ATTACHMENT
Text of Proposed Repeal of 19 TAC

Chapter 127. Texas Essential Knowledge and Skills for Career Development and Career and Technical Education

Subchapter G. Education and Training

[§127.310. Principles of Education and Training (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 Education and Training Career Cluster focuses on planning, managing, and providing education and training services and related learning support services.

(3) Principles of Education and Training is designed to introduce learners to the various careers available within the Education and Training Career Cluster. Students use self-knowledge as well as educational and career information to analyze various careers within the Education and Training Career Cluster. Students will develop a graduation plan that leads to a specific career choice in the student's interest area.

(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 written communication;

(B) perform job-appropriate numerical and arithmetic application;

(C) practice various forms of communication such as verbal and non-verbal communication used in educational and career settings;

(D) exhibit teamwork skills;

(E) apply decision-making skills;

(F) implement problem-solving techniques;

(G) acquire conflict management skills;

(H) develop leadership skills;

(I) demonstrate professionalism; and

(J) develop effective work ethic practices.

(2) The student explores education and training careers by such means as shadowing, interviewing, career interest inventory, researching, and/or self-reflection. The student is expected to:

(A) identify and investigate the three Education and Training Programs of Study: Teaching/Training, Professional Support Services, and Administration and Administrative Support;

(B) analyze transferable skills among a variety of careers within the Education and Training Career Cluster;

(C) recognize the impact of career choice on personal lifestyle;

(D) develop productive work habits such as organization, time management, and initiative; and

(E) analyze assessment results such as an interest and ability inventory as relative to those necessary for success in education and training.

(3) The student explains societal impacts within the education and training career cluster. The student is expected to:

(A) investigate trends or issues that have influenced the development of education across the United States such as historical, societal, cultural, and political trends and issues; and

(B) predict the Education and Training Career Cluster job market by using information from sources such as labor market information, technology, and societal or economic trends.

(4) The student explores careers in the teaching and training program of study. The student is expected to:

(A) summarize the various roles and responsibilities of professionals in the fields of teaching and training;

(B) describe typical personal characteristics, qualities, and aptitudes of professionals in the field of teaching and training;

(C) investigate education or training alternatives after high school for a career choice within the student's interest areas; and

(D) examine education or training degree plans for various occupations within the field of teaching and training.

(5) The student explores careers in the professional support services program of study. The student is expected to:

(A) summarize the various roles and responsibilities of professionals in the field of professional support services;

(B) describe typical personal characteristics, qualities, and aptitudes of professionals in the field of professional support services;

(C) investigate education and training alternatives after high school for a career choice within the student's interest areas; and

(D) examine education and training degree plans for various occupations within the field of professional support services.

(6) The student explores careers in the administration and administrative support program of study. The student is expected to:

(A) summarize the various roles and responsibilities of professionals in the field of administration and administrative support;

(B) describe typical personal characteristics, qualities, and aptitudes of professionals in the field of administration and administrative support;

(C) investigate education and training alternatives after high school for a career choice within the student's interest areas; and

(D) examine education and training degree plans for various occupations within the fields of administration and administrative support.

(7) The student experiences authentic education and training opportunities. The student is expected to:

(A) experience educator duties and responsibilities through activities such as assisting, shadowing, or observing;

(B) develop instructional materials such as visuals, teacher aids, manipulatives, lesson components, and mini lessons; and

(C) formulate a personal set of beliefs relevant to education in preparation of developing a philosophy of education.

(8) The student explores options in education and career planning. The student is expected to:

(A) develop a graduation plan that leads to a specific career choice in the area of interest;

(B) identify high school and dual enrollment courses related to specific career cluster programs of study;

(C) identify and compare technical and community college programs that align with interest areas; and

(D) identify and compare university programs and institutions that align with interest areas.

(9) The student documents technical knowledge and skills. The student is expected to:

(A) assemble basic professional portfolio components such as basic resume, samples of work, service learning log, assessment results, and mock scholarship applications; and

(B) present the portfolio to interested stakeholders.]

[§127.312. Instructional Practices (Two Credits), Adopted 2015.]

[(a) General requirements. This course is recommended for students in Grades 11 and 12. Recommended prerequisites: Principles of Education and Training and Human Growth and Development. Students shall be awarded two credits 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 Education and Training Career Cluster focuses on planning, managing, and providing education and training services and related learning support services.

(3) Instructional Practices is a field-based (practicum) internship that provides students with background knowledge of child and adolescent development as well as principles of effective teaching and training practices. Students work under the joint direction and supervision of both a teacher with knowledge of early childhood, middle childhood, and adolescence education and exemplary educators or trainers in direct instructional roles with elementary , middle school , and high school-aged students. Students learn to plan and direct individualized instruction and group activities, prepare instructional materials, develop materials for educational environments, assist with record keeping, and complete other responsibilities of teachers, trainers, paraprofessionals, or other educational personnel.

(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 written communication;

(B) perform job-appropriate numerical and arithmetic application;

(C) practice various forms of communication such as verbal and non-verbal communication skills used in educational and career settings;

(D) exhibit teamwork skills;

(E) apply decision-making skills;

(F) implement problem-solving techniques;

(G) acquire conflict management skills;

(H) develop leadership skills;

(I) demonstrate professionalism; and

(J) develop effective work ethic practices.

(2) The student explores the teaching and training profession. The student is expected to:

(A) demonstrate an understanding of the historical foundations of education and training in the United States;

(B) determine and implement knowledge and skills needed by teaching and training professionals;

(C) demonstrate and implement personal characteristics needed by teaching and training professionals;

(D) identify qualities of effective schools;

(E) investigate possible career options in the field of education and training;

(F) discuss teaching and training in non-traditional setting such as those in corporations, community outreach, nonprofits, and government entities; and

(G) formulate a professional philosophy of education based on a personal set of beliefs.

