Students will apply technical skills to address the IT industry and emerging technologies.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(i) demonstrate work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(ii) demonstrate work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) demonstrate positive personal qualities such as flexibility, open mindedness, initiative, listening attentively to speakers, and willingness to learn new skills	(i) demonstrate positive personal qualities
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(ii) employ effective writing skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) solve problems and think critically	(i) solve problems
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) solve problems and think critically	(ii) think critically
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) identify and implement proper safety procedures	(i) identify proper safety procedures

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) identify and implement proper safety procedures	(ii) implement proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(i) demonstrate an understanding of legal responsibilities in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(ii) demonstrate an understanding of ethical responsibilities in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(I) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoringa and controlling, and closing a project	(i) demonstrate planning skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(I) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoringa and controlling, and closing a project	(ii) demonstrate time-management skills
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(A) complete work orders for repair and installation	(i) complete work orders for repair

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(A) complete work orders for repair and installation	(ii) complete work orders for installation
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(i) estimate supplies costs for installation work orders
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(ii) estimate supplies costs for maintenance work orders
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(iii) estimate supplies costs for repair work orders
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(iv) estimate materials costs for installation work orders
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(v) estimate materials costs for maintenance work orders
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(vi) estimate materials costs for repair work orders

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(vii) estimate labor costs for installation work orders
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(viii) estimate labor costs for maintenance work orders
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(ix) estimate labor costs for repair work orders
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(C) locate and interpret appropriate documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins	(i) locate appropriate documentation
(2) The student applies academic skills to the requirements of computer technologies. The student is expected to:	(C) locate and interpret appropriate documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins	(ii) interpret appropriate documentation
(3) The student demonstrates the proper function and application of the tools, equipment, and materials used in computer technologies. The student is expected to:	(A) demonstrate safe use of equipment in computer technologies such as hand and power tools	(i) demonstrate safe use of equipment in computer technologies

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student demonstrates the proper function and application of the tools, equipment, and materials used in computer technologies. The student is expected to:	(B) employ available reference documentation such as tools, materials, and Internet sources to access information as needed	(i) employ available reference documentation to access information as needed
(3) The student demonstrates the proper function and application of the tools, equipment, and materials used in computer technologies. The student is expected to:	(C) demonstrate proper handling and disposal of environmentally hazardous materials used in computer technologies	(i) demonstrate proper handling of environmentally hazardous materials used in computer technologies
(3) The student demonstrates the proper function and application of the tools, equipment, and materials used in computer technologies. The student is expected to:	(C) demonstrate proper handling and disposal of environmentally hazardous materials used in computer technologies	(ii) demonstrate proper disposal of environmentally hazardous materials used in computer technologies
(3) The student demonstrates the proper function and application of the tools, equipment, and materials used in computer technologies. The student is expected to:	(D) research new and emerging technologies that may affect the field of computer technology	(i) research new technologies that may affect the field of computer technology
(3) The student demonstrates the proper function and application of the tools, equipment, and materials used in computer technologies. The student is expected to:	(D) research new and emerging technologies that may affect the field of computer technology	(ii) research emerging technologies that may affect the field of computer technology
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(A) use electronic test equipment to measure current, voltage, power, and resistance	(i) use electronic test equipment to measure current

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(A) use electronic test equipment to measure current, voltage, power, and resistance	(ii) use electronic test equipment to measure voltage
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(A) use electronic test equipment to measure current, voltage, power, and resistance	(iii) use electronic test equipment to measure power
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(A) use electronic test equipment to measure current, voltage, power, and resistance	(iv) use electronic test equipment to measure resistance
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(B) describe digital circuits and bus design	(i) describe digital circuits
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(B) describe digital circuits and bus design	(ii) describe bus design
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(C) demonstrate the operational features and proper terminology related to computer systems	(i) demonstrate the operational features related to computer systems
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(C) demonstrate the operational features and proper terminology related to computer systems	(ii) demonstrate proper terminology related to computer systems

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(D) demonstrate proper usage of the various components of a computer system such as the central processor, basic input and output system, read-only memory, and random access memory	(i) demonstrate proper usage of the various components of a computer system
(4) The student applies the concepts and skills of the trade in simulated work situations. The student is expected to:	(E) troubleshoot computer peripheral devices	(i) troubleshoot computer peripheral devices
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(A) assemble and install a basic computer system	(i) assemble a basic computer system
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(A) assemble and install a basic computer system	(ii) install a basic computer system
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(B) install and configure computer components such as printers and other peripherals	(i) install computer components
(5) The student uses hardware design, operation, and maintenance knowledge and skills to identify major computer components. The student is expected to:	(B) install and configure computer components such as printers and other peripherals	(ii) configure computer components

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(A) diagnose error messages and symptoms of hardware failures	(i) diagnose error messages
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(A) diagnose error messages and symptoms of hardware failures	(ii) diagnose symptoms of hardware failures
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(B) research and identify interrupt sequences and beep codes	(i) research interrupt sequences
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(B) research and identify interrupt sequences and beep codes	(ii) research beep codes
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(B) research and identify interrupt sequences and beep codes	(iii) identify interrupt sequences
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(B) research and identify interrupt sequences and beep codes	(iv) identify beep codes
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(C) identify priorities and interrupts at the system level	(i) identify priorities at the system level
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(C) identify priorities and interrupts at the system level	(ii) identify interrupts at the system level
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(D) test system using diagnostic tools and software	(i) test system using diagnostic tools

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(D) test system using diagnostic tools and software	(ii) test system using diagnostic software
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(E) diagnose problems in operating systems	(i) diagnose problems in operating systems
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(F) differentiate between hardware and software failure	(i) differentiate between hardware and software failure
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(G) update Basic Input/Output System (BIOS)	(i) update Basic Input/Output System (BIOS)
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(H) demonstrate hard drive maintenance procedures such as defrag scan and clear caches	(i) demonstrate hard drive maintenance procedures
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(I) gather information from user	(i) gather information from user
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(J) repair malfunctioning hardware systems	(i) repair malfunctioning hardware systems
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(K) reinstall software as needed	(i) reinstall software as needed
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(L) demonstrate system backup and recovery	(i) demonstrate system backup

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(L) demonstrate system backup and recovery	(ii) demonstrate system recovery
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(M) restore a system to various states such as safe modes and previous	(i) restore a system to various states
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(N) demonstrate knowledge of operating system design such as operation and maintenance	(i) demonstrate knowledge of operating system design
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(O) apply knowledge of operating system design to perform information support and service tasks of different operating systems	(i) apply knowledge of operating system design to perform information support of different operating systems
(6) The student uses troubleshooting skills to solve client problems. The student is expected to:	(O) apply knowledge of operating system design to perform information support and service tasks of different operating systems	(ii) apply knowledge of operating system design to perform service tasks of different operating systems
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(A) evaluate application software packages and test the functionality of a proposed software configuration	(i) evaluate application software packages
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(A) evaluate application software packages and test the functionality of a proposed software configuration	(ii) test the functionality of a proposed software configuration

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(B) verify software is properly licensed prior to installation	(i) verfiy software is properly licensed prior to installation
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(C) install application and systems software using available resources as needed	(i) install application software using available resources as needed
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(C) install application and systems software using available resources as needed	(ii) install systems software using available resources as needed
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(D) resolve problems with installation if any occur, such as recovery from system error	(i) resolve problems with installation if any occur
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(E) perform software customization as requested	(i) perform software customization as requested
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(F) document all procedures	(i) document all procedures
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(G) install and maintain security software	(i) install security software

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student installs and configures software programs and updates information technology systems. The student is expected to:	(G) install and maintain security software	(ii) maintain security software
(8) The student installs, configures, and verifies active network connection. The student is expected to:	(A) demonstrate an understanding of network connection and interface requirements	(i) demonstrate an understanding of network connection requirements
(8) The student installs, configures, and verifies active network connection. The student is expected to:	(A) demonstrate an understanding of network connection and interface requirements	(ii) demonstrate an understanding of network interface requirements
(8) The student installs, configures, and verifies active network connection. The student is expected to:	(B) install and configure a computer on a network	(i) install a computer on a network
(8) The student installs, configures, and verifies active network connection. The student is expected to:	(B) install and configure a computer on a network	(ii) configure a computer on a network
(8) The student installs, configures, and verifies active network connection. The student is expected to:	(C) verify and troubleshoot network connectivity	(i) verify network connectivity
(8) The student installs, configures, and verifies active network connection. The student is expected to:	(C) verify and troubleshoot network connectivity	(ii) troubleshoot network connectivity

Knowledge and Skill Statement	Student Expectation	Breakout
(9) The student provides support to computer users to maintain service. The student is expected to:	(A) develop a written disaster recovery plan	(i) develop a written disaster recovery plan
(9) The student provides support to computer users to maintain service. The student is expected to:	(B) develop a written preventive maintenance plan	(i) develop a written preventive maintenance plan

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	§130.305. Networking (One Credit), Adopted 2015.

(a) General Requirements. This course is recommended for students in Grades 10-12. Recommended prerequisites: Principles of Information Technology, Computer Maintenance, and Computer Maintenance Lab. Recommended corequisite: Networking Lab. Students shall be awarded one credit for successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Networking, students will develop knowledge of the concepts and skills related to data networking technologies and practices in order to apply them to personal or career development. To prepare for success, students will have opportunities to reinforce, apply, and transfer knowledge and skills to a variety of settings and problems.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(i) identify work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(ii) identify work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(iii) demonstrate work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(iv) demonstrate work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) identify and demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills	(i) identify positive personal qualities

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) identify and demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills	(ii) demonstrate positive personal qualities
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(ii) employ effective writing skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) solve problems and think critically	(i) solve problems
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) solve problems and think critically	(ii) think critically

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) identify and implement proper safety procedures	(i) identify proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) identify and implement proper safety procedures	(ii) implement proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(i) demonstrate an understanding of legal responsibilities in relation of the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(ii) demonstrate an understanding of ethical responsibility in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(I) demonstrate planning and time-management skills such as project management including initating, planning, executing, monitoring, and controlling and closing a project	(i) demonstrate planning skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(I) demonstrate planning and time-management skills such as project management including initating, planning, executing, monitoring, and controlling and closing a project	(ii) demonstrate time-management skills
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) select and research a specific job area with its accompanying duties and tasks	(i) select a specific job area
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) select and research a specific job area with its accompanying duties and tasks	(ii) research a specific job area with its accompanying duties
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) select and research a specific job area with its accompanying duties and tasks	(iii) research a specific job area with its accompanying tasks
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) formulate a personal career plan along with the education, job skills, and experience necessary to achieve career goals	(i) formulate a personal career plan along with education necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) formulate a personal career plan along with the education, job skills, and experience necessary to achieve career goals	(ii) formulate a personal career plan along with job skills necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) formulate a personal career plan along with the education, job skills, and experience necessary to achieve career goals	(iii) formulate a personal career plan along with experience necessary to achieve career goals

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(C) develop a resume	(i) develop a resume
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(A) demonstrate effective verbal and written communication skills with individuals from varied cultures such as fellow workers, management, and customers	(i) demonstrate effective verbal communication skills with indiviuals from varied cultures
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(A) demonstrate effective verbal and written communication skills with individuals from varied cultures such as fellow workers, management, and customers	(ii) demonstrate effective written communication skills with individuals from varied cultures
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(B) complete work orders for repair and installation	(i) complete work orders for repair
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(B) complete work orders for repair and installation	(ii) complete work orders for installation
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(i) estimate supplies costs on installation work orders
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(ii) estimate supplies costs on maintenance work orders

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(iii) estimate supplies costs on repair work orders
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(iv) estimate materials costs on installation work orders
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(v) estimate materials costs on maintenance work orders
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(vi) estimate materials costs on repair work orders
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(vii) estimate labor costs on installation work orders
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(viii) estimate labor costs on maintenance work orders
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(ix) estimate labor costs on repair work orders

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student relates core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(D) interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins	(i) interpret technical documentation
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(A) explain digital and analog electronics theory	(i) explain digital electronics theory
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(A) explain digital and analog electronics theory	(ii) explain analog electronics theory
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(B) demonstrate knowledge of binary in relation to Internet Protocol (IP) addressing	(i) demonstrate knowledge of binary in relation to Internet Protocol (IP) addressing
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(C) distinguish the differences between a data packet and voice communications	(i) distringuish the differences between a data packet and voice communications
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(D) define the layers and functions of the Open System Interconnection model	(i) define the layers of the Open System Interconnection model
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(D) define the layers and functions of the Open System Interconnection model	(ii) define the functions of the Open System Interconnection model

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(E) explain Transport Control Protocol and Internet Protocol fundamentals, including subnetting	(i) explain Transport Control Protocol fundamentals, including subnetting
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(E) explain Transport Control Protocol and Internet Protocol fundamentals, including subnetting	(ii) explain Internet Protocol fundamentals, including subnetting
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(F) distinguish between public and private networks	(i) distringuish between public and private networks
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(G) describe the standards and operations of wireless technologies in telecommunications and data networks	(i) describe the standards of wireless technologies in telecommunications
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(G) describe the standards and operations of wireless technologies in telecommunications and data networks	(ii) describe the standards of wireless technologies in data networks
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(G) describe the standards and operations of wireless technologies in telecommunications and data networks	(iii) describe the operations of wireless technologies in telecommunications
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(G) describe the standards and operations of wireless technologies in telecommunications and data networks	(iv) describe the operations of wireless technologies in data networks

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(H) differentiate between types of networks	(i) differentiate between types of networks
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(I) identify national standards for data communication	(i) identify national standards for data communication
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(J) identify the potential benefits and problems for the future of telecommunications and data networking	(i) identify the potential benefits for the future of telecommunications
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(J) identify the potential benefits and problems for the future of telecommunications and data networking	(ii) identify the potential benefits for the future of data networking
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(J) identify the potential benefits and problems for the future of telecommunications and data networking	(iii) identify the potential problems for the future of telecommunications
(4) The student acquires an understanding of telecommunications and data network services. The student is expected to:	(J) identify the potential benefits and problems for the future of telecommunications and data networking	(iv) identify the potential problems for the future of data networking
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(A) demonstrate understanding of components of telecommunications and data networks	(i) demonstrate understanding of components of telecommunications networks

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(A) demonstrate understanding of components of telecommunications and data networks	(ii) demonstrate understanding of components of data networks
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(B) identify major network operating systems	(i) identify major network operating systems
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(C) distinguish between different types of cables used in telecommunications and data networking	(i) distinguish between different types of cables used in telecommunications and data networking
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(D) describe telecommunications and data networking media and connectors	(i) describe telecommunications media
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(D) describe telecommunications and data networking media and connectors	(ii) describe telecommunications connectors
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(D) describe telecommunications and data networking media and connectors	(iii) describe data networking media
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(D) describe telecommunications and data networking media and connectors	(iv) describe data networking connectors

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(E) differentiate among computer network topologies	(i) differentiate among computer network topologies
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(F) explain the distinction between connectionless and connection transport	(i) explain the distinction between connectionless and connection transport
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(G) explain use of Transport Control Protocol and Iternet Protocol utilities	(i) explain use of Transport Control Protocol
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(G) explain use of Transport Control Protocol and Iternet Protocol utilities	(ii) explain use of Internet Protocol utilities
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(H) explain how to test, validate, and troubleshoot Internet Protocol connectivity	(i) explain how to test Internet Protocol connectivity
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(H) explain how to test, validate, and troubleshoot Internet Protocol connectivity	(ii) explain how to validate Internet Protocol connectivity
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(H) explain how to test, validate, and troubleshoot Internet Protocol connectivity	(iii) explain how to troubleshoot Internet Protocol connectivity

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes various types of configurations and upgrading. The student is expected to:	(I) identify good practices to ensure network security	(i) identify good practices to ensure network security
(6) The student recognizes and recommends the various types of network components to address industry needs. The student is expected to:	(A) analyze various types and components of networks	(i) analyze various types of networks
(6) The student recognizes and recommends the various types of network components to address industry needs. The student is expected to:	(A) analyze various types and components of networks	(ii) analyze various components of networks
(6) The student recognizes and recommends the various types of network components to address industry needs. The student is expected to:	(B) analyze the characteristics of networks to select the optimum configuration for an industry solution	(i) analyze the characteristics of networks to select the optimum configuration for an industry solution
(7) The student develops a network design plan. The student is expected to:	(A) produce planning documentation required prior to network implementation	(i) produce planning documentation required prior to network implementation
(7) The student develops a network design plan. The student is expected to:	(B) explain the impact of environmental factors on computer networks	(i) explain the impact of environmental factors on computer networks
(7) The student develops a network design plan. The student is expected to:	(C) identify common peripheral ports and common network components such as hubs, routers, and switches	(i) identify common peripheral ports
(7) The student develops a network design plan. The student is expected to:	(C) identify common peripheral ports and common network components such as hubs, routers, and switches	(ii) identify common network components

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student develops a network design plan. The student is expected to:	(D) develop an addressing scheme, including a subnetting chart	(i) develop an addressing scheme, including a subnetting chart
(7) The student develops a network design plan. The student is expected to:	(E) specify the tools that are commonly used to resolve network equipment problems	(i) specify the tools that are commonly used to resolve network equipment problems
(7) The student develops a network design plan. The student is expected to:	(F) identify vendor testing documentation such as patches, fixes, and upgrades	(i) identify vendor testing documentation
(7) The student develops a network design plan. The student is expected to:	(G) demonstrate standard backup procedures and backup media storage practices	(i) demonstrate standard backup procedures
(7) The student develops a network design plan. The student is expected to:	(G) demonstrate standard backup procedures and backup media storage practices	(ii) demonstrate backup media storage practices
(7) The student develops a network design plan. The student is expected to:	(H) identify the factors that might affect performance in a network environment such as logic or frequency spectrum interference	(i) identify the factors that might affect performance in a network environment
(8)The student provides support to computer users to maintain service. The student is expected to:	(A) develop a written disaster recovery plan	(i) develop a written disaster recovery plan
(8)The student provides support to computer users to maintain service. The student is expected to:	(B) develop a written preventive maintenance plan	(i) develop a written preventative maintenance plan

