

Chapter 130. Texas Essential Knowledge and Skills for Career and Technical Education**Subchapter K. Information Technology**

Statutory Authority: The provisions of this Subchapter K issued under the Texas Education Code, §§7.102(c)(4), 28.002, 28.00222, and 28.025, unless otherwise noted.

§130.301. Implementation of Texas Essential Knowledge and Skills for Information Technology, Adopted 2015.

- (a) The provisions of this subchapter shall be implemented by school districts beginning with the 2017-2018 school year.
- (b) No later than August 31, 2016, the commissioner of education shall determine whether instructional materials funding has been made available to Texas public schools for materials that cover the essential knowledge and skills for career and technical education as adopted in §§130.302-130.314 of this subchapter.
- (c) If the commissioner makes the determination that instructional materials funding has been made available under subsection (b) of this section, §§130.302-130.314 of this subchapter shall be implemented beginning with the 2017-2018 school year and apply to the 2017-2018 and subsequent school years.
- (d) If the commissioner does not make the determination that instructional materials funding has been made available under subsection (b) of this section, the commissioner shall determine no later than August 31 of each subsequent school year whether instructional materials funding has been made available. If the commissioner determines that instructional materials funding has been made available, the commissioner shall notify the State Board of Education and school districts that §§130.302-130.314 of this subchapter shall be implemented for the following school year.

Source: The provisions of this §130.301 adopted to be effective August 28, 2017, 40 TexReg 9123.

§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 will 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.

- (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;
 - (B) employ effective verbal and nonverbal communication skills;
 - (C) employ effective reading and writing skills;
 - (D) solve problems and think critically;
 - (E) demonstrate leadership skills and function effectively as a team member;
 - (F) identify and implement proper safety procedures; and
 - (G) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project.
- (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;
 - (B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals; and
 - (C) describe the functions of resumes and portfolios.
- (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;
 - (B) send and receive text information and file attachments using electronic methods such as email, electronic bulletin boards, and instant message services;
 - (C) demonstrate effective Internet search strategies, including keywords and Boolean logic, using various available search engines;
 - (D) identify the various components of a Uniform Resource Locator;
 - (E) demonstrate ability to effectively test acquired information from the Internet for accuracy, relevance, and validity;
 - (F) explain issues concerning computer-based threats such as computer viruses, malware, and hacking; and
 - (G) explain issues concerning Internet safety such as identity theft, online predators, cyber-bullying, and phishing.
- (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;
 - (B) use available reference tools as appropriate; and
 - (C) connect and use a variety of peripheral devices such as mouse, keyboard, microphone, digital camera, and printer.
- (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;

- (B) identify and explain major operating system fundamentals and components such as disk operations, graphical user interface components, and hardware drivers;
 - (C) explain the purpose of file types across software products;
 - (D) demonstrate use of computer numbering systems and internal data representation such as identifying the hexadecimal value of a color;
 - (E) compare and contrast open source and proprietary software;
 - (F) explain use of system management tools;
 - (G) apply proper file management techniques such as creating, naming, organizing, copying, moving, and deleting files;
 - (H) use appropriate file protection and security; and
 - (I) explain the process for discovering, quarantining, and 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;
 - (B) identify and describe various types of networks such as peer-to-peer, local area networks, wide area networks, wireless, and Ethernet;
 - (C) identify functions of network operating systems; and
 - (D) 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;
 - (B) edit a variety of text documents using functions such as pagination, appropriate white space, tab settings, and font style, size, and color; and
 - (C) create professional documents such as memorandums, technical manuals, or proposals using advanced word-processing features.
- (8) The student applies spreadsheet technology. The student is expected to:
- (A) identify the terminology associated with spreadsheet software;
 - (B) use numerical content to perform mathematical calculations;
 - (C) use student-created and preprogrammed functions to produce documents such as budget, payroll, statistical tables, and personal checkbook register;
 - (D) identify, generate, and describe the function of comma separated value files;
 - (E) create and analyze spreadsheets incorporating advanced features such as lookup tables, nested IF statements, subtotals, cell protection conditional formatting, charts, and graphs; and
 - (F) perform sorting, searching, and data filtering in documents.
- (9) The student explores computer programming concepts. The student is expected to:
- (A) identify the function of compilers and interpreters;
 - (B) explain the difference between the operation of compilers and interpreters;
 - (C) identify various computer languages and how the languages are used in software development;

- (D) recognize data representation in software development such as string, numeric, character, integer, and date;
 - (E) identify and explain the concept of algorithms; and
 - (F) describe the flow of a structured algorithm, including linear and iterative instructions such as using a flow chart.
- (10) The student explores database technology. The student is expected to:
- (A) identify the terminology associated with database software and database functions;
 - (B) explore the application of databases;
 - (C) identify and explain the purpose and elements of a query language;
 - (D) identify and explain the purpose of fields and records; and
 - (E) 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; and
 - (B) create, save, edit, and produce presentations incorporating advanced features such as links, hyperlinks, audio, and graphics.
- (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;
 - (B) identify and explain design elements such as typeface, color, shape, texture, space, and form;
 - (C) identify and explain design principles such as unity, harmony, balance, scale, and contrast;
 - (D) identify and explain common elements of Hyper Text Markup Language (HTML) such as tags, stylesheets, and hyperlinks; and
 - (E) create a web page containing links, graphics, and text using appropriate design principles.
- (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;
 - (B) adhere to intellectual property laws;
 - (C) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law;
 - (D) examine the consequences of plagiarism;
 - (E) identify and explain unethical practices such as hacking, online piracy, and data vandalism; and
 - (F) demonstrate ethical use of online resources, including citation of source.

Source: The provisions of this §130.302 adopted to be effective August 28, 2017, 40 TexReg 9123.