(3) The student understands the learner and the learning process. The student is expected to:

(A) relate and implement principles and theories of human development to teaching and training situations;

(B) relate and implement principles and theories about the learning process to teaching and training situations;

(C) demonstrate and implement behaviors and skills that facilitate the learning process; and

(D) explain the relationship between effective instructional practices and learning differences, learner exceptionality, and special needs conditions.

(4) The student interacts effectively in the role of an educator. The student is expected to:

(A) demonstrate effective interaction skills with stakeholders such as students, educators, parents/guardians, community members, and other professionals; and

(B) demonstrate techniques promoting literacy.

(5) The student plans and develops effective instruction. The student is expected to:

(A) explain the role of the Texas Essential Knowledge and Skills in planning and evaluating instruction;

(B) explain the rationale for having a fundamental knowledge of the subject matter in order to plan, prepare, and deliver effective instruction;

(C) explain the rationale for and process of instructional planning;

(D) describe principles and theories that impact instructional planning;

(E) create clear short-term and long-term learning objectives that are developmentally appropriate for students; and

(F) demonstrate lesson planning to meet instructional goals.

(6) The student creates an effective learning environment. The student is expected to:

(A) describe and implement a safe and an effective learning environment;

(B) demonstrate teacher and trainer characteristics that promote an effective learning environment;

(C) identify classroom management techniques that promote an effective learning environment; and

(D) demonstrate conflict management and mediation techniques supportive of an effective learning environment.

(7) The student assesses teaching and learning. The student is expected to:

(A) describe the role of assessment as part of the learning process;

(B) analyze the assessment process; and

(C) use appropriate assessment strategies in an instructional setting.

(8) The student understands the relationship between school and society. The student is expected to:

(A) explain the relationship between school and society;

(B) recognize and use resources for professional growth such as family, school, and community resources; and

(C) collaborate with stakeholders such as family, school, and community to promote learning.

(9) The student develops technology skills. The student is expected to:

(A) describe the role of technology in the instructional process;

(B) use technology applications appropriate for specific subject matter and student needs; and

(C) demonstrate skillful use of technology as a tool for instruction, evaluation, and management.

(10) The student understands the professional, ethical, and legal responsibilities in teaching and training. The student is expected to:

(A) describe teacher and trainer characteristics that promote professional and ethical conduct;

(B) analyze professional and ethical standards that apply to educators and trainers;

(C) analyze situations requiring decisions based on professional, ethical, and legal considerations; and

(D) analyze expected effects of compliance and non-compliance with Texas teacher code of conduct.

(11) The student participates in field-based experiences in education and training. The student is expected to:

(A) apply instructional strategies and concepts within a local educational or training facility; and

(B) document, assess, and reflect on instructional experiences.

(12) The student documents technical knowledge and skills. The student is expected to:

(A) update professional portfolio components such as resume, samples of work, service learning log, assessment results, and mock scholarship applications; and

(B) present the portfolio to interested stakeholders.]

[§127.313. Practicum in Education and Training (Two Credits), Adopted 2015.]

[(a) General requirements. This course is recommended for students in Grade 12. Prerequisite: Instructional Practices. Recommended prerequisites: Principles of Education and Training and Human Growth and Development. 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 Education and Training Career Cluster focuses on planning, managing, and providing education and training services and related learning support services.

(3) Practicum in Education and Training is a field-based internship that provides students background knowledge of child and adolescent development principles as well as principles of effective teaching and training practices. Students in the course work under the joint direction and supervision of both a teacher with knowledge of early childhood, middle childhood, and adolescence education and exemplary educators in direct instructional roles with elementary-, middle school-, and high school-aged students. Students learn to plan and direct individualized instruction and group activities, prepare instructional materials, assist with record keeping, make physical arrangements, and complete other responsibilities of classroom teachers, trainers, paraprofessionals, or other educational personnel.

(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 written communication;

(B) perform job-appropriate numerical and arithmetic application;

(C) practice various forms of communication such as verbal and non-verbal communication used in educational and career settings;

(D) exhibit teamwork skills;

(E) apply decision-making skills;

(F) implement problem-solving techniques;

(G) acquire conflict management skills;

(H) develop leadership skills;

(I) demonstrate professionalism; and

(J) develop effective work ethic practices.

(2) The student explores the teaching and training profession. The student is expected to:

(A) analyze current trends and issues that impact education such as political, societal, and economic trends and issues;

(B) demonstrate and implement knowledge and skills needed by the teaching and training profession;

(C) update assessment of personal characteristics needed to work in the teaching and training profession;

(D) explore qualities of effective schools;

(E) refine professional philosophy of education based on a personal set of beliefs;

(F) explore the educational/academic requirements and possible degree/certifications available in education;

(G) refine personal career plan in preparation for a career in the field of education or training;

(H) explore teaching and training in non-traditional setting such as those in corporations, community outreach, nonprofits, and government entities; and

(I) explore educational high-needs and teacher shortage areas.

(3) The student understands the learner and learning process. The student is expected to:

(A) apply principles and theories of human development appropriate to specific teaching or training situations;

(B) apply principles and theories about the learning process to specific teaching or training situations;

(C) analyze the dynamics of personal and student behaviors that facilitate the learning process;

(D) analyze teaching skills that facilitate the learning process; and

(E) demonstrate and evaluate effective instructional practices to accommodate diversity such as learning differences, learner exceptionality, and special-needs considerations.

(4) The student interacts effectively in the role of an educator. The student is expected to:

(A) demonstrate and evaluate effective interaction skills with stakeholders such as students, educators, parents/guardians, community members, and other professionals; and

(B) demonstrate and evaluate techniques promoting literacy.

