Report of the State Board of Education
Committee of the Full Board
Wednesday April 9, 2025

ACTION ITEMS

2. Proposed New 19 TAC Chapter 127, Texas Essential Knowledge and Skills in Career Development and Career and Technical Education, Subchapter I, Engineering, §§127.402-419, 127.452, and 127.453
(Second Reading and Final Adoption)
(Board agenda page I-49)
[Official agenda item #9]

Jessica Snyder, senior director, curriculum standards and student support division, explained that proposed new career and technical education (CTE) Texas Essential Knowledge and Skills (TEKS) in engineering were being presented for second reading and final adoption. She stated that no public comments were received during the public comment period.

MOTION: *It was moved by Mrs. Little and seconded by Ms. Childs to recommend that the State Board of Education approve for second reading and final adoption proposed new 19 TAC Chapter 127, Texas Essential Knowledge and Skills for Career Development and Career and Technical Education, Subchapter I, Engineering, §§127.402-127.419, 127.452, and 127.453; and*

Make an affirmative finding that immediate adoption of proposed new 19 TAC Chapter 127, Texas Essential Knowledge and Skills for Career Development and Career and Technical Education, Subchapter I, Engineering, §§127.402-127.419, 127.452, and 127.453, is necessary and shall have an effective date of August 1, 2025.

MOTION AND VOTE: *It was moved by Mr. Hickman, seconded by Ms. Childs, and carried without objection to recommend that the State Board of Education strike the employability skills strand in (d)(1) and add the employability skills reference appropriate for the level of the course to the implementation subsection as new Paragraph (a)(2) for all the proposed new engineering courses as follows:*

Level 1 and Level 2 courses:

> "School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Employability Skills) as an integral part of this course."

Level 3 and Level 4 courses:

> "School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Employability Skills) as an integral part of this course."

MOTION: *It was moved by Mr. Francis and seconded by Mr. Hickman to recommend that the State Board of Education amend proposed new 19 TAC Chapter 127, Texas Essential Knowledge and Skills for Career Development and Career and Technical Education, Subchapter I, Engineering, as follows:*

Insert the CTE program of study level in the general requirements section for each engineering course as follows in:

§§127.402, 127.411, 127.413, 127.415, 127.417, 127.419

" (b) General requirements. This course is a Level 2 course and is recommended for students in Grades 10-12."

§§127.403, 127.404, 127.407-127.410, 127.412, 127.414, 127.416, 127.418

" (b) General requirements. This course is a Level 3 course and is recommended for students in Grades 10-12."

§§127.405, 127.406, 127.452, 127.453

" (b) General requirements. This course is a Level 4 course and is recommended for students in Grades 10-12."

Add the following Texas-specific language to maintain applicable language from the proposed employability skills section to read:

For the Level 1 and Level 2 courses:

"The student discusses ethics pertaining to engineering. The student is expected to:

(A) identify and discuss the importance of professionalism, standards of conduct, and ethics as defined by the Texas Engineering Practice Act and rules concerning the practice of engineering and surveying;"

For the Level 3 and Level 4 courses:

"The student researches and describes ethics pertaining to engineering. The student is expected to:

(A) explain how engineering ethics as defined by ~~professional organizations such as~~ the Texas Board of Professional Engineers and Land Surveyors [~~National Society of Professional Engineers~~] apply to engineering practice;"

Amend §127.415 Civil Engineering I (One Credit), Adopted 2025 to read as follows:

"(17) The student researches and describes ethics pertaining to civil engineering. The student is expected to:

(A) research and identify the fundamental engineering ethics established by the Texas Board of Professional Engineers and Land Surveyors [~~and other professional organizations such as American Society of Civil Engineers, the National Society of Professional Engineers, the National Council of Examiners for Engineering and Surveying, and the National Institute of Engineering Ethics;~~] and"

Amend §127.416. Civil Engineering II (Two Credits), Adopted 2025 to read as follows:

"(17) The student researches and understands the code of ethics pertaining to civil engineering. The student is expected to:

(A) research and describe the impact of the State of Texas Engineering Practice Act ~~and Rules~~; and"

Amend §127.419. Surveying and Geomatics (Two Credits), Adopted 2025 to read as follows:

"(14) The student researches and understands the code of ethics pertaining to civil engineering and land surveyors. The student is expected to:

(A) research and identify the legal definitions and descriptions surveyors use to delineate and report survey data; and

(B) research and identify engineering ethics established by the Texas Engineering Practice Act and rules concerning the practice of engineering and surveying; ~~organizations such as the American Society of Civil Engineers, the National Society of Professional Engineers, the Texas Board of Professional Engineers and Land Surveyors, the National Council of Examiners for Engineering and Surveying, and the National Institute of Engineering Ethics.~~"

Amend §127.407. Environmental Engineering (One Credit), Adopted 2025 to read as follows:

"(4) Engineering ethics. The student applies ethical consideration to analyze resilient engineered systems. The student is expected to:

(A) analyze ~~compare~~ the Texas Engineering Practices Act and ~~to the code of ethics of other engineering societies such as the American Society of Civil Engineers and the National Society of Professional Engineers to~~ explain how engineers demonstrate the responsibility they have to serve the public interest, their clients, and the profession with a high degree of honesty, integrity, and accountability;"

Amend the course title for §127.404. Engineering Design and Presentation I and §127.405. Engineering Design and Presentation II to read Engineering Design and Presentation and Advanced Engineering Design and Presentation – and make conforming amendments in any places where these course titles appear.

