

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

### Subchapter P. Transportation, Distribution, and Logistics

*Statutory Authority: The provisions of this Subchapter P issued Texas Education Code, §§7.102(c)(4); 28.002; and 28.025, unless otherwise noted.*

#### §127.871. Principles of Transportation Systems (One Credit), Adopted 2015.

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 9-12. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) In Principles of Transportation Systems, students will gain knowledge and skills in the safe application, design, production, and assessment of products, services, and systems. This knowledge includes the history, laws and regulations, and common practices used in the transportation industry. Students should apply knowledge and skills in the application, design, and production of technology as it relates to the transportation industries. This course allows students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 develops leadership experience as it relates to transportation systems. The student is expected to:
    - (A) plan, propose, conduct, and evaluate industry-based occupational experiences;
    - (B) apply proper record-keeping skills as they relate to industry-based occupational experiences;
    - (C) use a customized record-keeping system for the individual industry-based occupational experiences;

- (D) discuss youth leadership opportunities to create a well-rounded industry-based occupational experience; and
  - (E) develop a work plan and budget.
- (2) The student explores concepts related to cultural diversity. The student is expected to:
- (A) identify significant similarities and differences in international culture;
  - (B) explain the variety of world markets; and
  - (C) describe marketing factors and practices that impact other cultures.
- (3) The student understands the historical, current, and future significance of the transportation industries. The student is expected to:
- (A) define terms associated with the transportation industries;
  - (B) identify the scope and effect on society of the transportation industries;
  - (C) identify significant historical and current developments in the transportation industries;
  - (D) identify potential future development for transportation industry systems;
  - (E) describe how emerging technologies and globalization impact the transportation industries; and
  - (F) compare and contrast issues affecting the transportation industries such as international trade, employment, safety, and environmental issues.
- (4) The student analyzes the structure of transportation organizations. The student is expected to:
- (A) describe common business management principles;
  - (B) identify opportunities for leadership development and personal growth;
  - (C) demonstrate democratic principles in conducting effective meetings;
  - (D) describe team dynamics; and
  - (E) describe the development of organizational vision, mission, and goals through the strategic planning process.
- (5) The student explains the transportation industries at the local, state, national, and international levels. The student is expected to:
- (A) identify reasons for world trade and globalization;
  - (B) identify the political impact of transportation;
  - (C) review regulations and major laws and evaluate their impact on transportation;
  - (D) read appropriate written material to stay abreast of current issues impacting transportation;
  - (E) collect public opinion and data in order to make informed decisions;
  - (F) use critical-thinking skills to identify and organize alternatives and evaluate public policy issues related to transportation; and
  - (G) evaluate performance and contract compliance of contractors and service providers.
- (6) The student demonstrates appropriate interpersonal and communication skills. The student is expected to:
- (A) examine workplace ethical and legal responsibilities;
  - (B) define the uses of proper etiquette;
  - (C) identify appropriate personal appearance and health habits;

- (D) practice written and oral communication skills in formal and informal situations;
  - (E) practice effective listening skills in formal and informal situations;
  - (F) read and comprehend materials common to the transportation industry;
  - (G) employ writing and preparation skills using technical information; and
  - (H) demonstrate speaking skills.
- (7) The student applies appropriate research methods for transportation systems. The student is expected to:
- (A) define major fields of research and development;
  - (B) identify and apply scientific methods of research in transportation industries;
  - (C) use a variety of resources for research and development; and
  - (D) describe the scientific methods of research.
- (8) The student applies problem-solving, mathematical, and organizational skills in order to maintain financial and logistical records related to transportation. The student is expected to:
- (A) discuss project proposals;
  - (B) maintain records appropriate to transportation system industries;
  - (C) collect and organize data in graphs, tables, charts, and plots; and
  - (D) analyze and interpret data from graphs, tables, charts, and plots.
- (9) The student uses information technology tools specific to transportation industries to access, manage, integrate, and create information. The student is expected to:
- (A) use management software, email applications, and Internet applications;
  - (B) use word-processing, database, spreadsheet, and presentation software;
  - (C) examine collaborative, groupware, and virtual meeting software; and
  - (D) discuss Geographic Information Systems, Global Positioning Systems, and other computer-based equipment in transportation systems.
- (10) The student discusses methods to reduce workplace hazards in order to promote a safe working environment. The student is expected to:
- (A) discuss safe work practices and emergency procedures;
  - (B) identify rules and laws designed to promote safety and health in transportation environments;
  - (C) demonstrate first aid and cardiopulmonary resuscitation procedures;
  - (D) demonstrate proper use of safety equipment; and
  - (E) evaluate worksite safety areas and/or plans.
- (11) The student examines Texas Department of Public Safety regulations as related to the transportation industry. The student is expected to:
- (A) discuss rules pertaining to obtaining a commercial driver license (CDL);
  - (B) explain the different types of CDLs;
  - (C) discuss the various endorsements available for a CDL;
  - (D) discuss the requirements for each endorsement;
  - (E) identify material handling and storage equipment and forklifts, including electric- and fuel-powered forklifts; and

- (F) identify types of transportation that supply warehouses and distribution centers.

Source: The provisions of this §127.871 adopted to be effective August 1, 2025, 50 TexReg 4421.

**§127.872. Principles of Distribution and Logistics (One Credit), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 9-12. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) In Principles of Distribution and Logistics, students will gain knowledge and skills in the safe application, design, production, and assessment of products, services, and systems. This knowledge includes the history, laws and regulations, and common practices used in the logistics of warehousing and transportation systems. Students should apply knowledge and skills in the application, design, and production of technology as it relates to distribution and logistics industries. This course allows students to reinforce, apply, and transfer their academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 develops leadership experience as it relates to distribution and logistics systems. The student is expected to:
    - (A) plan, propose, conduct, and evaluate industry-based occupational experiences;
    - (B) apply proper record-keeping skills as they relate to industry-based occupational experiences;
    - (C) use a customized record-keeping system for the individual industry-based occupational experiences;
    - (D) discuss youth leadership opportunities to create a well-rounded industry-based occupational experience; and
    - (E) develop a work plan and budget.
  - (2) The student explores concepts related to cultural diversity. The student is expected to:
    - (A) identify significant similarities and differences in international culture;

- (B) explain the variety of world markets; and
- (C) describe marketing factors and practices that impact other cultures.
- (3) The student understands the historical, current, and future significance of the distribution and logistics industries. The student is expected to:
  - (A) define terms associated with the distribution and logistics industries;
  - (B) identify the scope and effect upon society of the distribution and logistics industries;
  - (C) identify significant historical and current developments in the distribution and logistics industries;
  - (D) identify potential future scenarios for the distribution and logistics industry systems;
  - (E) describe how emerging technologies and globalization impact the distribution and logistics industries; and
  - (F) compare and contrast issues affecting the distribution and logistics industries such as international trade, employment, safety, and environmental issues.
- (4) The student analyzes the structure of distribution and logistics organizations. The student is expected to:
  - (A) describe common business management principles;
  - (B) identify opportunities for leadership development and personal growth;
  - (C) demonstrate democratic principles in conducting effective meetings;
  - (D) describe team dynamics; and
  - (E) describe the development of organizational vision, mission, and goals through the strategic planning process.
- (5) The student explains the distribution and logistics industries at the local, state, national, and international levels. The student is expected to:
  - (A) identify reasons for world trade and globalization;
  - (B) identify the political impact of distribution and logistics;
  - (C) review regulations and major laws to evaluate their impact on distribution and logistics;
  - (D) read appropriate written material to stay abreast of current issues impacting distribution and logistics;
  - (E) collect public opinion and data in order to make informed decisions;
  - (F) use critical-thinking skills to identify and organize alternatives and evaluate public policy issues related to distribution and logistics; and
  - (G) evaluate performance and contract compliance of contractors and service providers.
- (6) The student demonstrates appropriate personal and communication skills. The student is expected to:
  - (A) examine workplace ethical and legal responsibilities;
  - (B) define the uses of proper etiquette;
  - (C) identify appropriate personal appearance and health habits;
  - (D) practice written and oral communication skills in formal and informal situations;
  - (E) practice effective listening skills in formal and informal situations;
  - (F) employ writing and preparation skills using technical information; and

- (G) demonstrate speaking skills.
- (7) The student applies appropriate research methods for distribution and logistics systems. The student is expected to:
  - (A) define major fields of research and development;
  - (B) identify and apply scientific methods of research in distribution and logistics industries;
  - (C) use a variety of resources for research and development; and
  - (D) describe the scientific methods of research.
- (8) The student applies problem-solving, mathematical, and organizational skills in order to maintain financial and logistical records. The student is expected to:
  - (A) discuss project proposals;
  - (B) maintain records appropriate to distribution and logistics system industries;
  - (C) collect and organize data in graphs, tables, charts, and plots; and
  - (D) analyze and interpret data from graphs, tables, charts, and plots.
- (9) The student uses information technology tools specific to distribution and logistics industries to access, manage, integrate, and create information. The student is expected to:
  - (A) use management software, email applications, and Internet applications;
  - (B) use word-processing, database, spreadsheet, and presentation software;
  - (C) examine collaborative, groupware, and virtual meeting software;
  - (D) discuss Geographic Information Systems and Global Positioning Systems; and
  - (E) discuss other computer-based equipment in distribution and logistics systems.
- (10) The student discusses methods to reduce sources of workplace hazards in order to promote a safe working environment. The student is expected to:
  - (A) discuss safe work practices and emergency procedures;
  - (B) identify rules and laws designed to promote safety and health in the distribution and logistics environments;
  - (C) demonstrate first aid and cardiopulmonary resuscitation procedures; and
  - (D) demonstrate proper use of safety equipment.
- (11) The student examines material handling in warehouses and distribution centers. The student is expected to:
  - (A) discuss handling practices for goods and materials;
  - (B) explain size, weight, and shape requirements for packaging;
  - (C) discuss material handling, storage, and shipping methods;
  - (D) analyze visual design and appearance requirements for packages;
  - (E) discuss layout plans for processing packages;
  - (F) identify material handling and storage equipment; and
  - (G) identify types of warehouses and distribution centers.