§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.
- (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;
 - (B) employ effective verbal and nonverbal communication skills;
 - (C) solve problems and think critically;
 - (D) demonstrate leadership skills and function effectively as a team member;
 - (E) identify and implement proper safety procedures;
 - (F) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT; and
 - (G) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring and controlling, and closing a project.
 - (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; and
 - (B) examine the role of certifications, resumes, and portfolios in the IT profession.
 - (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; and
 - (B) interpret appropriate documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins.
 - (4) The student acquires an understanding of computer hardware technologies. The student is expected to:
 - (A) explain the fundamentals of microprocessor theory;
 - (B) define the use of Boolean and Binary logic in computer technologies;
 - (C) explain the theories of magnetism, electricity, and electronics as related to computer technologies;

- (D) explain proper troubleshooting techniques as related to computer hardware;
 - (E) differentiate among digital and analog input and output electronics theory;
 - (F) explain the relationships relative to data-communications theory;
 - (G) describe the architecture of various computer systems;
 - (H) describe the function of computer components such as central processing units, storage devices, and peripheral devices;
 - (I) explain computer system environmental requirements and related control devices; and
 - (J) identify new and 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);
 - (B) identify how mobile devices such as personal data assistants and cell phones operate;
 - (C) identify how mobile devices such as personal data assistants and cell phones connect and share data;
 - (D) demonstrate an understanding of the rationale behind error messages and symptoms of hardware failures;
 - (E) research interrupt sequences and beep codes; and
 - (F) identify priorities and 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;
 - (B) compare and contrast different operating systems; and
 - (C) identify the operating systems of mobile devices.
- (7) The student acquires knowledge of the theory behind the installation, 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;
 - (B) evaluate application software packages;
 - (C) verify that software is properly licensed prior to installation;
 - (D) differentiate between types of software such as Software as a Service, single-user, per-seat, enterprise, freeware, shareware, and open-source licensing; and
 - (E) 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;
 - (B) explain the steps required to install and configure a computer on a network; and
 - (C) identify the steps to troubleshoot network connectivity.

Source: The provisions of this §130.303 adopted to be effective August 28, 2017, 40 TexReg 9123.

§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.
- (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;
 - (B) demonstrate positive personal qualities such as flexibility, open mindedness, initiative, listening attentively to speakers, and willingness to learn new skills;
 - (C) employ effective reading and writing skills;
 - (D) employ effective verbal and nonverbal communication skills;
 - (E) solve problems and think critically;
 - (F) demonstrate leadership skills and function effectively as a team member;
 - (G) identify and implement proper safety procedures;
 - (H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT; and
 - (I) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring and controlling, and closing a project.
 - (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;
 - (B) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders; and

- (C) locate and interpret appropriate documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins.
- (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;
 - (B) employ available reference documentation such as tools, materials, and Internet sources to access information as needed;
 - (C) demonstrate proper handling and disposal of environmentally hazardous materials used in computer technologies; and
 - (D) research new and 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;
 - (B) describe digital circuits and bus design;
 - (C) demonstrate the operational features and proper terminology related to computer systems;
 - (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; and
 - (E) 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; and
 - (B) install and configure computer components such as printers and other peripherals.
- (6) The student uses troubleshooting skills to solve client problems. The student is expected to:
- (A) diagnose error messages and symptoms of hardware failures;
 - (B) research and identify interrupt sequences and beep codes;
 - (C) identify priorities and interrupts at the system level;
 - (D) test a system using diagnostic tools and software;
 - (E) diagnose problems in operating systems;
 - (F) differentiate between hardware and software failure;
 - (G) update Basic Input/Output System (BIOS);
 - (H) demonstrate hard drive maintenance procedures such as defrag scan and clear caches;
 - (I) gather information from the user;
 - (J) repair malfunctioning hardware systems;
 - (K) reinstall software as needed;
 - (L) demonstrate system backup and recovery;
 - (M) restore a system to various states such as safe modes and previous;
 - (N) demonstrate knowledge of operating system design such as operation and maintenance; and

- (O) apply knowledge of operating system design to perform information support and service tasks of different operating systems.
- (7) The student installs and configures software programs and updates IT systems. The student is expected to:
- (A) evaluate application software packages and test the functionality of a proposed software configuration;
 - (B) verify software is properly licensed prior to installation;
 - (C) install application and systems software using available resources as needed;
 - (D) resolve problems with installation if any occur such as recovery from system error;
 - (E) perform software customization as requested;
 - (F) document all procedures; and
 - (G) install and 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;
 - (B) install and configure a computer on a network; and
 - (C) verify and troubleshoot network connectivity.
- (9) The student provides support to computer users to maintain service. The student is expected to:
- (A) develop a written disaster recovery plan; and
 - (B) develop a written preventive maintenance plan.

Source: The provisions of this §130.304 adopted to be effective August 28, 2017, 40 TexReg 9123.

§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.

- (1) The student demonstrates the 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;
 - (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;
 - (C) employ effective reading and writing skills;
 - (D) employ effective verbal and nonverbal communication skills;
 - (E) solve problems and think critically;
 - (F) demonstrate leadership skills and function effectively as a team member;
 - (G) identify and implement proper safety procedures;
 - (H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT; and
 - (I) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring and controlling, and closing a project.
- (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;
 - (B) formulate a personal career plan along with the education, job skills, and experience necessary to achieve career goals; and
 - (C) 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;
 - (B) complete work orders for repair and installation;
 - (C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders; and
 - (D) interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins.
- (4) The student acquires an understanding of telecommunications and data network services. The student is expected to:
- (A) explain digital and analog electronics theory;
 - (B) demonstrate knowledge of binary in relation to Internet Protocol (IP) addressing;
 - (C) distinguish the differences between a data packet and voice communications;
 - (D) define the layers and functions of the Open System Interconnection model;
 - (E) explain Transport Control Protocol and IP fundamentals, including subnetting;
 - (F) distinguish between public and private networks;
 - (G) describe the standards and operations of wireless technologies in telecommunications and data networks;

- (H) differentiate between types of networks;
 - (I) identify national standards for data communication; and
 - (J) identify the potential benefits and problems for the future of telecommunications and 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;
 - (B) identify major network operating systems;
 - (C) distinguish between different types of cables used in the telecommunications and data networking;
 - (D) describe telecommunications and data networking media and connectors;
 - (E) differentiate among computer network topologies;
 - (F) explain the distinction between connectionless and connection transport;
 - (G) explain the use of Transport Control Protocol and IP utilities;
 - (H) explain how to test, validate, and troubleshoot IP connectivity; and
 - (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; and
 - (B) 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;
 - (B) explain the impact of environmental factors on computer networks;
 - (C) identify common peripheral ports and common network components such as hubs, routers, and switches;
 - (D) develop an addressing scheme, including a subnetting chart;
 - (E) specify the tools that are commonly used to resolve network equipment problems;
 - (F) identify vendor testing documentation such as patches, fixes, and upgrades;
 - (G) demonstrate standard backup procedures and backup media storage practices; and
 - (H) identify the factors that might affect performance in a network environment such as logic or frequency spectrum interference.
- (8) The student provides support to computer users to maintain service. The student is expected to:
- (A) develop a written disaster recovery plan; and
 - (B) develop a written preventive maintenance plan.

