

ATTACHMENT
Text of Proposed New 19 TAC

Chapter 127. Texas Essential Knowledge and Skills for Career Development

Subchapter G. Education and Training

§127.317. Child Development (One Credit), Adopted 2021.

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2022-2023 school year.
- (1) No later than August 31, 2022, 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 identified in this section.
 - (2) If the commissioner makes the determination that instructional materials funding has been made available this section shall be implemented beginning with the 2022-2023 school year and apply to the 2022-2023 and subsequent school years.
 - (3) If the commissioner does not make the determination that instructional materials funding has been made available under this subsection, 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 this section shall be implemented for the following school year.
- (b) General requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Principles of Human Services or Principles of Education and Training. Students shall be awarded one credit for successful completion of this course.
- (c) Introduction.
- (1) Career and technical education instruction provides content aligned with challenging academic standards, industry-relevant technical knowledge, and college and career readiness skills for students to further their education and succeed in current and 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) Child Development is a course that addresses knowledge and skills related to child growth and development from prenatal through school-age children. 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.
- (d) 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 the value of and demonstrate collaboration within the work environment;
 - (C) apply productive work habits, including time management, organization, initiative, and self-direction;

- (D) identify work ethics and professional skills needed in a work environment; and
 - (E) identify and demonstrate problem-solving, creativity, and critical-thinking skills needed within the work environment.
- (2) The student analyzes roles and responsibilities of caregivers or guardians. The student is expected to:
- (A) compare parenting styles and the potential influence of each style on a child's development;
 - (B) investigate the legal rights and responsibilities of parents;
 - (C) analyze positive relationship characteristics and developmentally appropriate communication skills needed for parenting; and
 - (D) analyze the parental responsibilities of educating children through the continuum of developmental stages.
- (3) The student examines the care, protection, and safety of children. The student is expected to:
- (A) analyze the effects of childhood trauma at each developmental stage;
 - (B) describe the counseling and therapeutic services available to children such as pharmacotherapy and cognitive-behavioral, family, trauma-focused, and play therapy;
 - (C) demonstrate first aid and cardiopulmonary resuscitation skills;
 - (D) analyze community resources relevant to the care and protection of children, including childcare services, health care services, and auxiliary service organizations;
 - (E) examine suggested preventative health care recommendations for children such as American Academy of Pediatrics (AAP) and Centers for Disease Control and Prevention (CDC) guidelines and recommendations for immunizations, physical exams, and oral hygiene;
 - (F) assess the safety of children's cribs, toys, clothing, food, and travel safety equipment; and
 - (G) identify current legislation and public policies affecting the care, protection, and safety of 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 conception and fetal development, including prenatal brain development;
 - (C) identify characteristics of, contributing factors to, and treatment of various fetal birth defects, including defects of unknown ideology;
 - (D) analyze nutritional needs prior to and during pregnancy;
 - (E) analyze appropriate medical care and good health practices prior to and during pregnancy;
 - (F) explain how technological advances in prenatal care can impact child development;
 - (G) explore careers that provide service to those receiving prenatal care; and
 - (H) analyze the process of labor and delivery methods.
- (5) The student investigates strategies for optimizing the development of children ages birth through 12 months, including those with special needs. The student is expected to:
- (A) analyze the physical, emotional, social, intellectual, and moral developmental needs of children ages birth through twelve months;