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	**§130.306 Networking Lab (One Credit), Adopted 2015**

(a) General Requirements. This course is recommended for students in Grades 10-12. Recommended prerequisites: Principles of Information Technology, Computer Maintenance, and Computer Maintenance Lab. Corequisite: Networking. This course must be taken concurrently with Networking and may not be taken as a stand-alone course. Districts are encouraged to offer this course in a consecutive block with Networking to allow students time to master the content in both courses. Students shall be awarded one credit for successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Networking Lab, students will develop knowledge of the concepts and skills related to telecommunications and data networking technologies and practices in order to apply them to personal or career development. To prepare for success, students will have opportunities to reinforce, apply, and transfer knowledge and skills to a variety of settings and problems.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(i) identify work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(ii) identify work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(iii) demonstrate work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(iv) demonstrate work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(B) identify and demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills	(i) identify positive personal qualities

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(B) identify and demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills	(ii) demonstrate positive personal qualities
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(C) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(C) employ effective reading and writing skills	(ii) employ effective writing skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(D) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(D) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(E) solve problems and think critically	(i) solve problems
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(E) solve problems and think critically	(ii) think critically

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(F) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(F) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(G) identify and implement proper safety procedures	(i) identify proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(G) identify and implement proper safety procedures	(ii) implement proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(i) demonstrate an understanding of legal responsibilities in relation of the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(ii) demonstrate an understanding of ethical responsibility in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(I) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring, and controlling, and closing project	(i) demonstrate planning skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected:	(I) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring, and controlling, and closing project	(ii) demonstrate time-management skills
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) select and research a specific job area with its accompanying duties and tasks	(i) select a specific job area
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) select and research a specific job area with its accompanying duties and tasks	(ii) research a specific job area with its accompanying duties
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) select and research a specific job area with its accompanying duties and tasks	(iii) research a specific job area with its accompanying tasks
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) formulate a personal career plan along with the education, job skills, and experience necessary to achieve career goals	(i) formulate a personal career plan along with education necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) formulate a personal career plan along with the education, job skills, and experience necessary to achieve career goals	(ii) formulate a personal career plan along with job skills necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) formulate a personal career plan along with the education, job skills, and experience necessary to achieve career goals	(iii) formulate a personal career plan along with experience necessary to achieve career goals

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(C) develop a resume	(i) develop a resume
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(A) demonstrate effective verbal and written communication skills with individuals from varied cultures such as fellow workers, management, and customers	(i) demonstrate effective verbal communication skills with indiviuals from varied cultures
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(A) demonstrate effective verbal and written communication skills with individuals from varied cultures such as fellow workers, management, and customers	(ii) demonstrate effective written communication skills with individuals from varied cultures
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(B) complete work orders for repair and installation	(i) complete work orders for repair
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(B) complete work orders for repair and installation	(ii) complete work orders for installation
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(i) estimate supplies costs on installation work orders

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(ii) estimate supplies costs on maintenance work orders
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(iii) estimate supplies costs on repair work orders
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(iv) estimate materials costs on installation work orders
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(v) estimate materials costs on maintenance work orders
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(vi) estimate materials costs on repair work orders
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(vii) estimate labor costs on installation work orders
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(viii) estimate labor costs on maintenance work orders

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders	(ix) estimate labor costs on repair work orders
(3) The student applies core academic skills to the requirements of telecommunications and data network services. The student is expected to:	(D) interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins	(i) interpret technical documentation
(4) The student recognizes and recommends the various types of network components to address industry needs. The student is expected to:	(A) analyze various types and components of networks	(i) analyze various types of networks
(4) The student recognizes and recommends the various types of network components to address industry needs. The student is expected to:	(A) analyze various types and components of networks	(ii) analyze various components of networks
(4) The student recognizes and recommends the various types of network components to address industry needs. The student is expected to:	(B) use knowledge of the characteristics of networks to select the optimum configuration for an industry solution	(i) use knowledge of the characteristics of networks to select the optimum configuration for an industry solution
(4) The student recognizes and recommends the various types of network components to address industry needs. The student is expected to:	(C) recommend data network solutions based on scenario-driven problems	(i) recommend data network solutions based on scenario-driven problems
(5) The student develops a network design plan. The student is expected to:	(A) produce necessary documentation required prior to network implementation such as administrative and test accounts, passwords, Internet Protocol addressing, and configurations	(i) produce necessary documentation required prior to network implementation

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student develops a network design plan. The student is expected to:	(B) analyze the impact of environmental factors on computer networks	(i) analyze the impact of environmental factors on computer networks
(5) The student develops a network design plan. The student is expected to:	(C) indicate common peripheral ports and common network components	(i) indicate common peripheral ports
(5) The student develops a network design plan. The student is expected to:	(C) indicate common peripheral ports and common network components	(ii) indicate common network components
(5) The student develops a network design plan. The student is expected to:	(D) develop an addressing scheme, including a subnetting chart	(i) develop an addressing scheme, including a subnetting chart
(5) The student develops a network design plan. The student is expected to:	(E) specify the tools that are commonly used to resolve network equipment problems	(i) specify the tools that are commonly used to resolve network equipment problems
(5) The student develops a network design plan. The student is expected to:	(F) identify vendor testing documentation such as patches, fixes, and upgrades	(i) identify vendor testing documentation
(5) The student develops a network design plan. The student is expected to:	(G) demonstrate awareness of standard backup procedures and backup media storage practices	(i) demonstrate awareness of standard backup procedures
(5) The student develops a network design plan. The student is expected to:	(G) demonstrate awareness of standard backup procedures and backup media storage practices	(ii) demonstrate awareness of standard backup media storage practices
(5) The student develops a network design plan. The student is expected to:	(H) distinguish between common types of telecommunications and data network cabling	(i) distinguish between common types of telecommunications and data network cabling

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student develops a network design plan. The student is expected to:	(I) identify the factors that might affect performance in a network environment such as logic or frequency spectrum interference	(i)identify the factors that might affect performance in a network environment
(5) The student develops a network design plan. The student is expected to:	(J) research new and emerging technologies that may affect the field of telecommunications and data networking services	(i) research new technologies that may affect the field of telecommunications
(5) The student develops a network design plan. The student is expected to:	(J) research new and emerging technologies that may affect the field of telecommunications and data networking services	(ii) research new technologies that may affect the field of data networking services
(5) The student develops a network design plan. The student is expected to:	(J) research new and emerging technologies that may affect the field of telecommunications and data networking services	(iii) research emerging technologies that may affect the field of telecommunications
(5) The student develops a network design plan. The student is expected to:	(J) research new and emerging technologies that may affect the field of telecommunications and data networking services	(iv) research emerging technologies that may affect the field of data networking services
(6) The student implements a data network plan. The student is expected to:	(A) demonstrate awareness of compatibility and cabling issues	(i) demonstrate awareness of compatibility issues
(6) The student implements a data network plan. The student is expected to:	(A) demonstrate awareness of compatibility and cabling issues	(ii) demonstrate awareness of cabling issues

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student implements a data network plan. The student is expected to:	(B) implement an addressing scheme, including a subnet	(i) implement an addressing scheme, including a subnet
(6) The student implements a data network plan. The student is expected to:	(C) install various types of data connectors and cabling used in computer networking and data communications	(i) install various types of data connectors used in computer networking
(6) The student implements a data network plan. The student is expected to:	(C) install various types of data connectors and cabling used in computer networking and data communications	(ii) install various types of data connectors used in data communications
(6) The student implements a data network plan. The student is expected to:	(C) install various types of data connectors and cabling used in computer networking and data communications	(iii) install various types of cabling used in computer networking
(6) The student implements a data network plan. The student is expected to:	(C) install various types of data connectors and cabling used in computer networking and data communications	(iv) install various types of cabling used in computer data communications
(6) The student implements a data network plan. The student is expected to:	(D) connect various types of data connectors and cabling used in computer networking and data communications	(i) connect various types of data connectors used in computer networking
(6) The student implements a data network plan. The student is expected to:	(D) connect various types of data connectors and cabling used in computer networking and data communications	(ii) connect various types of data connectors and used in data communications

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student implements a data network plan. The student is expected to:	(D) connect various types of data connectors and cabling used in computer networking and data communications	(iii) connect various types of cabling used in computer networking
(6) The student implements a data network plan. The student is expected to:	(D) connect various types of data connectors and cabling used in computer networking and data communications	(iv) connect various types of cabling used in data communications
(6) The student implements a data network plan. The student is expected to:	(E) troubleshoot physical and logical indicators of trouble	(i) troubleshoot physical indicators of trouble
(6) The student implements a data network plan. The student is expected to:	(E) troubleshoot physical and logical indicators of trouble	(ii) troubleshoot logical indicators of trouble
(6) The student implements a data network plan. The student is expected to:	(F) employ a systematic approach to identify a network problem, distinguish between operator or system error, and select the appropriate steps to correct the error	(i) employ a systematic approach to identify a network problem
(6) The student implements a data network plan. The student is expected to:	(F) employ a systematic approach to identify a network problem, distinguish between operator or system error, and select the appropriate steps to correct the error	(ii) distinguish between operator or system error
(6) The student implements a data network plan. The student is expected to:	(F) employ a systematic approach to identify a network problem, distinguish between operator or system error, and select the appropriate steps to correct the error	(iii) select the appropriate steps to correct the error

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student implements a data network plan. The student is expected to:	(G) determine the cause of a problem and select the appropriate corrective action for the network problem	(i) determine the cause of a problem
(6) The student implements a data network plan. The student is expected to:	(G) determine the cause of a problem and select the appropriate corrective action for the network problem	(ii) select the appropriate corrective action for the network problem
(6) The student implements a data network plan. The student is expected to:	(H) maintain a hierarchical structure for the storing and organizing of data on networks	(i) maintain a hierarchical structure for the storing of data on networks
(6) The student implements a data network plan. The student is expected to:	(H) maintain a hierarchical structure for the storing and organizing of data on networks	(ii) maintain a hierarchical structure for the organizing of data on networks
(7) The student implements network security systems. The student is expected to:	(A) assess potential security threats to information systems	(i) assess potential security threats to information systems
(7) The student implements network security systems. The student is expected to:	(B) identify the range of security needs and the problems that can occur on a data network due to security lapses	(i) identify the range of security needs
(7) The student implements network security systems. The student is expected to:	(B) identify the range of security needs and the problems that can occur on a data network due to security lapses	(ii) identify the problems that can occur on a data network due to security lapses
(7) The student implements network security systems. The student is expected to:	(C) define and identify unethical practices such as hacking, phone fraud, online piracy, and data vandalism	(i) define unethical practices

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student implements network security systems. The student is expected to:	(C) define and identify unethical practices such as hacking, phone fraud, online piracy, and data vandalism	(ii) identify unethical practices
(7) The student implements network security systems. The student is expected to:	(D) evaluate issues related to privacy, depersonalization, and government control of data communications	(i) evaluate issues related to privacy of data communications
(7) The student implements network security systems. The student is expected to:	(D) evaluate issues related to privacy, depersonalization, and government control of data communications	(ii) evaluate issues related to depersonalization of data communications
(7) The student implements network security systems. The student is expected to:	(D) evaluate issues related to privacy, depersonalization, and government control of data communications	(iii) evaluate issues related to government control of data communications
(7) The student implements network security systems. The student is expected to:	(E) develop and implement a network security plan	(i) develop a network security plan
(7) The student implements network security systems. The student is expected to:	(E) develop and implement a network security plan	(ii) implement a network security plan
(7) The student implements network security systems. The student is expected to:	(F) identify the role that network components such as routers, firewalls, intrusion detection systems, and virtual private networks play in security.	(i) identify the role that network components play in security

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student knows the function and application of the tools, equipment, technologies, and materials used in telecommunications services. The student is expected to:	(A) demonstrate safe use of equipment commonly employed in telecommunications services such as hand and power tools	(i) demonstrate safe use of equipment commonly employed in telecommunications services
(8) The student knows the function and application of the tools, equipment, technologies, and materials used in telecommunications services. The student is expected to:	(B) demonstrate proper handling and disposal of environmentally hazardous materials used in telecommunications services	(i) demonstrate proper handling of environmentally hazardous materials used in telecommunications services
(8) The student knows the function and application of the tools, equipment, technologies, and materials used in telecommunications services. The student is expected to:	(B) demonstrate proper handling and disposal of environmentally hazardous materials used in telecommunications services	(ii) demonstrate proper disposal of environmentally hazardous materials used in telecommunications services
(9) The student provides support to computer users to maintain service. The student is expected to:	(A) develop a written disaster recovery plan	(i) develop a written disaster recovery plan
(9) The student provides support to computer users to maintain service. The student is expected to:	(B) develop a written preventive maintenance plan	(i) develop a written preventative maintenance plan

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	**§130.307. Digital Media (One Credit), Adopted 2015**

(a) General Requirements. This course is recommended for students in Grades 9-12. Students shall be awarded one credit for successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Digital Media, students will analyze and assess current and emerging technologies, while designing and creating multimedia projects that address customer needs and resolve a problem. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. The knowledge and skills acquired and practiced will enable students to successfully perform and interact in a technology-driven society. Students will enhance reading, writing, computing, communication, and critical thinking and apply them to the IT environment.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(i) identify work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(ii) identify work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(iii) identify work qualities that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(iv) identify work qualities that enhance job advancement

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(v) demonstrate work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(vi) demonstrate work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(vii) demonstrate work qualities that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(viii) demonstrate work qualities that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(ii) employ effective writing skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) solve problems and think critically	(i) solve problems
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) solve problems and think critically	(ii) think critically
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate an understanding of legal and ethical responsibilities in relation to the field of information technology	(i) demonstrate an understanding of legal responsibilities in relation to the field of information technology
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate an understanding of legal and ethical responsibilities in relation to the field of information technology	(ii) demonstrate an understanding of ethical responsibilities in relation to the field of information technology
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring, and controlling, and closing a project	(i) demonstrate planning skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring, and controlling, and closing a project	(ii) demonstrate time-management skills
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive digital media. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(i) identify job opportunities
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive digital media. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(ii) identify [job opportunities'] accompanying job duties

Knowledge and Skill Statement	Student Expectation	Breakout
(2)The student identifies employment opportunities in the IT field with a focus in the area of interactive digital media. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(iii) identify [job opportunities'] accompanying job tasks
(2)The student identifies employment opportunities in the IT field with a focus in the area of interactive digital media. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(i) research careers of personal interest along with the education required to achieve personal career goals
(2)The student identifies employment opportunities in the IT field with a focus in the area of interactive digital media. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(ii) research careers of personal interest along with the job skills required to achieve personal career goals
(2)The student identifies employment opportunities in the IT field with a focus in the area of interactive digital media. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(iii) research careers of personal interest along with the experience required to achieve personal career goals
(2)The student identifies employment opportunities in the IT field with a focus in the area of interactive digital media. The student is expected to:	(C) demonstrate an understanding of the functions of resumes and portfolios	(i) demonstrate an understanding of the functions of resumes
(2)The student identifies employment opportunities in the IT field with a focus in the area of interactive digital media. The student is expected to:	(C) demonstrate an understanding of the functions of resumes and portfolios	(ii) demonstrate an understanding of the functions of portfolios
(2)The student identifies employment opportunities in the IT field with a focus in the area of interactive digital media. The student is expected to:	(D) create a digital portfolio	(i) create a digital portfolio

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student uses emerging technologies to exchange and gather information and resources. The student is expected to:	(A) collaborate using various electronic technologies such as email, blogs, chat rooms, discussion threads, social media, podcasting and wikis	(i) collaborate using various electronic technologies
(3) The student uses emerging technologies to exchange and gather information and resources. The student is expected to:	(B) demonstrate appropriate search strategies for finding resources or assets on the Internet	(i) demonstrate appropriate search strategies for finding resources or assets on the Internet
(3) The student uses emerging technologies to exchange and gather information and resources. The student is expected to:	(C) discuss recent digital media technologies	(i) discuss recent digital media technologies
(3) The student uses emerging technologies to exchange and gather information and resources. The student is expected to:	(D) evaluate and select appropriate software for the development of projects	(i) evaluate appropriate software for the development of projects
(3) The student uses emerging technologies to exchange and gather information and resources. The student is expected to:	(D) evaluate and select appropriate software for the development of projects	(ii) select appropriate software for the development of projects
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(i) explain ethical use of technology
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(ii) explain ethical use of of online resources

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(iii) demonstrate ethical use of technology
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(iv) demonstrate ethical use of online resources
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(B) compare and contrast fair use, open source, and creative commons	(i) compare and contrast fair use, open source, and creative commons
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(C) adhere to intellectual property laws and regulations	(i) adhere to intellectual property laws
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(C) adhere to intellectual property laws and regulations	(ii) adhere to intellectual property regulations
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(D) differentiate between copyright and trademarks	(i) differentiate between copyright and trademarks
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) explain the concept of intellectual property laws including copyright, trademarks, and patents and consequences of violating each type of law	(i) explain the concept of intellectual property laws, including copyright

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) explain the concept of intellectual property laws including copyright, trademarks, and patents and consequences of violating each type of law	(ii) explain the concept of intellectual property laws, including trademarks
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) explain the concept of intellectual property laws including copyright, trademarks, and patents and consequences of violating each type of law	(iii) explain the concept of intellectual property laws, including patents
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) explain the concept of intellectual property laws including copyright, trademarks, and patents and consequences of violating each type of law	(iv) explain the consequences of violating [copyright] law
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) explain the concept of intellectual property laws including copyright, trademarks, and patents and consequences of violating each type of law	(v) explain the consequences of violating [trademarks] law
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) explain the concept of intellectual property laws including copyright, trademarks, and patents and consequences of violating each type of law	(vi) explain the consequences of violating [patents] law
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(F) define and identify unethical practices such as hacking, online piracy, and data vandalism	(i) define unethical practices
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(F) define and identify unethical practices such as hacking, online piracy, and data vandalism	(ii) identify unethical practices