Source: The provisions of this §130.305 adopted to be effective August 28, 2017, 40 TexReg 9123.

§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 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 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 must 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.

- (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;
 - (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;
 - (C) employ effective reading and writing skills;
 - (D) employ effective verbal and nonverbal communication skills;
 - (E) solve problems and think critically;
 - (F) demonstrate leadership skills and function effectively as a team member;
 - (G) identify and implement proper safety procedures;
 - (H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT; and
 - (I) demonstrate planning and time-management skills such as project management, including initiating, planning, executing, monitoring and controlling, and closing a project.
- (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;
 - (B) formulate a personal career plan along with the education, job skills, and experience necessary to achieve career goals; and
 - (C) develop a resume.
- (3) The student applies related 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;
 - (B) complete work orders for repair and installation;
 - (C) estimate supplies, materials, and labor costs on installation, maintenance, and repair work orders; and
 - (D) interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins.
- (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;
 - (B) use knowledge of the characteristics of networks to select the optimum configuration for an industry solution; and
 - (C) 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;
 - (B) analyze the impact of environmental factors on computer networks;
 - (C) indicate common peripheral ports and common network components;
 - (D) develop an addressing scheme, including a subnetting chart;
 - (E) specify the tools that are commonly used to resolve network equipment problems;
 - (F) identify vendor testing documentation such as patches, fixes, and upgrades;
 - (G) demonstrate awareness of standard backup procedures and backup media storage practices;
 - (H) distinguish between common types of telecommunications and data network cabling;
 - (I) identify the factors that might affect performance in a network environment such as logic or frequency spectrum interference; and
 - (J) research new and emerging technologies that may affect the field of telecommunications and data networking services.
- (6) The student implements a data network plan. The student is expected to:
- (A) demonstrate awareness of compatibility and cabling issues;
 - (B) implement an addressing scheme, including a subnet;
 - (C) install various types of data connectors and cabling used in computer networking and data communications;
 - (D) connect various types of data connectors and cabling used in computer networking and data communications;
 - (E) troubleshoot physical and logical indicators of trouble;
 - (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;
 - (G) determine the cause of a problem and select the appropriate corrective action for the network problem; and
 - (H) maintain a hierarchical structure for the storing and 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;
 - (B) identify the range of security needs and the problems that can occur on a data network due to security lapses;
 - (C) define and identify unethical practices such as hacking, phone fraud, online piracy, and data vandalism;
 - (D) evaluate issues related to privacy, depersonalization, and government control of data communications;
 - (E) develop and implement a network security plan; and
 - (F) identify the role that network components such as routers, firewalls, intrusion detection systems, and virtual private networks play in security.
- (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; and
 - (B) demonstrate proper handling and 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; and
 - (B) develop a written preventive maintenance plan.

Source: The provisions of this §130.306 adopted to be effective August 28, 2017, 40 TexReg 9123.

§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.

- (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;
 - (B) employ effective verbal and nonverbal communication skills;
 - (C) employ effective reading and writing skills;
 - (D) solve problems and think critically;
 - (E) demonstrate leadership skills and function effectively as a team member;
 - (F) demonstrate an understanding of legal and ethical responsibilities in relation to the field of information technology; and
 - (G) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project.
- (2) The student identifies employment opportunities in the IT field with a focus in the area of digital media. The student is expected to:
- (A) identify job opportunities and accompanying job duties and tasks;
 - (B) research careers of personal interest along with the education, job skills, and experience required to achieve personal career goals;
 - (C) demonstrate an understanding of the functions of resumes and portfolios; and
 - (D) create a digital portfolio.
- (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;
 - (B) demonstrate appropriate search strategies for finding resources or assets on the Internet;
 - (C) discuss recent digital media technologies; and
 - (D) evaluate and 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;
 - (B) compare and contrast fair use, open source, and creative commons;
 - (C) adhere to intellectual property laws and regulations;
 - (D) differentiate between copyright and trademarks;
 - (E) explain the concept of intellectual property laws, including copyright, trademarks, and patents and consequences of violating each type of law;
 - (F) define and identify unethical practices such as hacking, online piracy, and data vandalism;
 - (G) demonstrate ethical use of Internet and online resources, including citation of source; and
 - (H) describe the function of a non-disclosure agreement and 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;
 - (B) identify and apply perspective such as backgrounds, light, shades, shadows, and scale to capture a focal point and create depth;
 - (C) identify and apply principles of proportion, balance, variety, emphasis, harmony, symmetry, unity, and repetition in type, color, size, line thickness, shape, and space;
 - (D) identify and apply three-dimensional effects such as foreground, middle distance, and background images;
 - (E) identify and apply concepts of typography;
 - (F) identify and apply color theory; and
 - (G) create and improve digital products by applying the appropriate design and layout 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;
 - (B) create and modify digital graphics using appropriate vector-based and raster-based software following standard design principles;
 - (C) export and set graphics to be used in both print and digital formats;
 - (D) demonstrate knowledge of graphic resolution, file size, file formats, and file management;
 - (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; and
 - (F) differentiate between the color mode selections 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;
 - (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;
 - (C) transfer still shot images from equipment to the computer; and
 - (D) demonstrate photographic enhancement techniques such as feathering, layering, masking, and color enhancement 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;
 - (B) demonstrate proper use of terminology in relation to video technology;
 - (C) demonstrate proper ethics in the use of digital video photography equipment to capture video images;
 - (D) transfer video images from equipment to the computer;
 - (E) apply videographic enhancement and editing techniques such as panning, transitioning, zooming, content editing, and synchronizing audio and video using appropriate digital manipulation software; and

- (F) export video files in digital formats to be used in various delivery systems such as podcasts, downloadable media, social media, and streaming video.
- (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;
 - (B) demonstrate proper use of terminology and concepts in relation to audio technology;
 - (C) demonstrate proper use of digital audio equipment to capture audio files;
 - (D) transfer audio files from equipment to the computer;
 - (E) demonstrate proper use of audio editing software such as adding effects, fading, volume control, and manipulation of waveforms using appropriate digital manipulation software; and
 - (F) export audio files to be used in digital formats in various delivery systems such as podcasts, downloadable files, social media, and streaming video.
- (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;
 - (B) deploy animation to be used in various digital formats and on various video animation players; and
 - (C) 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;
 - (B) develop a plan for a media project such as a storyboard and stage development and identify equipment and resources;
 - (C) execute and monitor and control a project along its timeline and make suggested revisions until completion of the project; and
 - (D) 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;
 - (B) incorporate various digital media products into an electronic document such as a newsletter, social media outlet, poster, or report; and
 - (C) incorporate various digital media products into an interactive product such as an animation, computer program, simulation, interactive website, or application.