- (B) investigate the impact of children ages birth through twelve months on the family such as the impact on roles, finances, responsibilities, and relationships in the family;
 - (C) analyze the impact of technology such as personal usage or exposure and assistive technologies on the growth and development of children ages birth through 12 months;
 - (D) explore careers that provide service to children ages birth through twelve months; and
 - (E) identify appropriate nutrition and ways to meet nutritional needs, including breast feeding and formula feeding, and considerations related to food allergies for children ages birth through twelve months.
- (6) The student investigates strategies for optimizing the development of children ages 13 months through 35 months, including those with special needs. The student is expected to:
- (A) analyze the physical, emotional, social, intellectual, and moral developmental needs of children ages 13 months through 35 months;
 - (B) create play activities such as pre-literacy, social emotional learning, mathematics, science, physical movement, outdoor play, art, and music activities that enhance the growth and development of children ages 13 months through 35 months;
 - (C) analyze the impact of technology such as personal usage and assistive technologies on the growth and development of children ages 13 months through 35 months;
 - (D) analyze appropriate nutritional guidelines that promote wellness in children ages 13 months through 35 months;
 - (E) explore careers that provide service to children ages 13 months through 35 months; and
 - (F) prepare or plan developmentally appropriate snacks or meals that meet appropriate nutritional guidelines for children ages 13 months through 35 months.
- (7) The student analyzes the growth and development of children ages 3 through 5 years, including those with special needs. The student is expected to:
- (A) analyze the physical, emotional, social, intellectual, and moral development needs of the children ages 3 through 5 years;
 - (B) describe the role of play in the development of children ages 3 through 5 years;
 - (C) develop activities such as physical exercise or group play activities that meet developmental needs of children ages 3 through 5 years;
 - (D) prepare or plan developmentally appropriate snacks or meals that meet appropriate nutritional guidelines for children ages 3 through 5 years;
 - (E) identify minimum standards for licensing regulations of various preschools and childcare settings such as in-home, private, public, and religious organizations;
 - (F) explore careers that provide service to children ages 3 through 5 years; and
 - (G) analyze the impact of technology on the growth and development of children ages 3 through 5 years such as personal usage, assistive technologies, and digital citizenship.
- (8) The student analyzes the growth and development of children ages 6 through 11 years, including those with special needs. The student is expected to:
- (A) analyze the physical, emotional, social, intellectual, and moral development needs of children ages 6 through 11 years;
 - (B) compare the roles of various school environments such as public, private, and home settings in the growth and development of children ages 6 through 11 years;

- (C) evaluate the importance of and influences on individual and group identity such as self-concept theories, learning styles, group dynamics, cultural influences, and societal norms in relation to the growth and development of children ages 6 through 11 years;
 - (D) develop appropriate activities for meeting developmental needs of children ages 6 through 11 years such as physical exercise, language development, communication, listening skills, independence, conflict resolution, and self-discipline;
 - (E) create balanced meal plans that are developmentally appropriate for children ages 6 through 11 years, including children with special dietary needs such as food allergies and type I diabetes;
 - (F) explore careers that provide service to children ages 6 through 11 years;
 - (G) discuss legislation and public policies affecting children ages 6 through 11 years; and
 - (H) analyze the impact of technology on the growth and development of children ages 6 through 11 years such as personal usage, assistive technologies, and digital citizenship.
- (9) The student analyzes the growth and development of children ages 12 through 19 years, including those with special needs. The student is expected to:
- (A) summarize the physical, emotional, social, intellectual, and moral needs of children ages 12 through 19 years;
 - (B) assess the role of the various school environments such as public, private, and home environments on the growth and development of children ages 12 through 19 years;
 - (C) evaluate the importance of and influences on individual and group identity such as self-concept theories, group dynamics, cultural influences, and societal norms in relation to the growth and development of children ages 12 through 19 years;
 - (D) develop appropriate activities for meeting developmental needs of children ages 12 through 19 years such as physical, academic, professional, and social skills;
 - (E) create recipes for nutritious snacks or meals appropriate for preparation by children ages 12 through 19 years, including snacks or meals for individuals with special dietary needs such as food allergies or type I diabetes;
 - (F) explore careers that provide service to children ages 12 through 19 years;
 - (G) discuss legislation, child labor laws, and public policies affecting children ages 12 through 19 years;
 - (H) analyze the impact of technology such as personal usage, assistive technologies, digital citizenship, digital footprints, and social media on the growth and development of children ages 12 through 19 years; and
 - (I) propose short- and long-term career goals in child development.

§127.318. Child Guidance (Two Credits), Adopted 2021.

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2024-2025 school year.
 - (1) No later than August 31, 2024, 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 identified in this section.
 - (2) If the commissioner makes the determination that instructional materials funding has been made available this section shall be implemented beginning with the 2024-2025 school year and apply to the 2024-2025 and subsequent school years.
 - (3) If the commissioner does not make the determination that instructional materials funding has been made available under this subsection, 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 this section shall be implemented for the following school year.

(b) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisite: Child Development or Child Development Associate Foundations. Students shall be awarded two credits for successful completion of this course.

(c) Introduction.