(5) The student plans and uses effective instruction. The student is expected to:

(A) apply principles and theories that impact instructional planning;

(B) develop instructional materials that align with the Texas Essential Knowledge and Skills;

(C) demonstrate competency in core and non-core subject areas;

(D) create lessons plans that meet instructional goals;

(E) analyze concepts for developing effective instructional strategies;

(F) evaluate and analyze effectiveness of lessons plans and instructional strategies; and

(G) explain how learner and professional feedback is used to guide selection and adjustment of instructional strategies.

(6) The student creates and maintains an effective learning environment. The student is expected to:

(A) create and maintain a safe and an effective learning environment;

(B) integrate teacher or trainer characteristics that promote an effective learning environment;

(C) apply classroom management techniques that promote an effective learning environment; and

(D) demonstrate specific conflict management and mediation techniques supportive of an effective learning environment.

(7) The student assesses instruction and learning. The student is expected to:

(A) develop and apply assessments to foster student learning;

(B) use assessment strategies to promote personal growth and teaching or training improvement; and

(C) use reflective techniques to promote personal growth and teaching or training improvement.

(8) The student understands the relationship between school and society. The student is expected to:

(A) identify and support learning through advocacy;

(B) select family, school, and community resources for professional growth; and

(C) promote learning and build support through positive school partnership activities with stakeholders such as families, schools, communities, and business/industry.

(9) The student develops technology skills. The student is expected to:

(A) access and use current technology applications appropriate for specific subject matter and student needs; and

(B) integrate the skillful use of technology as a tool for instruction, evaluation, and management.

(10) The student understands the professional, ethical, and legal responsibilities in teaching and training. The student is expected to:

(A) develop teacher and trainer characteristics that promote professional and ethical conduct;

(B) analyze professional and ethical standards that apply to educators and trainers;

(C) analyze situations requiring decisions based on professional, ethical, and legal considerations; and

(D) analyze expected effects of compliance and non-compliance with Texas teacher code of conduct.

(11) The student explores the need and opportunities for continued professional development for educators and trainers. The student is expected to:

(A) identify strategies and resources for the professional development of educators or trainers such as research and assessment;

(B) demonstrate teacher or trainer characteristics that promote ongoing professional development and lifelong learning; and

(C) plan for professional growth.

(12) The student continues to participate in field-based experiences in education or training. The student is expected to:

(A) apply instructional strategies and concepts within a local educational or training facility; and

(B) document, assess, and reflect on instructional experiences.

(13) The student documents technical knowledge and skills. The student is expected to:

~~(A) gather artifacts and documentation that support attainment of technical skill competencies;~~

~~(B) update a professional portfolio to include components such as a resume, samples of work, service learning log, recognitions, awards, scholarship essays, letters of recommendation, certifications, and evaluations; and~~

~~(C) present the portfolio to interested stakeholders.~~]

Chapter 127. Texas Essential Knowledge and Skills for Career Development and Career and Technical Education

Subchapter I. Health Science

[§127.409. Health Informatics (One Credit), Adopted 2015.]

[(a) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisites: Business Information Management I and Medical Terminology. 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 Health Science Career Cluster focuses on planning, managing, and providing therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.

(3) The Health Informatics course is designed to provide knowledge of one of the fastest growing areas in both academic and professional fields. The large gap between state of the art computer technologies and the state of affairs in health care information technology has generated demand for information and health professionals who can effectively design, develop, and use technologies such as electronic medical records, patient monitoring systems, and digital libraries, while managing the vast amount of data generated by these systems.

(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 verbal and non-verbal communication in a clear, concise, and effective manner;

(B) demonstrate adaptability skills such as problem solving and creative thinking;

(C) develop a career plan;

(D) employ teamwork;

(E) create a job-specific resume; and

(F) appraise the characteristics desired by employers such as work ethics and professionalism.

(2) The student interprets fundamental knowledge of concepts of health information systems technology and the tools for collecting, storing, and retrieving health care data. The student is expected to:

(A) discuss and define the common information systems;

(B) differentiate between the six types of information systems;

(C) explain how each of the six information systems support the administrative, financial, clinical, and research needs of a health care enterprise;

(D) describe the components of an information system; and

(E) implement the concepts of health informatics by creating a culminating project.

(3) The student employs the various types of databases in relation to health informatics. The student is expected to:

(A) define the function of a database management system;

(B) identify the purpose of data modeling;

(C) define the customary steps in the data modeling process;

(D) differentiate between entities, attributes, and relationships in a data model; and

(E) explain various types of organizational databases.

(4) The student distinguishes between data and information. The student is expected to:

(A) discuss the importance of data security, accuracy, integrity, and validity; and

(B) demonstrate an understanding of data information concepts for health information systems and electronic health records.

(5) The student examines the evolution of the health information system. The student is expected to:

(A) evaluate the growing role of the electronic health record;

(B) review the progress of the development of the electronic health record; and

(C) explain functional requirements for electronic health records.

(6) The student examines the process of medical diagnostic and coding concepts as well as current procedural practices. The student is expected to:

(A) examine Health Insurance Portability and Accountability Act (HIPAA) guidelines for confidentiality, privacy, and security of a patient's information within the medical record;

(B) differentiate between insurance fraud and insurance abuse;

(C) discuss the linkage between current procedural technology (CPT) codes, International Classification of Diseases, 10th revision, clinical modification (ICD-10-CM) codes, and medical necessity for reimbursement for charges billed;

(D) search ICD-10-CM code system for correct diagnosis code using patient information;

(E) identify the two types of codes in the health care common procedure coding system (HCPCS); and

(F) explain how medical coding affects the payment process.

(7) The student identifies agencies involved in the health insurance claims process. The student is expected to:

(A) define Medicaid and Medicare;

(B) discuss health care benefit programs such as TRICARE and CHAMPVA;

(C) explain how to manage a worker's compensation case;

(D) complete a current health insurance claim form such as the Centers for Medicare and Medicaid Service (CMS-1500) form; and

(E) identify three ways to transmit electronic claims.]