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(G) demonstrate ethical use of Internet and online resources, including citation of source	(i) demonstrate ethical use of Internet resources, including citation of source
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(G) demonstrate ethical use of Internet and online resources, including citation of source	(ii) demonstrate ethical use of online resources, including citation of source
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(H) describe the function of a non-disclosure agreement and intellectual property agreement	(i) describe the function of a non-disclosure agreement
(4) The student complies with standard practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(H) describe the function of a non-disclosure agreement and intellectual property agreement	(ii) describe the function of [an] intellectual property agreement
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(A) compare and contrast printed and digital communications products that demonstrate appropriate and inappropriate use of design and layout principles	(i) compare and contrast printed and digital communications products that demonstrate appropriate use of design and layout principles
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(A) compare and contrast printed and digital communications products that demonstrate appropriate and inappropriate use of design and layout principles	(ii) compare and contrast printed and digital communications products that demonstrate inappropriate use of design and layout principles

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(B) identify and apply perspective such as backgrounds, light, shades, shadows, and scale to capture a focal point and create depth	(i) identify perspective to capture a focal point
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(B) identify and apply perspective such as backgrounds, light, shades, shadows, and scale to capture a focal point and create depth	(ii) apply perspective to capture a focal point
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(B) identify and apply perspective such as backgrounds, light, shades, shadows, and scale to capture a focal point and create depth	(iii) identify perspective to create depth
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(B) identify and apply perspective such as backgrounds, light, shades, shadows, and scale to capture a focal point and create depth	(iv) apply perspective to create depth
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(i) identify [the] design principle of proportion, in type
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(ii) identify [the] design principle of balance, in type

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(iii) identify [the] design principle of variety, in type
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(iv) identify [the] designprinciple of emphasis, in type
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(v) identify [the] design principle of harmony, in type
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(vi) identify [the] design principle of symmetry, in type
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(vii) identify [the] design principle of unity, in type
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(viii) identify [the] design principle of repitition, in type

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(ix) identify design principle of repitition, in color
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(x) identify design principles of repitition, in size
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xi) identify design principles of repitition, in line thickness
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xii) identify design principles of repitition, in shape
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xiii) identify design principles of repitition, in space
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xiv) apply design principles of proportion

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xv) apply design principles of balance
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xvi) apply design principles of variety
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xvii) apply design principles of emphasis
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xviii) apply design principles of harmony
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xix) apply design principles of symmetry
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xx) apply design principles of unity

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xxi) apply design principles of repitition, in type
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xxii) apply design principles of repitition, in color
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xxiii) apply design principles of repitition, in size
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xxiv) apply design principles of repitition, in line thickness
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xxv) apply design principles of repitition, in shape
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(C) identify and apply design principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space	(xxvi) apply design principles of repitition, in space

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(D) identify and apply three-dimensional effects such as foreground, middle distance, and background images	(i) identify three-dimensional effects
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(D) identify and apply three-dimensional effects such as foreground, middle distance, and background images	(ii) apply three-dimensional effects
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(E) identify and apply concepts of typography	(i) identify concepts of typography
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(E) identify and apply concepts of typography	(i) apply concepts of typography
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(F) identify and apply color theory	(i) identify color theory
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(F) identify and apply color theory	(ii) apply color theory
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(G) create and improve digital products by applying the appropriate design and layout principles	(i) create digital products by applying the appropriate design principles

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(G) create and improve digital products by applying the appropriate design and layout principles	(ii) create digital products by applying the appropriate layout principles
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(G) create and improve digital products by applying the appropriate design and layout principles	(iii) improve digital products by applying the appropriate layout principles
(5) The student analyzes and applies design and layout principles in digital media. The student is expected to:	(G) create and improve digital products by applying the appropriate design and layout principles	(iv) improve digital products by applying the appropriate design principles
(6) The student designs and creates digital graphics. The student is expected to:	(A) compare and contrast the characteristics of raster-based bitmap graphics and vector-based graphics	(i) compare and contrast the characteristics of raster-based bitmap graphics and vector-based graphics
(6) The student designs and creates digital graphics. The student is expected to:	(B) create and modify digital graphics using appropriate vector-based and raster-based software following standard design principles	(i) create digital graphics using appropriate vector-based software following standard design principles
(6) The student designs and creates digital graphics. The student is expected to:	(B) create and modify digital graphics using appropriate vector-based and raster-based software following standard design principles	(ii) create digital graphics using appropriate raster-based software following standard design principles
(6) The student designs and creates digital graphics. The student is expected to:	(B) create and modify digital graphics using appropriate vector-based and raster-based software following standard design principles	(iii) modify digital graphics using appropriate vector-based software following standard design principles

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student designs and creates digital graphics. The student is expected to:	(B) create and modify digital graphics using appropriate vector-based and raster-based software following standard design principles	(iv) modify digital graphics using raster-based software following standard design principles
(6) The student designs and creates digital graphics. The student is expected to:	(C) export and set graphics to be used in both print and digital formats	(i) export graphics to be used in print formats
(6) The student designs and creates digital graphics. The student is expected to:	(C) export and set graphics to be used in both print and digital formats	(ii) export graphics to be used in digital formats
(6) The student designs and creates digital graphics. The student is expected to:	(C) export and set graphics to be used in both print and digital formats	(iii) set graphics to be used in print formats
(6) The student designs and creates digital graphics. The student is expected to:	(C) export and set graphics to be used in both print and digital formats	(iv) set graphics to be used in digital formats
(6) The student designs and creates digital graphics. The student is expected to:	(D) demonstrate knowledge of graphic resolution, file size, file formats, and file management	(i) demonstrate knowledge of graphic resolution
(6) The student designs and creates digital graphics. The student is expected to:	(D) demonstrate knowledge of graphic resolution, file size, file formats, and file management	(ii) demonstrate knowledge of file size
(6) The student designs and creates digital graphics. The student is expected to:	(D) demonstrate knowledge of graphic resolution, file size, file formats, and file management	(iii) demonstrate knowledge of file formats

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student designs and creates digital graphics. The student is expected to:	(D) demonstrate knowledge of graphic resolution, file size, file formats, and file management	(iv) demonstrate knowledge of file management
(6) The student designs and creates digital graphics. The student is expected to:	(E) determine the type of data stored in a file based on its file extension and select appropriate software to modify, create and view the file	(i) determine the type of data stored in a file based on its file extension
(6) The student designs and creates digital graphics. The student is expected to:	(E) determine the type of data stored in a file based on its file extension and select appropriate software to modify, create and view the file	(ii) select appropriate software to modify the file
(6) The student designs and creates digital graphics. The student is expected to:	(E) determine the type of data stored in a file based on its file extension and select appropriate software to modify, create and view the file	(iii) select appropriate software to create the file
(6) The student designs and creates digital graphics. The student is expected to:	(E) determine the type of data stored in a file based on its file extension and select appropriate software to modify, create and view the file	(iv) select appropriate software to view the file
(6) The student designs and creates digital graphics. The student is expected to:	(F) differentiate between the color mode selections in determining product output	(i) differentiate between the color mode selectrions in determining product output
(7) The student demonstrates appropriate use of digital photography equipment and techniques. The student is expected to:	(A) demonstrate proper use of safety procedures while using digital photography equipment	(i) demonstrate proper use of safety procedures while using digital photography equipment

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student demonstrates appropriate use of digital photography equipment and techniques. The student is expected to:	(B) capture still shot images using digital photography equipment incorporating various photo composition techniques such as lighting, perspective, candid versus posed, rule of thirds, and level of horizon	(i) capture still shot images using digital photography equipment incorporating various photo composition techniques
(7) The student demonstrates appropriate use of digital photography equipment and techniques. The student is expected to:	(C) transfer still shot images from equipment to the computer	(i) transfer still shot images from equipment to the computer
(7) The student demonstrates appropriate use of digital photography equipment and techniques. The student is expected to:	(D) demonstrate photographic enhancement techniques such as feathering, layering, masking, and color enhancement using appropriate photo editing software	(i) demonstrate photographic enhancement techniques using appropriate photo editing software
(8) The student demonstrates appropriate use of video equipment and techniques. The student is expected to:	(A) demonstrate proper use of safety procedures while using digital video equipment	(i) demonstrate proper use of safety procedures while using digital video equipment
(8) The student demonstrates appropriate use of video equipment and techniques. The student is expected to:	(B) demonstrate proper use of terminology in relation to video technology	(i) demonstrate proper use of terminology in relation to video technology
(8) The student demonstrates appropriate use of video equipment and techniques. The student is expected to:	(C) demonstrate proper ethics in the use of digital video photography equipment to capture video images	(i) demonstrate proper ethics in the use of digital video photography equipment to capture video images

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student demonstrates appropriate use of video equipment and techniques. The student is expected to:	(D) transfer video images from equipment to the computer	(i) transfer video images from equipment to the computer
(8) The student demonstrates appropriate use of video equipment and techniques. The student is expected to:	(E) apply videographic enhancement and editing techniques such as panning, transitioning, zooming, content editing, and synchronizing audio and video using appropriate digital manipulation software	(i) apply videographic enhancement techniques using appropriate digital manipulation software
(8) The student demonstrates appropriate use of video equipment and techniques. The student is expected to:	(E) apply videographic enhancement and editing techniques such as panning, transitioning, zooming, content editing, and synchronizing audio and video using appropriate digital manipulation software	(ii) apply videographic editing techniques using appropriate digital manipulation software
(8) The student demonstrates appropriate use of video equipment and techniques. The student is expected to:	(F) export video files in digital formats to be used in various delivery systems such as podcasts, downloadable media, social media, and streaming video.	(i) export video files in digital formats to be used in various delivery systems
(9) The student demonstrates appropriate use of audio equipment and techniques. The student is expected to:	(A) demonstrate proper use of safety procedures while using digital audio equipment	(i) demonstrate proper use of safety procedures while using digital audio equipment
(9) The student demonstrates appropriate use of audio equipment and techniques. The student is expected to:	(B) demonstrate proper use of terminology and concepts in relation to audio technology	(i) demonstrate proper use of terminology in relation to audio technology

Knowledge and Skill Statement	Student Expectation	Breakout
(9) The student demonstrates appropriate use of audio equipment and techniques. The student is expected to:	(B) demonstrate proper use of terminology and concepts in relation to audio technology	(ii) demonstrate proper use of concepts in relation to audio technology
(9) The student demonstrates appropriate use of audio equipment and techniques. The student is expected to:	(C) demonstrate proper use of digital audio equipment to capture audio files	(i) demonstrate proper use of digital audio equipment to capture audio files
(9) The student demonstrates appropriate use of audio equipment and techniques. The student is expected to:	(D) transfer audio files from equipment to the computer	(i) transfer audio files from equipment to the computer
(9) The student demonstrates appropriate use of audio equipment and techniques. The student is expected to:	(E) demonstrate proper use of audio editing software such as adding effects, fading, volume control, and manipulation of waveforms using appropriate digital manipulation software	(i) demonstrate proper use of audio editing software using appropriate digital manipulation software
(9) The student demonstrates appropriate use of audio equipment and techniques. The student is expected to:	(F) export audio files to be used in digital formats in various delivery systems such as podcasts, downloadable files, social media and streaming video	(i) export audio files to be used in digital formats in various delivery systems
(10) The student demonstrates appropriate use of animation. The student is expected to:	(A) plan and create a linear and non-linear animation using accepted standards such as design principles, frames and key frames, integration of audio into an animation, and user interactive controls	(i) plan a linear animation using accepted standards

Knowledge and Skill Statement	Student Expectation	Breakout
(10) The student demonstrates appropriate use of animation. The student is expected to:	(A) plan and create a linear and non-linear animation using accepted standards such as design principles, frames and key frames, integration of audio into an animation, and user interactive controls	(ii) create a linear animation using accepted standards
(10) The student demonstrates appropriate use of animation. The student is expected to:	(A) plan and create a linear and non-linear animation using accepted standards such as design principles, frames and key frames, integration of audio into an animation, and user interactive controls	(iii) plan a non-linear animation using accepted standards
(10) The student demonstrates appropriate use of animation. The student is expected to:	(A) plan and create a linear and non-linear animation using accepted standards such as design principles, frames and key frames, integration of audio into an animation, and user interactive controls	(iv) create a non-linear animation using accepted standards
(10) The student demonstrates appropriate use of animation. The student is expected to:	(B) deploy animation to be used in various digital formats and on various video animation players	(i) deploy animation to be used in various digital formats
(10) The student demonstrates appropriate use of animation. The student is expected to:	(B) deploy animation to be used in various digital formats and on various video animation players	(ii) deploy animation to be used on various video animation players
(10) The student demonstrates appropriate use of animation. The student is expected to:	(C) create an interactive animation	(i) create an interactive animation
(11) The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:	(A) initiate a project, including identifying the purpose, audience, and audience needs for design plans	(i) initiate a project, including identifying the purpose for design plans

Knowledge and Skill Statement	Student Expectation	Breakout
(11) The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:	(A) initiate a project, including identifying the purpose, audience, and audience needs for design plans	(ii) initiate a project, including identifying the audience for design plans
(11) The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:	(A) initiate a project, including identifying the purpose, audience, and audience needs for design plans	(iii) initiate a project, including identifying the audience needs for design plans
(11) The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:	(B) develop a plan for a media project such as a storyboard, stage development, and identification of equipment and resources	(i) develop a plan for a media project
(11) The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:	(C) execute and monitor and control a project along its timeline and make suggested revisions until completion of the project	(i) execute a project along its timeline
(11) The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:	(C) execute and monitor and control a project along its timeline and make suggested revisions until completion of the project	(ii) monitor a project along its timeline
(11) The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:	(C) execute and monitor and control a project along its timeline and make suggested revisions until completion of the project	(iii) control a project along its timeline
(11) The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:	(C) execute and monitor and control a project along its timeline and make suggested revisions until completion of the project	(ii) make suggested revisions [to a project] until completion of the project

Knowledge and Skill Statement	Student Expectation	Breakout
(11) The student demonstrates appropriate project management in the creation of digital media projects. The student is expected to:	(D) close a project, including identifying lessons learned	(i) close a project, including identifying lessons learned
(12) The student deploys digital media into print, web-based, and video products. The student is expected to:	(A) incorporate video, audio, text, graphics, and animations into a web page	(i) incorporate video into a web page
(12) The student deploys digital media into print, web-based, and video products. The student is expected to:	(A) incorporate video, audio, text, graphics, and animations into a web page	(ii) incorporate audio into a web page
(12) The student deploys digital media into print, web-based, and video products. The student is expected to:	(A) incorporate video, audio, text, graphics, and animations into a web page	(iii) incorporate text into a web page
(12) The student deploys digital media into print, web-based, and video products. The student is expected to:	(A) incorporate video, audio, text, graphics, and animations into a web page	(iv) incorporate graphics into a web page
(12) The student deploys digital media into print, web-based, and video products. The student is expected to:	(A) incorporate video, audio, text, graphics, and animations into a web page	(v) incorporate animations into a web page
(12) The student deploys digital media into print, web-based, and video products. The student is expected to:	(B) incorporate various digital media products into an electronic document such as a newsletter, social media outlet, poster, or report	(i) incorporate various digital media products into an electronic document

Knowledge and Skill Statement	Student Expectation	Breakout
(12) The student deploys digital media into print, web-based, and video products. The student is expected to:	(C) incorporate various digital media products into an interactive product such as an animation, computer program, simulation, interactive website, or application	(i) incorporate various digital media products into an interactive product

Subject	**Chapter 130. Career and Technical Education, Subchapter K. Information Technology**
Course Title	**§130.308. Web Technologies (One Credit), Adopted 2015.**

(a) General Requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Principles of Information Technology. Students shall be awarded one credit for successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Web Technologies, students will learn to make informed decisions and apply the decisions to the field of IT. Students will implement personal and interpersonal skills to prepare for a rapidly evolving workplace environment. The knowledge and skills acquired and practiced will enable students to successfully perform and interact in a technology-driven society. Students will enhance reading, writing, computing, communication, and critical thinking and apply them to the IT environment.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(i) identify work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(ii) identify work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(iii) identify work qualities that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(iv) identify work qualities that enhance job advancement

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(v) demonstrate work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(vi) demonstrate work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(vii) demonstrate work qualities that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors and qualities that enhance employability and job advancement such as regular attendance, attention to proper attire, maintenance of a clean and safe work environment, pride in work, flexibility, and initiative	(viii) demonstrate work qualities that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) examine the role of certifications, resumes, and portfolios in the web technology profession	(i) examine the role of certifications in the web technology profession
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) examine the role of certifications, resumes, and portfolios in the web technology profession	(ii) examine the role of resumes in the web technology profession
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) examine the role of certifications, resumes, and portfolios in the web technology profession	(iii) examine the role of portfolios in the web technology profession
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) solve problems and think critically	(i) solve problems
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) solve problems and think critically	(ii) think critically
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate planning and time-management skills such as storyboarding and project management, including initating, planning, executing, monitoring, and controlling, and closing projects	(i) demonstrate planning skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate planning and time-management skills such as storyboarding and project management, including initating, planning, executing, monitoring, and controlling, and closing projects	(ii) demonstrate time-management skills
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(i) identify job opportunities
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(ii) identify [job opportunities'] accompanying job duties
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:	(A) identify job opportunities and accompanying job duties and tasks	(iii) identify [job opportunities'] accompanying job tasks