(1) Career and technical education instruction provides content aligned with challenging academic standards, industry-relevant technical knowledge, and college and career readiness skills for students to further their education and succeed in current and 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) Child Guidance is a course that addresses the knowledge and skills related to child growth and guidance, equipping students to develop positive relationships with children and effective caregiver skills. Students use these skills to promote the well-being and healthy development of children, strengthen a culturally diverse society, and pursue careers related to the care, guidance, and education of children, including those with special needs. Instruction may be delivered through school-based laboratory training or through work-based delivery arrangements such as cooperative education, mentoring, and job shadowing.

(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.

(d) Knowledge and skills.

(1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:

(A) demonstrate effective verbal, nonverbal, written, and electronic communication skills;

(B) demonstrate effective collaboration skills within the workplace;

(C) identify characteristics of effective leaders and team members;

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

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

(E) use appropriate problem-solving and critical-thinking skills.

(2) The student practices ethical and legal responsibilities associated with providing childcare services. The student is expected to:

(A) apply ethical codes of conduct in a childcare setting;

(B) create coherent written communication between parents and childcare staff;

(C) identify regulatory and compliance guidelines for maintaining documentation in childcare settings, including educational, personnel, and public records;

(D) advocate through appropriate means for children when necessary;

(E) comply with laws and regulations related to childcare services;

(F) determine potential uses and management of technology, media, and resources to foster healthy child development; and

(G) employ safeguards to prevent misuse and abuse of technology and media with children.

- (3) The student analyzes childcare options for children of various ages. The student is expected to:
- (A) compare the financial considerations of childcare options;
 - (B) examine criteria for selecting quality childcare; and
 - (C) review minimum standards for licensing and regulations for center-based and home-based programs.
- (4) The student analyzes responsibilities that promote health and wellness of children. The student is expected to:
- (A) monitor student behavior for signs of physical illness and emotional disturbances in children;
 - (B) practice child guidance techniques that contribute to the health and wellness of children such as adequate rest, exercise, safety, and sanitation;
 - (C) apply procedures for creating safe environments for children; and
 - (D) create a meal plan for children, including nutritious snacks, following appropriate food guidelines.
- (5) The student analyzes the effect of play in the development of children. The student is expected to:
- (A) create examples of play that promote the physical, intellectual, emotional, and social development of children; and
 - (B) implement strategies to encourage socially appropriate constructive and creative play, including indoor and outdoor activities.
- (6) The student applies appropriate guidance techniques for children of various ages and developmental levels, including those with special needs. The student is expected to:
- (A) discuss the various types of guidance and their effects on children;
 - (B) determine and apply appropriate guidance techniques; and
 - (C) distinguish between guidance techniques and behavior that could be considered inappropriate, harmful, or abusive.
- (7) The student will implement appropriate strategies and practices for optimizing the development of children ages birth through twelve months, including those with special needs. The student is expected to:
- (A) create and implement activities for the development of sensory skills;
 - (B) create and implement activities for the development of language skills;
 - (C) create and implement activities for the development of physical and motor skills; and
 - (D) create and implement activities for the development of social skills.
- (8) The student will implement appropriate strategies and practices for optimizing the development of children ages 13 months through 35 months, including those with special needs. The student is expected to:
- (A) create and implement lesson plans for the development of physical skills;
 - (B) create and implement lesson plans for the development of vocabulary and language skills;
 - (C) create and implement lesson plans for the development of appropriate mathematics skills;
 - (D) create and implement lesson plans for the development of appropriate science skills; and
 - (E) create and implement lesson plans for the development of social and emotional skills.
- (9) The student will implement appropriate strategies and practices for optimizing the development of children ages 3 through 5 years, including those with special needs. The student is expected to:

- (A) create and implement lesson plans for the development of physical skills;
 - (B) create and implement lesson plans for the development of appropriate reading and language skills;
 - (C) create and implement lesson plans for the development of appropriate mathematics and problem-solving skills;
 - (D) create and implement lesson plans for the development of appropriate science skills; and
 - (E) create and implement lesson plans for the development of social and emotional skills.
- (10) The student makes informed career decisions that reflect personal, family, and career goals. The student is expected to:
- (A) analyze the impact of career decisions on personal and family goals;
 - (B) assess personal interests, aptitudes, and abilities needed in the childcare profession;
 - (C) develop short- and long-term career goals;
 - (D) evaluate employment and entrepreneurial opportunities; and
 - (E) evaluate educational requirements for early childhood development and services.