Chapter 127. Texas Essential Knowledge and Skills for Career Development and Career and Technical Education

Subchapter O. Science, Technology, Engineering, and Mathematics

[§127.753. Engineering Design and Problem Solving (One Credit), Adopted 2015.]

[(a) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisites: Algebra I and Geometry. Recommended prerequisites: two Science, Technology, Engineering, and Mathematics (STEM) Career Cluster credits. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. 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 STEM Career Cluster focuses on planning, managing, and providing scientific research and professional and technical services, including laboratory and testing services, and research and development services.

(3) The Engineering Design and Problem Solving course is the creative process of solving problems by identifying needs and then devising solutions. The solution may be a product, technique, structure, or process depending on the problem. Science aims to understand the natural world, while engineering seeks to shape this world to meet human needs and wants. Engineering design takes into consideration limiting factors or "design under constraint." Various engineering disciplines address a broad spectrum of design problems using specific concepts from the sciences and mathematics to derive a solution. The design process and problem solving are inherent to all engineering disciplines.

(4) Engineering Design and Problem Solving reinforces and integrates skills learned in previous mathematics and science courses. This course emphasizes solving problems, moving from well-defined toward more open-ended, with real-world application. Students will apply critical thinking skills to justify a solution from multiple design options. Additionally, the course promotes interest in and understanding of career opportunities in engineering.

(5) This course is intended to stimulate students' ingenuity, intellectual talents, and practical skills in devising solutions to engineering design problems. Students use the engineering design process cycle to investigate, design, plan, create, and evaluate solutions. At the same time, this course fosters awareness of the social and ethical implications of technological development.

(6) Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.

(7) Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation are experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.

(8) Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).

(9) A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in

systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

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

(11) 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 knowledge of how to dress appropriately, speak politely, and conduct oneself in a manner appropriate for the profession;

(B) show the ability to cooperate, contribute, and collaborate as a member of a group in an effort to achieve a positive collective outcome;

(C) present written and oral communication in a clear, concise, and effective manner;

(D) demonstrate time-management skills in prioritizing tasks, following schedules, and performing goal-relevant activities in a way that produces efficient results; and

(E) demonstrate punctuality, dependability, reliability, and responsibility in performing assigned tasks as directed.

(2) The student, for at least 40% of instructional time, conducts engineering laboratory and field activities using safe, environmentally appropriate, and ethical practices. The student is expected to:

(A) demonstrate safe practices during engineering laboratory and field activities; and

(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

(3) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:

(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(6) of this section;

(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories;

(C) know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;

(D) distinguish between scientific hypotheses and scientific theories;

(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;

(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as calculators, spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, stereoscopes, metric rulers, electronic balances, gel electrophoresis

apparatuses, micropipettors, hand lenses, Celsius thermometers, hot plates, lab notebooks or journals, timing devices, cameras, Petri dishes, lab incubators, dissection equipment, meter sticks, and models, diagrams, or samples of biological specimens or structures;

(G) analyze, evaluate, make inferences, and predict trends from data; and

(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

(4) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:

(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;

(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;

(C) draw inferences based on data related to promotional materials for products and services;

(D) evaluate the impact of scientific research on society and the environment;

(E) evaluate models according to their limitations in representing biological objects or events; and

(F) research and describe the history of biology and contributions of scientists.

(5) The student applies knowledge of science and mathematics and the tools of technology to solve engineering design problems. The student is expected to:

(A) apply scientific processes and concepts outlined in the Texas essential knowledge and skills (TEKS) for Biology, Chemistry, or Physics relevant to engineering design problems;

(B) apply concepts, procedures, and functions outlined in the TEKS for Algebra I, Geometry, and Algebra II relevant to engineering design problems;

(C) select appropriate mathematical models to develop solutions to engineering design problems;

(D) integrate advanced mathematics and science skills as necessary to develop solutions to engineering design problems;

(E) judge the reasonableness of mathematical models and solutions;

(F) investigate and apply relevant chemical, mechanical, biological, electrical, and physical properties of materials to engineering design problems;

(G) identify the inputs, processes, outputs, control, and feedback associated with open and closed systems;

(H) describe the difference between open-loop and closed-loop control systems;

(I) make measurements with accuracy and precision and specify tolerances;

(J) use appropriate measurement systems, including customary and International System (SI) of units; and

(K) use conversions between measurement systems to solve real-world problems.

(6) The student communicates through written documents, presentations, and graphic representations using the tools and techniques of professional engineers. The student is expected to:

(A) communicate visually by sketching and creating technical drawings using established engineering graphic tools, techniques, and standards;

(B) read and comprehend technical documents, including specifications and procedures;

(C) prepare written documents such as memorandums, emails, design proposals, procedural directions, letters, and technical reports using the formatting and terminology conventions of technical documentation;

(D) organize information for visual display and analysis using appropriate formats for various audiences, including graphs and tables;

(E) evaluate the quality and relevance of sources and cite appropriately; and

(F) defend a design solution in a presentation.

(7) The student recognizes the history, development, and practices of the engineering professions. The student is expected to:

(A) identify and describe career options, working conditions, earnings, and educational requirements of various engineering disciplines such as those listed by the Texas Board of Professional Engineers;

(B) recognize that engineers are guided by established codes emphasizing high ethical standards;

(C) explore the differences, similarities, and interactions among engineers, scientists, and mathematicians;

(D) describe how technology has evolved in the field of engineering and consider how it will continue to be a useful tool in solving engineering problems;

(E) discuss the history and importance of engineering innovation on the U.S. economy and quality of life; and

(F) describe the importance of patents and the protection of intellectual property rights.