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(i) research careers of personal interest along with the education required to achieve personal career goals
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(ii) research careers of personal interest along with the job skills required to achieve personal career goals
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:	(B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals	(iii) research careers of personal interest along with the experience required to achieve personal career goals
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:	(C) demonstrate an understanding of the functions of resumes and portfolios	(i) demonstrate an understanding of the functions of resumes
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:	(C) demonstrate an understanding of the functions of resumes and portfolios	(ii) demonstrate an understanding of the functions of portfolios
(2) The student identifies employment opportunities in the IT field with a focus in the area of interactive media. The student is expected to:	(D) create a portfolio	(i) create a portfolio
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(A) identify networking components and define the impact of networking components on web development	(i) identify networking components

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(A) identify networking components and define the impact of networking components on web development	(ii) define the impact of networking components on web development
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(B) evaluate the various input, processing, output, and storage devices and storage services	(i) evaluate the various input devices
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(B) evaluate the various input, processing, output, and storage devices and storage services	(ii) evaluate the various processing devices
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(B) evaluate the various input, processing, output, and storage devices and storage services	(iii) evaluate the various output devices
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(B) evaluate the various input, processing, output, and storage devices and storage services	(iv) evaluate the various storage devices
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(B) evaluate the various input, processing, output, and storage devices and storage services	(v) evaluate the various input storage services
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(B) evaluate the various input, processing, output, and storage devices and storage services	(vi) evaluate the various processing storage services

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(B) evaluate the various input, processing, output, and storage devices and storage services	(vii) evaluate the various output storage services
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(B) evaluate the various input, processing, output, and storage devices and storage services	(viii) evaluate the various storage services
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(C) identify current and future Internet protocols such as hypertext transfer protocol, file transfer protocol, telnet, and email	(i) identify current Internet protocols
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(C) identify current and future Internet protocols such as hypertext transfer protocol, file transfer protocol, telnet, and email	(ii) identify future Internet protocols
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(D) describe new trends in web technology and evaluate their impact on web development	(i) describe new trends in web technology
(3) The student demonstrates knowledge and appropriate use of hardware, software, and connectivity technologies. The student is expected to:	(D) describe new trends in web technology and evaluate their impact on web development	(ii) evaluate [new trends in web technology's] impact on web development
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(i) explain ethical use of technology

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(ii) explain ethical use of online resources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(iii) demonstrate ethical use of technology
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(A) explain and demonstrate ethical use of technology and online resources	(iv) demonstrate ethical use of online resources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(B) differentiate between copyright and trademarks	(i) differentiate between copyright and trademarks
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(i) explain the concept of intellectual property laws, including copyright
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(ii) explain the concept of intellectual property laws, including trademarks
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(iii) explain the concept of intellectual property laws, including patents

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(iv) explain consequences of violating [copyright] law
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(v) explain consequences of violating [trademarks] law
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law	(vi) explain consequences of violating [patents] law
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(D) examine the consequences of plagiarism	(i) examine the consequences of plagiarism
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) adhere to copyright and trademark intellectual property laws and regulations, including demonstrating correct acquisition and citation of sources	(i) adhere to copyright intellectual property laws, including demonstrating correct acquisition of sources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) adhere to copyright and trademark intellectual property laws and regulations, including demonstrating correct acquisition and citation of sources	(ii) adhere to copyright intellectual property laws, including demonstrating correct citation of sources

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) adhere to copyright and trademark intellectual property laws and regulations, including demonstrating correct acquisition and citation of sources	(iii) adhere to trademark intellectual property laws, including demonstrating correct acquisition of sources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) adhere to copyright and trademark intellectual property laws and regulations, including demonstrating correct acquisition and citation of sources	(iv) adhere to trademark intellectual property laws, including demonstrating correct citation of sources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) adhere to copyright and trademark intellectual property laws and regulations, including demonstrating correct acquisition and citation of sources	(v) adhere to copyright intellectual property regulations, including demonstrating correct acquisition of sources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) adhere to copyright and trademark intellectual property laws and regulations, including demonstrating correct acquisition and citation of sources	(vi) adhere to copyright intellectual property regulations, including demonstrating correct citation of sources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) adhere to copyright and trademark intellectual property laws and regulations, including demonstrating correct acquisition and citation of sources	(vii) adhere to trademark intellectual property regulations, including demonstrating correct acquisition of sources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(E) adhere to copyright and trademark intellectual property laws and regulations, including demonstrating correct acquisition and citation of sources	(viii) adhere to trademark intellectual property regulations, including demonstrating correct citation of sources

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(F) discuss the process of acquiring rights to use copyrighted and trademarked content in a web site	(i) discuss the process of acquiring rights to use copyrighted content in a web site
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(F) discuss the process of acquiring rights to use copyrighted and trademarked content in a web site	(ii) discuss the process of acquiring rights to use trademarked content in a web site
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(G) demonstrate appropriate behavior and adherence to acceptable use policies when accessing and using online resources	(i) demonstrate appropriate behavior when accessing online resources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(G) demonstrate appropriate behavior and adherence to acceptable use policies when accessing and using online resources	(ii) demonstrate appropriate behavior when using online resources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(G) demonstrate appropriate behavior and adherence to acceptable use policies when accessing and using online resources	(iii) demonstrate adherence to acceptable use policies when accessing online resources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(G) demonstrate appropriate behavior and adherence to acceptable use policies when accessing and using online resources	(iv) demonstrate adherence to acceptable use policies when using online resources
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(H) explain the importance of information privacy such as securing credit card information, passwords, and personal information	(i) explain the importance of information privacy

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(I) describe the function of a non-disclosure agreement	(i) describe the function of a non-disclosure agreement
(4) The student complies with practices and behaviors that meet legal and ethical responsibilities. The student is expected to:	(J) discuss website accessibility concerns	(i) discuss website accessibility concerns
(5) The student evaluates electronic information. The student is expected to:	(A) identify appropriate methods to analyze the design and functionality of web pages	(i) identify appropriate methods to analyze the design of web pages
(5) The student evaluates electronic information. The student is expected to:	(A) identify appropriate methods to analyze the design and functionality of web pages	(ii) identify appropriate methods to analyze the functionality of web pages
(5) The student evaluates electronic information. The student is expected to:	(B) demonstrate skill in testing the accuracy and validity of information acquired	(i) demonstrate skill in testing the accuracy of information acquired
(5) The student evaluates electronic information. The student is expected to:	(B) demonstrate skill in testing the accuracy and validity of information acquired	(ii) demonstrate skill in testing the validity of information acquired
(5) The student evaluates electronic information. The student is expected to:	(C) synthesize information from data acquired from online resources	(i) synthesize information from data acquired from online resources
(6) The student creates and modifies web and digital media designs. The student is expected to:	(A) implement functional design elements such as proximity, repetition, contrast, alignment, color theory, consistency, image file size, and typography	(i) implement functional design elements

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student creates and modifies web and digital media designs. The student is expected to:	(B) identify, create, modify, and use common file formats such as text, image, video analog and digital, and audio files	(i) identify common file formats
(6) The student creates and modifies web and digital media designs. The student is expected to:	(B) identify, create, modify, and use common file formats such as text, image, video analog and digital, and audio files	(ii) create common file formats
(6) The student creates and modifies web and digital media designs. The student is expected to:	(B) identify, create, modify, and use common file formats such as text, image, video analog and digital, and audio files	(iii) modify common file formats
(6) The student creates and modifies web and digital media designs. The student is expected to:	(B) identify, create, modify, and use common file formats such as text, image, video analog and digital, and audio files	(iv) use common file formats
(6) The student creates and modifies web and digital media designs. The student is expected to:	(C) select, create, modify, and integrate effective digital content such as vector-based and raster graphics, motion graphics, video, and audio	(i) select effective digital content
(6) The student creates and modifies web and digital media designs. The student is expected to:	(C) select, create, modify, and integrate effective digital content such as vector-based and raster graphics, motion graphics, video, and audio	(ii) create effective digital content
(6) The student creates and modifies web and digital media designs. The student is expected to:	(C) select, create, modify, and integrate effective digital content such as vector-based and raster graphics, motion graphics, video, and audio	(iii) modify effective digital content

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student creates and modifies web and digital media designs. The student is expected to:	(C) select, create, modify, and integrate effective digital content such as vector-based and raster graphics, motion graphics, video, and audio	(iv) integrate effective digital content
(6) The student creates and modifies web and digital media designs. The student is expected to:	(D) create web pages using current web standards and web development skills such as version control, documentation, web application security, validation, accessibility, and compatibility across multiple browsers and devices	(i) create web pages using current web standards
(6) The student creates and modifies web and digital media designs. The student is expected to:	(D) create web pages using current web standards and web development skills such as version control, documentation, web application security, validation, accessibility, and compatibility across multiple browsers and devices	(ii) create web pages using web development skills
(6) The student creates and modifies web and digital media designs. The student is expected to:	(E) demonstrate proper use of folder structure hierarchy	(i) demonstrate proper use of folder structure hierarchy
(6) The student creates and modifies web and digital media designs. The student is expected to:	(F) use web coding standards to evaluate the design and functionality of web pages such as the World Wide Web Consortium (W3C) guidelines	(i) use web coding standards to evaluate the design of web pages
(6) The student creates and modifies web and digital media designs. The student is expected to:	(F) use web coding standards to evaluate the design and functionality of web pages such as the World Wide Web Consortium (W3C) guidelines	(ii) use web coding standards to evaluate the functionality of web pages

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(A) explain the importance of Internet programming standards	(i) explain the importance of Internet programming standards
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(B) differentiate among various web coding standards such as HyperText Markup Language, and cascading style sheets	(i) differentiate among various web coding standards
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(C) use standard applications to develop web applications such as text-based editing programs, word processors, and web authoring software	(i) use standard applications to develop web applications
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(D) compare and contrast the impact of different browsers on web development	(i) compare and contrast the impact of different browsers on web development
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(E) explain client-server applications and describe the process of a client-server transaction	(i) explain client-server applications
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(E) explain client-server applications and describe the process of a client-server transaction	(ii) describe the process of a client-server transaction

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(F) identify the advantages and disadvantages of client-side processing	(i) identify the advantages of client-side processing
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(F) identify the advantages and disadvantages of client-side processing	(ii) identify the disadvantages of client-side processing
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(G) identify security issues related to client-side processing	(i) identify security issues related to client-side processing
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(H) use standard scripting languages to produce interactive web applications	(i) use standard scripting languages to produce interactive web applications
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(I) identify characteristics of various scripting languages	(i) identify characteristics of various scripting languages
(7) The student demonstrates and employs knowledge of Internet programming strategies to develop and maintain web applications. The student is expected to:	(J) explain the process to construct secure transaction interfaces from the web server to the customer	(i) explain the process to construct secure transaction interfaces from the web server to the customer

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(A) compare the advantages and disadvantages of running a personal server versus using a server provider	(i) compare the advantages and disadvantages of running a personal server versus using a server provider
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(B) explain the Transmission Control Protocol/Internet Protocol	(i) explain the Transmission Control Protocol/Internet Protocol
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(C) identify hardware and software requirements for web servers	(i) identify hardware requirements for web servers
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(C) identify hardware and software requirements for web servers	(ii) identify software requirements for web servers
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(D) evaluate server providers	(i) evaluate server providers
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(E) describe the process of establishing a domain name	(i) describe the process of establishing a domain name
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(F) simulate the administration of web servers, including uploading and managing files	(i) simulate the administration of web servers, including uploading files

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(F) simulate the administration of web servers, including uploading and managing files	(ii) simulate the administration of web servers, including managing files
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(G) collect and analyze usage statistics	(i) collect usage statistics
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(G) collect and analyze usage statistics	(ii) analyze usage statistics
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(H) maintain documentation of the server environment such as specifications, passwords, and software versions	(i) maintain documentation of the server environment
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(I) summarize the process of server backup and restoration of software features	(i) summarize the process of server backup of software features
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(I) summarize the process of server backup and restoration of software features	(ii) summarize the restoration of software features
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(J) propose security measures to protect web servers from electronic threats such as unauthorized access and negative intentions	(i) propose security measures to protect web servers from electronic threats

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student employs knowledge of web administration to develop and maintain web applications. The student is expected to:	(K) evaluate security measures such as using a firewall, Secure Socket Layer (SSL) connections, and Hypertext Transfer Protocol Secure (HTTPS) transactions	(i) evaluate security measures
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(A) communicate with clients to analyze requirements to meet the needs of the client and target audience	(i) communicate with clients to analyze requirements to meet the needs of the client
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(A) communicate with clients to analyze requirements to meet the needs of the client and target audience	(ii) communicate with clients to analyze requirements to meet the needs of the target audience
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(B) document design properties, necessary tools, and resources, and identify and address risks	(i) document design properties
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(B) document design properties, necessary tools, and resources, and identify and address risks	(ii) document necessary tools
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(B) document design properties, necessary tools, and resources, and identify and address risks	(iii) document resources
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(B) document design properties, necessary tools, and resources, and identify and address risks	(iv) identify risks

Knowledge and Skill Statement	Student Expectation	Breakout
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(B) document design properties, necessary tools, and resources, and identify and address risks	(v) address risks
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(C) develop and use a timeline task list such as critical milestones, potential challenges, and interdependencies	(i) develop a timeline task list
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(C) develop and use a timeline task list such as critical milestones, potential challenges, and interdependencies	(ii) use a timeline task list
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(D) use various methods to evaluate the progress of the plan and modify as necessary	(i) use various methods to evaluate the progress of the plan
(9) The student evaluates a problem and creates a project management plan of action for meeting client requirements. The student is expected to:	(D) use various methods to evaluate the progress of the plan and modify as necessary	(ii) modify [the plan] as necessary
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(A) create and simulate the publication of a multipage web product using client required content and web design concepts	(i) create the publication of a multipage web product using client required content
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(A) create and simulate the publication of a multipage web product using client required content and web design concepts	(ii) create the publication of a multipage web product using web design concepts

Knowledge and Skill Statement	Student Expectation	Breakout
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(A) create and simulate the publication of a multipage web product using client required content and web design concepts	(iii) simulate the publication of a multipage web product using client required content
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(A) create and simulate the publication of a multipage web product using client required content and web design concepts	(iv) simulate the publication of a multipage web product using web design concepts
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(B) develop a test plan for a multipage web product for testing usability, effectiveness, reliability, and customer acceptance	(i) develop a test plan for a multipage web product for testing usability
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(B) develop a test plan for a multipage web product for testing usability, effectiveness, reliability, and customer acceptance	(ii) develop a test plan for a multipage web product for testing effectiveness
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(B) develop a test plan for a multipage web product for testing usability, effectiveness, reliability, and customer acceptance	(iii) develop a test plan for a multipage web product for testing reliability
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(B) develop a test plan for a multipage web product for testing usability, effectiveness, reliability, and customer acceptance	(iv) develop a test plan for a multipage web product for testing customer acceptance
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(C) explain the quality assurance process	(i) explain the quality assurance process

Knowledge and Skill Statement	Student Expectation	Breakout
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(D) develop and implement a quality assurance plan	(i) develop a quality assurance plan
(10) The student creates and implements a web product using a project management plan. The student is expected to:	(D) develop and implement a quality assurance plan	(ii) implement a quality assurance plan

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	§130.309. Computer Programming I (One-Credit), Adopted 2015

(a) General Requirements. This course is recommended for students in Grades 10-12. Recommended prerequisites: Principles of Information Technology and Algebra I. Students shall be awarded one credit for successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Computer Programming I, students will acquire knowledge of structured programming techniques and concepts appropriate to developing executable programs and creating appropriate documentation. Students will analyze the social responsibility of business and industry regarding the significant issues relating to the environment, ethics, health, safety, and diversity in society and in the workplace as related to computer programming. Students will apply technical skills to address business applications of emerging technologies.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(A) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(A) employ effective reading and writing skills	(ii) employ effective writing skills
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(B) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(C) solve problems and think critically	(i) solve problems

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(C) solve problems and think critically	(ii) think critically
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(D) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(D) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(E) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(i) demonstrate an understanding of legal responsibilities in relation to the field of IT
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(E) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(ii) demonstrate an understanding of ethical responsibilities in relation to the field of IT
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(F) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring, and controlling, and closing a project	(i) demonstrate planning skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(F) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring, and controlling, and closing a project	(ii) demonstrate time-management skills
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(G) identify job opportunities and accompanying job duties and tasks	(i) identify job opportunities
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(G) identify job opportunities and accompanying job duties and tasks	(ii) identify [job opportunities'] accompanying job duties
(1) The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:	(G) identify job opportunities and accompanying job duties and tasks	(iii) identify [job opportunities'] accompanying job tasks
(2) The student differentiates the concepts of integrity and confidentiality as related to technology in the business environment. The student is expected to:	(A) define business ethics	(i) define business ethics
(2) The student differentiates the concepts of integrity and confidentiality as related to technology in the business environment. The student is expected to:	(B) distinguish between honest and dishonest business practices	(i) distinguish between honest and dishonest business practices

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student differentiates the concepts of integrity and confidentiality as related to technology in the business environment. The student is expected to:	(C) examine copyright and licensing issues in the software industry	(i) examine copyright issues in the software industry
(2) The student differentiates the concepts of integrity and confidentiality as related to technology in the business environment. The student is expected to:	(C) examine copyright and licensing issues in the software industry	(ii) examine licensing issues in the software industry
(2) The student differentiates the concepts of integrity and confidentiality as related to technology in the business environment. The student is expected to:	(D) analyze the effects of unethical practices on a business	(i) analyze the effects of unethical practices on a business
(3) The student identifies and analyzes the client project software needs and requirements. The student is expected to:	(A) gather data to identify client and project requirements	(i) gather data to identify client requirements
(3) The student identifies and analyzes the client project software needs and requirements. The student is expected to:	(A) gather data to identify client and project requirements	(ii) gather data to identify project requirements
(3) The student identifies and analyzes the client project software needs and requirements. The student is expected to:	(B) identify input and output requirements	(i) identify input requirements
(3) The student identifies and analyzes the client project software needs and requirements. The student is expected to:	(B) identify input and output requirements	(ii) identify output requirements