Source: The provisions of this §130.307 adopted to be effective August 28, 2017, 40 TexReg 9123.

§130.311. Computer Technician Practicum (Two 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. 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 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.

- (1) The student demonstrates professional standards/employability skills 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;
 - (B) identify and demonstrate qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills;
 - (C) employ effective reading and writing skills;
 - (D) employ effective verbal and nonverbal communication skills;
 - (E) solve problems and think critically;
 - (F) demonstrate leadership skills and function effectively as a team member;
 - (G) identify and implement proper safety procedures;
 - (H) demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT; and
 - (I) demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project.
- (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;
 - (B) develop a resume appropriate to a chosen career plan, including letters of recommendation; and

- (C) 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;
 - (B) complete work orders and related paperwork for repair and installation;
 - (C) estimate supplies, materials, and labor costs for installation, maintenance, and repair work orders; and
 - (D) read and interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins.
- (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;
 - (B) demonstrate proper use of mathematics concepts in the development of products or services; and
 - (C) 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;
 - (B) define the use of Boolean logic in computer technologies;
 - (C) describe the theories of magnetism, electricity, and electronics as they apply to computer systems;
 - (D) identify proper troubleshooting techniques;
 - (E) differentiate among digital and analog input and output electronics theories;
 - (F) describe the architecture of various computer systems;
 - (G) describe the function of central processing units, storage devices, peripheral devices, and microprocessor units; and
 - (H) explain computer system environmental requirements and related control devices.
- (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;
 - (B) employ available reference tools, materials, and Internet sources to access information as needed;
 - (C) demonstrate the proper handling and disposal of environmentally hazardous materials used in computer technologies; and
 - (D) identify new and emerging technologies that may affect the field of computer technology such as quantum computing, photonics, and nanotechnology.
- (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;

- (B) develop a solution using appropriate technologies, IT concepts, and IT industry standards;
 - (C) explain how the proposed technological solution will resolve the problem and the methodologies involved;
 - (D) apply decision-making techniques to the selection of technological solutions;
 - (E) identify areas where quality, reliability, and safety can be designed into a product or service;
 - (F) apply critical-thinking strategies to analyze and evaluate the proposed technological solution;
 - (G) develop a sustainability plan for the product or service;
 - (H) select and use the appropriate technological resources to conduct, research, design, and develop activities;
 - (I) develop the documentation of the research and development process; and
 - (J) 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;
 - (B) define the scope of work to achieve individual and group goals;
 - (C) develop time and activity plans to achieve objectives;
 - (D) implement or participate with cross-functional teams to achieve IT project goals;
 - (E) develop and implement quality assurance test plans; and
 - (F) 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;
 - (B) identify the range of security needs and the problems that can occur due to security lapses;
 - (C) develop and implement plans to address security threats;
 - (D) document security procedures; and
 - (E) describe the use of computer forensics in countering security threats such as IT crimes and security breaches.
- (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;
 - (B) identify customer need and formulate a support plan;
 - (C) create queries and reports and assess critical system information;
 - (D) employ problem-solving skills in performing support, maintenance, and repair;
 - (E) use hardware and software diagnostics;
 - (F) report to the user the cause of and solution to the problem; and
 - (G) create written documentation indicating the cause of and solution to the problem.

- (11) The student demonstrates and applies knowledge of security risks and safeguards. The student is expected to:
- (A) install security software;
 - (B) update security software; and
 - (C) use security 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; and
 - (B) 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;
 - (B) organize and prioritize information within the portfolio; and
 - (C) use written, verbal, and visual communication techniques consistent with IT industry standards.

Source: The provisions of this §130.311 adopted to be effective August 28, 2017, 40 TexReg 9123.

§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.
- (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;*
- (B) *identify and demonstrate qualities such as flexibility, open-mindedness, initiative, listening attentively to speakers, and willingness to learn new knowledge and skills;*
- (C) *employ effective reading and writing skills;*
- (D) *employ effective verbal and nonverbal communication skills;*
- (E) *solve problems and think critically;*
- (F) *demonstrate leadership skills and function effectively as a team member;*
- (G) *identify and implement proper safety procedures;*
- (H) *demonstrate an understanding of legal and ethical responsibilities in relation to the field of IT; and*
- (I) *demonstrate planning and time-management skills such as storyboarding and project management, including initiating, planning, executing, monitoring and controlling, and closing a project.*
- (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;
- (B) develop a resume that includes letters of recommendation and a portfolio appropriate to a chosen career plan; and
- (C) illustrate interview skills for successful job placement.
- (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;
- (B) demonstrate proper use of mathematics concepts in the development of products or services; and
- (C) 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; and
- (B) describe and use an approach such as top-down or bottom-up 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;
- (B) apply decision-making techniques to the selection of technological solutions; and
- (C) 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;

- (B) develop a product or service that meets a specified need following a problem-solving strategy;
 - (C) identify areas where quality, reliability, and safety can be designed into a product or service;
 - (D) develop and implement a security management plan to address security requirements;
 - (E) develop a sustainability plan for the product or service;
 - (F) develop an evaluation method for analyzing the effect of the product or service on client satisfaction and problem resolution;
 - (G) develop a project portfolio that documents the research and development process; and
 - (H) 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;
 - (B) organize and prioritize information within the portfolio; and
 - (C) use written, verbal, and visual communication techniques consistent with IT industry standards.

Source: The provisions of this §130.312 adopted to be effective August 28, 2017, 40 TexReg 9123.