(8) The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. The student is expected to:

(A) identify and define an engineering problem;

(B) formulate goals, objectives, and requirements to solve an engineering problem;

(C) determine the design parameters associated with an engineering problem such as materials, personnel, resources, funding, manufacturability, feasibility, and time;

(D) establish and evaluate constraints pertaining to a problem, including health, safety, social, environmental, ethical, political, regulatory, and legal;

(E) identify or create alternative solutions to a problem using a variety of techniques such as brainstorming, reverse engineering, and researching engineered and natural solutions;

(F) test and evaluate proposed solutions using methods such as models, prototypes, mock-ups, simulations, critical design review, statistical analysis, or experiments;

(G) apply structured techniques to select and justify a preferred solution to a problem such as a decision tree, design matrix, or cost-benefit analysis;

(H) predict performance, failure modes, and reliability of a design solution; and

(I) prepare a project report that clearly documents the designs, decisions, and activities during each phase of the engineering design process.

(9) The student manages an engineering design project. The student is expected to:

(A) participate in the design and implementation of a real-world or simulated engineering project using project management methodologies, including initiating, planning, executing, monitoring and controlling, and closing a project;

(B) develop a plan and project schedule for completion of a project;

(C) work in teams and share responsibilities, acknowledging, encouraging, and valuing contributions of all team members;

(D) compare and contrast the roles of a team leader and other team responsibilities;

(E) identify and manage the resources needed to complete a project;

(F) use a budget to determine effective strategies to meet cost constraints;

(G) create a risk assessment for an engineering design project;

(H) analyze and critique the results of an engineering design project; and

(I) maintain an engineering notebook that chronicles work such as ideas, concepts, inventions, sketches, and experiments.]

[§127.755. Engineering Science (One Credit), Adopted 2015.]

[(a) General requirements. This course is recommended for students in Grades 10-12. Prerequisite: Algebra I and Biology, Chemistry, Integrated Physics and Chemistry (IPC), or Physics. Recommended prerequisite: Geometry. Students must meet the 40% laboratory and fieldwork requirement. This course satisfies a high school science graduation requirement. 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 Science, Technology, Engineering, and Mathematics (STEM) Career Cluster focuses on planning, managing, and providing scientific research and professional and technical services, including laboratory and testing services, and research and development services.

(3) Engineering Science is an engineering course designed to expose students to some of the major concepts and technologies that they will encounter in a postsecondary program of study in any engineering domain. Students will have an opportunity to investigate engineering and high tech careers. In Engineering Science, students will employ science, technology, engineering, and mathematical concepts in the solution of real-world challenge situations. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students will also learn how to document their work and communicate their solutions to their peers and members of the professional community.

(4) Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.

(5) Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation are experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.

(6) Scientific decision-making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).

(7) A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

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

(9) 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 knowledge of how to dress appropriately, speak politely, and conduct oneself in a manner appropriate for the profession;

(B) show the ability to cooperate, contribute, and collaborate as a member of a group in an effort to achieve a positive collective outcome;

(C) present written and oral communication in a clear, concise, and effective manner;

(D) demonstrate time management skills in prioritizing tasks, following schedules, and performing goal-relevant activities in a way that produces efficient results; and

(E) demonstrate punctuality, dependability, reliability, and responsibility in performing assigned tasks as directed.

(2) The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

(A) demonstrate safe practices during laboratory and field investigations; and

(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

(3) The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:

(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(4) of this section;

(B) know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;

(C) know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;

(D) distinguish between scientific hypotheses and scientific theories;

(E) plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;

(F) collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides,

stereoscopes, electronic balances, micropipettors, hand lenses, surgical and imagining equipment, thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, and models, diagrams, or samples of biological specimens or structures;

(G) analyze, evaluate, make inferences, and predict trends from data; and

(H) communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

(4) The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:

(A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking;

(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;

(C) draw inferences based on data related to promotional materials for products and services;

(D) evaluate the impact of scientific research on society and the environment; and

(E) evaluate models according to their limitations in representing objects or events.

(5) The student investigates engineering-related fields and career opportunities. The student is expected to:

(A) differentiate between engineering and engineering technology;

(B) compare the roles or job descriptions for career opportunities in the fields of pure science, engineering, and engineering technology;

(C) identify and differentiate between the different engineering disciplines; and

(D) demonstrate appropriate oral, written, and visual forms of technical communication.

(6) The student demonstrates an understanding of design problems and works individually and as a member of a team to solve design problems. The student is expected to:

(A) solve design problems individually and in a team;

(B) create solutions to existing problems using a design process;

(C) use a design brief to identify problem specifications and establish project constraints;

(D) use communication to achieve a desired goal within a team; and

(E) work as a member of a team to conduct research to develop a knowledge base, stimulate creative ideas, and make informed decisions.

(7) The student understands mechanisms, including simple and compound machines, and performs calculations related to mechanical advantage, drive ratios, work, and power. The student is expected to:

(A) explain the purpose and operation of components, including gears, sprockets, pulley systems, and simple machines;

(B) explain how components, including gears, sprockets, pulley systems, and simple machines, make up mechanisms;

(C) distinguish between the six simple machines and their attributes and components;

(D) measure forces and distances related to a mechanism;

(E) calculate work and power in mechanical systems;

(F) determine experimentally the efficiency of mechanical systems; and

(G) calculate mechanical advantage and drive ratios of mechanisms.

(8) The student understands energy sources, energy conversion, and circuits and performs calculations related to work and power. The student is expected to:

(A) identify and categorize energy sources as nonrenewable, renewable, or inexhaustible;

(B) define and calculate work and power in electrical systems;

(C) calculate power in a system that converts energy from electrical to mechanical; and

(D) define voltage, current, and resistance and calculate each quantity in series, parallel, and combination electrical circuits using Ohm's law.