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student identifies and analyzes the client project software needs and requirements. The student is expected to:	(C) identify system processing requirements	(i) identify system processing requirements
(3) The student identifies and analyzes the client project software needs and requirements. The student is expected to:	(D) develop program requirements and specifications	(i) develop program requirements
(3) The student identifies and analyzes the client project software needs and requirements. The student is expected to:	(D) develop program requirements and specifications	(ii) develop program specifications
(4) The student develops an IT-based project plan to solve a specific problem. The student is expected to:	(A) define scope of work to meet client-based project needs	(i) define scope of work to meet client-based project needs
(4) The student develops an IT-based project plan to solve a specific problem. The student is expected to:	(B) identify software development processes and issues	(i) identify software development processes
(4) The student develops an IT-based project plan to solve a specific problem. The student is expected to:	(B) identify software development processes and issues	(ii) identify software development issues
(4) The student develops an IT-based project plan to solve a specific problem. The student is expected to:	(C) explain the software system life cycle approach	(i) explain the software system life cycle approach
(5) The student designs a software application plan. The student is expected to:	(A) articulate the principles of system design such as procedural, object-oriented, and event-driven processes	(i) articulate the principles of system design

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student designs a software application plan. The student is expected to:	(B) perform a logical design using appropriate software tools	(i) perform a logical design using appropriate software tools
(5) The student designs a software application plan. The student is expected to:	(C) apply algorithmic and data structure concepts	(i) apply algorithmic structure concepts
(5) The student designs a software application plan. The student is expected to:	(C) apply algorithmic and data structure concepts	(ii) apply data structure concepts
(5) The student designs a software application plan. The student is expected to:	(D) identify constraints	(i) identify constraints
(5) The student designs a software application plan. The student is expected to:	(E) identify modular design concepts	(i) identify modular design concepts
(5) The student designs a software application plan. The student is expected to:	(F) document the design specification using a defined procedure	(i) document the design specification using a defined procedure
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(A) differentiate among the concepts of data such as procedural, object-oriented, and event-driven representation	(i) differentiate among concepts of data
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(B) identify current programming languages and the environment in which each is used	(i) identify current programming languages

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(B) identify current programming languages and the environment in which each is used	(ii) identify the environments in which each [current programming language] is used
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(C) produce procedural and object-oriented programs using structured coding with appropriate style and clarity of expression	(i) produce procedural programs using structured coding with appropriate style
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(C) produce procedural and object-oriented programs using structured coding with appropriate style and clarity of expression	(ii) produce procedural programs using structured coding with clarity of expression
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(C) produce procedural and object-oriented programs using structured coding with appropriate style and clarity of expression	(iii) produce object-oriented programs using structured coding with appropriate style
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(C) produce procedural and object-oriented programs using structured coding with appropriate style and clarity of expression	(iv) produce object-oriented programs using structred coding with clarity of expression
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(D) demonstrate skill in program testing	(i) demonstrate skill in program testing
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(E) compare computed results with anticipated results to determine the reasonableness of the solutions	(i) compare computed results with anticipated results to determine the reasonableness of the solutions

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(F) troubleshoot technological problems	(i) troubleshoot technological problems
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(G) explain the software quality assurance process	(i) explain the software quality assurance process
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(H) follow established quality assurance procedures for testing, identifying problems, and tracking resolutions	(i) follow established quality assurance procedures for testing
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(H) follow established quality assurance procedures for testing, identifying problems, and tracking resolutions	(ii) follow established quality assurance procedures for identifying problems
(6) The student solves problems using different types and levels of programming languages and quality assurances. The student is expected to:	(H) follow established quality assurance procedures for testing, identifying problems, and tracking resolutions	(iii) follow established quality assurance procedures for tracking resolutions
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(A) identify risks to information systems facilities, data communications systems, and applications	(i) identify risks to information systems facilities
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(A) identify risks to information systems facilities, data communications systems, and applications	(ii) identify risks to information systems data communications systems

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(A) identify risks to information systems facilities, data communications systems, and applications	(iii) identify risks to information systems applications
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(i) comply with federal legislation pertaining to computer crime
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(ii) comply with federal legislation pertaining to computer fraud
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(iii) comply with federal legislation pertaining to computer abuse
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(iv) comply with state legislation pertaining to computer crime
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(v) comply with state legislation pertaining to computer fraud
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(vi) comply with state legislation pertaining to computer abuse

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(i) identify controls for information systems facilities appropriate to specific risks
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(ii) identify controls for information systems data communications appropriate to specific risks
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(iii) identify controls for information systems applications appropriate to specific risks
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(iv) select controls for information systems facilities appropriate to specific risks
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(v) select controls for information systems data communications appropriate to specific risks
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(vi) select controls for information systems applications appropriate to specific risks
(7) The student recognizes issues and complies with procedures for maintaining the security of computerized information. The student is expected to:	(D) apply procedures used to recover from situations such as system failure and computer virus	(i) apply procedures used to recover from situations

Subject	**Chapter 130. Career and Technical Education, Subchapter K. Information Technology**
Course Title	**§130.310. Computer Programming II (One Credit), Adopted 2015**

(a) General Requirements. This course is recommended for students in Grades 11 and 12. Recommended prerequisites: Principles of Information Technology and Computer Programming I. Students shall be awarded one credit for successful completion of this course.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Computer Programming II, students will expand their knowledge and skills in structured programming techniques and concepts by addressing more complex problems and developing comprehensive programming solutions. Students will analyze the social responsibility of business and industry regarding the significant issues relating to environment, ethics, health, safety, and diversity in society and in the workplace as related to computer programming. Students will apply technical skills to address business applications of emerging technologies.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(A) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(A) employ effective reading and writing skills	(ii) employ effective writing skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(B) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(B) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(C) illustrate interview skills for successful job placement	(i) illustrate interview skills for successful job placement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(D) solve problems and think critically	(i) solve problems

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(D) solve problems and think critically	(ii) think critically
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(E) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(E) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(F) identify and implement proper safety procedures	(i) identify proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(F) identify and implement proper safety procedures	(ii) implement proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(G) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(i) demonstrate an understanding of legal responsibilities in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(G) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(ii) demonstrate an understanding of ethical responsibilities in relation to the field of IT

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(H) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring, and controlling, and closing a project	(i) demonstrate planning skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected	(H) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring, and controlling, and closing a project	(ii) demonstrate time-management skills
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) create a personal career plan along with education, job skills, and experience necessary to achieve career goals	(i) create a personal career plan along with education, job skills, and experience necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) develop a resume that includes letters of recommendation appropriate to a chosen career plan	(i) develop a resume that includes letters of recommendation appropriate to a chosen career plan
(3) The student identifies project software needs and requirements. The student is expected to:	(A) identify input and output requirements	(i) identify input requirements
(3) The student identifies project software needs and requirements. The student is expected to:	(A) identify input and output requirements	(ii) identify output requirements
(3) The student identifies project software needs and requirements. The student is expected to:	(B) identify system processing requirements	(i) identify system processing requirements

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student identifies project software needs and requirements. The student is expected to:	(C) identify hardware, networking, and software system functional requirements	(i) identify hardware system functional requirements
(3) The student identifies project software needs and requirements. The student is expected to:	(C) identify hardware, networking, and software system functional requirements	(ii) identify networking system functional requirements
(3) The student identifies project software needs and requirements. The student is expected to:	(C) identify hardware, networking, and software system functional requirements	(iii) identify software system functional requirements
(3) The student identifies project software needs and requirements. The student is expected to:	(D) conduct a project needs analysis	(i) conduct a project needs analysis
(3) The student identifies project software needs and requirements. The student is expected to:	(E) define a problem to be solved by a created application	(i) define a problem to be solved by a created application
(3) The student identifies project software needs and requirements. The student is expected to:	(F) analyze requirement specifications using current approaches	(i) analyze requirement specifications using current approaches
(3) The student identifies project software needs and requirements. The student is expected to:	(G) identify project constraints	(i) identify project constraints
(3) The student identifies project software needs and requirements. The student is expected to:	(H) use advanced modeling and analysis of functional requirements	(i) use advanced modeling of functional requirements
(3) The student identifies project software needs and requirements. The student is expected to:	(H) use advanced modeling and analysis of functional requirements	(ii) use advanced analysis of functional requirements

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student produces an IT-based strategy and project plan to solve a provided class problem. The student is expected to:	(A) identify key functions and subsystem capabilities of modern software products	(i) identify key functions of modern software products
(4) The student produces an IT-based strategy and project plan to solve a provided class problem. The student is expected to:	(A) identify key functions and subsystem capabilities of modern software products	(ii) identify subsystem capabilities of modern software products
(4) The student produces an IT-based strategy and project plan to solve a provided class problem. The student is expected to:	(B) identify software resources and individual product risks	(i) identify software resources
(4) The student produces an IT-based strategy and project plan to solve a provided class problem. The student is expected to:	(B) identify software resources and individual product risks	(ii) identify individual product risks
(4) The student produces an IT-based strategy and project plan to solve a provided class problem. The student is expected to:	(C) identify software development methodologies	(i) identify software development methodologies
(5) The student demonstrates knowledge of the software development environment. The student is expected to	(A) apply prototyping techniques	(i) apply prototyping techniques
(5) The student demonstrates knowledge of the software development environment. The student is expected to	(B) use appropriate configuration management tools	(i) use appropriate configuration management tools

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student demonstrates knowledge of the software development environment. The student is expected to	(C) apply language-specific programming techniques	(i) apply language-specific programming techniques
(5) The student demonstrates knowledge of the software development environment. The student is expected to	(D) develop programs using appropriate language	(i) develop programs using appropriate language
(5) The student demonstrates knowledge of the software development environment. The student is expected to	(E) apply the appropriate development environment for each selected language such as the compiler, debugger, test generator, and analyzer	(i) apply the appropriate development environment for each selected language
(5) The student demonstrates knowledge of the software development environment. The student is expected to	(F) use appropriate modeling and analysis tools	(i) use appropriate modeling tools
(5) The student demonstrates knowledge of the software development environment. The student is expected to	(F) use appropriate modeling and analysis tools	(ii) use appropriate analysis tools
(5) The student demonstrates knowledge of the software development environment. The student is expected to	(G) use appropriate requirement tracking tools	(i) use appropriate requirement tracking tools
(6) The student demonstrates knowledge of the software development process. The student is expected to	(A) articulate the information system life cycle	(i) articulate the information system life cycle

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student demonstrates knowledge of the software development process. The student is expected to	(B) identify system analysis issues related to design, testing, implementation, and maintenance	(i) identify system analysis issues related to design
(6) The student demonstrates knowledge of the software development process. The student is expected to	(B) identify system analysis issues related to design, testing, implementation, and maintenance	(ii) identify system analysis issues related to testing
(6) The student demonstrates knowledge of the software development process. The student is expected to	(B) identify system analysis issues related to design, testing, implementation, and maintenance	(iii) identify system analysis issues related to implementation
(6) The student demonstrates knowledge of the software development process. The student is expected to	(B) identify system analysis issues related to design, testing, implementation, and maintenance	(iv) identify system analysis issues related to maintenance
(6) The student demonstrates knowledge of the software development process. The student is expected to	(C) identify the use of program design tools in a software-development process	(i) identify the use of program design tools in a software-development process
(6) The student demonstrates knowledge of the software development process. The student is expected to	(D) identify current information life cycle models	(i) identify current information life cycle models
(7) The student designs a software application. The student is expected to:	(A) apply principals of system design such as structured, object-oriented, and event-driven processes;	(i) apply principals of system design

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student designs a software application. The student is expected to:	(B) develop a logical design	(i) develop a logical design
(7) The student designs a software application. The student is expected to:	(C) document design specifications according to a defined procedure	(i) document design specifications according to a defined procedure
(7) The student designs a software application. The student is expected to:	(D) design system input, output, processing, and interfaces	(i) design system input
(7) The student designs a software application. The student is expected to:	(D) design system input, output, processing, and interfaces	(ii) design system output
(7) The student designs a software application. The student is expected to:	(D) design system input, output, processing, and interfaces	(iii) design system processing
(7) The student designs a software application. The student is expected to:	(D) design system input, output, processing, and interfaces	(iv) design system interfaces
(7) The student designs a software application. The student is expected to:	(E) identify the characteristics and uses of data processing such as batch, interactive, event driven, and object oriented	(i) identify the characteristics of data processing
(7) The student designs a software application. The student is expected to:	(E) identify the characteristics and uses of data processing such as batch, interactive, event driven, and object oriented	(ii) identify the uses of data processing

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student designs a software application. The student is expected to:	(F) explain algorithmic and data structure concepts	(i) explain algorithmic concepts
(7) The student designs a software application. The student is expected to:	(F) explain algorithmic and data structure concepts	(ii) explain data structure concepts
(7) The student designs a software application. The student is expected to:	(G) identify constraints	(i) identify constraints
(7) The student designs a software application. The student is expected to:	(H) identify modular design concepts	(i) identify modular design concepts
(7) The student designs a software application. The student is expected to:	(I) identify the features, functions, and architectures of client-server computing	(i) identify the features of client-server computing
(7) The student designs a software application. The student is expected to:	(I) identify the features, functions, and architectures of client-server computing	(ii) identify the functions of client-server computing
(7) The student designs a software application. The student is expected to:	(I) identify the features, functions, and architectures of client-server computing	(iii) identify the architectures of client-server computing
(7) The student designs a software application. The student is expected to:	(J) articulate database-management concepts	(i) articulate database-management concepts
(7) The student designs a software application. The student is expected to:	(K) define the objectives of a client-server application	(i) define the objectives of a client-server application

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student designs a software application. The student is expected to:	(L) design static and dynamic online processing systems	(i) design static online processing systems
(7) The student designs a software application. The student is expected to:	(L) design static and dynamic online processing systems	(ii) design dynamic online processing systems
(7) The student designs a software application. The student is expected to:	(M) employ interface techniques	(i) employ interface techniques
(8) The student codes a software application. The student is expected to:	(A) apply programming language concepts	(i) apply programming language concepts
(8) The student codes a software application. The student is expected to:	(B) identify the hardware-software connection	(i) identify the hardware-software connection
(8) The student codes a software application. The student is expected to:	(C) articulate the concept of data representation	(i) articulate the concept of data representation
(8) The student codes a software application. The student is expected to:	(D) apply structured, object-oriented, and event-driven programming techniques	(i) apply structured programming techniques
(8) The student codes a software application. The student is expected to:	(D) apply structured, object-oriented, and event-driven programming techniques	(ii) apply object-oriented programming techniques
(8) The student codes a software application. The student is expected to:	(D) apply structured, object-oriented, and event-driven programming techniques	(iii) apply event-driven programming techniques

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student codes a software application. The student is expected to:	(E) articulate how a programming language can support multitasking and exception handling	(i) articulate how a programming language can support multitasking
(8) The student codes a software application. The student is expected to:	(E) articulate how a programming language can support multitasking and exception handling	(ii) articulate how a programming language can support exception handling
(8) The student codes a software application. The student is expected to:	(F) identify how current key programming languages work in different operating system environments	(i) identify how current key programming languages work in different operating system environments
(8) The student codes a software application. The student is expected to:	(G) translate data structures and program design into code in an appropriate language	(i) translate data structures into code in an appropriate language
(8) The student codes a software application. The student is expected to:	(G) translate data structures and program design into code in an appropriate language	(ii) translate program design into code in an appropriate language
(8) The student codes a software application. The student is expected to:	(H) demonstrate key constructs and commands specific to a language	(i) demonstrate key constructs specific to a language
(8) The student codes a software application. The student is expected to:	(H) demonstrate key constructs and commands specific to a language	(ii) demonstrate key commands specific to a language
(8) The student codes a software application. The student is expected to:	(I) identify current programming languages used in software development	(i) identify current programming languages used in software development

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student codes a software application. The student is expected to:	(J) explain how to resolve program implementation issues such as debugging, documentation, and auditing	(i) explain how to resolve program implementation issues
(8) The student codes a software application. The student is expected to:	(K) articulate software development issues such as correctness, reliability, and productivity	(i) articulate software development issues
(8) The student codes a software application. The student is expected to:	(L) explain code analysis issues related to design, testing, implementation, and maintenance	(i) explain code analysis issues related to design
(8) The student codes a software application. The student is expected to:	(L) explain code analysis issues related to design, testing, implementation, and maintenance	(ii) explain code analysis issues related to testing
(8) The student codes a software application. The student is expected to:	(L) explain code analysis issues related to design, testing, implementation, and maintenance	(iii) explain code analysis issues related to implementation
(8) The student codes a software application. The student is expected to:	(L) explain code analysis issues related to design, testing, implementation, and maintenance	(iv) explain code analysis issues related to maintenance
(8) The student codes a software application. The student is expected to:	(M) demonstrate how to design and implement programs in a top-down manner	(i) demonstrate how to design programs in a top-down manner
(8) The student codes a software application. The student is expected to:	(M) demonstrate how to design and implement programs in a top-down manner	(ii) demonstrate how to implement programs in a top-down manner

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student codes a software application. The student is expected to:	(N) demonstrate how to translate algorithmic and modular design into computer code	(i) demonstrate how to translate algorithmic design into computer code
(8) The student codes a software application. The student is expected to:	(N) demonstrate how to translate algorithmic and modular design into computer code	(ii) demonstrate how to translate modular design into computer code
(8) The student codes a software application. The student is expected to:	(O) explain how programming control structures are used to verify correctness	(i) explain how programming control structures are used to verify correctness
(8) The student codes a software application. The student is expected to:	(P) compile and debug computer code	(i) compile computer code
(8) The student codes a software application. The student is expected to:	(P) compile and debug computer code	(ii) debug computer code
(8) The student codes a software application. The student is expected to:	(Q) prepare appropriate commenting within code	(i) prepare appropriate commenting within code
(9) The student demonstrates knowledge of software testing. The student is expected to:	(A) develop a test plan	(i) develop a test plan
(9) The student demonstrates knowledge of software testing. The student is expected to:	(B) define test procedures	(i) define test procedures
(9) The student demonstrates knowledge of software testing. The student is expected to:	(C) develop test cases	(i) develop test cases

Knowledge and Skill Statement	Student Expectation	Breakout
(9) The student demonstrates knowledge of software testing. The student is expected to:	(D) perform software testing	(i) perform software testing
(10) The student performs quality assurance testing. The student is expected to:	(A) explain the software quality assurance process	(i) explain the software quality assurance process
(10) The student performs quality assurance testing. The student is expected to:	(B) apply standard requirements for software quality assurance	(i) apply standard requirements for software quality assurance
(10) The student performs quality assurance testing. The student is expected to:	(C) perform software quality assurance tasks to determine a quality software product	(i) perform software quality assurance tasks to determine a quality software product
(10) The student performs quality assurance testing. The student is expected to:	(D) conduct code inspection	(i) conduct code inspection
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(A) identify risks to information systems facilities, data, communication systems, and applications	(i) identify risks to information systems facilities
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(A) identify risks to information systems facilities, data, communication systems, and applications	(ii) identify risks to data
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(A) identify risks to information systems facilities, data, communication systems, and applications	(iii) identify risks to communication systems

Knowledge and Skill Statement	Student Expectation	Breakout
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(A) identify risks to information systems facilities, data, communication systems, and applications	(iv) identify risks to applications
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(i) comply with federal legislation pertaining to computer crime
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(ii) comply with federal legislation pertaining to computer fraud
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(iii) comply with federal legislation pertaining to computer abuse
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(iv) comply with state legislation pertaining to computer crime
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(v) comply with state legislation pertaining to computer fraud
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(B) comply with federal and state legislation pertaining to computer crime, fraud, and abuse	(vi) comply with state legislation pertaining to computer abuse

Knowledge and Skill Statement	Student Expectation	Breakout
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(i) identify controls for information systems facilities appropriate to specific risks
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(ii) identify controls for data communications appropriate to specific risks
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(iii) identify controls for applications appropriate to specific risks
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(iv) select controls for information systems facilities appropriate to specific risks
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(v) select controls for data communications appropriate to specific risks
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(C) identify and select controls for information systems facilities, data communications, and applications appropriate to specific risks	(vi) select controls for applications appropriate to specific risks
(11) The student applies procedures for maintaining the security of computerized information. The student is expected to	(D) apply procedures used to recover from situations such as system failure and computer virus	(i) apply procedures used to recover from situations

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	§130.311. Computer Technician Practicum (Two or Three Credits), Adopted 2015.