§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.
- (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;
 - (B) participate in training, education, or preparation for licensure, certification, or other relevant credentials to prepare for employment;
 - (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; and
 - (D) employ planning and time-management skills and tools with increased fluency to enhance results and 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;
 - (B) analyze, interpret, and effectively communicate information;
 - (C) apply active listening skills to obtain and clarify information; and
 - (D) exhibit public relations skills to maintain internal and external customer/client satisfaction.
- (3) The student implements advanced problem-solving methods. The student is expected to employ critical-thinking skills with increased fluency both independently and in groups to solve problems and 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;
 - (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;
 - (C) identify the range of security needs and the problems that can occur due to security lapses with increased proficiency;
 - (D) demonstrate safe use of computer technology equipment such as hand and power tools with increased proficiency; and
 - (E) demonstrate the proper handling and 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;
 - (B) describe and practice ethical and legal responsibilities associated with the field of IT;
 - (C) show integrity by choosing the ethical course of action when making decisions; and
 - (D) comply with all applicable rules, laws, and regulations in a consistent manner.
- (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;
- (B) read and interpret technical documentation such as schematics, drawings, charts, diagrams, technical manuals, and bulletins with increased fluency;
- (C) employ available reference tools, materials, and Internet sources with increased fluency to access information as needed;
- (D) develop solutions using appropriate technologies, IT concepts, and IT industry standards with increased proficiency;
- (E) implement project methodologies to manage information system projects; and
- (F) collect representative work samples.

Source: The provisions of this §130.313 adopted to be effective August 28, 2017, 41 TexReg 614.

§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.
 - (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;
 - (B) participate in training, education, or preparation for licensure, certification, or other relevant credentials to prepare for employment;

- (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;
 - (D) employ teamwork and conflict-management skills with increased fluency to achieve collective goals; and
 - (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.
- (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;
 - (B) apply active listening skills to obtain and clarify information;
 - (C) create and deliver formal and informal presentations in an effective manner; and
 - (D) exhibit public relations skills to maintain internal and external customer/client satisfaction.
- (3) The student implements advanced problem-solving methods. The student is expected to:
- (A) employ critical-thinking skills with increased fluency both independently and in groups to solve problems and make decisions;
 - (B) apply critical-thinking strategies with increased fluency to develop solutions using appropriate technologies and resources, IT concepts, and industry standards; and
 - (C) 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; and
 - (B) develop and 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;
 - (B) describe and practice ethical and legal responsibilities associated with the field of IT;
 - (C) show integrity by choosing the ethical course of action when making decisions; and
 - (D) comply with all applicable rules, laws, and 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;
 - (B) identify areas where quality, reliability, and safety can be designed into a product or service;
 - (C) develop a sustainability plan for the product or service;
 - (D) develop an evaluation method to analyze the effect of the product or service on client satisfaction and problem resolution; and
 - (E) collect representative work samples.

Source: The provisions of this §130.314 adopted to be effective August 28, 2017, 41 TexReg 614.

§130.315. Web Communications (One-Half Credit).

- (a) General requirements. Students shall be awarded one-half credit for successful completion of this course. This course is recommended for students in Grade 9.
- (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 Communications, students will acquire knowledge of web communications and technological operations and concepts. This is an exploratory course in web communications. The six strands include creativity and innovation; communication and collaboration; research and information fluency; critical thinking; problem solving, and decision making; digital citizenship; and technology operations and concepts.
 - (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.
- (1) Creativity and innovation. The student demonstrates creative thinking, constructs knowledge, and develops innovative products and processes using technology. The student is expected to:
 - (A) demonstrate proficiency in the use of local and online collaboration;
 - (B) create websites using web editors or web authoring programs;
 - (C) evaluate the accessibility and usability of original websites; and
 - (D) conceptualize possible technologies based on current technical trends.
 - (2) Communication and collaboration. The student uses digital technology to work collaboratively toward his or her own learning and the learning of others. The student is expected to:
 - (A) analyze and implement the proper and acceptable use of digital/virtual communications technologies such as instant messaging (IM), chat, email, and social networking;
 - (B) define and implement the acquisition, sharing, and use of files taking into consideration primary ownership and copyright;
 - (C) apply decisions regarding the selection, acquisition, and sharing of uniform resource locators (URLs) used in research, taking into consideration their quality, appropriateness, and effectiveness; and
 - (D) solve problems using critical-thinking strategies.
 - (3) Research and information fluency. The student applies digital tools to gather, evaluate, and use information. The student is expected to:
 - (A) verify the accuracy, validity, and currency of acquired information;
 - (B) conduct effective searches using Boolean operators;
 - (C) acquire and use appropriate vocabulary terms;
 - (D) cite sources appropriately using established methods;

- (E) model ethical and legal acquisition of digital information following guidelines in the student code of conduct, including plagiarism and copyright laws;
 - (F) identify and discuss emerging technologies and their impact;
 - (G) understand Internet history and structure and how they impact current use; and
 - (H) demonstrate appropriate use of grammar, spelling, and vocabulary when creating original work.
- (4) Critical thinking, problem solving, and decision making. The student uses critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. The student is expected to:
- (A) demonstrate the transfer and adaptation of knowledge through the creation of original work;
 - (B) evaluate and implement security measures such as firewalls and Hypertext Transfer Protocol Secure (HTTPS) to protect original work;
 - (C) analyze and follow timelines needed to create, edit, and present original work;
 - (D) verify current licensing issues for software being used for the creation of original work;
 - (E) identify and evaluate the design and functionality of web pages using rubrics;
 - (F) optimize web information for fast download such as dial-up and high-speed Internet and mobile devices; and
 - (G) evaluate original work through self-, peer, and professional review of websites.
- (5) Digital citizenship. The student understands human, cultural, and societal issues related to technology and practices legal and ethical behavior. The student is expected to:
- (A) engage in online activities that follow appropriate behavioral, communication, and privacy guidelines, including ethics, personal security, and verbiage determined by the intended audience;
 - (B) understand the negative impact of inappropriate technology use, including online bullying and harassment;
 - (C) implement online security guidelines, including identity protection, limited personal information sharing, and password protection of a secure website; and
 - (D) advocate and practice safe, legal, and responsible use of information and technology.
- (6) Technology operations and concepts. The student demonstrates a sound understanding of technology concepts, systems, and operations. The student is expected to:
- (A) demonstrate knowledge of hardware such as scanners, cameras, printers, video cameras, and external hard drives;
 - (B) identify the parts of a computer and explain their functions;
 - (C) summarize the need, functionality, and use of servers;
 - (D) identify the advantages and disadvantages of running a personal web server versus using a web server provider;
 - (E) differentiate and appropriately use various input, processing, output, and primary/secondary storage devices;
 - (F) create and implement universally accessible documents;
 - (G) analyze bandwidth issues as they relate to audience, servers, connectivity, and cost;
 - (H) establish a folder/directory hierarchy for storage of a web page and its related or linked files;

- (I) follow file and folder naming conventions, including spacing, special characters, and capitalization; and
- (J) identify basic design principles when creating a website.