*Source: The provisions of this §127.872 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.873. Introduction to Transportation Technology (One-Half Credit), Adopted 2015.**

- (a) Implementation.

- (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
- (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 9 and 10. Students shall be awarded one-half credit for successful completion of this course.
- (c) 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 Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation, infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Introduction to Transportation Technology includes knowledge of the major automotive systems and the principles of diagnosing and servicing these systems. Transportation Technology includes applicable safety and environmental rules and regulations. In Transportation Technology, students will gain knowledge and skills in the repair, maintenance, and diagnosis of transportation systems. This study will allow students to reinforce, apply, and transfer academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. The focus of this course is to teach safety, tool identification, proper tool use, and employability.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 academic skills related to the requirements of transportation technology. The student is expected to:
    - (A) demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers;
    - (B) demonstrate effective written communication skills with individuals from various cultures such as fellow students, coworkers, and customers; and
    - (C) demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using the metric and U.S. customary systems.
  - (2) The student understands the technical knowledge and skills of basic transportation systems. The student is expected to:
    - (A) locate, read, and interpret transportation repair and service information; and
    - (B) describe the basic and emerging transportation technologies.
  - (3) The student knows the functions and applications of the tools, equipment, technologies, and materials used in transportation technology. The student is expected to:
    - (A) demonstrate awareness of the proper way to safely use hand and power tools and equipment commonly employed in the industry;
    - (B) identify diagnostic tools and equipment; and

- (C) identify hand and shop tools and describe their proper usage.

*Source: The provisions of this §127.873 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.874. Introduction to Small Engine Technology (One Credit), Adopted 2015.**

- (a) Implementation.
- (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 9-12. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Introduction to Small Engine Technology includes knowledge of the function and maintenance of the systems and components of all types of small engines such as outdoor power equipment, motorcycles, generators, and irrigation engines. This course is designed to provide training for employment in the small engine technology industry. Instruction includes the repair and service of cooling, air, fuel, lubricating, electrical, ignition, and mechanical systems. In addition, the student will receive instruction in safety, academic, and leadership skills as well as career opportunities.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 appropriate personal and communication skills. The student is expected to:
    - (A) describe and demonstrate ethical and legal responsibilities for appropriate workplace conduct;
    - (B) demonstrate proper etiquette and behavior;
    - (C) demonstrate appropriate personal appearance and hygiene;
    - (D) practice written and oral communication skills and employ effective listening skills;
    - (E) employ technical writing and preparation skills; and
    - (F) demonstrate effective speaking skills through prepared and extemporaneous oral presentations.
  - (2) The student describes the historical, current, and future significance of the small engine technology industry. The student is expected to:

- (A) describe emerging technologies and their impact on the small engine technology industry;
  - (B) identify issues affecting the small engine technology industry related to employment, safety, and environmental issues;
  - (C) discuss regulations and laws and their impact on the small engine technology industry; and
  - (D) read appropriate written material to stay abreast of current issues impacting the small engine technology industry.
- (3) The student participates in opportunities for leadership development and personal growth. The student is expected to:
- (A) participate in the planning and development of leadership and skill development activities such as conducting effective meetings, team building activities, and strategic planning; and
  - (B) use resources available through an organization such as a career and technical student organization to develop employability skills.
- (4) The student identifies the skills used to maintain and operate a small engine maintenance facility. The student is expected to:
- (A) perform preventative maintenance schedule plans and systems to keep facility, tools, and equipment operating safely and properly;
  - (B) use the preventative maintenance schedule of the facility, tools, and equipment to determine repair or replacement needs;
  - (C) complete repair orders and paperwork related to the small engine technology industry to properly document work needed or completed;
  - (D) estimate parts and labor costs on repair orders for small engine repair; and
  - (E) locate, read, and interpret service repair information such as small engine schematics, charts, and service-repair manuals and bulletins.
- (5) The student applies problem-solving, mathematical, and organizational skills to maintain financial and logistical records. The student is expected to:
- (A) develop project proposals;
  - (B) develop and maintain records appropriate to the small engine technology industry;
  - (C) describe mathematical formulas used to perform engine calculations such as calculating cylinder volume, engine displacement, combustion chamber volume, compressed head gasket volume, piston and deck height, piston dish volume, dome volume, cylinder volume, compression ratio, and horsepower;
  - (D) describe mathematical formulas used to perform electrical calculations such as calculating electrical resistance, current, and voltage in engines; and
  - (E) apply Ohm's law to small engine electrical circuits using a digital multimeter.
- (6) The student uses information technology resources specific to the small engine technology industry to access, manage, integrate, and create information. The student is expected to:
- (A) use personal management software such as email and Internet applications and word-processing, database, spreadsheet, presentation, collaborative, groupware, and virtual meeting software;
  - (B) discuss Geographic Information Systems and Global Positioning Systems applications; and

- (C) use computer-based equipment.
- (7) The student demonstrates an understanding of technical knowledge and skills of small engine technology. The student is expected to:
  - (A) identify the use and application of small engines and their components;
  - (B) identify the components of electrical-electronic systems;
  - (C) demonstrate awareness of engine designs, components, and applications;
  - (D) identify and use engine measuring tools and test equipment;
  - (E) use tools used in the operation, maintenance, and repair of small engines;
  - (F) compare and contrast the characteristics of two- and four-cycle engines; and
  - (G) identify and discuss the functions of the major small engine components.
- (8) The student applies technical knowledge and skills in simulated or actual work situations. The student is expected to:
  - (A) troubleshoot and repair small engines;
  - (B) assess the proper fuel mixtures and analyze the efficiency of various fuels used in small engines;
  - (C) distinguish between valve arrangement positions and analyze valve timing with respect to crankshaft rotation;
  - (D) perform preventative maintenance and service engine lubrication, cooling, starting, fuel, and ignition systems and associated fluids and filters;
  - (E) perform routine installations, inspections, adjustments, and maintenance on small engines using testing tools and equipment;
  - (F) demonstrate knowledge of electrical testing tools and equipment commonly used in small engine maintenance;
  - (G) perform measurements using precision instruments;
  - (H) inspect and measure small engine parts for wear tolerances;
  - (I) explain the relationship between an electric current and magnetic fields in ignition, charging, and starting systems; and
  - (J) analyze the effects of heating and cooling on small engines.

*Source: The provisions of this §127.874 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.875. Small Engine Technology (Two Credits), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 10-12. Prerequisite: Introduction to Small Engine Technology. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Small Engine Technology includes advanced knowledge of the function, diagnosis, and service of the systems and components of all types of small engines such as outdoor power equipment, motorcycles, generators, and irrigation engines. This course is designed to provide hands-on and practical application for employment in the small engine technology industry. Instruction includes the repair and service of cooling, air, fuel, lubricating, electrical, ignition, and mechanical systems and small engine overhauls. In addition, students will receive instruction in safety, academic, and leadership skills as well as career opportunities.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 appropriate personal and communication skills. The student is expected to:
    - (A) describe, demonstrate, and apply ethical and legal responsibilities for appropriate workplace conduct;
    - (B) demonstrate proper etiquette and behavior;
    - (C) demonstrate appropriate personal appearance and hygiene;
    - (D) demonstrate effective written and oral communication skills and employ effective listening skills;
    - (E) demonstrate advanced technical writing and preparation skills; and
    - (F) demonstrate effective speaking skills through prepared and extemporaneous oral presentations.
  - (2) The student participates in opportunities for leadership development and personal growth. The student is expected to:
    - (A) participate in the planning and development of leadership and skill development activities such as conducting effective meetings, team building activities, and strategic planning;
    - (B) use resources available through an organizations such as a career and technical student organizations to develop employability skills; and
    - (C) record individual progress to document achievements.
  - (3) The student describes the historical, current, and future significance of the small engine technology industry. The student is expected to:
    - (A) describe emerging technologies and their impact on the small engine technology industry;
    - (B) compare and contrast issues affecting the small engine technology industry related to employment, safety, environmental, and regulatory issues; and