(9) The student understands system energy requirements and how energy sources can be combined to convert energy into useful forms. The student understands the relationships among material conductivity, resistance, and geometry in order to calculate energy transfer and determine power loss and efficiency. The student is expected to:

(A) explain the purpose of energy management;

(B) evaluate system energy requirements in order to select the proper energy source;

(C) explain how multiple energy sources can be combined to convert energy into useful forms;

(D) describe how hydrogen fuel cells create electricity and heat and how solar cells create electricity;

(E) measure and analyze how thermal energy is transferred via convection, conduction, and radiation;

(F) analyze how thermal energy transfer is affected by conduction, thermal resistance values, convection, and radiation; and

(G) calculate resistance, efficiency, and power transfer in power transmission and distribution applications for various material properties.

(10) The student understands the interaction of forces acting on a body and performs calculations related to structural design. The student is expected to:

(A) illustrate, calculate, and experimentally measure all forces acting upon a given body;

(B) locate the centroid of structural members mathematically or experimentally;

(C) calculate moment of inertia of structural members;

(D) define and calculate static equilibrium;

(E) differentiate between scalar and vector quantities;

(F) identify properties of a vector, including magnitude and direction;

(G) calculate the X and Y components given a vector;

(H) calculate moment forces given a specified axis;

(I) calculate unknown forces using equations of equilibrium; and

(J) calculate external and internal forces in a statically determinate truss using translational and rotational equilibrium equations.

(11) The student understands material properties and the importance of choosing appropriate materials for design. The student is expected to:

(A) conduct investigative non-destructive material property tests on selected common household products;

(B) calculate and measure the weight, volume, mass, density, and surface area of selected common household products; and

(C) identify the manufacturing processes used to create selected common household products.

(12) The student uses material testing to determine a product's function and performance. The student is expected to:

(A) use a design process and mathematical formulas to solve and document design problems;

(B) obtain measurements of material samples such as length, width, height, and mass;

(C) use material testing to determine a product's reliability, safety, and predictability in function;

(D) identify and calculate test sample material properties using a stress-strain curve; and

(E) identify and compare measurements and calculations of sample material properties such as elastic range, proportional limit, modulus of elasticity, elastic limit, resilience, yield point, plastic deformation, ultimate strength, failure, and ductility using stress-strain data points.

(13) The student understands that control systems are designed to provide consentient process control and reliability and uses computer software to create flowcharts and control system operating programs. The student is expected to:

(A) create detailed flowcharts using a computer software application;

(B) create control system operating programs using computer software;

(C) create system control programs that use flowchart logic;

(D) select appropriate input and output devices based on the need of a technological system; and

(E) judge between open- and closed-loop systems in order to select the most appropriate system for a given technological problem.

(14) The student demonstrates an understanding of fluid power systems and calculates values in a variety of systems. The student is expected to:

(A) identify and explain basic components and functions of fluid power devices;

(B) differentiate between pneumatic and hydraulic systems and between hydrodynamic and hydrostatic systems;

(C) use Pascal's Law to calculate values in a fluid power system;

(D) distinguish between gauge pressure and absolute pressure and between temperature and absolute temperature;

(E) calculate values in a pneumatic system using the ideal gas laws; and

(F) calculate flow rate, flow velocity, and mechanical advantage in a hydraulic system.

(15) The student demonstrates an understanding of statistics and applies the concepts to real-world engineering design problems. The student is expected to:

(A) calculate the theoretical probability that an event will occur;

(B) calculate the experimental frequency distribution of an event occurring;

(C) apply the Bernoulli process to events that only have two distinct possible outcomes;

(D) apply AND, OR, and NOT logic to solve complex probability scenarios;

(E) apply Bayes's theorem to calculate the probability of multiple events occurring;

(F) calculate the central tendency of a data array, including mean, median, and mode;

(G) calculate data variation, including range, standard deviation, and variance; and

(H) create a histogram to illustrate frequency distribution.

(16) The student demonstrates an understanding of kinematics in one and two dimensions and applies the concepts to real-world engineering design problems. The student is expected to:

(A) calculate distance, displacement, speed, velocity, and acceleration from data;

(B) calculate experimentally the acceleration due to gravity given data from a free-fall device;

(C) calculate the X and Y components of an object in projectile motion; and

(D) determine the angle needed to launch a projectile a specific range given the projectile's initial velocity.]

[§127.761. Fundamentals of Computer Science (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 Science, Technology, Engineering, and Mathematics (STEM) Career Cluster focuses on planning, managing, and providing scientific research and professional and technical services, including laboratory and testing services, and research and development services.

(3) Fundamentals of Computer Science is intended as a first course for those students just beginning the study of computer science. Students will learn about the computing tools that are used every day. Students will foster their creativity and innovation through opportunities to design, implement, and present solutions to real-world problems. Students will collaborate and use computer science concepts to access, analyze, and evaluate information needed to solve problems. Students will learn the problem-solving and reasoning skills that are the foundation of computer science. By using computer science knowledge and skills that support 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. Students will learn digital citizenship by researching current laws and regulations and by practicing integrity and respect. Students will gain an understanding of the principles of computer science through the study of technology operations and concepts. 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 develops products and generates new understanding by extending existing knowledge. The student is expected to:

(A) investigate and explore various career opportunities within the computer science field and report findings through various media;

(B) create and publish interactive stories, games, and animations;

(C) create and publish interactive animations;

(D) create algorithms for the solution of various problems;

(E) create web pages using a mark-up language;

(F) use the Internet to create and publish solutions; and

(G) design creative and effective user interfaces.

(2) Communication and collaboration. The student communicates and collaborates with peers to contribute to his or her own learning and the learning of others. The student is expected to:

(A) seek and respond to advice from peers and professionals in evaluating problem solutions;

(B) debug and solve problems using reference materials and effective strategies; and

(C) publish information in a variety of ways such as print, monitor display, web pages, and video.