§127.323. Human Growth and Development (One Credit), Adopted 2021.

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2024-2025 school year.
- (1) No later than August 31, 2024, 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 identified in this section.
 - (2) If the commissioner makes the determination that instructional materials funding has been made available this section shall be implemented beginning with the 2024-2025 school year and apply to the 2024-2025 and subsequent school years.
 - (3) If the commissioner does not make the determination that instructional materials funding has been made available under this subsection, 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 this section shall be implemented for the following school year.
- (b) General requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Principles of Education and Training or Principles of Human Services. Students shall be awarded one credit for successful completion of this course.
- (c) Introduction.
- (1) Career and technical education instruction provides content aligned with challenging academic standards, industry-relevant technical knowledge, and college and career readiness skills for students to further their education and succeed in current and 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) Human Growth and Development is an examination of human development across the lifespan with emphasis on research, theoretical perspectives, and common physical, cognitive, emotional, and social developmental milestones. Students use the knowledge and skills gained in this course to prepare for a career path working with children in an educational or service learning setting. The course covers material that is generally taught in a postsecondary, one-semester introductory course in developmental psychology or human development.

- (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.
- (d) 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 skills;
 - (B) perform job-appropriate numerical and arithmetic applications;
 - (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) describe and apply conflict management skills;
 - (H) describe and demonstrate effective leadership skills;
 - (I) update a professional portfolio with portfolio components such as a resume and samples of work;
 - (J) demonstrate professionalism; and
 - (K) describe effective work ethic practices.
 - (2) The student understands historical, theoretical, and research perspectives of human growth and development throughout the lifespan. The student is expected to:
 - (A) explain the role of theories in understanding human development;
 - (B) describe theoretical perspectives regarding influences on human development throughout the lifespan;
 - (C) summarize how historical theories influence modern theories of human development;
 - (D) compare research methods commonly used to study human development; and
 - (E) compare pedagogy and andragogy.
 - (3) The student understands the importance of prenatal care in the development of a child. The student is expected to:
 - (A) describe nutritional needs prior to and during pregnancy;
 - (B) explain reasons for medical care and good health practices prior to and during pregnancy;
 - (C) outline stages of prenatal development;
 - (D) discuss the role of genetics in prenatal development; and
 - (E) identify environmental factors affecting development of the fetus.
 - (4) The student understands the development of children ages newborn through two years. The student is expected to:
 - (A) analyze the physical, emotional, social, and cognitive development of infants and toddlers;
 - (B) analyze various developmental theories relating to infants and toddlers;

- (C) investigate the influences of the family and society on the infant and toddler;
 - (D) summarize strategies for optimizing the development of infants and toddlers, including those with special needs;
 - (E) determine techniques that promote the health and safety of infants and toddlers; and
 - (F) determine developmentally appropriate guidance techniques for children in the first two years of life.
- (5) The student understands the development of children ages 3 through 5 years. The student is expected to:
- (A) analyze the physical, emotional, social, and cognitive development of preschoolers;
 - (B) analyze various developmental theories relating to preschoolers;
 - (C) investigate the influences of the family and society on preschoolers;
 - (D) summarize strategies for optimizing the development of preschoolers, including those with special needs;
 - (E) determine techniques that promote the health and safety of preschoolers; and
 - (F) compare and suggest developmentally appropriate guidance techniques for preschoolers.
- (6) The student understands the development of children ages 6 through 11 years. The student is expected to:
- (A) analyze the physical, emotional, social, and cognitive development of children in the early to middle childhood stage of development;
 - (B) analyze various developmental theories relating to children in the early to middle childhood stage of development;
 - (C) investigate the influences of the family and society on children in the early to middle childhood stage of development;
 - (D) summarize strategies for optimizing the development of children in the early to middle childhood stage of development, including those with special needs;
 - (E) determine techniques that promote the health and safety of children in the early to middle childhood stage of development; and
 - (F) compare and suggest developmentally appropriate guidance techniques for children in the early to middle childhood stage of development.
- (7) The student understands the development of adolescents ages 12 through 19 years. The student is expected to:
- (A) analyze the biological and cognitive development of adolescents;
 - (B) analyze the emotional and social development of adolescents;
 - (C) discuss various theoretical perspectives relevant to adolescent growth and development;
 - (D) investigate the influences of the family and society on adolescents;
 - (E) summarize strategies for optimizing the development of adolescents, including those with special needs;
 - (F) determine techniques that promote the health and safety of adolescents; and
 - (G) compare and suggest developmentally appropriate guidance techniques for adolescents.
- (8) The student understands the importance of care and protection of children and adolescents. The student is expected to:

- (A) determine services provided by agencies that protect the rights of children and adolescents;
 - (B) summarize various resources focusing on the care and protection of children and adolescents;
 - (C) discuss the impact of changing demographics and cultural diversity on the health and welfare of children and adolescents;
 - (D) analyze forms, causes, effects, prevention, and treatment of child abuse;
 - (E) explain the impact of appropriate health care and importance of safety for children and adolescents; and
 - (F) discuss responsibilities of community members, legislation, and public policies related to care and protection of children and adolescents.
- (9) The student understands the development of adults ages 20 through 39 years. The student is expected to:
- (A) analyze various development theories relating to early adults, including biological and cognitive development;
 - (B) analyze various development theories relating to early adults, including emotional, moral, and psychosocial development;
 - (C) investigate the influences of society and culture on early adults; and
 - (D) discuss the importance of family, human relationships, and social interaction for early adults.
- (10) The student understands the development of adults ages 40 through 65 years. The student is expected to:
- (A) analyze various development theories relating to middle adults, including biological and cognitive development;
 - (B) analyze various development theories relating to middle adults, including emotional, moral, and psychosocial development;
 - (C) investigate the influences of society and culture on middle adults; and
 - (D) discuss the importance of family, human relationships, and social interaction for middle adults.
- (11) The student understands the development of adults ages 66 years and older. The student is expected to:
- (A) analyze various development theories relating to those within the stage of late adulthood, including biological and cognitive development;
 - (B) analyze various development theories relating to those within the stage of late adulthood, including emotional, moral, and psychosocial development;
 - (C) investigate the influences of society and culture on those within the stage of late adulthood; and
 - (D) discuss the importance of family, human relationships, and social interaction for those within the stage of late adulthood.
- (12) The student explores career opportunities available in education and training and human services. The student is expected to:
- (A) assess personal interests, aptitudes, and abilities as related to the various occupations within education and training and human services;

- (B) evaluate employment and entrepreneurial opportunities, including education requirements in a field of interest; and
- (C) identify effective methods for securing part-time or entry-level employment in positions that prepare students for careers in education and training or human services.

ATTACHMENT
Text of Proposed New 19 TAC

Chapter 127. Texas Essential Knowledge and Skills for Career Development

Subchapter O. Science, Technology, Engineering, and Mathematics

§127.783. Engineering Design and Presentation I (One Credit), Adopted 2022.