- (C) describe local and global market conditions and practices that impact the application and need of the small engine technology industry.
- (4) The student identifies the skills used to maintain and operate a small engine maintenance facility. The student is expected to:
- (A) develop, evaluate, and perform preventative maintenance plans and systems to keep facility, tools, and equipment operating safely and properly;
  - (B) complete repair orders and paperwork related to the small engine technology industry to properly document work needed or completed such as ensuring proper customer communication and authorization;
  - (C) estimate parts and labor costs on repair orders for small engine repair;
  - (D) describe common business management principles such as technician productivity, shop efficiency, and profit margins; and
  - (E) locate, read, and interpret service repair information such as small engine schematics, charts, and technical bulletins.
- (5) The student applies appropriate research methods to small engine technology topics. The student is expected to:
- (A) use a variety of resources to research, trouble shoot, and diagnose concerns and failures; and
  - (B) describe the application of the scientific method of research to small engine technology such as identifying a problem, establishing a procedure, performing direct and indirect observation, collecting and interpreting data, and drawing conclusions by verifying the complaint, determining the related symptoms, analyzing the symptoms, isolating the trouble, correcting the trouble, and checking for proper operation.
- (6) The student applies problem-solving, mathematical, and organizational skills to maintain financial and logistical records. The student is expected to:
- (A) develop project proposals;
  - (B) develop and maintain records appropriate to the small engine technology industry;
  - (C) collect and organize data in graphs, tables, and charts;
  - (D) analyze and interpret data from graphs, tables, and charts;
  - (E) use mathematical formulas to perform engine calculations such as calculating cylinder volume, engine performance and enhancement, engine displacement, combustion chamber volume, compressed head gasket volume, piston and deck height, piston dish volume, dome volume, cylinder volume, compression ratio, and horsepower;
  - (F) use mathematical formulas to perform electrical calculations such as calculating and measuring electrical resistance, current, and voltage in engines;
  - (G) apply Ohm's law to small engine electrical circuits using a digital multimeter; and
  - (H) apply electrical principles to diagnose and repair small engine components such as generators, electric motors, power supplies, electronic amplifiers, relays, and circuits.
- (7) The student uses information technology tools specific to the small engine technology industry to access, manage, integrate, and create information. The student is expected to:
- (A) use personal management software such as email and Internet applications and word-processing, database, spreadsheet, presentation, collaborative, groupware, and virtual meeting software;
  - (B) discuss Geographic Information Systems and Global Positioning Systems applications; and

- (C) use other computer-based equipment.
- (8) The student demonstrates advanced technical knowledge and skills of small engine technology. The student is expected to:
  - (A) demonstrate the use and application of small engines and components;
  - (B) demonstrate the components of electrical-electronic systems;
  - (C) demonstrate knowledge of engine designs, components, and applications; and
  - (D) demonstrate the correct use of engine measuring tools and test equipment.
- (9) The student demonstrates advanced technical knowledge and skills in simulated or actual work situations. The student is expected to:
  - (A) troubleshoot and repair small engines;
  - (B) perform preventative maintenance on small engines;
  - (C) assess the proper fuel mixtures and analyze the efficiency of various fuels used in small engines;
  - (D) distinguish between valve arrangement positions and analyze valve timing with respect to crankshaft rotation;
  - (E) perform preventative maintenance and service engine lubrication, cooling, starting, fuel, and ignition systems and associated fluids and filters;
  - (F) perform routine installations, inspections, adjustments, and maintenance on small engine testing tools and equipment;
  - (G) demonstrate knowledge of electrical testing tools and equipment commonly used in small engine maintenance such as digital multimeters;
  - (H) perform measurements using precision instruments such as micrometers, dial indicators, and Vernier calipers;
  - (I) inspect and measure small engine parts for wear tolerances and compare to specifications;
  - (J) demonstrate the relationship between an electric current and magnetic fields in ignition, starting, and charging systems with the use of test equipment;
  - (K) analyze the effects of heating and cooling on small engines;
  - (L) explain the thermophysical properties of fluids commonly used in small engine systems;
  - (M) explain the laws of thermodynamics;
  - (N) explain torque, horsepower, and heat energy transfer in small engines;
  - (O) calculate speed and acceleration in small engines; and
  - (P) compare and contrast efficiency of various engine sizes and types.

*Source: The provisions of this §127.875 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.876. Automotive Basics (One Credit), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.

- (b) General requirements. This course is recommended for students in Grades 9-12. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Automotive Basics includes knowledge of the basic automotive systems and the theory and principles of the components that make up each system and how to service these systems. Automotive Basics includes applicable safety and environmental rules and regulations. In Automotive Basics, students will gain knowledge and skills in the repair, maintenance, and servicing of vehicle systems. This study allows students to reinforce, apply, and transfer academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. The focus of this course is to teach safety, tool identification, proper tool use, and employability.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 appropriate personal and communication skills. The student is expected to:
    - (A) describe, demonstrate, and apply ethical and legal responsibilities for appropriate workplace conduct;
    - (B) demonstrate proper etiquette and behavior;
    - (C) demonstrate appropriate personal appearance and hygiene;
    - (D) demonstrate effective written and oral communication skills and employ effective listening skills;
    - (E) demonstrate advanced technical writing and preparation skills; and
    - (F) demonstrate effective speaking skills through prepared and extemporaneous oral presentations.
  - (2) The student demonstrates academic skills related to the requirements of automotive technology. The student is expected to:
    - (A) demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers;
    - (B) demonstrate effective written communication skills, including documenting on a repair order the customer concern/complaint, root cause of the failure, and corrective action to complete the repair; and
    - (C) demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate.
  - (3) The student understands the technical knowledge and skills of basic automotive systems. The student is expected to:

- (A) describe the eight major vehicle systems;
  - (B) locate, read, and interpret vehicle maintenance and service information; and
  - (C) describe the basic and emerging vehicle power systems.
- (4) The student knows the functions and applications of the tools, equipment, technologies, and materials used in automotive services. The student is expected to:
- (A) demonstrate the proper way to safely use hand and power tools and equipment commonly employed in the maintenance and repair of vehicles;
  - (B) discuss the proper handling and disposal of environmentally hazardous materials used in servicing vehicles;
  - (C) identify diagnostic tools and equipment; and
  - (D) identify hand and shop tools and describe their proper usage.
- (5) The student applies technical knowledge and skills in simulated or actual work situations. The student is expected to:
- (A) demonstrate the procedures for ordering and locating parts;
  - (B) demonstrate an understanding of the operation theory of internal combustion engines;
  - (C) identify brake system components, including drum, disc, power assist, and anti-lock braking system (ABS);
  - (D) demonstrate an understanding of basic concepts related to hydraulic brakes systems, including Pascal's Theory of Hydraulics;
  - (E) demonstrate an understanding of basic concepts related to electrical and electronic systems such as Ohm's law, voltage drop, resistance, amperage, voltage, and wiring diagram symbols;
  - (F) identify air-conditioning, heating, and accessory system components;
  - (G) inspect and identify chassis and power train components and systems;
  - (H) identify cooling and lubrication system components;
  - (I) identify steering and suspension components, including power steering;
  - (J) identify and interpret tire sidewall data information such as Department of Transportation (DOT) production date information, tire load capacity, inflation pressures, sizing description, and speed rating;
  - (K) compare the preventative maintenance schedules for a variety of vehicles based on their use;
  - (L) perform a preventative maintenance inspection;
  - (M) explain and perform a "jump-start" of a vehicle using jumper cables and a booster battery or an auxiliary power supply according to manufacturer recommended procedures; and
  - (N) perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations.

*Source: The provisions of this §127.876 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.877. Automotive Technology I: Maintenance and Light Repair (Two Credits), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.

- (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 9-12. Recommended prerequisite: Automotive Basics. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Automotive Technology I: Maintenance and Light Repair includes knowledge of the major automotive systems and the principles of diagnosing and servicing these systems. This course includes applicable safety and environmental rules and regulations. In Automotive Technology I: Maintenance and Light Repair, students will gain knowledge and skills in the repair, maintenance, and diagnosis of vehicle systems. This study will allow students to reinforce, apply, and transfer academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. The focus of this course is to teach safety, tool identification, proper tool use, and employability.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 academic skills related to the requirements of automotive technology. The student is expected to:
    - (A) demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers;
    - (B) demonstrate effective written communication skills, including documenting on a repair order the customer concern/complaint, root cause of the failure, and corrective action to complete the repair; and
    - (C) demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate.
  - (2) The student demonstrates technical knowledge and skills related to the manufacturer preventative maintenance schedule. The student is expected to:
    - (A) locate the manufacturer recommended preventative maintenance schedule;
    - (B) perform a preventative maintenance inspection of vehicle systems, including engine, fuel, lubrication, cooling, electrical, suspension, drive train, and air-conditioning systems;
    - (C) describe the function of the automotive chassis components, including braking, steering, transmission, drive train, and suspension systems;
    - (D) locate, read, and interpret service repair information such as schematics, charts, diagrams, graphs, parts catalogs, and technical bulletins;