Source: The provisions of this §130.315 adopted to be effective August 1, 2020, 45 TexReg 4190.

§130.316. Web Design (One Credit).

- (a) General requirements. Students shall be awarded one credit for successful completion of this course. This course is recommended for students in Grades 9-12.
- (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 Design students will acquire knowledge of web design and technological operations and concepts that support creativity, innovation, collaboration, information fluency, critical thinking and decision making. The six strands include creativity and innovation; communication and collaboration; research and information fluency; critical thinking; problem solving, and decision making; digital citizenship; and technology operations and concepts.
 - (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.
 - (1) Creativity and innovation. The student demonstrates creative thinking, constructs knowledge, and develops innovative products and processes using technology. The student is expected to:
 - (A) demonstrate proficiency in local and online collaboration;
 - (B) create a website using web editors and web authoring programs;
 - (C) evaluate the accessibility and usability of an original website as it relates to a target audience;
 - (D) conceptualize new possible technologies based on current technical trends;
 - (E) analyze the use of virtualization such as virtual classrooms, distance learning, virtual storage, and a virtual operating system;
 - (F) demonstrate knowledge and appropriate use of operating systems, software applications, and communication and networking components; and
 - (G) make decisions regarding the selection, acquisition, and use of software, taking into consideration its quality, appropriateness, effectiveness, and efficiency.
 - (2) Communication and collaboration. The student uses digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning experience of others. The student is expected to:
 - (A) analyze and implement the proper and acceptable use of digital/virtual communications technologies such as instant messaging (IM), chat, email, and social networking;
 - (B) define and implement the acquisition, sharing, and use of files, taking into consideration their primary ownership and copyright;

- (C) apply decisions regarding the selection, acquisition, and sharing of uniform resource locators (URLs) used in research, taking into consideration their quality, appropriateness, and effectiveness;
 - (D) solve problems using critical-thinking strategies; and
 - (E) compare, evaluate, and implement the use of wired versus wireless access.
- (3) Research and information fluency. The student applies digital tools to gather, evaluate, and use information. The student is expected to:
- (A) verify the accuracy, validity, and currency of acquired information;
 - (B) conduct effective searches with Boolean operators;
 - (C) acquire and use appropriate vocabulary terms;
 - (D) cite sources appropriately using established methods;
 - (E) model ethical and legal acquisition of digital information following guidelines in the student code of conduct, including plagiarism and copyright laws;
 - (F) identify and discuss emerging technologies and their impact;
 - (G) understand Internet history and structure and how they impact current use;
 - (H) demonstrate appropriate use of grammar, spelling, and vocabulary when creating original work;
 - (I) acquire, evaluate, and use various web standards such as World Wide Web Consortium (W3C), Ecma International, and Internet Corporation for Assigned Names and Numbers (ICANN) to make informed decisions and implement standards in original work;
 - (J) understand, analyze, and use interactive websites;
 - (K) understand, evaluate, and determine the appropriate use of dynamic and static websites;
 - (L) understand, evaluate, and determine the appropriate use of open/closed source file formats and software;
 - (M) explain and demonstrate how search engines work such as advanced options, preferences, advertising, and search categories;
 - (N) evaluate, create, and apply principles of project management, including web storyboards, site maps, job duties, time constraints, group dynamics, communication interaction, and project completion, evaluation, and feedback;
 - (O) understand the use and application of a virtual private network (VPN);
 - (P) distinguish among protocols, including Hypertext Transfer Protocol (HTTP) and File Transfer Protocol (FTP);
 - (Q) summarize the technical needs of a World Wide Web server, including random access memory (RAM), hard disk capacity, central processing unit (CPU) speed, busses, methods of connectivity, and appropriate software;
 - (R) demonstrate proficiency in the use of a variety of electronic input devices such as keyboard, scanner, voice/sound recorder, mouse, touch screen, or digital video by incorporating such components while publishing web pages;
 - (S) demonstrate proper digital etiquette and knowledge of acceptable use policies when using networks, especially resources on the Internet and intranets;
 - (T) demonstrate proficiency in and appropriate use and navigation of local area networks (LANs), wide area networks (WANs), the Internet, and intranets for research and resource sharing;

- (U) construct appropriate search strategies in the acquisition of information from the Internet, including keyword searches and searches with Boolean operators; and
 - (V) acquire information in electronic formats, including text, audio, video, and graphics, citing the source.
- (4) Critical thinking, problem solving, and decision making. The student uses critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. The student is expected to:
- (A) demonstrate the transfer and adaptation of knowledge through the creation of original work;
 - (B) evaluate and implement security measures to protect original work such as firewalls and Hypertext Transfer Protocol Secure (HTTPS);
 - (C) analyze and follow timelines needed to create, edit, and present original work;
 - (D) verify current licensing issues for software being used for the creation of original work;
 - (E) identify and evaluate the design and functionality of web pages using rubrics;
 - (F) optimize web information for fast download such as dial-up and high-speed Internet and mobile devices;
 - (G) evaluate original work through self-, peer, and professional review of websites;
 - (H) evaluate the types, functions, and target audiences of websites;
 - (I) read, use, and develop technical documents;
 - (J) analyze, examine, assess, and decide on servers as they relate to the management of a website;
 - (K) analyze, examine, assess, and decide on a web host;
 - (L) analyze, examine, assess, and decide on domain name acquisition and retention;
 - (M) evaluate the functionality of a website such as color scheme, grammar, technological constraints, age appropriateness, cross-platform usability, and user relevant criteria as it relates to an intended audience;
 - (N) identify software file formats and their characteristics and appropriate use;
 - (O) identify and apply search engine optimization (SEO) to ensure optimal website visibility;
 - (P) investigate and choose electronic security methods for a web server to protect from unauthorized access and negative intentions; and
 - (Q) draw conclusions from data gathered from electronic and telecommunication resources.
- (5) Digital citizenship. The student understands human, cultural, and societal issues related to technology and practices legal and ethical behavior. The student is expected to:
- (A) engage in online activities that follow appropriate behavioral, communication, and privacy guidelines, including ethics, personal security, verbiage determined by the intended audience, and ethical use of files and file sharing;
 - (B) understand the negative impact of inappropriate technology use, including online bullying and harassment;
 - (C) implement online security guidelines, including identity protection, limited personal information sharing, and password protection of a secure website;
 - (D) engage in safe, legal, and responsible use of information and technology;
 - (E) understand and respond to local, state, national, and global issues to ensure appropriate cross-browser and cross-platform usability;