(3) Research and information fluency. The student locates, analyzes, processes, and organizes data. The student is expected to:

(A) construct appropriate electronic search strategies; and

(B) use a variety of resources, including other subject areas, together with various productivity tools to gather authentic data as a basis for individual and group programming projects.

(4) Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:

(A) demonstrate the ability to insert applets into web pages;

(B) find, download, and insert scripting code into web pages to enhance interactivity;

(C) understand binary representation of data in computer systems, perform conversions between decimal and binary number systems, and count in binary number systems;

(D) read and define a problem's description, purpose, and goals;

(E) demonstrate coding proficiency in a contemporary programming language by developing solutions that create stories, games, and animations;

(F) choose, identify, and use the appropriate data type to properly represent data in a problem solution;

(G) demonstrate an understanding of and use variables within a programmed story, game, or animation;

(H) demonstrate proficiency in the use of arithmetic operators to create mathematical expressions, including addition, subtraction, multiplication, real division, integer division, and modulus division;

(I) demonstrate an understanding of and use sequence within a programmed story, game, or animation;

(J) demonstrate an understanding of and use conditional statements within a programmed story, game, or animation;

(K) demonstrate an understanding of and use iteration within a programmed story, game, or animation;

(L) create an interactive story, game, or animation;

(M) use random numbers within a programmed story, game, or animation; and

(N) test program solutions by investigating valid and invalid data.

(5) Digital citizenship. The student explores and understands safety, legal, cultural, and societal issues relating to the use of technology and information. The student is expected to:

(A) discuss copyright laws/issues and model ethical acquisition of digital information by citing sources using established methods;

(B) demonstrate proper digital etiquette and knowledge of acceptable use policies when using networks, especially resources on the Internet and on intranets;

(C) investigate measures such as passwords or virus detection/prevention to protect computer systems and databases from unauthorized use and tampering;

(D) understand the safety risks associated with the use of social networking sites;

(E) discuss the impact of computing and computing related advancements on society; and

(F) determine the reliability of information available through electronic media.

(6) Technology operations and concepts. The student understands technology concepts, systems, and operations as they apply to computer science. The student is expected to:

(A) demonstrate knowledge of the basic computer components, including a central processing unit (CPU), storage, and input/output devices;

(B) use operating system tools, including appropriate file management;

(C) demonstrate knowledge and appropriate use of different operating systems;

(D) demonstrate knowledge and understanding of basic network connectivity;

(E) describe, compare, and contrast the differences between an application and an operating system; and

(F) compare, contrast, and appropriately use various input, processing, output, and primary/secondary storage devices.]

[§127.764. Computer Science III (One Credit).]

[(a) General requirements. Students shall be awarded one credit for successful completion of this course. Prerequisite: Computer Science II, Advanced Placement (AP) Computer Science A, or International Baccalaureate (IB) Computer Science. This course is recommended for students in Grades 11 and 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 Science, Technology, Engineering, and Mathematics (STEM) Career Cluster focuses on planning, managing, and providing scientific research and professional and technical services, including laboratory and testing services, and research and development services.

(3) Computer Science III will foster students' creativity and innovation by presenting opportunities to design, implement, and present meaningful programs through a variety of media. Students will collaborate with one another, their instructor, and various electronic communities to solve the problems presented throughout the course. Through data analysis, students will identify task requirements, plan search strategies, and use computer science concepts to access, analyze, and evaluate information needed to solve problems. By using computer science knowledge and skills that support 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. Students will learn digital citizenship by researching current laws and regulations and by practicing integrity and respect. Students will gain an understanding of advanced computer science data structures through the study of technology operations, systems, and concepts. 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) 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.

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

(c) Knowledge and skills.

(1) Creativity and innovation. The student develops products and generates new understandings by extending existing knowledge. The student is expected to:

(A) apply data abstraction and encapsulation to manage complexity;

(B) implement a student-created class hierarchy;

(C) read and write class specifications using visual organizers, including Unified Modeling Language;

(D) use black box programming methodology;

(E) design, create, and use interfaces to apply protocols;

(F) identify, describe, design, create, evaluate, and compare standard sorting algorithms that perform sorting operations on data structures, including quick sort and heap sort;

(G) select, identify, and use the appropriate abstract data type, advanced data structure, and supporting algorithms to properly represent the data in a program problem solution; and

(H) manage complexity by using a systems approach.

(2) Communication and collaboration. The student communicates and collaborates with peers to contribute to his or her own learning and the learning of others. The student is expected to:

(A) use local area networks (LANs) and wide area networks (WANs), including the Internet and intranets, in research, file management, and collaboration;

(B) create interactive human interfaces to acquire data from a user and display program results using an advanced Graphical User Interface (GUI);

(C) write programs and communicate with proper programming style to enhance the readability and functionality of the code by using meaningful descriptive identifiers, internal comments, white space, indentation, and a standardized program style; and

(D) work in software design teams.

(3) Research and information fluency. The student locates, analyzes, processes, and organizes data. The student is expected to:

(A) identify and use the structured data type of arrays of objects to traverse, search, modify, insert, and delete data;

(B) identify and use two-dimensional ragged arrays to traverse, search, modify, insert, and delete data;

(C) identify and use a list object data structure, including vector, to traverse, search, insert, and delete object data;

(D) understand and trace a linked list data structure;

(E) create program solutions using a linked list data structure, including unordered single, ordered single, double, and circular linked;

(F) understand composite data structures, including a linked list of linked lists;

(G) understand and create program solutions using stacks, queues, trees, heaps, priority queues, graph theory, and enumerated data types;

(H) understand and create program solutions using sets, including HashSet and TreeSet;

(I) understand and create program solutions using maps, including HashMap and TreeMap; and

(J) write and modify text file data.