- (E) use published specifications to diagnose component wear and determine necessary repairs;
  - (F) identify the appropriate oil viscosity and capacity;
  - (G) verify operation of the instrument panel engine warning indicators;
  - (H) inspect engine assembly and document findings of fuel, oil, coolant, and other leaks;
  - (I) perform common fastener and thread repair, including removing broken bolt, restoring internal and external threads, and repairing internal threads with thread insert;
  - (J) inspect, replace, and adjust drive belts, tensioners, and pulleys;
  - (K) perform engine oil and filter change; and
  - (L) explain and perform a "jump-start" of a vehicle using jumper cables and a booster battery or an auxiliary power supply according to manufacturer recommended procedures.
- (3) The student demonstrates the functions and applications of the tools, equipment, technologies, and materials used in automotive technology. The student is expected to:
- (A) demonstrate the proper use of hand and power tools and equipment commonly employed in the maintenance and repair of vehicles; and
  - (B) discuss the proper handling and disposal of environmentally hazardous materials used in servicing vehicles.
- (4) The student applies the technical knowledge and skills related to brakes in simulated or actual work situations. The student is expected to:
- (A) explains Pascal's Theory of Hydraulics as it relates to the brake system;
  - (B) inspect brake system components, including master cylinder, brake lines, wheel cylinders, calipers, and flexible hoses and fittings, for external leaks and proper operation;
  - (C) inspect, measure, and refinish brake drum diameter to manufacturer specifications;
  - (D) remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates;
  - (E) lubricate, reassemble, and pre-adjust brake shoes and parking brake;
  - (F) remove, inspect for damage or wear, clean, lubricate, and reassemble pads and retaining hardware, caliper assembly, and mounting components such as slides and pins for proper operation;
  - (G) refinish a rotor on and off a vehicle and measure final rotor thickness with manufacturer specifications;
  - (H) retract and re-adjust caliper piston on an integral parking brake system;
  - (I) check brake pedal travel with, and without, engine running to verify proper power booster operation;
  - (J) check brake pedal travel with, and without, engine running to verify proper power booster operation;
  - (K) check vacuum supply from a manifold or auxiliary pump to vacuum-type brake power booster; and
  - (L) describe the operation of a regenerative braking system.
- (5) The student applies the technical knowledge and skills related to electrical systems in simulated or actual work situations. The student is expected to:

- (A) demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity as defined by Ohm's Law;
  - (B) demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop, current flow, resistance, and ground circuits;
  - (C) use wiring diagrams to trace electrical/electronic circuits;
  - (D) demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits;
  - (E) confirm proper battery capacity for vehicle application and perform battery capacity test;
  - (F) perform battery state-of-charge test;
  - (G) inspect and clean the battery, fill battery cells, and check battery cables, connectors, clamps, and hold-downs;
  - (H) perform starter current draw test;
  - (I) inspect and test fusible links, circuit breakers, fuses, and relays;
  - (J) perform charging system output test;
  - (K) inspect, adjust, or replace generator/alternator drive belts and check pulleys and tensioners for wear and belt alignment;
  - (L) verify operation of instrument panel gauges and warning/indicator lights, and reset maintenance indicators;
  - (M) inspect interior and exterior lamps and sockets, including headlights and auxiliary light such as fog and driving lights and replace as needed; and
  - (N) verify windshield wiper and washer operation and replace wiper blades as needed.
- (6) The student applies the technical knowledge and skills related to heating and air conditioning (A/C) in simulated or actual work situations. The student is expected to:
- (A) identify refrigerant type and the safety and environmental concerns related to handling and storage;
  - (B) inspect engine cooling and heater systems hoses;
  - (C) inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets;
  - (D) inspect A/C condenser for airflow restrictions; and
  - (E) identify hybrid vehicle A/C system electrical circuits and the service/safety precautions.
- (7) The student applies the technical knowledge and skills related to manual and automatic drive train and axles in simulated or actual work situations. The student is expected to:
- (A) identify the different fluid types used in both an automatic and manual transmission/transaxle;
  - (B) identify the fluid types and capacity required by application using service information;
  - (C) check fluid level in a transmission or a transaxle equipped with a dip-stick;
  - (D) check fluid level in a transmission or a transaxle not equipped with a dip-stick;
  - (E) check fluid condition and inspect for leaks;
  - (F) drain and replace fluid and filter or filters in an automatic transmission/transaxle;
  - (G) drain and replace fluid in an manual transmission/transaxle; and
  - (H) inspect power train mounts.

- (8) The student applies the technical knowledge and skills related to engine performance in simulated or actual work situations. The student is expected to:
- (A) inspect and explain the electrical/electronic components, sensors and circuits on an on board diagnostics (OBD) controlled engine;
  - (B) perform engine absolute manifold pressure tests such as vacuum or boost;
  - (C) verify engine operating temperature;
  - (D) remove and replace spark plugs and inspect secondary ignition components for wear and damage;
  - (E) describe the importance of operating all OBD II monitors for repair verification;
  - (F) retrieve and record diagnostic trouble codes, OBD II monitor status, and freeze frame data and clear codes when applicable;
  - (G) inspect, service, or replace air filters, filter housings, and intake duct work;
  - (H) replace fuel filter or filters;
  - (I) inspect integrity of the exhaust manifolds, exhaust pipes, mufflers, catalytic converters, resonators, tail pipes, and heat shields; and
  - (J) inspect, test, and service positive crankcase ventilation (PCV) system and its components such as the filter/breather cap, valve, tubes, orifices, and hoses.
- (9) The student applies the technical knowledge and skills related to suspension systems and simulated or actual work situations. The student is expected to:
- (A) identify and interpret tire sidewall data information such as Department of Transportation (DOT) production date information, tire load capacity, inflation pressures, sizing description, and speed rating;
  - (B) demonstrate tire tread depth measuring procedures using industry standards such as common tread depth gauges;
  - (C) demonstrate tire and wheel balance such as static and dynamic balance, and proper wheel weight selection;
  - (D) demonstrate tire and wheel measurements such as radial and lateral run-out in tire and wheel assembly;
  - (E) inspect steering linkage components and mounts such as inner and outer tie-rod ends, pitman arm, idler arm, inner rack and pinion ends, rack and pinion mounts, upper and lower ball joints, power steering pump, and hoses for leaks;
  - (F) remove, clean, inspect, and repack wheel bearings, properly install wheel seals, and adjust wheel bearing pre-load;
  - (G) inspect shock absorbers and McPherson struts for leakage and performance using jounce and rebound tests;
  - (H) demonstrate wheel stud replacement and installation of wheel and tire assembly with proper torquing procedure;
  - (I) identify and test the Tire Pressure Monitoring Systems (TPMS), both the direct and indirect, for proper operation;
  - (J) dismount and mount a tire on a wheel and reinstall the assembly, including torquing the lug nuts; and
  - (K) rotate tires according to manufacturer recommendations.

*Source: The provisions of this §127.877 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.878. Automotive Technology II: Automotive Service (Two Credits), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisite: Automotive Technology I: Maintenance and Light Repair. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Automotive Technology II: Automotive Service includes knowledge of the major automotive systems and the principles of diagnosing and servicing these systems. Automotive Technology II: Automotive Service includes applicable safety and environmental rules and regulations. In this course, students will gain knowledge and skills in the repair, maintenance, and diagnosis of vehicle systems. This study will allow students to reinforce, apply, and transfer academic knowledge and skills to a variety of interesting and relevant activities, problems, and settings. The focus of this course is to teach safety, tool identification, proper tool use, and employability.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 relates core academic skills to the requirements of automotive technology. The student is expected to:
    - (A) demonstrate effective written communication skills throughout the course, including documenting on a repair order customer concern/complaint, root cause of the failure, and corrective action to complete the repair;
    - (B) estimate the cost of parts and labor operations on repair orders throughout the course, including the flat rate system;
    - (C) demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate; and
    - (D) research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
  - (2) The student demonstrates the technical knowledge and skills that form the core of knowledge of automotive service. The student is expected to:
    - (A) diagnose the major components of powered vehicles;

- (B) diagnose automotive chassis and driveline components;
  - (C) locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair information and technical bulletins;
  - (D) locate the manufacturer recommended preventative maintenance schedule;
  - (E) perform a preventative maintenance inspection;
  - (F) perform common fastener and thread repair, including removing broken bolt, restoring internal and external threads, and repairing internal threads with thread insert;
  - (G) perform precision measurements and use published specifications to diagnose component wear and determine necessary repairs; and
  - (H) employ critical-thinking skills and structured problem-solving skills to diagnose vehicle malfunctions, solve problems, and make decisions.
- (3) The student knows the functions and applications of the tools, equipment, technologies, and materials used in automotive technology. The student is expected to:
- (A) demonstrate the proper and safe use of hand and power tools and equipment commonly employed in the maintenance and repair of vehicles;
  - (B) discuss and demonstrate the proper handling and disposal of environmentally hazardous materials used in servicing vehicles;
  - (C) demonstrate proper use of diagnostic tools and equipment; and
  - (D) locate, read, and interpret service repair information such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair bulletins.
- (4) The student applies the technical knowledge and skills related to suspension in simulated or actual work situations. The student is expected to:
- (A) inspect and replace power steering hoses and fittings;
  - (B) remove, clean, inspect, repack, and install wheel bearings; replace seals; install hubs; and adjust bearings;
  - (C) replace wheel bearing and race;
  - (D) disable and enable supplemental restraint system (SRS);
  - (E) inspect, remove, and replace shock absorbers and struts and inspect mounts and bushings;
  - (F) dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system (TPMS);
  - (G) inspect rear suspension system lateral links/arms, trailing arms, leaf springs, spring insulators, shackles, brackets, center pins, and mounting bolts;
  - (H) inspect tire condition and wear patterns, check for correct size and application based on load and speed rating, and adjust air pressure;
  - (I) perform pre-alignment inspection and measure vehicle ride height;
  - (J) inspect tire and wheel assembly for air loss;
  - (K) identify and test indirect and direct TPMSs and operation of the instrument panel lamps;
  - (L) demonstrate knowledge of steps required to remove and replace sensors in a TPMS; and
  - (M) inspect, remove, and replace front wheel drive (FWD) bearings, hubs, seals, shafts, boots, and universal/constant velocity (CV) joints.