- (F) interpret, use, and develop a safe online shared computing environment;
 - (G) identify legal, ethical, appropriate, and safe website marketing practices;
 - (H) identify legal, ethical, appropriate, and safe multimedia usage, including video, audio, graphics, animation, and emerging trends;
 - (I) analyze the impact of the World Wide Web on society through research, interviews, and personal observation; and
 - (J) participate in relevant and meaningful activities in the larger community and society to create electronic projects.
- (6) Technology operations and concepts. The student demonstrates a sound understanding of technology concepts, systems, and operations. The student is expected to:
- (A) demonstrate knowledge of hardware, including scanners, cameras, printers, video cameras, and external hard drives;
 - (B) identify the parts of a computer and explain its functions;
 - (C) summarize the need for and functionality and use of servers;
 - (D) identify the advantages and disadvantages of running a personal web server versus using a web server provider;
 - (E) differentiate and appropriately use various input, processing, output, and primary/secondary storage devices;
 - (F) create and implement universally accessible documents;
 - (G) analyze bandwidth issues as related to audience, server, connectivity, and cost;
 - (H) establish a folder/directory hierarchy for storage of a web page and its related or linked files;
 - (I) create file and folder naming conventions to follow established guidelines, including spacing, special characters, and capitalization;
 - (J) identify basic design principles when creating a website, including white space, color theory, background color, shape, line, proximity, unity, balance (ratio of text to white space), alignment, typography, font size, type, style, image file size, repetition, contrast, consistency, and aesthetics;
 - (K) demonstrate knowledge of the six core domains (gov, net, com, mil, org, edu) and be familiar with new domain implementation;
 - (L) implement escape codes, HyperText Markup Language (HTML), cascading style sheets (CSS), and JavaScript through hard coding, web editors, and web authoring programs;
 - (M) identify and use FTP client software;
 - (N) implement java applet insertion;
 - (O) identify and differentiate various network topologies, including physical and logical;
 - (P) create, evaluate, and use web-based animation;
 - (Q) create, evaluate, and use video, including editing, compression, exporting, appropriateness, and delivery;
 - (R) demonstrate the ability to conduct secure communications from a web server to a client; and
 - (S) use hypertext linking appropriately when creating web pages.

Source: The provisions of this §130.316 adopted to be effective August 1, 2020, 45 TexReg 4190.

§130.317. Independent Study in Technology Applications (One Credit), Beginning with School Year 2012-2013.

- (a) General requirements. Students shall be awarded one credit for successful completion of this course. Recommended prerequisite: a minimum of one credit from the courses in the Information Technology Career Cluster. This course may be taken at Grades 9-12.
- (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 Independent Study in Technology Applications, through the study of technology applications foundations, including technology-related terms, concepts, and data input strategies, students will communicate information in different formats and to diverse audiences using a variety of technologies. Students will learn to make informed decisions; develop and produce original work that exemplifies the standards identified by the selected profession or discipline; and publish the product in electronic media and print. Students will practice the efficient acquisition of information by identifying task requirements, using search strategies, and using technology to access, analyze, and evaluate the acquired information. By using technology as a tool that supports the work of individuals and groups in solving problems, students will select the technology appropriate for the task, synthesize knowledge, create solutions, and evaluate the results. The six strands include creativity and innovation; communication and collaboration; research and information fluency; critical thinking; problem solving, and decision making; digital citizenship; and technology operations and concepts.
 - (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.
- (1) Creativity and innovation. The student demonstrates creative thinking, constructs knowledge, and develops innovative products and processes using technology. The student is expected to:
 - (A) apply existing knowledge to promote creativity in designing new technology products or services;
 - (B) design and implement procedures to track trends, set timelines, and review and evaluate progress for continual improvement in process and product;
 - (C) produce electronic documentation to illustrate the progress of a project;
 - (D) seek and respond to input from peers and professionals in delineating technological tasks and problem solving;
 - (E) make necessary revisions and/or proceed to the next stage of study;
 - (F) use technology terminology appropriate to the independent study course;
 - (G) develop and apply advanced creativity and innovation employed in technology applications skills;
 - (H) identify and solve problems, individually and with input from peers and professionals, using research methods and advanced creativity and innovation skills used in a selected profession or discipline;

- (I) develop products that meet standards identified by the selected profession or discipline; and
 - (J) produce original work to solve an identified problem and publish a product in electronic media and print.
- (2) Communication and collaboration. The student uses digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning experience of others. The student is expected to:
- (A) format developed projects according to defined output specifications, including target audience and viewing environment;
 - (B) present findings to a panel for comment and professional response;
 - (C) determine and implement the best method of presenting or publishing findings;
 - (D) synthesize and publish information in a variety of print or digital formats;
 - (E) use evolving network and Internet resources and appropriate technology skills to create, exchange, and publish information;
 - (F) develop cultural understanding and global awareness by interacting with learners of other cultures through evolving digital formats and communication methods;
 - (G) collaborate with others to identify a problem to be solved, hypotheses, and strategies to accomplish a task;
 - (H) participate with electronic communities as a learner, initiator, contributor, and facilitator/mentor; and
 - (I) participate in relevant, meaningful activities in the larger community and society to create electronic projects.
- (3) Research and information fluency. The student applies digital tools to gather, evaluate, and use information. The student is expected to:
- (A) use evolving network and Internet resources for research and resource sharing of technology applications;
 - (B) apply appropriate search strategies in the acquisition of information from the Internet, including keyword and Boolean search strategies;
 - (C) pose hypotheses and questions related to a selected problem;
 - (D) acquire information using appropriate research strategies with source citations through electronic formats, including interactive components, text, audio, video, graphics, and simulations; and
 - (E) identify, create, and use available file formats, including text, image, video, and audio files.
- (4) Critical thinking, problem solving, and decision making. The student uses critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. The student is expected to:
- (A) evaluate the design, functionality, and accuracy of the accessed information;
 - (B) conduct systematic research;
 - (C) demonstrate creative-thinking and problem-solving skills;
 - (D) integrate appropriate productivity tools, including network, mobile access, and multimedia tools, in the creation of solutions to problems;
 - (E) use enriched curricular content in the creation of products;