(a) General Requirements. This course is recommended for students in Grades 10-12. Recommended prerequisites: Principles of Information Technology, Computer Maintenance, Computer Maintenance Lab, Networking, and Networking Lab. Student shall be awarded two credits for successful completion of this course. A student may repeat this course once for credit provided that the student is experiencing different aspects of the industry and demonstrating proficiency in additional and more advance knowledge and skills.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In the Computer Technician Practicum, students will gain knowledge and skills in the area of computer technologies, including advanced knowledge of electrical and electronic theory, computer principles, and components related to the installation, diagnosis, service, and repair of computer-based technology systems. Students will reinforce, apply, and transfer their knowledge and skills to a variety of settings and problems. Proper use of analytical skills and application of IT concepts and standards are essential to prepare students for success in a technology-driven society. Critical thinking, IT experience, and product development may be conducted in a classroom setting with an instructor, with an industry mentor, or both.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(i) identify work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(ii) identify work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(iii) demonstrate work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(iv) demonstrate work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) identify and demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills	(i) identify positive personal qualities

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) identify and demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills	(ii) demonstrate positive personal qualities
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(ii) employ effective writing skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) solve problems and think critically	(i) solve problems
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) solve problems and think critically	(ii) think critically

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) identify and implement proper safety procedures	(i) identify proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) identify and implement proper safety procedures	(ii) implement proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(i) demonstrate an understanding of legal responsibilities in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(ii) demonstrate an understanding of ethical responsibilities in relation to field of IT

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(I) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring, and controlling, and closing a project	(i) demonstrate planning skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(I) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring, and controlling, and closing a project	(ii) demonstrate time-management skills
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) improve on a personal career plan along with education, job skills, and experience necessary to achieve career goals	(i) improve on a personal career plan along with education necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) improve on a personal career plan along with education, job skills, and experience necessary to achieve career goals	(ii) improve on a personal career plan along with job skills necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) improve on a personal career plan along with education, job skills, and experience necessary to achieve career goals	(iii) improve on a personal career plan along with experience necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) develop a resume appropriate to a chosen career plan, including letters of recommendation	(i) develop a resume appropriate to a chosen career plan, including letters of recommendation

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(C) illustrate interview skills for successful job placement	(i) illustrate interview skills for successful job placement
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(A) demonstrate effective verbal and written communication skills with individuals from varied cultures such as fellow workers, management, and customers	(i) demonstrate effective verbal communication skills with individuals from varied cultures
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(A) demonstrate effective verbal and written communication skills with individuals from varied cultures such as fellow workers, management, and customers	(ii) demonstrate effective written communication skills with individuals from varied cultures
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(B) complete work orders and related paperwork for repair and installation	(i) complete work orders for repair
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(B) complete work orders and related paperwork for repair and installation	(ii) complete work orders for installation
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(B) complete work orders and related paperwork for repair and installation	(iii) complete paperwork [related to work orders] for repair

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(B) complete work orders and related paperwork for repair and installation	(iv) complete paperwork [related to work orders] for installation
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(i) estimate supplies for installation work orders
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(ii) estimate supplies for maintenance work orders
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(iii) estimate supplies for repair work orders
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(iv) estimate materials for installation work orders
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(v) estimate materials for maintenance work orders
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(vi) estimate materials for repair work orders

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(vii) estimate labor costs for installation
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(viii) estimate labor costs for maintenance work orders
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders	(ix) estimate labor costs for repair work orders
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(D) read and interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins	(i) read technical documentation
(3) The student relates core academic skills to the requirements of computer technologies. The student is expected to:	(D)read and interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins	(ii) interpret technical documentation
(4) The student applies communication, mathematics, English, and science knowledge and skills to research and develop projects. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards	(i) demonstrate proper use of written communication techniques consistent with IT industry standards

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student applies communication, mathematics, English, and science knowledge and skills to research and develop projects. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards	(ii) demonstrate proper use of verbal communication techniques consistent with IT industry standards
(4) The student applies communication, mathematics, English, and science knowledge and skills to research and develop projects. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards	(iii) demonstrate proper use of visual communication techniques consistent with IT industry standards
(4) The student applies communication, mathematics, English, and science knowledge and skills to research and develop projects. The student is expected to:	(B) demonstrate proper use of mathematics concepts in the development of products or services	(i) demonstrate proper use of mathematics concepts in the development of products or services
(4) The student applies communication, mathematics, English, and science knowledge and skills to research and develop projects. The student is expected to:	(C) demonstrate proper use of science principles to the development of products or services	(i) demonstrate proper use of science principles to the development of products or services
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(A) explain microprocessor theory	(i) explain microprocessor theory
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(B) define the use of Boolean logic in computer technologies	(i) define the use of Boolean logic in computer technologies

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(C) describe the theories of magnetism, electricity, and electronics as they apply to computer systems	(i) describe the [theory] of magnetism as [it applies] to computer systems
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(C) describe the theories of magnetism, electricity, and electronics as they apply to computer systems	(ii) describe the [theory] of electricity as [it applies] to computer systems
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(C) describe the theories of magnetism, electricity, and electronics as they apply to computer systems	(iii) describe the [theory] of electronics as [it applies] to computer systems
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(D) identify proper troubleshooting techniques	(i) identify proper troubleshooting techniques
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(E) differentiate among digital and analog input and output electronics theories	(i) differentiate among digital and analog input and output electronics theories
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(F) describe the architecture of various computer systems	(i) describe the architecture of various computer systems
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(G) describe the function of central processing units, storage devices, peripheral devices, and microprocessor units	(i) describe the function of central processing units

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(G) describe the function of central processing units, storage devices, peripheral devices, and microprocessor units	(ii) describe the function of storage devices
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(G) describe the function of central processing units, storage devices, peripheral devices, and microprocessor units	(iii) describe the function of peripheral devices
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(G) describe the function of central processing units, storage devices, peripheral devices, and microprocessor units	(iv) describe the function of microprocessor units
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(H) explain computer system environmental requirements and related control devices	(i) explain computer system environmental requirements
(5) The student knows the concepts and skills that form the basis of computer technologies. The student is expected to:	(H) explain computer system environmental requirements and related control devices	(ii) explain control devices [related to computer system environmental requirements]
(6) The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. The student is expected to:	(A) demonstrate safe use of equipment in computer technologies such as hand and power tools	(i) demonstrate safe use of equipment in computer technologies

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. The student is expected to:	(B) employ available reference tools, materials, and Internet sources to access information as needed	(i) employ available reference tools to access information as needed
(6) The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. The student is expected to:	(B) employ available reference tools, materials, and Internet sources to access information as needed	(ii) employ available materials to access information as needed
(6) The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. The student is expected to:	(B) employ available reference tools, materials, and Internet sources to access information as needed	(iii) employ available Internet sources to access information as needed
(6) The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. The student is expected to:	(C) demonstrate the proper handling and disposal of environmentally hazardous materials used in computer technologies	(i) demonstrate the proper handling of environmentally hazardous materials used in computer technologies
(6) The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. The student is expected to:	(C) demonstrate the proper handling and disposal of environmentally hazardous materials used in computer technologies	(ii) demonstrate the proper disposal of environmentally hazardous materials used in computer technologies
(6) The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. The student is expected to:	(D) identify new and emerging technologies that may affect the field of computer technology such as quantum computing, photonics, and nanotechnology	(i) identify new technologies that may affect the field of computer technology

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. The student is expected to:	(D) identify new and emerging technologies that may affect the field of computer technology such as quantum computing, photonics, and nanotechnology	(ii) identify emerging technologies that may affect the field of computer technology
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(A) identify a problem relating to information technology	(i) identify a problem relating to information technology
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(B) develop a solution using appropriate technologies, IT concepts, and IT industry standards	(i) develop a solution using appropriate technologies
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(B) develop a solution using appropriate technologies, IT concepts, and IT industry standards	(ii) develop a solution using IT concepts
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(B) develop a solution using appropriate technologies, IT concepts, and IT industry standards	(iii) develop a solution using IT industry standards

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(C) explain how the proposed technological solution will resolve the problem and the methodologies involved	(i) explain how the proposed technological solution will resolve the problem
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(C) explain how the proposed technological solution will resolve the problem and the methodologies involved	(ii) explain the methodologies involved [in the proposed technological solution]
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(D) apply decision-making techniques to the selection of technological solutions	(i) apply decision-making techniques to the selection of technological solutions
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(E) identify areas where quality, reliability, and safety can be designed into a product or service	(i) identify areas where quality can be designed into a product or service
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(E) identify areas where quality, reliability, and safety can be designed into a product or service	(ii) identify areas where reliability can be designed into a product or service

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(E) identify areas where quality, reliability, and safety can be designed into a product or service	(iii) identify areas where safety can be designed into a product or service
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(F) apply critical-thinking strategies to analyze and evaluate the proposed technological solution	(i) apply critical-thinking strategies to analyze the proposed technological solution
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(F) apply critical-thinking strategies to analyze and evaluate the proposed technological solution	(ii) apply critical-thinking strategies to the evaluate the proposed technological solution
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(G) develop a sustainability plan for the product or service	(i) develop a sustainability plan for the product or service
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(H) select and use the appropriate technological resources to conduct research, design, and develop activities	(i) select the appropriate technological resources to conduct research

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(H) select and use the appropriate technological resources to conduct research, design, and develop activities	(ii) select the appropriate technological resources to design
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(H) select and use the appropriate technological resources to conduct research, design, and develop activities	(iii) select the appropriate technological resources to develop activities
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(H) select and use the appropriate technological resources to conduct research, design, and develop activities	(iv) use the appropriate technological resources to conduct research
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(H) select and use the appropriate technological resources to conduct research, design, and develop activities	(v) use the appropriate technological resources to design
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(H) select and use the appropriate technological resources to conduct research, design, and develop activities	(vi) use the appropriate technological resources to develop activities

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(I) develop the documentation of the research and development process	(i) develop the documentation of the research and development process
(7) The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. The student is expected to:	(J) present the solution to a panel of professionals using formal presentation skills	(i) present the solution to a panel of professionals using formal presentation skills
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(A) implement project methodologies, including initiating, planning, executing, monitoring, and controlling, and closing a project, to manage information system projects	(i) implement project methodologies, including initiating a project, to manage information system projects
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(A) implement project methodologies, including initiating, planning, executing, monitoring, and controlling, and closing a project, to manage information system projects	(ii) implement project methodologies,including planning a project, to manage information system projects
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(A) implement project methodologies, including initiating, planning, executing, monitoring, and controlling, and closing a project, to manage information system projects	(iii) implement project methodologies, including executing a project, to manage information system projects

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(A) implement project methodologies, including initiating, planning, executing, monitoring, and controlling, and closing a project, to manage information system projects	(iv) implement project methodologies, including monitoring a project, to manage information system projects
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(A) implement project methodologies, including initiating, planning, executing, monitoring, and controlling, and closing a project, to manage information system projects	(v) implement project methodologies, including controlling a project, to manage information system projects
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(A) implement project methodologies, including initiating, planning, executing, monitoring, and controlling, and closing a project, to manage information system projects	(vi) implement project methodologies, including closing a project, to manage information system projects
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(B) define the scope of work to achieve individual and group goals	(i) define the scope of work to achieve individual goals
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(B) define the scope of work to achieve individual and group goals	(ii) define the scope of work to achieve group goals
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(C) develop time and activity plans to achieve objectives	(i) develop time plans to achieve objectives

Knowledge and Skill Statement	Student Expectation	Breakout
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(C) develop time and activity plans to achieve objectives	(ii) develop activity plans to achieve objectives
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(D) implement or participate with cross-functional teams to achieve IT project goals	(i) implement or participate with cross-functional teams to achieve IT project goals
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(E) develop and implement quality assurance test plans	(i) develop quality assurance test plans
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(E) develop and implement quality assurance test plans	(ii) implement quality assurance test plans
(8) The student employs project management knowledge to oversee IT projects. The student is expected to:	(F) create a contingency plan	(i) create a contingency plan
(9) The student recognizes and analyzes potential IT security threats to develop and maintain security requirements. The student is expected to:	(A) describe potential security threats to information systems	(i) describe potential security threats to information systems
(9) The student recognizes and analyzes potential IT security threats to develop and maintain security requirements. The student is expected to:	(B) identify the range of security needs and the problems that can occur due to security lapses	(i) identify the range of security needs

Knowledge and Skill Statement	Student Expectation	Breakout
(9) The student recognizes and analyzes potential IT security threats to develop and maintain security requirements. The student is expected to:	(B) identify the range of security needs and the problems that can occur due to security lapses	(ii) identify problems that can occur due to security lapses
(9) The student recognizes and analyzes potential IT security threats to develop and maintain security requirements. The student is expected to:	(C) develop and implement plans to address security threats	(i) develop plans to address security threats
(9) The student recognizes and analyzes potential IT security threats to develop and maintain security requirements. The student is expected to:	(C) develop and implement plans to address security threats	(ii) implement plans to address security threats
(9) The student recognizes and analyzes potential IT security threats to develop and maintain security requirements. The student is expected to:	(D) document security procedures	(i) document security procedures
(9) The student recognizes and analyzes potential IT security threats to develop and maintain security requirements. The student is expected to:	(E) describe the use of computer forensics in countering security threats such as IT crimes and security breaches	(i) describe the use of computer forensics in countering security threats
(10) The student provides support to computer users to maintain service. The student is expected to:	(A) employ effective listening skills when working with clients to identify support needs	(i) employ effective listening skills when working with clients to identify support needs
(10) The student provides support to computer users to maintain service. The student is expected to:	(B) identify customer need and formulate a support plan	(i) identify customer need

Knowledge and Skill Statement	Student Expectation	Breakout
(10) The student provides support to computer users to maintain service. The student is expected to:	(B) identify customer need and formulate a support plan	(ii) formulate a support plan
(10) The student provides support to computer users to maintain service. The student is expected to:	(C) create queries and reports and assess critical system information	(i) create queries
(10) The student provides support to computer users to maintain service. The student is expected to:	(C) create queries and reports and assess critical system information	(ii) create reports
(10) The student provides support to computer users to maintain service. The student is expected to:	(C) create queries and reports and assess critical system information	(iii) assess critical system information
(10) The student provides support to computer users to maintain service. The student is expected to:	(D) employ problem-solving skills in performing support, maintenance, and repair	(i) employ problem-solving skills in performing support
(10) The student provides support to computer users to maintain service. The student is expected to:	(D) employ problem-solving skills in performing support, maintenance, and repair	(ii) employ problem-solving skills in performing maintenance
(10) The student provides support to computer users to maintain service. The student is expected to:	(D) employ problem-solving skills in performing support, maintenance, and repair	(iii) employ problem-solving skills in performing repair
(10) The student provides support to computer users to maintain service. The student is expected to:	(E) use hardware and software diagnostics	(i) use hardware diagnostics
(10) The student provides support to computer users to maintain service. The student is expected to:	(E) use hardware and software diagnostics	(ii) use software diagnostics

Knowledge and Skill Statement	Student Expectation	Breakout
(10) The student provides support to computer users to maintain service. The student is expected to:	(F) report to the user the cause of and solution to the problem	(i) report to the user the cause of the problem
(10) The student provides support to computer users to maintain service. The student is expected to:	(F) report to the user the cause of and solution to the problem	(ii) report to the user the solution to the problem
(10) The student provides support to computer users to maintain service. The student is expected to:	(G) create written documentation indicating cause of and solution to the problem	(i) create written documentation indicating cause of the problem
(10) The student provides support to computer users to maintain service. The student is expected to:	(G) create written documentation indicating cause of and solution to the problem	(ii) create written documentation indicating the solution of the problem
(11) The student demonstrates and applies knowledge of security risks and safeguards. The student is expected to:	(A) install security software	(i) install security software
(11) The student demonstrates and applies knowledge of security risks and safeguards. The student is expected to:	(B) update security software	(i) update security software
(11) The student demonstrates and applies knowledge of security risks and safeguards. The student is expected to:	(C) use security software to clean an infected machine	(i) use securtiy software to clean an infected machine
(12) The student provides support to computer users to maintain service. The student is expected to:	(A) develop a written disaster recovery plan	(i) develop a written disaster recovery plan

Knowledge and Skill Statement	Student Expectation	Breakout
(12) The student provides support to computer users to maintain service. The student is expected to:	(B) develop a written preventive maintenance plan	(i) develop a written preventive maintenance plan
(13) The student creates a personal portfolio. The student is expected to:	(A) create a portfolio that documents all projects and accomplishments such as academics, volunteer experience, employment experience, awards, and certifications	(i) create a portfolio that documents all projects
(13) The student creates a personal portfolio. The student is expected to:	(A) create a portfolio that documents all projects and accomplishments such as academics, volunteer experience, employment experience, awards, and certifications	(ii) create a portfolio that documents all accomplishments
(13) The student creates a personal portfolio. The student is expected to:	(B) organize and prioritize information within the portfolio	(i) organize information within the portfolio
(13) The student creates a personal portfolio. The student is expected to:	(B) organize and prioritize information within the portfolio	(ii) prioritize information within the portfolio
(13) The student creates a personal portfolio. The student is expected to:	(C) use written, verbal, and visual communication techniques consistent with IT industry standards	(i) use written communication techniques consistent with IT industry standards
(13) The student creates a personal portfolio. The student is expected to:	(C) use written, verbal, and visual communication techniques consistent with IT industry standards	(ii) use verbal communication techniques consistent with IT industry standards
(13) The student creates a personal portfolio. The student is expected to:	(C) use written, verbal, and visual communication techniques consistent with IT industry standards	(iii) use visual communication techniques consistent with IT industry standards

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	§130.312. Practicum in Information Technology (Two Credits), Adopted 2015.