- (5) The student applies the technical knowledge and skills related to electrical systems in simulated or actual work situations. The student is expected to:
  - (A) demonstrate knowledge of the causes and effects from shorts, opens, and resistance in electrical/electronic circuits;
  - (B) measure key-off battery drain/parasitic draw;
  - (C) perform solder repair of electrical wiring;
  - (D) replace electrical connectors and terminal ends;
  - (E) demonstrate the ability to maintain or restore electronic memory functions;
  - (F) perform slow and fast battery charges according to manufacturer recommendations;
  - (G) identify electronic modules, security systems, radios, and other accessories that require re-initialization or code entry after reconnecting a vehicle battery;
  - (H) perform starter current draw test and starter circuit voltage drop tests and inspect and test starter relays and solenoids;
  - (I) remove and install a starter in a vehicle;
  - (J) inspect and test switches, connectors, and wires of starter control circuits;
  - (K) perform charging system output test;
  - (L) remove, inspect, and re-install alternator;
  - (M) identify system voltage and safety precautions associated with high-intensity discharge headlights;
  - (N) disable and enable airbag system for vehicle service and verify indicator lamp operation;
  - (O) remove and reinstall a door panel; and
  - (P) describe the operation of keyless entry and remote-start systems.
- (6) The student applies the technical knowledge and skills related to brakes in simulated or actual work situations. The student is expected to:
  - (A) describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS);
  - (B) measure brake pedal height, reserve distance, travel, and free play;
  - (C) identify components of brake warning light system;
  - (D) bleed and flush brake system;
  - (E) identify and check the operation of brake stop light system; and
  - (F) identify traction control and vehicle stability control system components.
- (7) The student applies the technical knowledge and skills related to engine performance in simulated or actual work situations. The student is expected to:
  - (A) describe the importance of operating all on board diagnostics II (OBDII) monitors for repair verification;
  - (B) perform cylinder power balance test;
  - (C) perform cylinder cranking and running compression tests;
  - (D) perform cylinder leakage test;
  - (E) verify engine operating temperature;

- (F) remove and replace spark plugs and inspect secondary ignition components for wear and damage; and
  - (G) retrieve and record diagnostic trouble codes and OBD II monitor status, freeze frame data, and clear trouble codes when applicable.
- (8) The student applies the technical knowledge and skills related to engines in simulated or actual work situations. The student is expected to:
- (A) install engine covers using gaskets, seals, and sealers as required;
  - (B) remove and replace timing belt and verify correct camshaft timing;
  - (C) perform cooling system pressure and dye tests to identify leaks, check coolant condition and level, and inspect and test radiator, pressure cap, coolant recovery tank, and heater core; and
  - (D) remove, inspect, and replace thermostat and gasket or seal.
- (9) The student applies the technical knowledge and skills related to heating ventilation and air conditioning (HVAC) in simulated or actual work situations. The student is expected to:
- (A) identify, locate, and replace cabin air filters;
  - (B) inspect air conditioning (A/C) condenser for airflow restrictions;
  - (C) identify the source of A/C system odors; and
  - (D) identify hybrid vehicle A/C system electrical circuits and safety precautions.

*Source: The provisions of this §127.878 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.879. Basic Collision Repair and Refinishing (One Credit), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 9-12. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Basic Collision Repair and Refinishing includes knowledge of the processes, technologies, and materials used in the reconstruction of vehicles. This course is designed to teach the concepts and theory of systems related to automotive collision repair and refinishing.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.

- (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 relates core academic skills to the requirements of collision repair and refinishing technology. The student is expected to:
    - (A) apply effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers;
    - (B) use technical writing skills to complete collision repair and refinishing orders and related paperwork; and
    - (C) locate and read documents such as service and repair information, technical bulletins, specifications, schematics, and parts catalogs.
  - (2) The student understands the technical knowledge and skills of basic collision repair and refinishing systems. The student is expected to:
    - (A) demonstrate an understanding of basic types of repair procedures used in the auto collision industry;
    - (B) demonstrate an understanding of basic preparation, application, and refinishing with various paint products; and
    - (C) estimate parts and labor costs on collision repair and refinishing orders.
  - (3) The student knows the basic function and application of tools, equipment, technologies, and materials used in collision repair and refinishing services. The student is expected to:
    - (A) identify hand and power tools and equipment commonly used in collision repair and refinishing;
    - (B) identify proper welding and cutting techniques and processes used in collision repair;
    - (C) identify environmentally hazardous materials and appropriate handling methods used in collision repair and refinishing technologies; and
    - (D) demonstrate awareness of new and emerging collision repair and refinishing technologies.
  - (4) The student reviews the technical knowledge and skills of collision repair and refinishing. The student is expected to:
    - (A) demonstrate the safe use of various hand and power tools and equipment commonly used in collision repair and refinishing;
    - (B) identify types of vehicle construction materials and associated repair methods;
    - (C) remove paint from the damaged area of a body panel;
    - (D) identify and repair surface irregularities on a damaged body panel;
    - (E) demonstrate hammer and dolly techniques for dent repair;
    - (F) prepare damaged area using water-based and solvent-based cleaners;
    - (G) identify, prepare, and apply body filler;
    - (H) rough sand body filler to contour panel and finish sand for the application of primer;
    - (I) demonstrate the proper preparation, application, and refinishing of various paint products;

- (J) apply finish using appropriate spray techniques such as gun arc, angle, distance, travel speed, and spray pattern overlap for the finish being applied;
- (K) apply basecoat and clear coat for overall refinishing; and
- (L) sand, buff, and polish fresh or existing finish to remove defects as required.

*Source: The provisions of this §127.879 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.880. Collision Repair (Two Credits), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Basic Collision Repair and Refinishing. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Collision Repair includes knowledge of the processes, technologies, and materials used in the reconstruction of vehicles. This course is designed to teach the concepts and theory of systems related to automotive collision repair and refinishing.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 relates core academic skills to the requirements of collision repair. The student is expected to:
    - (A) apply effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers;
    - (B) use technical writing skills to complete collision repair orders and related paperwork;
    - (C) locate, read, and interpret documents such as service and repair information, technical bulletins, specifications, schematics, and parts catalogs; and
    - (D) apply mathematical skills to the estimating process such as establishing charges and totals, profit margins, technician productivity, and shop efficiency.
  - (2) The student understands the technical knowledge and skills of collision repair. The student is expected to:

- (A) demonstrate an understanding of basic types of repair procedures for the different types of vehicle body construction used in the auto collision industry;
  - (B) demonstrate an understanding of pre-repair and repair inspection of non-damaged components;
  - (C) demonstrate the proper preparation, application, and refinishing of various paint products;
  - (D) estimate parts and labor costs of collision repair; and
  - (E) perform precision measurements to diagnose vehicle body shape and frame alignment angles.
- (3) The student knows the function and application of tools, equipment, technologies, and materials used in collision repair. The student is expected to:
- (A) use hand and power tools and equipment commonly employed in collision repair, according to industry safety standards;
  - (B) identify proper welding and cutting techniques and processes [in in collision repair](#);
  - (C) properly handle and dispose of environmentally hazardous materials used in collision repair and refinishing technologies; and
  - (D) demonstrate knowledge of new and emerging collision repair technologies.
- (4) The student applies the technical knowledge and skills of collision repair and refinishing to simulated or actual work situations. The student is expected to:
- (A) perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations;
  - (B) identify types of vehicle construction materials and associated repair methods;
  - (C) identify methods of collision energy management and types of damage;
  - (D) determine vehicle damage and prepare an estimate of the repair costs;
  - (E) determine body panel damage and identify the associated repair methods, including inspection, disassembly, and repair or replacement of components;
  - (F) inspect, remove, replace, and align various body components such as hoods, hinges, latches, and bumper covers;
  - (G) identify types of vehicle finishes and associated refinish techniques;
  - (H) inspect, remove, and replace bolted, bonded, and welded panels or panel assemblies;
  - (I) identify vehicle occupant restraint systems and associated repair methods;
  - (J) identify vehicle body components and assess for repair or replacement;
  - (K) demonstrate the welding and cutting processes used in vehicle collision repair;
  - (L) remove, install, and adjust vehicle mechanical systems and electrical components;
  - (M) identify and determine the cause of paint and refinishing defects;
  - (N) discuss interior and exterior trim repair;
  - (O) discuss corrosion protection, including sealers, adhesives, and under-coatings;
  - (P) prepare damaged area using water-based and solvent-based cleaners;
  - (Q) demonstrate vehicle detailing;
  - (R) restore sound deadeners and foam materials; and
  - (S) diagnose and repair water leaks, dust leaks, and wind noise.