(4) Critical thinking, problem solving, and decision making. The student uses appropriate strategies to analyze problems and design algorithms. The student is expected to:

(A) develop choice algorithms using selection control statements, including break, label, and continue;

(B) demonstrate proficiency in the use of the bitwise operators;

(C) develop iterative algorithms using do-while loops;

(D) demonstrate proficiency in the use of the ternary operator;

(E) create program solutions that use iterators;

(F) identify, trace, and appropriately use recursion;

(G) understand and create program solutions using hashing;

(H) perform pattern recognition using regular expressions;

(I) explore common algorithms, including matrix addition and multiplication, fractals, Towers of Hanoi, and magic square;

(J) create program solutions that exhibit robust behavior by understanding and avoiding runtime errors and handling anticipated errors;

(K) understand object-oriented design concepts of inner classes, outer classes, and anonymous classes;

(L) use object reference scope identifiers, including null, this, and super;

(M) provide object functionality to primitive data types;

(N) write program assumptions in the form of assertions;

(O) write a Boolean expression to test a program assertion; and

(P) construct assertions to make explicit program invariants.

(5) Digital citizenship. The student explores and understands safety, legal, cultural, and societal issues relating to the use of technology and information. The student is expected to:

(A) model ethical acquisition and use of digital information; and

(B) demonstrate proper digital etiquette, responsible use of software, and knowledge of acceptable use policies.

(6) Technology operations and concepts. The student understands technology concepts, systems, and operations as they apply to computer science. The student is expected to:

(A) compare and contrast high-level programming languages;

(B) create a small workgroup network;

(C) create and apply a basic network addressing scheme; and

~~(D) create discovery programs in a low-level language, high-level language, and scripting language.~~]

Chapter 130. Texas Essential Knowledge and Skills for Career and Technical Education

Subchapter J. Human Services

[§130.277. Child Development (One Credit), Adopted 2015.]

[(a) General requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Principles of Human Services. 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 Human Services Career Cluster focuses on preparing individuals for employment in career pathways that relate to families and human needs such as counseling and mental health services, family and community services, personal care services, and consumer services.

(3) Child Development is a technical laboratory course that addresses knowledge and skills related to child growth and development from prenatal through school-age children, equipping students with child development skills. Students use these skills to promote the well-being and healthy development of children and investigate careers related to the care and education of children.

(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) apply interpersonal communication skills in business and industry settings;

(B) explain and recognize the value of collaboration within the workplace;

(C) examine the importance of time management to succeed in the workforce;

(D) identify work ethics and professionalism in a job setting; and

(E) develop problem-solving and critical-thinking skills.

(2) The student analyzes roles and responsibilities of parenting. The student is expected to:

(A) identify parenting skills and responsibilities;

(B) investigate the legal rights and responsibilities of parents;

(C) analyze relationship and communication skills needed for parenting; and

(D) explore the parental responsibilities of educating children.

(3) The student examines the protection and safety of children. The student is expected to:

(A) recognize the signs of domestic violence;

(B) demonstrate first aid and cardiopulmonary resuscitation skills;

(C) evaluate community resources relevant to the care and protection of children, including child care services, health care services, and organizations;

(D) examine appropriate health care for children, including immunizations;

(E) assess the safety of children's cribs, toys, clothing, and food; and

(F) discuss legislation and public policies affecting children.

(4) The student investigates components of optimal prenatal care and development. The student is expected to:

(A) identify signs and stages of pregnancy;

(B) analyze the effect of environmental and hereditary factors on fetal development, including prenatal brain development;

(C) describe nutritional needs prior to and during pregnancy;

(D) analyze appropriate medical care and good health practices prior to and during pregnancy;

(E) explore technological advances in prenatal care and development; and

(F) analyze the process of labor and delivery.

(5) The student investigates strategies for optimizing the development of infants, including those with special needs. The student is expected to:

(A) explain the physical, emotional, social, and intellectual needs of the infant;

(B) investigate the impact of the infant on the family in areas such as roles, finances, responsibilities, and relationships;

(C) identify typical growth and development of infants such as brain development;

(D) identify appropriate nutritional needs for infants; and

(E) discuss the advantages of breast feeding.

(6) The student investigates strategies for optimizing the development of toddlers, including those with special needs. The student is expected to:

(A) analyze the physical, emotional, social, and intellectual needs of the toddler;

(B) create play activities such as mathematics, science, physical movement, outdoor play, art, and music that enhance a toddler's growth and development;

(C) identify patterns of typical growth and development of toddlers; and

(D) prepare snacks or meals that meet appropriate nutritional guidelines for toddlers.

(7) The student analyzes the growth and development of preschool children, including those with special needs. The student is expected to:

(A) analyze the physical, emotional, social, and intellectual needs of the preschool child;

(B) describe the role of play in a preschool child's growth and development;

(C) develop activities such as physical exercise or group play that meet developmental needs of preschool children;

(D) prepare snacks or meals that meet appropriate nutritional guidelines for preschool children; and

(E) identify appropriate licensing regulations for preschools.

(8) The student analyzes the growth and development of school-age children, including those with special needs. The student is expected to:

(A) analyze the physical, emotional, social, and intellectual needs of the school-age child;

(B) assess the role of the school environment on the growth and development of the school-age child;

~~(C) evaluate the importance of individual and group identification to the growth and development of school-age children;~~

~~(D) develop appropriate activities for meeting developmental needs of school-age children such as physical exercise, language development, communication, listening skills, independence, conflict resolution, and self-discipline;~~

~~(E) create recipes for nutritious snacks or meals appropriate for preparation by school-age children;~~

~~(F) explore careers involving school-age children;~~

~~(G) discuss legislation and public policies affecting school-age children; and~~

~~(H) propose short- and long-term career goals in child development.~~]