- (F) synthesize and generate new information from data gathered from electronic resources;
 - (G) read and use technical documentation; and
 - (H) write simple technical documentation relative to the audience.
- (5) Digital citizenship. The student understands human, cultural, and societal issues related to technology and practices legal and ethical behavior. The student is expected to:
- (A) discuss intellectual property, privacy, sharing of information, copyright laws, and software licensing agreements;
 - (B) model ethical acquisition and use of digital information;
 - (C) model respect of intellectual property when editing graphics, video, text, and sound files;
 - (D) demonstrate proper etiquette, responsible use of software, and knowledge of acceptable use policies when using network resources;
 - (E) demonstrate best practices in understanding and applying information security;
 - (F) develop and maintain a technical documentation library in a variety of formats; and
 - (G) investigate how technology has changed and the social and ethical ramifications of computer usage.
- (6) Technology operations and concepts. The student demonstrates a sound understanding of technology concepts, systems, and operations. The student is expected to:
- (A) demonstrate knowledge and appropriate use of input devices, operating systems, software applications, and communication and networking components;
 - (B) select, acquire, and use appropriate digital tools;
 - (C) delineate and make necessary adjustments regarding compatibility issues, including digital file formats and cross-platform connectivity; and
 - (D) use appropriate technology terminology and naming conventions.

Source: The provisions of this §130.317 adopted to be effective August 1, 2020, 45 TexReg 4190.

§130.318. Independent Study in Evolving/Emerging Technologies (One Credit).

- (a) General requirements. Students shall be awarded one credit for successful completion of this course. Recommended prerequisite: a minimum of one credit from the courses in the Information Technology Career Cluster. This course may be taken at Grades 9-12.
- (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 Independent Study in Evolving/Emerging Technologies course, through the study of evolving/emerging technologies, including technology-related terms, concepts, and data input strategies, students will communicate information in different formats and to diverse audiences using a variety of technologies. Students will learn to make informed decisions, develop and produce original work that exemplifies the standards identified by the selected profession or discipline, and publish the product in electronic media and print. Students will demonstrate efficient acquisition of information by identifying task requirements, using search strategies, and using technology to access, analyze, and evaluate the acquired information. By using technology as a tool that supports the work of individuals and groups in solving problems, students will select

the technology appropriate for the task, synthesize knowledge, create solutions, and evaluate the results. The six strands include creativity and innovation; communication and collaboration; research and information fluency; critical thinking; problem solving, and decision making; digital citizenship; and technology operations and concepts.

- (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.
- (1) Creativity and innovation. The student demonstrates creative thinking, constructs knowledge, and develops innovative products and processes using technology. The student is expected to:
- (A) apply existing knowledge to promote creativity in designing new technology products or services;
 - (B) design and implement procedures to track trends, set timelines, and review and evaluate progress for continual improvement in process and product;
 - (C) produce electronic documentation to illustrate the progress of a project;
 - (D) seek and respond to input from peers and professionals in delineating technological tasks and problem solving;
 - (E) make necessary revisions and/or proceed to the next stage of study;
 - (F) use technology terminology appropriate to the independent study course;
 - (G) develop and apply advanced creativity and innovation employed in technology applications skills;
 - (H) identify and solve problems, individually and with input from peers and professionals, using research methods and advanced creativity and innovation skills used in a selected profession or discipline;
 - (I) develop products that meet standards identified by a selected profession or discipline; and
 - (J) produce original work to solve an identified problem and publish a product in electronic media and print.
- (2) Communication and collaboration. The student uses digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning experience of others. The student is expected to:
- (A) format developed projects according to defined output specifications, including target audience and viewing environment;
 - (B) present findings to a panel for comment and professional response;
 - (C) determine and implement the best method of presenting or publishing findings;
 - (D) synthesize and publish information in a variety of print or digital formats;
 - (E) use evolving network resources and appropriate technology skills to create, exchange, and publish information;
 - (F) develop cultural understanding and global awareness by interacting with learners of other cultures through evolving digital formats and communication methods;
 - (G) collaborate with others to identify a problem to be solved, hypotheses, and strategies to accomplish a task;
 - (H) participate with electronic communities as a learner, initiator, contributor, and facilitator/mentor; and

- (I) participate in relevant, meaningful activities in the larger community and society to create electronic projects.
- (3) Research and information fluency. The student applies digital tools to gather, evaluate, and use information. The student uses a variety of strategies to acquire information from electronic resources, with appropriate supervision. The student is expected to:
- (A) use evolving network and Internet resources for research and resource sharing of technology applications;
 - (B) apply appropriate search strategies in the acquisition of information from the Internet, including keyword and Boolean search strategies;
 - (C) pose hypotheses and questions related to a selected problem;
 - (D) acquire information using appropriate research strategies with source citations through electronic formats, including interactive components, text, audio, video, graphics, and simulations; and
 - (E) identify, create, and use available file formats, including text, image, video, and audio files.
- (4) Critical thinking, problem solving, and decision making. The student uses critical-thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. The student is expected to:
- (A) evaluate the design, functionality, and accuracy of the accessed information;
 - (B) conduct systematic research;
 - (C) demonstrate creative-thinking and problem-solving skills;
 - (D) integrate appropriate productivity tools, including network, mobile access, and multimedia tools, in the creation of solutions to problems;
 - (E) use enriched curricular content in the creation of products;
 - (F) synthesize and generate new information from data gathered from electronic resources;
 - (G) read and use technical documentation; and
 - (H) write simple technical documentation relative to the audience.
- (5) Digital citizenship. The student understands human, cultural, and societal issues related to technology and practices legal and ethical behavior. The student is expected to:
- (A) discuss intellectual property, privacy, sharing of information, copyright laws, and software licensing agreements;
 - (B) model ethical acquisition and use of digital information;
 - (C) model respect of intellectual property when editing graphics, video, text, and sound files;
 - (D) demonstrate proper etiquette, responsible use of software, and knowledge of acceptable use policies when using network resources;
 - (E) demonstrate best practices in understanding and applying information security;
 - (F) develop and maintain a technical documentation library in a variety of formats; and
 - (G) investigate how technology has changed and the social and ethical ramifications of computer usage.
- (6) Technology operations and concepts. The student demonstrates a sound understanding of technology concepts, systems, and operations. The student is expected to:
- (A) demonstrate knowledge and appropriate use of input devices, operating systems, software applications, and communication and networking components;

- (B) select, acquire, and use appropriate digital tools;
- (C) delineate and make necessary adjustments regarding compatibility issues, including digital file formats and cross-platform connectivity; and
- (D) use appropriate technology terminology and naming conventions.

Source: The provisions of this §130.318 adopted to be effective August 1, 2020, 45 TexReg 4190.