(a) General Requirements. This course is recommended for students in Grade 12. Prerequisite: a minimum of two high school information technology (IT) courses. Students shall be awarded two credits for successful completion of this course. A student may repeat this course once for credit provided that the student is experiencing different aspects of the industry and demonstrating proficiency in additional and more advanced knowledge and skills.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In the Practicum in Information Technology, students will gain advanced knowledge and skills in the application, design, production, implementation, maintenance, evaluation, and assessment of products, services, and systems. Knowledge and skills in the proper use of analytical skills and application of IT concepts and standards are essential to prepare students for success in a technology-driven society. Critical thinking, IT experience, and product development may be conducted in a classroom setting with an industry mentor, as an unpaid or paid internship, as part of a capstone project, or as career preparation.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(i) identify work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(ii) identify work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(iii) demonstrate work behaviors that enhance employability
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) identify and demonstrate work behaviors that enhance employability and job advancement such as regular attendance, promptness, attention to proper attire, maintenance of a clean and safe work environment, appropriate voice, and pride in work	(iv) demonstrate work behaviors that enhance job advancement
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) identify and demonstrate qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills	(i) identify qualities

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) identify and demonstrate qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills	(ii) demonstrate qualities
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(i) employ effective reading skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) employ effective reading and writing skills	(ii) employ effective writing skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ effective verbal and nonverbal communication skills	(i) employ effective verbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ effective verbal and nonverbal communication skills	(ii) employ effective nonverbal communication skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) solve problems and think critically	(i) solve problems
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) solve problems and think critically	(ii) think critically

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate leadership skills and function effectively as a team member	(i) demonstrate leadership skills
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(F) demonstrate leadership skills and function effectively as a team member	(ii) function effectively as a team member
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) identify and implement proper safety procedures	(i) identify proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(G) identify and implement proper safety procedures	(ii) implement proper safety procedures
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(i) demonstrate an understanding of legal responsibilities in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT	(ii) demonstrate an understanding of ethical responsibilities in relation to the field of IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(I) demonstrate planning and time-management skills such as storyboarding including initiating, planning, executing, monitoring, and controlling, and closing a project	(i) demonstrate planning skills

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(I) demonstrate planning and time-management skills such as storyboarding including initiating, planning, executing, monitoring, and controlling, and closing a project	(ii) demonstrate time-management skills
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) improve on a personal career plan along with education, job skills, and experience necessary to achieve career goals	(i) improve on a personal career plan along with education necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) improve on a personal career plan along with education, job skills, and experience necessary to achieve career goals	(ii) improve on a personal career plan along with job skills necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(A) improve on a personal career plan along with education, job skills, and experience necessary to achieve career goals	(iii) improve on a personal career plan along with experience necessary to achieve career goals
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) develop a resume that includes letters of recommendation and a portfolio appropriate to a chosen career plan	(i) develop a resume that includes letters of recommendation appropriate to a chosen career plan
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(B) develop a resume that includes letters of recommendation and a portfolio appropriate to a chosen career plan	(ii) develop a portfolio appropriate to a chosen career plan
(2) The student identifies various employment opportunities in the IT field. The student is expected to:	(C) illustrate interview skills for successful job placement	(i) illustrate interview skills for successful job placement

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student applies academic knowledge and skills to research and develop projects. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards	(i) demonstrate proper use of written communication techniques consistent with IT industry standards
(3) The student applies academic knowledge and skills to research and develop projects. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards	(ii) demonstrate proper use of verbal communication techniques consistent with IT industry standards
(3) The student applies academic knowledge and skills to research and develop projects. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards	(iii) demonstrate proper use of visual communication techniques consistent with IT industry standards
(3) The student applies academic knowledge and skills to research and develop projects. The student is expected to:	(B) demonstrate proper use of mathematics concepts in the development of products or services	(i) demonstrate proper use of mathematics concepts in the development of products or services
(3) The student applies academic knowledge and skills to research and develop projects. The student is expected to:	(C) demonstrate proper use of science principles in the development of products or services.	(i) demonstrate proper use of science principles in the development of products or services
(4) The student selects an approach for conducting research to discover a problem in the field of IT with the appropriate supervision and guidance. The student is expected to:	(A) identify a problem relating to information technology	(i) identify a problem relating to information technology

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student selects an approach for conducting research to discover a problem in the field of IT with the appropriate supervision and guidance. The student is expected to:	(B) describe and use an approach, such as top-down or bottom-up, for conducting a research activity	(i) describe an approach for conducting a research activity
(4) The student selects an approach for conducting research to discover a problem in the field of IT with the appropriate supervision and guidance. The student is expected to:	(B) describe and use an approach, such as top-down or bottom-up, for conducting a research activity	(ii) use an approach for conducting a research activity
(5) The student creates a technological solution for a problem in the field of IT. The student is expected to:	(A) apply critical-thinking strategies to develop a solution using appropriate technologies and resources, IT concepts, and industry standards	(i) apply critical-thinking strategies to develop a solution using appropriate technologies
(5) The student creates a technological solution for a problem in the field of IT. The student is expected to:	(A) apply critical-thinking strategies to develop a solution using appropriate technologies and resources, IT concepts, and industry standards	(ii) apply critical-thinking strategies to develop a solution using appropriate resources
(5) The student creates a technological solution for a problem in the field of IT. The student is expected to:	(A) apply critical-thinking strategies to develop a solution using appropriate technologies and resources, IT concepts, and industry standards	(iii) apply critical-thinking strategies to develop a solution using appropriate IT concepts
(5) The student creates a technological solution for a problem in the field of IT. The student is expected to:	(A) apply critical-thinking strategies to develop a solution using appropriate technologies and resources, IT concepts, and industry standards	(iv) apply critical-thinking strategies to develop a solution using appropriate industry standards
(5) The student creates a technological solution for a problem in the field of IT. The student is expected to:	(B) apply decision-making techniques to the selection of technological solutions	(i) apply decision-making techniques to the selection of technological solutions

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student creates a technological solution for a problem in the field of IT. The student is expected to:	(C) explain how the proposed technological solution will resolve the problem	(i) explain how the proposed technological solution will resolve the problem
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(A) work closely with a mentor throughout the design, creation, and implementation process	(i) work closely with a mentor throughout the design process
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(A) work closely with a mentor throughout the design, creation, and implementation process	(ii) work closely with a mentor throughout the creation process
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(A) work closely with a mentor throughout the design, creation, and implementation process	(iii) work closely with a mentor throughout the implementation process
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(B) develop a product or service that meets a specified need following a problem-solving strategy	(i) develop a product or service that meets a specified need following a problem-solving strategy
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(C) identify areas where quality, reliability, and safety can be designed into a product or service	(i) identify areas where quality can be designed into a product or service

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(C) identify areas where quality, reliability, and safety can be designed into a product or service	(ii) identify areas where reliability can be designed into a product or service
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(C) identify areas where quality, reliability, and safety can be designed into a product or service	(iii) identify areas where safety can be designed into a product or service.
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(D) develop and implement a security management plan to address security requirements	(i) develop a security management plan to address security requirements
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(D) develop and implement a security management plan to address security requirements	(ii) implement a security management plan to address security requirements
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(E) develop a sustainability plan for the product or service	(i) develop a sustainability plan for the product or service
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(F) develop an evaluation method for analyzing the effect of the product or service on client satisfaction and problem resolution	(i) develop an evaluation method for analyzing the effect of the product or service on client satisfaction.

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(F) develop an evaluation method for analyzing the effect of the product or service on client satisfaction and problem resolution	(ii) develop an evaluation method for analyzing the effect of the product or service on problem resolution
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(G) develop a project portfolio that documents the research and development process	(i) develop a project portfolio that documents the research and development process
(6) The student designs, creates, and implements a product or service that addresses a problem in the field of IT and incorporates the solution. The student is expected to:	(H) present the portfolio to a panel of professionals using formal presentation skills	(i) present the portfolio to a panel of professionals using formal presentation skills
(7) The student creates a personal portfolio. The student is expected to:	(A) create a portfolio that documents all projects and accomplishments such as academics, volunteer experience, employment experience, awards, and certifications	(i) create a portfolio that documents all projects
(7) The student creates a personal portfolio. The student is expected to:	(A) create a portfolio that documents all projects and accomplishments such as academics, volunteer experience, employment experience, awards, and certifications	(ii) create a portfolio that documents all accomplishments
(7) The student creates a personal portfolio. The student is expected to:	(B) organize and prioritize information within the portfolio	(i) organize information within the portfolio

Knowledge and Skill Statement	Student Expectation	Breakout
(7) The student creates a personal portfolio. The student is expected to:	(B) organize and prioritize information within the portfolio	(ii) prioritize information within the portfolio
(7) The student creates a personal portfolio. The student is expected to:	(C) use written, verbal, and visual communication techniques consistent with IT industry standards	(i) use written communciation techniques consistent with IT industry standards
(7) The student creates a personal portfolio. The student is expected to:	(C) use written, verbal, and visual communication techniques consistent with IT industry standards	(ii) use verbal communication techniques consistent with IT industry standards
(7) The student creates a personal portfolio. The student is expected to:	(C) use written, verbal, and visual communication techniques consistent with IT industry standards	(iii) use visual communication techniques consistent with IT industry standards

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	§130.313. Extended Computer Technician Practicum (One Credit), Adopted 2015.

(a) **General Requirements.** This course is recommended for students in Grades 10-12. The practicum course is a paid or unpaid capstone experience for students participating in a coherent sequence of career and technical education courses in the Information Technology Career Cluster. Recommended prerequisites: Principles of Information Technology, Computer Maintenance, Computer Maintenance Lab, Networking, and Networking Lab. Corequisite: Computer Technician Practicum. This course must be taken concurrently with Computer Technician Practicum and may not be taken as a stand-alone course. Students shall be awarded one credit for successful completion of this course. A student may repeat this course once for credit provided that the student is experiencing different aspects of the industry and demonstrating proficiency in additional and more advanced knowledge and skills.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In the Extended Computer Technician Practicum, students will gain knowledge and skills in the area of computer technologies, including advanced knowledge of electrical and electronic theory, computer principles, and components related to the installation, diagnosis, service, and repair of computer-based technology systems. Students will reinforce, apply, and transfer their knowledge and skills to a variety of settings and problems. Proper use of analytical skills and application of IT concepts and standards are essential to prepare students for success in a technology-driven society. Critical thinking, IT experience, and product development may be conducted in a classroom setting with an instructor, with an industry mentor, or both.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) participate in a paid or unpaid, laboratory- or work-based application of previously studied knowledge and skills related to IT	(i) participate in a paid or unpaid, laboratory- or work-based application of previously studied knowledge related to IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) participate in a paid or unpaid, laboratory- or work-based application of previously studied knowledge and skills related to IT	(ii) participate in a paid or unpaid, laboratory- or work-based application of previously studied skills related to IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) participate in training, education, or preparation for licensure, certification, or other relevant credentials to prepare for employment	(i) participate in training, education, or preparation for licensure, certification, or other relevant credentials to prepare for employment
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) demonstrate professional standards and personal qualities needed to be employable such as self-discipline, regular attendance, promptness, integrity, pride in work, and customer service with increased fluency	(i) demonstrate professional standards needed to be employable
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) demonstrate professional standards and personal qualities needed to be employable such as self-discipline, regular attendance, promptness, integrity, pride in work, and customer service with increased fluency	(ii) demonstrate personal qualities needed to be employable
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ planning and time-management skills and tools with increased fluency to enhance results and complete work tasks	(i) employ planning skills with increased fluency to enhance results

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ planning and time-management skills and tools with increased fluency to enhance results and complete work tasks	(ii) employ planning skills with increased fluency to complete work tasks
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ planning and time-management skills and tools with increased fluency to enhance results and complete work tasks	(iii) employ planning tools with increased fluency to enhance results
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ planning and time-management skills and tools with increased fluency to enhance results and complete work tasks	(iv) employ planning tools with increased fluency to complete work tasks
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ planning and time-management skills and tools with increased fluency to enhance results and complete work tasks	(v) employ time-management skills with increased fluency to enhance results
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ planning and time-management skills and tools with increased fluency to enhance results and complete work tasks	(vi) employ time-management skills with increased fluency to complete work tasks
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ planning and time-management skills and tools with increased fluency to enhance results and complete work tasks	(vii) employ time-managment tools with increased fluency to enhance results
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ planning and time-management skills and tools with increased fluency to enhance results and complete work tasks	(viii) employ time-management tools with increased fluency to complete work tasks

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student applies professional communications strategies. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards with increased proficiency	(i) demonstrate proper use of written communication techniques consistent with IT industry standards with increased proficiency
(2) The student applies professional communications strategies. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards with increased proficiency	(ii) demonstrate proper use of verbal communication techniques consistent with IT industry standards with increased proficiency
(2) The student applies professional communications strategies. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards with increased proficiency	(iii) demonstrate proper use of visual communication techniques consistent with IT industry standards with increased proficiency
(2) The student applies professional communications strategies. The student is expected to:	(B) analyze, interpret, and effectively communicate information	(i) analyze information
(2) The student applies professional communications strategies. The student is expected to:	(B) analyze, interpret, and effectively communicate information	(ii) interpret information
(2) The student applies professional communications strategies. The student is expected to:	(B) analyze, interpret, and effectively communicate information	(iii) effectively communicate information
(2) The student applies professional communications strategies. The student is expected to:	(C) apply active listening skills to obtain and clarify information	(i) apply active listening skills to obtain information
(2) The student applies professional communications strategies. The student is expected to:	(C) apply active listening skills to obtain and clarify information	(ii) apply active listening skills to clarify information

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student applies professional communications strategies. The student is expected to:	(D) exhibit public relations skills to maintain internal and external customer/client satisfaction	(i) exhibit public relations skills to maintain internal customer/client satisfaction
(2) The student applies professional communications strategies. The student is expected to:	(D) exhibit public relations skills to maintain internal and external customer/client satisfaction	(ii) exhibit public relations skills to maintain external customer/client satisfaction
(3) The student implements advanced problem-solving methods. The student is expected to:	(A) employ critical-thinking skills independently and in groups with increased fluency to solve problems and make decisions	(i) employ critical-thinking skills independently with increased fluency to solve problems
(3) The student implements advanced problem-solving methods. The student is expected to:	(A) employ critical-thinking skills independently and in groups with increased fluency to solve problems and make decisions	(ii) employ critical-thinking skills independently with increased fluency to make decisions
(3) The student implements advanced problem-solving methods. The student is expected to:	(A) employ critical-thinking skills independently and in groups with increased fluency to solve problems and make decisions	(iii) employ critical-thinking skills in groups with increased fluency to solve problems
(3) The student implements advanced problem-solving methods. The student is expected to:	(A) employ critical-thinking skills independently and in groups with increased fluency to solve problems and make decisions	(iv) employ critical-thinking skills in groups with increased fluency to make decisions
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(A) demonstrate an understanding of and consistently follow IT security rules, regulations, and procedures	(i) demonstrate an understanding of IT security rules, regulations, and procedures

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(A) demonstrate an understanding of and consistently follow IT security rules, regulations, and procedures	(ii) consistently follow IT security rules, regulations, and procedures
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(B) recognize and analyze potential IT security threats and address security by installing and updating security software and using security software to clean an infected machine	(i) recognize potential IT security threats
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(B) recognize and analyze potential IT security threats and address security by installing and updating security software and using security software to clean an infected machine	(ii) analyze potential IT security threats
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(B) recognize and analyze potential IT security threats and address security by installing and updating security software and using security software to clean an infected machine	(iii) address security by installing security software
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(B) recognize and analyze potential IT security threats and address security by installing and updating security software and using security software to clean an infected machine	(iv) address security by updating security software
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(B) recognize and analyze potential IT security threats and address security by installing and updating security software and using security software to clean an infected machine	(v) address security by using security software to clean an infected machine