Amend the prerequisite for §127.405. Advanced Engineering Design and Presentation, by striking "Principles of Applied Engineering."

Replace references to the course title "Physics" with the discipline of "physics" in Fluid Mechanics, Mechanics of Materials, and Statics.

Identify Mechanical Design I and Aerospace Design I as Level 2 courses and make all necessary conforming amendments; and

Identify Mechanical Design II and Aerospace Design II as Level 3 courses and make all necessary conforming amendments.

Insert the following introduction paragraphs from the science TEKS into the introduction for §127.408, Fluid Mechanics, to read:

"(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 currently scientifically testable.

(5) Scientific hypotheses and theories. Students are expected to know that:

(A) 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; and

(B) 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.

(6) Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, comparative, or experimental. The method chosen should be appropriate to the question being asked. Student learning for different types of investigations include descriptive investigations, which involve collecting data and recording observations without making comparisons; comparative investigations, which involve collecting data with variables that are manipulated to compare results; and experimental investigations, which involve processes similar to comparative investigations but in which a control is identified.

(A) Scientific practices. Students should be able to ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.

(B) Engineering practices. Students should be able to identify problems and design solutions using appropriate tools and models.

(7) Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. 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).

(8) Science consists of recurring themes and making connections between overarching concepts. Recurring themes include systems, models, and patterns. 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, while models allow for boundary specification and provide a tool for understanding the ideas presented. 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."

MOTION AND VOTE: *It was moved by Mr. Francis to restate his original motion to 19 TAC Chapter 127, Texas Essential Knowledge and Skills for Career Development and Career and Technical Education, Subchapter I, Engineering to replace "physics" with "Physics or Physics for Engineering." The motion failed.*

MOTION AND VOTE: *It was moved by Mr. Hickman, seconded by Mrs. Little, and carried to recommend that the State Board of Education amend §127.408(b) to read:*

"(b) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisite: at least one credit in a course from the Engineering Career Cluster and physics or chemistry ~~Chemistry~~ ."

VOTE: *A vote was taken on the Mr. Francis's original motion as amended. The motion carried.*

MOTION AND VOTE: *It was moved by Mr. Francis, seconded by Mr. Hall, and carried without objection to recommend that the State Board of Education amend §127.411(d)(12)(I) to read:*

"identify and explain the use of engineering computational tools such as computer aided design (CAD), finite element analysis (FEA), or computational fluid dynamics (CFD)."

and amend §127.413(d)(11)(B) to read:

"explain the applications of engineering computational tools used in aerospace ~~mechanical~~ design."

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mrs. Little, and carried without objection to recommend that the State Board of Education amend §127.402(d)(8)(D) to read:*

"(D) analyze and evaluate solutions using the established criteria such as structured techniques, design matrix, or cost benefit analysis;"

MOTION AND VOTE: *It was moved by Dr. Bell-Metereau, seconded by Mr. Reveles, and carried without objection to recommend that the State Board of Education amend §127.402(d)(8)(D) to read:*

"analyze and evaluate solutions using ~~the~~ established criteria such as structured techniques, design matrix, or cost benefit analysis;"

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mrs. Little, and carried without objection to recommend that the State Board of Education amend §127.407(d)(10)(H) to read:*

"research and describe emerging contaminants in water such as microplastics and pharmaceuticals, including methods of detection, measurement techniques, degradation, assessment of risk, and strategies for mitigation and removal;"

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mr. Francis, and carried to recommend that the State Board of Education amend §127.407(d)(11)(A) to read:*

"~~explain the differences between and cost of renewable and non-renewable sources of energy and provide examples of each~~"

"explain the differences between and costs of renewable and non-renewable ~~sources of~~ energy sources, ~~and provide~~ providing examples of each, and discuss factors, including energy density, subsidies, raw materials, the impact on land and animal life, and the environmental and resource demands of mining for renewable and non-renewable energy sources;"

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mrs. Little, and carried without objection to recommend that the State Board of Education add new §127.407(d)(11)(E) to read:*

"define and identify types of intermittent and on-demand energy;"

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mrs. Little, and carried to recommend that the State Board of Education amend §127.407(d)(12)(A) to read:*

"identify innovations and laws which have improved air quality in the United States, including bag houses, water suppression at mines, the catalytic converter, industrial scrubbers, and the Clean Air Act;"
"~~describe mitigation techniques and their associated costs for air pollutants and greenhouse gas emissions~~"