- (5) The student applies the technical knowledge and skills of metal finishing and body filling to simulated or actual work situations. The student is expected to:
- (A) remove paint from damaged area of a body panel;
  - (B) identify and repair surface irregularities on a damaged body panel;
  - (C) demonstrate hammer and dolly techniques for dent repair;
  - (D) heat shrink stretched panel areas to proper contour;
  - (E) cold shrink stretched panel areas to proper contour;
  - (F) identify, prepare, and apply body filler;
  - (G) rough sand body filler to contour panel and finish sand for the application of primer;
  - (H) determine the proper metal finishing techniques for aluminum; and
  - (I) determine the proper application of body filler to aluminum.
- (6) The student applies the technical knowledge and skills of moveable glass and hardware to simulated or actual work situations. The student is expected to:
- (A) inspect, adjust, repair, or replace window systems such as regulators, run channels, glass, power mechanisms, and related controls;
  - (B) inspect, adjust, remove, repair, or reinstall body sealing systems such as weather stripping;
  - (C) inspect, adjust, repair, or replace regulators, run channels, glass, power mechanisms, and related controls for roof panel options such as sun roofs and convertible tops; and
  - (D) inspect, remove, reinstall, and align convertible tops and related mechanisms.
- (7) The student applies the technical knowledge and skills of plastics and adhesives to simulated or actual work situations. The student is expected to:
- (A) identify the types of plastics used in automotive applications;
  - (B) clean and prepare the surface of plastic parts;
  - (C) repair rigid, semi-rigid, or flexible plastic panels;
  - (D) remove or repair damaged areas from rigid exterior composite panels; and
  - (E) replace bonded rigid exterior composite body panels, including straightening or aligning panel supports.
- (8) The student applies the technical knowledge and skills of damage analysis to simulated or actual work situations. The student is expected to:
- (A) prepare vehicle for inspection by providing access to damaged areas;
  - (B) analyze damage to determine appropriate methods for overall repairs;
  - (C) perform visual inspection of structural components and members;
  - (D) identify structural damage using measuring tools and equipment;
  - (E) perform visual inspection of non-structural components and members;
  - (F) determine parts, components, material type(s), and procedures necessary for a proper repair;
  - (G) identify type and condition of finish and determine if refinishing is required;
  - (H) identify suspension, electrical, and mechanical component physical damage;

- (I) identify safety systems physical damage;
  - (J) identify interior component damage;
  - (K) identify damage to add-on accessories and modifications; and
  - (L) identify single/one-time use components.
- (9) The student applies the technical knowledge and skills of estimating in simulated or actual work situations. The student is expected to:
- (A) locate and record customer/vehicle owner information;
  - (B) locate and record vehicle identification number (VIN) information, including nation of origin, make, model, restraint system, body type, production date, engine type, and assembly plant;
  - (C) identify and record vehicle options, including trim level, paint code, accessories, and modifications;
  - (D) identify the safety systems;
  - (E) apply appropriate estimating and parts terminology;
  - (F) determine and apply appropriate estimating sequence;
  - (G) utilize estimating guide procedure pages;
  - (H) estimate labor time for operations;
  - (I) select appropriate labor rates for each operation such as structural, non-structural, mechanical, and refinish;
  - (J) select and price replacement parts such as original equipment manufacturer (OEM), alternative/optional OEM, aftermarket, recycled/used, remanufactured, rebuilt, and reconditioned parts;
  - (K) determine labor time, prices, charges, allowances, or fees for non-included operations and miscellaneous items;
  - (L) determine additional material and charges such as environmental, administrative, shop, and disposal fees;
  - (M) determine refinishing material and charges;
  - (N) review computer-assisted and manually written estimates and verify that the information is correct;
  - (O) identify labor time and material charges for restoring corrosion protection; and
  - (P) determine the approximate vehicle retail value compared to the repair cost.

*Source: The provisions of this §127.880 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.881. Paint and Refinishing (Two Credits), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.

- (b) General requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Basic Collision Repair and Refinishing or Collision Repair. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Paint and Refinishing includes knowledge of the processes, technologies, and materials used in the reconstruction of vehicles. This course is designed to teach the concepts and theory of systems related to automotive paint and refinishing.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 relates core academic skills to the requirements of paint and refinishing. The student is expected to:
    - (A) demonstrate effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers;
    - (B) use technical writing skills to complete paint and refinishing orders and related paperwork;
    - (C) locate, read, and interpret documents such as service and repair information, technical bulletins, specifications, schematics, and parts catalogs; and
    - (D) demonstrate competencies required to use and interpret service repair bulletins.
  - (2) The student understands the technical knowledge and skills of paint and refinishing systems. The student is expected to:
    - (A) demonstrate the basic types of refinishing procedures for the different types of vehicle body construction used in the auto refinishing industry;
    - (B) demonstrate the proper preparation, application, and refinishing with various paint products, decals, and adhesives;
    - (C) estimate parts and labor costs on paint and refinishing orders; and
    - (D) perform precision measurements of paint and materials.
  - (3) The student knows the function and application of tools, equipment, technologies, and materials used in paint and refinishing services. The student is expected to:
    - (A) identify safety and personal health hazards according to Occupational Safety and Health Association (OSHA) guidelines and the "Right to Know Law";
    - (B) inspect spray environment and equipment to ensure compliance with federal, state, and local regulations and for safety and cleanliness hazards;
    - (C) select, use, inspect, ensure fit and operation, and perform maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation of a National

- Institute of Occupational of Safety and Health (NIOSH) approved air purifying respirator;
- (D) select, use, and perform maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation for a NIOSH approved fresh air make-up respirator system;
- (E) select and use the proper personal safety equipment such as gloves, suits, hoods, and eye and ear protection;
- (F) use hand and power tools and equipment commonly employed in paint and refinishing technologies, according to industry safety standards;
- (G) properly handle and dispose of environmentally hazardous materials used in paint and refinishing technologies; and
- (H) demonstrate knowledge of new and emerging paint and refinishing technologies.
- (4) The student applies the technical knowledge and skills of paint and refinishing to simulated or actual work situations. The student is expected to:
  - (A) perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations;
  - (B) inspect types of vehicle construction materials and associated refinishing methods;
  - (C) identify different types of vehicle finishes and associated refinish techniques;
  - (D) inspect, identify, and determine the cause of paint and refinishing defects;
  - (E) discuss corrosion protection; and
  - (F) demonstrate vehicle detailing.
- (5) The student applies the technical knowledge and skills of surface preparation to simulated or actual work situations. The student is expected to:
  - (A) inspect and identify type of finish, surface condition, and film thickness and develop and document a plan for refinishing;
  - (B) featheredge areas to be refinished;
  - (C) apply suitable metal treatment or primer;
  - (D) mask and protect other areas that will not be refinished;
  - (E) mix primer, primer-surfacer, or primer-sealer;
  - (F) identify a complimentary color or shade of undercoat to improve coverage;
  - (G) apply primer onto surface of repaired area;
  - (H) remove dust from area to be refinished, including cracks or moldings of adjacent areas;
  - (I) clean area to be refinished using a final cleaning solution;
  - (J) remove, with a tack rag, any dust or lint particles from the area to be refinished;
  - (K) apply suitable sealer to the area being refinished;
  - (L) apply stone chip resistant coating;
  - (M) identify the types of rigid, semi-rigid, or flexible plastic parts to be refinished and determine the materials needed and preparation and refinishing procedures; and
  - (N) identify metal parts to be refinished and determine the materials needed and preparation and refinishing procedures.