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2024-2025 school year.
- (1) No later than August 31, 2024, 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 identified in this section.
 - (2) If the commissioner makes the determination that instructional materials funding has been made available this section shall be implemented beginning with the 2024-2025 school year and apply to the 2024-2025 and subsequent school years.
 - (3) If the commissioner does not make the determination that instructional materials funding has been made available under this subsection, 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 this section shall be implemented for the following school year.
- (b) General requirements. This course is recommended for students in Grades 10-12. Prerequisite: Algebra I and at least one credit in a course from the science, technology, engineering, and mathematics career cluster. Recommended prerequisite: Principles of Applied Engineering. Students shall be awarded one credit for successful completion of this course.
- (c) Introduction.
- (1) Career and technical education instruction provides content aligned with challenging academic standards, industry-relevant technical knowledge, and college and career readiness skills for students to further their education and succeed in current and 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) Students enrolled in Engineering Design and Presentation I will demonstrate knowledge and skills of the design process as it applies to engineering fields and project management using multiple software applications and tools necessary to produce and present working drawings, solid model renderings, and prototypes. Through implementation of the design process, students will transfer advanced academic skills to component designs. Additionally, students will explore career opportunities in engineering, technology, and drafting and what is required to gain and maintain employment in these areas.
 - (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.
- (d) 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 and work site;
 - (B) cooperate, contribute, and collaborate as a member of a group to attain agreement and achieve a collective outcome;
 - (C) present written and oral communication in a clear, concise, and effective manner, including explaining and justifying actions;
 - (D) use time-management skills in prioritizing tasks, following schedules, and tending to goal-relevant activities in a way that optimizes efficiency and results; and
 - (E) demonstrate punctuality, dependability, reliability, and responsibility in reporting for duty and performing assigned tasks as directed.
- (2) The student gains knowledge of and demonstrates the skills necessary for success in the workplace. The student is expected to:
- (A) distinguish between an engineering technician, engineering technologist, and engineer;
 - (B) identify employment and career opportunities in engineering and describe the educational requirements for each;
 - (C) investigate and describe the requirements of industry-based certifications in engineering;
 - (D) demonstrate the principles of teamwork related to engineering and technology;
 - (E) research and describe governmental regulations, including health and safety;
 - (F) analyze ethical issues related to engineering and technology and incorporate proper ethics in submitted projects;
 - (G) demonstrate respect for diversity in the workplace;
 - (H) identify consequences relating to discrimination, harassment, and inequality;
 - (I) demonstrate effective oral and written communication skills using a variety of software applications and media; and
 - (J) investigate and present on career preparation learning experiences, including job shadowing, mentoring, and apprenticeship training.
- (3) The student participates in team projects in various roles. The student is expected to:
- (A) describe the various roles on an engineering team and discuss how teams function;
 - (B) apply teamwork to solve problems; and
 - (C) serve as both a team leader and member and demonstrate appropriate attitudes while participating in team projects.
- (4) The student develops skills for managing a project. The student is expected to:
- (A) implement project management methodologies, including initiating, planning, executing, monitoring and controlling, and closing a project;
 - (B) develop a project schedule and complete work according to established criteria;
 - (C) participate in the organization and operation of a real or simulated engineering project; and
 - (D) develop a plan for production of an individual product.
- (5) The student practices safe and proper work habits. The student is expected to:
- (A) master relevant safety tests;
 - (B) comply with safety guidelines as described in various manuals, instructions, and regulations;

- (C) identify and classify hazardous materials and wastes according to Occupational Safety and Health Administration (OSHA) regulations;
 - (D) describe the appropriate disposal of hazardous materials and wastes appropriately;
 - (E) perform maintenance on selected tools, equipment, and machines;
 - (F) handle and store tools and materials correctly; and
 - (G) describe the results of negligent or improper maintenance.
- (6) The student applies skills associated with computer-aided drafting and design. The student is expected to:
- (A) use single and multi-view projections;
 - (B) use orthographic and pictorial views;
 - (C) use auxiliary views;
 - (D) use section views;
 - (E) use advanced construction techniques;
 - (F) prepare and revise annotated multi-dimensional production drawings in computer-aided drafting and design to industry standards;
 - (G) apply best practices for effective file structure and management;
 - (H) use advanced dimensioning techniques;
 - (I) construct and use basic 3D parametric drawings; and
 - (J) develop and use prototype drawings for presentation.
- (7) The student uses engineering design methodologies. The student is expected to:
- (A) describe principles of ideation and apply ideation techniques for an engineering project;
 - (B) demonstrate critical thinking, identify the solution constraints, and make fact-based decisions;
 - (C) develop or improve a product using rational thinking;
 - (D) apply decision-making strategies when developing solutions;
 - (E) use an engineering notebook to record prototypes, corrections, and/or mistakes in the design process; and
 - (F) use an engineering notebook or portfolio to record the final design, construction, and manipulation of finished projects.
- (8) The student applies concepts of engineering to specific problems. The student is expected to:
- (A) design components using a variety of technologies;
 - (B) investigate the applications of different types of computer-aided drafting and design software for various engineering problems; and
 - (C) use multiple software applications for concept presentations.
- (9) The student designs products using appropriate design processes and techniques. The student is expected to:
- (A) interpret engineering drawings;
 - (B) identify areas where quality, reliability, and safety can be designed into a product;
 - (C) modify a product design to meet a specified need;
 - (D) produce engineering drawings to industry standards; and

- (E) describe potential patents and the patenting process.
- (10) The student builds a prototype using the appropriate tools, materials, and techniques. The student is expected to:
 - (A) identify and describe the steps needed to produce a prototype;
 - (B) identify and use appropriate tools, equipment, machines, and materials to produce the prototype; and
 - (C) present the prototype using a variety of media.
- (11) 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 such as materials, personnel, resources, funding, manufacturability, feasibility, and time associated with an engineering problem;
 - (D) establish and evaluate constraints, including health, safety, social, environmental, ethical, political, regulatory, and legal, pertaining to a problem;
 - (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 tools and methods such as models, prototypes, mock-ups, simulations, critical design review, statistical analysis, or experiments; and
 - (G) apply structured techniques such as a decision tree, design matrix, or cost-benefit analysis to select and justify a preferred solution to a problem.