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(C) identify the range of security needs and the problems that can occur due to security lapses with increased proficiency	(i) identify the range of security needs that can occur due to security lapses with increased proficiency
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(C) identify the range of security needs and the problems that can occur due to security lapses with increased proficiency	(ii) identify the range of security problems that can occur due to security lapses with increased proficiency
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(D) demonstrate safe use of computer technology equipment such as hand and power tools with increased proficiency	(i) demonstrate safe use of computer technology equipment
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(E) demonstrate the proper handling and disposal of environmentally hazardous materials used in computer technologies in a consistent manner	(i) demonstrate the proper handling of environmentally hazardous materials used in computer technologies in a consistent manner
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(E) demonstrate the proper handling and disposal of environmentally hazardous materials used in computer technologies in a consistent manner	(ii) demonstrate the proper disposal of environmentally hazardous materials used in computer technologies in a consistent manner
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(A) demonstrate a positive, productive work ethic by performing assigned tasks as directed	(i) demonstrate a positive, productive work ethic by performing assigned tasks as directed
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(B) describe and practice ethical and legal responsibilities associated with the field of IT	(i) describe ethical responsibilities associated with the field of IT

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(B) describe and practice ethical and legal responsibilities associated with the field of IT	(ii) describe legal responsibilities associated with the field of IT
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(B) describe and practice ethical and legal responsibilities associated with the field of IT	(iii) practice ethical responsibilities associated with the field of IT
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(B) describe and practice ethical and legal responsibilities associated with the field of IT	(iv) practice legal responsibilities associated with the field of IT
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(C) show integrity by choosing the ethical course of action when making decisions	(i) show integrity by choosing the ethical course of action when making decisions
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(D) comply with all applicable rules, laws, and regulations in a consistent manner	(i) comply with all applicable rules in a consistent manner
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(D) comply with all applicable rules, laws, and regulations in a consistent manner	(ii) comply with all applicable laws in a consistent manner
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(D) comply with all applicable rules, laws, and regulations in a consistent manner	(iii) comply with all applicable regulations in a consistent manner

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student participates in a supervised IT experience. The student is expected to:	(A) select and use the appropriate technological resources to conduct, document, and evaluate learning activities in a supervised IT experience	(i) select the appropriate technological resources to conduct learning activities in a supervised IT experience
(6) The student participates in a supervised IT experience. The student is expected to:	(A) select and use the appropriate technological resources to conduct, document, and evaluate learning activities in a supervised IT experience	(ii) select the appropriate technological resources to document learning activities in a supervised IT experience
(6) The student participates in a supervised IT experience. The student is expected to:	(A) select and use the appropriate technological resources to conduct, document, and evaluate learning activities in a supervised IT experience	(iii) select the appropriate technological resources to evaluate learning activities in a supervised IT experience
(6) The student participates in a supervised IT experience. The student is expected to:	(A) select and use the appropriate technological resources to conduct, document, and evaluate learning activities in a supervised IT experience	(iv) use the appropriate technological resources to conduct learning activities in a supervised IT experience
(6) The student participates in a supervised IT experience. The student is expected to:	(A) select and use the appropriate technological resources to conduct, document, and evaluate learning activities in a supervised IT experience	(v) use the appropriate technological resources to document learning activities in a supervised IT experience
(6) The student participates in a supervised IT experience. The student is expected to:	(A) select and use the appropriate technological resources to conduct, document, and evaluate learning activities in a supervised IT experience	(vi) use the appropriate technological resources to evaluate learning activities in a supervised IT experience
(6) The student participates in a supervised IT experience. The student is expected to:	(B) read and interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins with increased fluency	(i) read technical documentation

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student participates in a supervised IT experience. The student is expected to:	(B) read and interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins with increased fluency	(ii) interpret technical documentation
(6) The student participates in a supervised IT experience. The student is expected to:	(C) employ available reference tools, materials, and Internet sources with increased fluency to access information as needed	(i) employ available reference tools with increased fluency to access information as needed
(6) The student participates in a supervised IT experience. The student is expected to:	(C) employ available reference tools, materials, and Internet sources with increased fluency to access information as needed	(ii) employ available reference materials with increased fluency to access information as needed
(6) The student participates in a supervised IT experience. The student is expected to:	(C) employ available reference tools, materials, and Internet sources with increased fluency to access information as needed	(iii) employ available reference Internet sources with increased fluency to access information as needed
(6) The student participates in a supervised IT experience. The student is expected to:	(D) develop solutions using appropriate technologies, IT concepts, and IT industry standards with increased proficiency	(i) develop solutions using appropriate technologies with increased proficiency
(6) The student participates in a supervised IT experience. The student is expected to:	(D) develop solutions using appropriate technologies, IT concepts, and IT industry standards with increased proficiency	(ii) develop solutions using appropriate IT concepts with increased proficiency
(6) The student participates in a supervised IT experience. The student is expected to:	(D) develop solutions using appropriate technologies, IT concepts, and IT industry standards with increased proficiency	(iii) develop solutions using appropriate IT industry standards with increased proficiency

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student participates in a supervised IT experience. The student is expected to:	(E) implement project methodologies to manage information system projects	(i) implement project methodologies to manage information system projects
(6) The student participates in a supervised IT experience. The student is expected to:	(F) collect representative work samples	(i) collect representative work samples

Subject	Chapter 130. Career and Technical Education, Subchapter K. Information Technology
Course Title	§130.314. Extended Practicum in Information Technology (One Credit), Adopted 2015.

(a) General Requirements. This course is recommended for students in Grade 12. The practicum course is a paid or unpaid capstone experience for students participating in a coherent sequence of career and technical education courses in the Information Technology Career Cluster. Prerequisite: a minimum of two high school information technology courses. Corequisite: Practicum in Information Technology. This course must be taken concurrently with Practicum in Information Technology and may not be taken as a stand-alone course. Students shall be awarded one credit for successful completion of this course. A student may repeat this course once for credit provided that the student is experiencing different aspects of the industry and demonstrating proficiency in additional and more advanced knowledge and skills.

(b) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.

(2) The Information Technology (IT) Career Cluster focuses on building linkages in IT occupations for entry level, technical, and professional careers related to the design, development, support, and management of hardware, software, multimedia, and systems integration services.

(3) In Extended Practicum in Information Technology, students will gain advanced knowledge and skills in the application, design, production, implementation, maintenance, evaluation, and assessment of products, services, and systems. Knowledge and skills in the proper use of analytical skills and application of IT concepts and standards are essential to prepare students for success in a technology-driven society. Critical thinking, IT experience, and product development may be conducted in a classroom setting with an instructor, with an industry mentor, or both.

(4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

(5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.		
Knowledge and Skill Statement	**Student Expectation**	**Breakout**
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) participate in a paid or unpaid, laboratory- or work-based application of previously studied knowledge and skills related to IT	(i) participate in a paid or unpaid, laboratory- or work-based application of previously studied knowledge related to IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(A) participate in a paid or unpaid, laboratory- or work-based application of previously studied knowledge and skills related to IT	(ii) participate in a paid or unpaid, laboratory- or work-based application of previously studied skills related to IT
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(B) participate in training, education, or preparation for licensure, certification, or other relevant credentials to prepare for employment	(i) participate in training, education, or preparation for licensure, certification, or other relevant credentials to prepare for employment
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) demonstrate professional standards and personal qualities needed to be employable such as self-discipline, integrity, customer service, work ethic, and adaptability with increased fluency	(i) demonstrate professional standards needed to be employable
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(C) demonstrate professional standards and personal qualities needed to be employable such as self-discipline, integrity, customer service, work ethic, and adaptability with increased fluency	(ii) demonstrate personal qualities needed to be employable
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ teamwork and conflict-management skills with increased fluency to achieve collective goals	(i) employ teamwork skills with increased fluency to achieve collective goals

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(D) employ teamwork and conflict-management skills with increased fluency to achieve collective goals	(ii) employ conflict-management skills with increased fluency to achieve collective goals
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) employ planning and time-management skills and tools such as project management and storyboarding with increased fluency to enhance results and complete work tasks	(i) employ planning skills with increased fluency to enhance results
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) employ planning and time-management skills and tools such as project management and storyboarding with increased fluency to enhance results and complete work tasks	(ii) employ planning skills with increased fluency to complete work tasks
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) employ planning and time-management skills and tools such as project management and storyboarding with increased fluency to enhance results and complete work tasks	(iii) employ planning tools with increased fluency to enhance results
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) employ planning and time-management skills and tools such as project management and storyboarding with increased fluency to enhance results and complete work tasks	(iv) employ planning tools with increased fluency to complete work tasks
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) employ planning and time-management skills and tools such as project management and storyboarding with increased fluency to enhance results and complete work tasks	(v) employ time-management skills with increased fluency to enhance results

Knowledge and Skill Statement	Student Expectation	Breakout
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) employ planning and time-management skills and tools such as project management and storyboarding with increased fluency to enhance results and complete work tasks	(vi) employ time-management skills with increased fluency to complete work tasks
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) employ planning and time-management skills and tools such as project management and storyboarding with increased fluency to enhance results and complete work tasks	(vii) employ time-management tools with increased fluency to enhance results
(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:	(E) employ planning and time-management skills and tools such as project management and storyboarding with increased fluency to enhance results and complete work tasks	(viii) employ time-management tools with increased fluency to complete work tasks
(2) The student applies professional communications strategies. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards with increased proficiency	(i) demonstrate proper use of written communication techniques consistent with IT industry standards with increased proficiency
(2) The student applies professional communications strategies. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards with increased proficiency	(ii) demonstrate proper use of verbal communication techniques consistent with IT industry standards with increased proficiency
(2) The student applies professional communications strategies. The student is expected to:	(A) demonstrate proper use of written, verbal, and visual communication techniques consistent with IT industry standards with increased proficiency	(iii) demonstrate proper use of visual communication techniques consistent with IT industry standards with increased proficiency

Knowledge and Skill Statement	Student Expectation	Breakout
(2) The student applies professional communications strategies. The student is expected to:	(B) apply active listening skills to obtain and clarify information	(i) apply active listening skills to obtain information
(2) The student applies professional communications strategies. The student is expected to:	(B) apply active listening skills to obtain and clarify information	(ii) apply active listening skills to clarify information
(2) The student applies professional communications strategies. The student is expected to:	(C) create and deliver formal and informal presentations in an effective manner	(i) create formal presentations in an effective manner
(2) The student applies professional communications strategies. The student is expected to:	(C) create and deliver formal and informal presentations in an effective manner	(ii) create informal presentations in an effective manner
(2) The student applies professional communications strategies. The student is expected to:	(C) create and deliver formal and informal presentations in an effective manner	(iii) deliver formal presentations in an effective manner
(2) The student applies professional communications strategies. The student is expected to:	(C) create and deliver formal and informal presentations in an effective manner	(iv) deliver informal presentations in an effective manner
(2) The student applies professional communications strategies. The student is expected to:	(D) exhibit public relations skills to maintain internal and external customer/client satisfaction	(i) exhibit public relations skills to maintain internal customer/client satisfaction
(2) The student applies professional communications strategies. The student is expected to:	(D) exhibit public relations skills to maintain internal and external customer/client satisfaction	(ii) exhibit public relations skills to maintain external customer/client satisfaction

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student implements advanced problem-solving methods. The student is expected to:	(A) employ critical-thinking skills independently and in groups with increased fluency to solve problems and make decisions	(i) employ critical-thinking skills independently with increased fluency to solve problems
(3) The student implements advanced problem-solving methods. The student is expected to:	(A) employ critical-thinking skills independently and in groups with increased fluency to solve problems and make decisions	(ii) employ critical-thinking skills independently with increased fluency to make decisions
(3) The student implements advanced problem-solving methods. The student is expected to:	(A) employ critical-thinking skills independently and in groups with increased fluency to solve problems and make decisions	(iii) employ critical-thinking skills in groups with increased fluency to solve problems
(3) The student implements advanced problem-solving methods. The student is expected to:	(A) employ critical-thinking skills independently and in groups with increased fluency to solve problems and make decisions	(iv) employ critical-thinking skills in groups with increased fluency to make decisions
(3) The student implements advanced problem-solving methods. The student is expected to:	(B) apply critical-thinking strategies with increased fluency to develop solutions using appropriate technologies and resources, IT concepts, and industry standards	(i) apply critical-thinking strategies with increased fluency to develop solutions using appropriate technologies
(3) The student implements advanced problem-solving methods. The student is expected to:	(B) apply critical-thinking strategies with increased fluency to develop solutions using appropriate technologies and resources, IT concepts, and industry standards	(ii) apply critical-thinking strategies with increased fluency to develop solutions using appropriate resources

Knowledge and Skill Statement	Student Expectation	Breakout
(3) The student implements advanced problem-solving methods. The student is expected to:	(B) apply critical-thinking strategies with increased fluency to develop solutions using appropriate technologies and resources, IT concepts, and industry standards	(iii) apply critical-thinking strategies with increased fluency to develop solutions using appropriate IT concepts
(3) The student implements advanced problem-solving methods. The student is expected to:	(B) apply critical-thinking strategies with increased fluency to develop solutions using appropriate technologies and resources, IT concepts, and industry standards	(iv) apply critical-thinking strategies with increased fluency to develop solutions using appropriate industry standards
(3) The student implements advanced problem-solving methods. The student is expected to:	(C) apply decision-making techniques with increased fluency to choose a technology-based solution	(i) apply decision-making techniques with increased fluency to choose a technology-based solution
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(A) demonstrate an understanding of and consistently follow IT security rules, regulations, and procedures	(i) demonstrate an understanding of IT security rules
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(A) demonstrate an understanding of and consistently follow IT security rules, regulations, and procedures	(ii) demonstrate an understanding of IT security regulations
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(A) demonstrate an understanding of and consistently follow IT security rules, regulations, and procedures	(iii) demonstrate an understanding of IT security procedures
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(A) demonstrate an understanding of and consistently follow IT security rules, regulations, and procedures	(iv) consistently follow IT security rules

Knowledge and Skill Statement	Student Expectation	Breakout
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(A) demonstrate an understanding of and consistently follow IT security rules, regulations, and procedures	(v) consistently follow IT security regulations
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(A) demonstrate an understanding of and consistently follow IT security rules, regulations, and procedures	(vi) consistently follow IT security procedures
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(B) develop and implement security management plans to address security requirements	(i) develop security management plans to address security requirements
(4) The student understands and applies proper safety and security techniques in the workplace. The student is expected to:	(B) develop and implement security management plans to address security requirements	(ii) implement security management plans to address security requirements
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(A) demonstrate a positive, productive work ethic by performing assigned tasks as directed	(i) demonstrate a positive, productive work ethic by performing assigned tasks as directed
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(B) describe and practice ethical and legal responsibilities associated with the field of IT	(i) describe ethical responsibilities associated with the field of IT
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(B) describe and practice ethical and legal responsibilities associated with the field of IT	(ii) describe legal responsibilities associated with the field of IT

Knowledge and Skill Statement	Student Expectation	Breakout
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(B) describe and practice ethical and legal responsibilities associated with the field of IT	(iii) practice ethical responsibilities associated with the field of IT
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(B) describe and practice ethical and legal responsibilities associated with the field of IT	(iv) practice legal responsibilities associated with the field of IT
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(C) show integrity by choosing the ethical course of action when making decisions	(i) show integrity by choosing the ethical course of action when making decisions
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(D) comply with all applicable rules, laws, and regulations in a consistent manner	(i) comply with all applicable rules in a consistent manner
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(D) comply with all applicable rules, laws, and regulations in a consistent manner	(ii) comply with all applicable laws in a consistent manner
(5) The student understands the professional, ethical, and legal responsibilities in IT. The student is expected to:	(D) comply with all applicable rules, laws, and regulations in a consistent manner	(iii) comply with all applicable regulations in a consistent manner
(6) The student participates in a supervised IT experience. The student is expected to:	(A) design, create, and implement a product or service that addresses a problem or meets a specified need in the field of IT	(i) design a product or service that addresses a problem or meets a specified need in the field of IT

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student participates in a supervised IT experience. The student is expected to:	(A) design, create, and implement a product or service that addresses a problem or meets a specified need in the field of IT	(ii) create a product or service that addresses a problem or meets a specified need in the field of IT
(6) The student participates in a supervised IT experience. The student is expected to:	(A) design, create, and implement a product or service that addresses a problem or meets a specified need in the field of IT	(iii) implement a product or service that addresses a problem or meets a specified need in the field of IT
(6) The student participates in a supervised IT experience. The student is expected to:	(B) identify areas where quality, reliability, and safety can be designed into a product or service	(i) identify areas where quality can be designed into a product or service
(6) The student participates in a supervised IT experience. The student is expected to:	(B) identify areas where quality, reliability, and safety can be designed into a product or service	(ii) identify areas where reliability can be designed into a product or service
(6) The student participates in a supervised IT experience. The student is expected to:	(B) identify areas where quality, reliability, and safety can be designed into a product or service	(iii) identify areas where safety can be designed into a product or service
(6) The student participates in a supervised IT experience. The student is expected to:	(C) develop a sustainability plan for the product or service	(i) develop a sustainability plan for the product or service
(6) The student participates in a supervised IT experience. The student is expected to:	(D) develop an evaluation method to analyze the effect of the product or service on client satisfaction and problem resolution	(i) develop an evaluation method to analyze the effect of the product or service on client satisfaction
(6) The student participates in a supervised IT experience. The student is expected to:	(D) develop an evaluation method to analyze the effect of the product or service on client satisfaction and problem resolution	(ii) develop an evaluation method to analyze the effect of the product or service on problem resolution

Knowledge and Skill Statement	Student Expectation	Breakout
(6) The student participates in a supervised IT experience. The student is expected to:	(E) collect representative work samples	(i) collect representative work samples