- (6) The student applies the technical knowledge and skills of spray gun and related components to simulated or actual work situations. The student is expected to:
  - (A) inspect, clean, and determine condition of spray guns, spray environment, and related equipment such as air hoses, regulators, air lines, and air source;
  - (B) select spray gun setup, including fluid needle, nozzle, and cap, for product being applied;
  - (C) test and adjust spray gun using fluid, air, and pattern control valves; and
  - (D) demonstrate an understanding of the operation of pressure spray equipment.
- (7) The student applies the technical knowledge and skills of paint mixing, matching, and applying techniques to simulated or actual work situations. The student is expected to:
  - (A) identify color code by manufacturer vehicle information label;
  - (B) measure, shake, stir, reduce, catalyze/activate, and strain refinish materials;
  - (C) apply finish using appropriate spray techniques, including gun arc, angle, distance, travel speed, and spray pattern overlap, for the finish being applied;
  - (D) apply selected product on test or let-down panel and check for color match;
  - (E) apply single stage topcoat;
  - (F) apply basecoat and clearcoat for panel blending and panel refinishing;
  - (G) apply basecoat and clearcoat for overall refinishing;
  - (H) remove nibs or imperfections from basecoat;
  - (I) refinish rigid or semi-rigid plastic parts;
  - (J) refinish flexible plastic parts;
  - (K) apply multi-stage coats for panel blending and overall refinishing;
  - (L) identify and mix paint using a formula;
  - (M) identify poor hiding colors and determine necessary action;
  - (N) tint color using formula to achieve a blendable match;
  - (O) identify alternative color formula to achieve a blendable match; and
  - (P) identify the materials, equipment, and preparation differences between petroleum and waterborne technologies.
- (8) The student applies the technical knowledge and skills of final detailing to simulated or actual work situations. The student is expected to:
  - (A) apply decals, transfers, tapes, woodgrains, and pinstripes such as painted and taped;
  - (B) sand, buff, and polish fresh or existing finish to remove defects as required;
  - (C) clean vehicle interior, exterior, and glass;
  - (D) clean body openings such as door jambs and edges;
  - (E) remove overspray; and
  - (F) complete quality control using a checklist.

*Source: The provisions of this §127.881 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.882. Diesel Equipment Technology I (Two Credits), Adopted 2015.**

- (a) Implementation.

- (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
- (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 9-12. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Diesel Equipment Technology I includes knowledge of the function and maintenance of diesel systems. Rapid advances in diesel technology have created new career opportunities and demands in the transportation industry. This course provides the knowledge, skills, and technologies required for employment in transportation systems.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 academic skills related to the requirements of transportation technology. The student is expected to:
    - (A) demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers;
    - (B) demonstrate effective written communication skills with individuals from various cultures such as fellow students, coworkers, and customers; and
    - (C) demonstrate mathematical skills and precision measurements using the metric and U.S. standard systems.
  - (2) The student demonstrates technical knowledge and skills of diesel equipment technology. The student is expected to:
    - (A) describe the function of the major components of diesel powered vehicles such as engines, fuel injection systems, lubrication, cooling, electrical, air-conditioning systems, air induction, exhaust, and emissions;
    - (B) describe the function of the chassis components such as braking, steering, transmission, drivetrain, suspension systems, pneumatics, and hydraulics;
    - (C) locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair information and technical bulletins; and
    - (D) demonstrate precision measurement procedures to diagnose component wear, compare measurements to published specifications, and determine necessary repairs.
  - (3) The student learns the functions and applications of the tools, equipment, technologies, and materials used in diesel equipment service. The student is expected to:

- (A) describe and demonstrate the safe use of hand and power tools and equipment commonly used in the diesel equipment field;
  - (B) discuss the proper handling and disposal of environmentally hazardous materials generated in the service of diesel equipment;
  - (C) describe new and emerging diesel technologies;
  - (D) identify and perform the use of diagnostic tools and equipment; and
  - (E) describe hydraulic/pneumatic properties, controls, and safety.
- (4) The student applies the technical knowledge and skills of diesel equipment technology to simulated or actual work situations. The student is expected to:
- (A) describe the parts management procedures such as ordering, stocking, and locating parts;
  - (B) demonstrate procedures for removal, inspection, and replacement of engine components;
  - (C) describe procedures for inspection and maintenance of ancillary systems such as braking, steering, suspension, and hydraulic/pneumatic systems;
  - (D) demonstrate and apply the concepts of electrical circuit testing, including Ohm's law, voltage drop, resistance, amperage, and voltage, as related to batteries and charging and starting systems;
  - (E) demonstrate and apply the concepts of wiring diagrams and related symbols and series and parallel circuits;
  - (F) discuss the proper procedures to inspect and maintain auxiliary systems such as air-conditioning, heating, and accessory systems;
  - (G) demonstrate and apply the procedures to inspect and maintain chassis and power train systems;
  - (H) demonstrate and apply the procedures to inspect and maintain cooling and lubrication systems; and
  - (I) demonstrate an understanding of the process to perform regular audits and inspections to maintain compliance with appropriate regulations in areas such as safety, health, emissions, and environmental protection.

*Source: The provisions of this §127.882 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.883. Diesel Equipment Technology II (Two Credits), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 10-12. Prerequisite: Diesel Equipment Technology I. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related

professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.

- (3) Diesel Equipment Technology II includes knowledge of the function, diagnosis, and service of diesel equipment systems. Rapid advances in diesel technology have created new career opportunities and demands in the transportation industry. This course provides the advanced knowledge, skills, and technologies required for employment in transportation systems.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 academic skills related to the requirements of transportation technology. The student is expected to:
    - (A) demonstrate effective oral communication skills with individuals from various cultures such as fellow students, coworkers, and customers;
    - (B) demonstrate effective written communication skills with individuals from various cultures such as fellow students, coworkers, and customers; and
    - (C) demonstrate mathematical skills and precision measurements using the metric and U.S. standard systems.
  - (2) The student demonstrates technical knowledge and skills of diesel equipment service and repair. The student is expected to:
    - (A) describe the function of the major components of diesel powered vehicles and equipment such as engines; fuel injection systems; lubrication, cooling, electrical, and air-conditioning systems; and air induction, exhaust, and emissions systems;
    - (B) perform system diagnostics and failure analyses;
    - (C) describe the function of the chassis components such as braking, steering, transmission, drivetrain, suspension systems, pneumatics, and hydraulics;
    - (D) diagnose, repair, and replace auxiliary equipment such as power take offs, hydraulic components, and pneumatic components;
    - (E) locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair information and technical bulletins; and
    - (F) perform precision measurements and use published specifications to diagnose component wear and determine necessary repair or replacement.
  - (3) The student demonstrates the application of the tools, equipment, technologies, and materials used in diesel equipment diagnosis, service, and repair. The student is expected to:
    - (A) demonstrate safe use of hand and power tools and equipment commonly employed in diesel equipment technology;
    - (B) demonstrate the proper handling and disposal of environmentally hazardous materials generated in the servicing of diesel equipment;
    - (C) describe emerging diesel technologies;
    - (D) perform the proper use of diagnostic tools and equipment; and
    - (E) demonstrate knowledge of hydraulic/pneumatic properties, controls, and safety.

- (4) The student applies the technical knowledge and skills of diesel equipment technology to simulated or actual work situations. The student is expected to:
  - (A) demonstrate parts inventory management such as ordering parts, stocking parts, and locating parts;
  - (B) demonstrate procedures for the diagnosis, removal, repair, and replacement of engine components such as cylinder heads, engine blocks, timing components, crankshafts, intake and exhaust systems, and ancillary and auxiliary systems;
  - (C) diagnose, service, and repair diesel equipment systems such as braking, steering, suspension, pneumatic, and hydraulic systems;
  - (D) diagnose and repair electrical and electronic systems such as starting, charging, lighting, computer controls, and on board diagnostics systems and components such as modules, solenoids, sensors, actuators, relays, and switches;
  - (E) demonstrate an understanding of the diagnosis, service, and repair of air-conditioning, heating, and accessory systems;
  - (F) diagnose, service, and repair chassis and power train systems;
  - (G) service and repair cooling and lubrication systems such as water pumps, oil pumps, radiators, and oil coolers;
  - (H) use appropriate diagnostic equipment on various diesel equipment systems; and
  - (I) perform regular audits and inspections to maintain compliance with appropriate regulations in areas such as emissions, safety, health, and environmental protection.

*Source: The provisions of this §127.883 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.884. Energy and Power of Transportation Systems (One Credit), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Principles of Transportation Systems. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Energy and Power of Transportation Systems will prepare students to meet the expectations of employers in this industry and to interact and relate to others. Students will learn the technologies used to provide products and services in a timely manner. The businesses and industries of the Transportation, Distribution, and Logistics Career Cluster are rapidly expanding to provide new career and career advancement opportunities. Performance requirements will include academic and technical skills. Students will need to understand the interaction between various vehicle

systems, including engines, transmissions, brakes, fuel, cooling, and electrical. Students will also need to understand the logistics used to move goods and services to consumers, as well as the components of transportation infrastructure.

- (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 knows the functions and applications of the tools, equipment, technologies, and materials used in the field of energy and power of transportation systems. The student is expected to:
    - (A) discuss the safe use of hand and power tools and equipment commonly used in the maintenance and repair of engines; and
    - (B) discuss the use of audits and inspections to maintain compliance with safety, health, and environmental regulations.
  - (2) The student applies technical knowledge and skills to simulated situations. The student is expected to:
    - (A) identify the major components in a vehicular system;
    - (B) identify necessary maintenance and service of vehicular systems; and
    - (C) discuss preventative maintenance plans and systems to keep vehicular systems in operation.
  - (3) The student describes the historical, current, and future significance of the energy and power of transportation systems. The student is expected to:
    - (A) identify the scope and effect upon society of the energy and power of transportation systems; and
    - (B) identify potential future scenarios for the energy and power of transportation systems.
  - (4) The student uses academic skills to document the requirements of the energy and power of transportation systems. The student is expected to:
    - (A) demonstrate communication skills related to working with customers, technicians, and others;
    - (B) prepare documentation such as quotes, invoices, bills of lading, work orders, and other reports;
    - (C) read and interpret appropriate documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair manuals and bulletins;
    - (D) perform precision measurements and use industry specifications to diagnose component shape and alignment issues and determine necessary repair;
    - (E) use critical-thinking skills to diagnose vehicular system malfunctions, solve problems, and make decisions; and
    - (F) demonstrate knowledge of regulations that govern the construction, maintenance, and service of energy and power of transportation systems.