§127.784. Engineering Design and Presentation II (Two Credits), Adopted 2022.

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2024-2025 school year.
 - (1) No later than August 31, 2024, 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 identified in this section.
 - (2) If the commissioner makes the determination that instructional materials funding has been made available this section shall be implemented beginning with the 2024-2025 school year and apply to the 2024-2025 and subsequent school years.
 - (3) If the commissioner does not make the determination that instructional materials funding has been made available under this subsection, 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 this section shall be implemented for the following school year.
- (b) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisites: Principles of Applied Engineering or Engineering Design and Presentation I, Algebra I, and Geometry. Students shall be awarded two credits for successful completion of this course.
- (c) Introduction.
 - (1) Career and technical education instruction provides content aligned with challenging academic standards, industry-relevant technical knowledge, and college and career readiness skills for students to further their education and succeed in current and 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 Design and Presentation II is a continuation of knowledge and skills learned in Engineering Design and Presentation I. Students enrolled in this course will demonstrate advanced knowledge and skills of a system design process as it applies to engineering fields and project management using multiple software applications and tools necessary to produce and present working drawings, solid model renderings, and prototypes. Students will expand on the use of a variety of computer hardware and software applications to complete assignments and projects. Through implementation of a system design process, students will transfer advanced academic skills to component designs and engineering systems. Emphasis will be placed on transdisciplinary and integrative approaches using skills from ideation, prototyping, and project management methods.
 - (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.
- (d) Knowledge and skills.
- (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:
 - (A) distinguish between an engineering technician, engineering technologist, and engineer;
 - (B) identify employment and career opportunities in engineering and describe the educational requirements for each;
 - (C) investigate and describe the requirements of industry-based certifications in engineering;
 - (D) demonstrate the principles of teamwork related to engineering and technology;
 - (E) research and describe governmental regulations, including health and safety;
 - (F) analyze ethical issues related to engineering and technology and incorporate proper ethics in submitted projects;
 - (G) demonstrate respect for diversity in the workplace;
 - (H) identify consequences relating to discrimination, harassment, and inequality;
 - (I) demonstrate effective oral and written communication skills using a variety of software applications and media; and
 - (J) investigate and present on career preparation learning experiences, including job shadowing, mentoring, and apprenticeship training.
 - (2) The student participates in team projects in various roles. The student is expected to:
 - (A) describe the various roles on an engineering team and discuss how teams function;
 - (B) demonstrate teamwork to solve problems; and
 - (C) serve as a team leader and member and demonstrate appropriate attitudes while participating in team projects.
 - (3) The student develops skills for managing a project. The student is expected to:
 - (A) create, implement, and evaluate project management methodologies, including initiating, planning, executing, monitoring and controlling, and closing a project;
 - (B) develop a project schedule and complete projects according to established criteria;