MOTION: *It was moved by Mr. Maynard and seconded by Mrs. Little to recommend that the State Board of Education amend §127.407(d)(12)(B) to read:*

"analyze the impact on humans of naturally occurring extreme weather events such as flooding, freezing temperatures, hurricanes, tornadoes, and thunderstorms, including types of habitat and access to energy;"

MOTION AND VOTE: *It was moved by Mr. Francis, seconded by Mr. Maynard, and carried to recommend that the State Board of Education amend §127.407(d)(12)(B) to read:*

"analyze the impact on humans of climate and ~~naturally occurring~~ extreme weather events such as flooding, freezing temperatures, hurricanes, tornadoes, and thunderstorms, including types of habitat and access to energy;"

MOTION AND VOTE: *It was moved by Mr. Hickman, seconded by Mr. Francis and carried to recommend that the State Board of Education amend §127.407(d)(12)(B) to read:*

"analyze the impact on ~~humans~~ humans' habitat and access to energy of climate and extreme weather events, such as flooding, freezing temperature, hurricanes, tornadoes, and thunderstorms, ~~including types of habitat and access to energy~~."

VOTE: *A vote was taken on Mr. Maynard's original motion as amended. The motion carried.*

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Ms. Pickren, and carried to recommend that the State Board of Education add new §127.407(d)(12)(E) to read:*

"compare and analyze air quality data from different countries around the world, evaluating factors that influence air quality such as laws and use of different types of energy."

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mrs. Little, and carried without objection to recommend that the State Board of Education amend §127.407(d)(13)(C) to read:*

"identify and evaluate land conservation, ~~and~~ preservation, and restoration ~~restorative~~ measures using industry practice standards , including ~~such as~~ the United States Department of Agriculture (USDA) National Resources Conservation Services (NRCS) Conservation Practice Standards and the Texas Railroad Commission (RRC) environmental regulations ~~for a given land area~~ ;

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mrs. Little, and carried without objection to recommend that the State Board of Education amend §127.407(d)(13)(E) to read:*

"analyze and report positive and negative environmental impacts due to changes in land use , including ~~such as~~ urbanization over time, mining of rare earth minerals, and precision farming; and"

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mrs. Little, and carried without objection to recommend that the State Board of Education amend §127.407(d)(14)(C) to read:*

"explain how landfills manage waste decomposition, including the capture and potential use of gases, including methane;"

"~~explain the capture and use of methane gas from landfills;~~"

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mrs. Little, and carried without objection to recommend that the State Board of Education add new §127.407(d)(15)(D) to read:*

"explain the role of the Texas Railroad Commission in facilitating the restoration of mined land to its original condition."

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mr. Francis, and carried without objection to recommend that the State Board of Education amend §127.407(d)(16)(C) to read:*

"identify principles that ~~help~~ guide the development of resilient solutions that enhance quality of life, support a high standard of living, and conserve resources ~~with considerations for sustainable development to include people and the planet;~~"

MOTION AND VOTE: *It was moved by Mr. Maynard, seconded by Mr. Francis, and carried without objection to recommend that the State Board of Education amend §127.415(d)(18)(B) to read:*

"~~describe~~ apply cost-benefit analysis to sustainability standards used throughout the project life cycle to evaluate their economic, environmental, and social trade-offs;"

MOTION AND VOTE: *It was moved by Mr. Francis, seconded by Mr. Hall, and carried without objection to recommend that the State Board of Education amend §127.418(d)(5)(F) to read:*

(F) "research and describe ~~sustainable~~ resilient building materials, methods, and costs; and"

MOTION AND VOTE: *It was moved by Dr. Clark and seconded by Mr. Reveles to recommend that the State Board of Education amend the general requirements in §127.403(a) to read:*

> General requirements. Prerequisite: Algebra I and Principles of Applied Engineering, physics ~~Physics for Engineering~~, Introduction to Computer-Aided Design and Drafting, or Introduction to Engineering Design.

and the general requirements in §127.406(a) to read:

General requirements. This course is recommended for students in Grade 12. Prerequisites: Algebra I, Geometry, and at least one credit in a Level 2 or higher course in the Engineering Career Cluster. Recommended prerequisites or corequisites: Engineering Science, chemistry ~~Chemistry~~, or physics ~~Physics, or Physics for Engineering~~.

The motion failed.

VOTE: *A vote was taken on the main motion to recommend that the State Board of Education approve for second reading and final adoption proposed new 19 TAC Chapter 127, Texas Essential Knowledge and Skills for Career Development and Career and Technical Education, Subchapter I, Engineering, §§127.402-127.419, 127.452, and 127.453, as amended; and*

Make an affirmative finding that immediate adoption of proposed new 19 TAC Chapter 127, Texas Essential Knowledge and Skills for Career Development and Career and Technical Education, Subchapter I, Engineering, §§127.402-127.419, 127.452, and 127.453 is necessary and shall have an effective date of August 1, 2025. The motion carried.