- (C) use strategies such as decision matrices, flow charts, or Gantt charts to maintain the project schedule and quality of project.
 - (D) participate in the organization and operation of a real or simulated engineering project; and
 - (E) develop a plan for production of an individual product.
- (4) The student demonstrates principles of project documentation, workflow, and evaluated results. The student is expected to:
- (A) complete work orders and related documentation;
 - (B) identify and defend factors affecting cost and strategies to minimize costs;
 - (C) formulate a project budget;
 - (D) develop a production schedule;
 - (E) identify intellectual property and other legal restrictions; and
 - (F) read and interpret technical drawings, manuals, and bulletins.
- (5) The student applies the concepts and skills of computer-aided drafting and design software to perform the following tasks. The student is expected to:
- (A) prepare drawings to American National Standards Institute (ANSI) and International Organization for Standardization (ISO) graphic standards;
 - (B) customize software user interface;
 - (C) prepare and use advanced views such as auxiliary, section, and break-away;
 - (D) draw detailed parts, assembly diagrams, and sub-assembly diagrams;
 - (E) indicate tolerances and standard fittings using appropriate library functions;
 - (F) demonstrate understanding of annotation styles and setup by defining units, fonts, dimension styles, notes, and leader lines;
 - (G) identify and incorporate the use of advanced layout techniques and viewports using paper-space and modeling areas;
 - (H) use management techniques by setting up properties to define and control individual layers;
 - (I) create and use custom templates for advanced project management;
 - (J) prepare and use advanced development drawings;
 - (K) use advanced polar tracking and blocking techniques to increase drawing efficiency;
 - (L) create drawings that incorporate external referencing;
 - (M) create and render objects using parametric modeling tools; and
 - (N) model individual parts or assemblies and produce rendered or animated output.
- (6) The student practices safe and proper work habits. The student is expected to:
- (A) master relevant safety tests;
 - (B) comply with safety guidelines as described in various manuals, instructions, and regulations;
 - (C) identify and classify hazardous materials and wastes according to Occupational Safety and Health Administration (OSHA) regulations;
 - (D) describe the appropriate disposal of hazardous materials and wastes appropriately;

- (E) perform maintenance on selected tools, equipment, and machines;
 - (F) handle and store tools and materials correctly; and
 - (G) describe the results of negligent or improper maintenance.
- (7) The student uses engineering design methodologies. The student is expected to:
- (A) describe principles of solution ideation and evaluate ideation techniques for an engineering project, including systems-based engineering and advanced prototyping;
 - (B) demonstrate critical thinking, identify the solution constraints, and make fact-based decisions;
 - (C) develop or improve a solution using rational thinking;
 - (D) apply decision-making strategies when developing solutions;
 - (E) identify quality-control issues in engineering design and production;
 - (F) describe perceptions of the quality of products and how they affect engineering decisions;
 - (G) use an engineering notebook to record prototypes, corrections, and/or mistakes in the design process; and
 - (H) use an engineering notebook or portfolio to record and justify the final design, construction, and manipulation of finished projects.
- (8) The student applies concepts of engineering to specific problems. The student is expected to:
- (A) design solutions from various engineering disciplines such as electrical, mechanical, structural, civil, or biomedical engineering;
 - (B) experiment with the use of tools, laboratory equipment, and precision measuring instruments to develop prototypes;
 - (C) research different types of computer-aided drafting and design software and evaluate their applications for use in design systems and problem solving; and
 - (D) use multiple software applications for concept presentations.
- (9) The student addresses a need or problem using appropriate systems engineering design processes and techniques. The student is expected to:
- (A) create and interpret engineering drawings;
 - (B) identify areas where quality, reliability, and safety and multidisciplinary optimization and stakeholder analysis can be designed into a solution such as a product, process, or system;
 - (C) improve a system design, including properties of materials selected, to meet a specified need;
 - (D) produce engineering drawings to industry standards; and
 - (E) describe potential patents and the patenting process.
- (10) The student builds a prototype using the appropriate tools, materials, and techniques. The student is expected to:
- (A) implement and delineate the steps needed to produce a prototype such as defining the problem and generating concepts;
 - (B) identify industry-appropriate tools, equipment, machines, and materials;
 - (C) fabricate the prototype using a systems engineering approach to compare the performance and use of materials; and
 - (D) present and validate the prototype using a variety of media and defend engineering practices used in the prototype.

- (11) The student creates justifiable solutions to open-ended real-world problems within a multitude of engineering disciplines such as mechanical, electrical, civil, structural, bio, or aerospace using engineering design practices and processes. The student is expected to:
- (A) identify and define engineering problems from different engineering disciplines such as mechanical, civil, structural, electrical, bio, or aerospace engineering;
 - (B) formulate goals, objectives, and requirements to solve an engineering problem;
 - (C) determine the design parameters such as materials, personnel, resources, funding, manufacturability, feasibility, and time associated with an engineering problem;
 - (D) establish and evaluate constraints of systems engineering, including health, safety, social, environmental, ethical, political, regulatory, and legal, pertaining to a problem;
 - (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 tools and methods such as models, prototypes, mock-ups, simulations, critical design review, statistical analysis, or experiments; and
 - (G) apply a structured technique problem such as a decision tree, design matrix, or cost-benefit analysis to select and justify a preferred solution to a problem.