*Source: The provisions of this §127.884 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.885. Management of Transportation Systems (One Credit), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(1) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Principles of Transportation Systems. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) In Management of Transportation Systems, students will gain knowledge and skills in material handling and distribution and proper application, design, and production of technology as it relates to the transportation industries. This course includes the safe operation of tractor-trailers, forklifts, and related heavy equipment. This course will allow students to reinforce, apply, and transfer their academic knowledge and skills to management of transportation systems and associated careers.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 an understanding of the transportation systems. The student is expected to:
    - (A) explain the history and development of the U.S. transportation systems such as railroads, highways, airports, water systems, and intermodal vans;
    - (B) examine logistics systems used for the transportation of products and services;
    - (C) define practices and terms commonly used in international sales contracts as published by the International Chamber of Commerce;
    - (D) summarize laws and regulations concerning interstate and international trade;
    - (E) explain the role of homeland security in interstate and international trade;
    - (F) evaluate risk factors and social and economic trends such as factors and trends related to risk mitigation, policy issues, security, and culture;
    - (G) evaluate documentation and other requirements for interstate and international transportation and logistics;
    - (H) describe transportation issues such as internal processing, product and supply storage, forecasting, scheduling, cost analysis, documentation confirmation, packing lists,

- materials safety data sheets, product seals, packaging types, packaging labels, and routing issues;
- (I) identify employer's expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills; and
  - (J) demonstrate computer skills related to transportation and materials handling.
- (2) The student demonstrates an understanding of the U.S. Department of Transportation, Environmental Protection Agency, and Occupational Safety and Health Administration hazardous materials regulations. The student is expected to:
- (A) discuss U.S. Department of Transportation regulations, including procedures or policies, material designations, packaging requirements, and operational rules;
  - (B) explain U.S. Department of Transportation, Environmental Protection Agency, and Occupational Safety and Health Administration compliance requirements concerning hazardous materials, hazardous waste operations, medical surveillance, personnel training, adequate ventilation, confined space hazards, and emergency preparedness and response;
  - (C) examine personal protective equipment;
  - (D) compare specifications for accident prevention signs and tags, retention of U.S. Department of Transportation markings, and placards and labels for toxic and hazardous materials;
  - (E) research handling and storage requirements for liquid fuels, liquid petroleum gas, carbon monoxide, and toxic and hazardous substances;
  - (F) examine emergency action plans, employee training requirements, evacuation procedure requirements, and facility and equipment safety standards;
  - (G) explain fire prevention resources, including portable fire extinguishers, fire management systems, employee alarm systems, and hazard communication; and
  - (H) examine fire prevention plans and documentation.
- (3) The student demonstrates an understanding of tractor-trailer knowledge and skills. The student is expected to:
- (A) read and interpret control systems;
  - (B) perform vehicle inspections and maintenance such as checking vehicle systems and components, diagnosing potential problems, and developing malfunction reports and maintenance schedules and reports;
  - (C) perform visual search and inspection of a tractor-trailer;
  - (D) demonstrate operation of tractor-trailer controls such as shifting, backing, docking, coupling and uncoupling, and adjusting vehicle speed and conduct break-down procedures;
  - (E) explain the management and adjustment of vehicle speed and space relations;
  - (F) identify potential driving hazards and environmental conditions;
  - (G) examine emergency maneuvers, procedures, and accident reports; and
  - (H) discuss appropriate decision-making procedures for planning trips.
- (4) The student demonstrates an understanding of forklift knowledge and skills. The student is expected to:
- (A) explain Occupational Safety and Health Administration forklift safety standards, including equipment operation, battery maintenance, liquid propane tank maintenance,

- lift truck stability, load weight limits, seat belt requirements, overhead guards, tip over prevention, and ride-out procedures;
  - (B) perform visual inspection of forklifts and their operating environment;
  - (C) discuss proper start-up, shut-down, and traveling procedures;
  - (D) perform maintenance inspections and documentation procedures;
  - (E) discuss forklift attachments; and
  - (F) evaluate proper lifting, carrying, load stability, and stacking procedures for loading trailers, boxcars, and containers.
- (5) The student demonstrates an understanding of heavy equipment knowledge and skills. The student is expected to:
- (A) explain safety issues pertaining to heavy equipment operation;
  - (B) discuss principles and maintenance of heavy equipment components, including cooling systems, fuel systems, lubrication systems, electrical systems, air systems, power systems, braking systems, pneumatic systems, hydraulic systems, operator ergonomics systems, tires, tracks, and track frames;
  - (C) observe the operation of heavy equipment such as bull dozers, crawler tractors, backhoes, excavators, track hoes, graders, scrapers, skid steer loaders, mini excavators, dump trucks, trenchers, cranes, hoists, soil compactors, land planes, landscaping equipment, and quarry equipment;
  - (D) discuss safe transportation of heavy equipment; and
  - (E) discuss equipment theft prevention procedures.

*Source: The provisions of this §127.885 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.886. Distribution and Logistics (One Credit), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 11 and 12. Recommended prerequisite: Principles of Distribution and Logistics. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Distribution and Logistics is designed to provide training for entry-level employment in distribution and logistics. This course focuses on the business planning and management aspects of distribution and logistics. To prepare for success, students will learn, reinforce, experience, apply, and transfer their knowledge and skills related to distribution and logistics.

- (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 identifies concepts related to cultural diversity. The student is expected to:
    - (A) identify similarities and differences in international cultures;
    - (B) explain the variety of world markets; and
    - (C) describe marketing factors and practices that impact other cultures.
  - (2) The student describes the historical, current, and future significance of the distribution and logistics industries. The student is expected to:
    - (A) define terms associated with the distribution and logistics industries;
    - (B) identify the scope of the distribution and logistics industries and the industries' effect on society;
    - (C) identify significant historical and current issues in the distribution and logistics industries;
    - (D) identify potential future scenarios for the distribution and logistics industries;
    - (E) describe how emerging technology and globalization impacts the distribution and logistics industries; and
    - (F) compare and contrast issues affecting the distribution and logistics industries such as international trade, employment, safety, and environmental issues.
  - (3) The student explains the distribution and logistics industries at local, state, national, and international levels. The student is expected to:
    - (A) identify reasons for world trade and globalization;
    - (B) identify the political impact of distribution and logistics;
    - (C) review regulations and major laws to evaluate their impact on the distribution and logistics industries;
    - (D) read appropriate written material to stay abreast of current issues;
    - (E) use critical-thinking skills to identify and organize alternatives and evaluate public policy issues; and
    - (F) evaluate performance and contract compliance of contractors and service providers.
  - (4) The student demonstrates appropriate personal and communication skills. The student is expected to:
    - (A) describe and apply workplace ethical and legal responsibilities;
    - (B) define the uses of proper etiquette and behavior;
    - (C) identify appropriate personal appearance and health habits;
    - (D) practice written and oral communication skills and employ effective listening skills;
    - (E) comprehend technical reading materials common to the distribution and logistics industries;
    - (F) employ sound writing and preparation skills for prepared and extemporaneous oral presentations, including presentations of technical information; and

- (G) demonstrate speaking skills.
- (5) The student applies appropriate research methods for distribution and logistics topics. The student is expected to:
  - (A) define major fields of research and development;
  - (B) demonstrate proficiency in using a variety of resources for both research and development; and
  - (C) describe the scientific method of research.
- (6) The student applies problem-solving, mathematical, and organizational skills to maintain financial and logistical records. The student is expected to:
  - (A) discuss project proposals;
  - (B) develop and maintain records;
  - (C) collect and organize data in graphs, tables, charts, and plots;
  - (D) analyze and interpret data from graphs, tables, charts, and plots;
  - (E) maintain appropriate financial records such as journals, inventories, income and expense logs, and financial statements and balance sheets;
  - (F) conduct formative, summative, and financial analyses of project learning objectives and records in order to problem-solve for the future;
  - (G) review commercial driver license (CDL) preparation guidelines; and
  - (H) explain CDL guidelines in preparation for testing.
- (7) The student uses information technology tools to access, manage, and create information. The student is expected to:
  - (A) use personal management software, email applications, and Internet applications;
  - (B) use word-processing, database, spreadsheet, and presentation software;
  - (C) use collaborative or virtual meeting software;
  - (D) use and explain the benefits of Geographic Information Systems (GIS) and Global Positioning Systems (GPS) hardware and applications;
  - (E) use computer-based equipment to manage human resources and physical assets;
  - (F) use technology applications such as barcode systems to identify and track goods and shipments; and
  - (G) use mobile applications such as GPS to track goods and shipments.
- (8) The student uses data to optimize distribution and logistics business operations such as storage, distribution routes, equipment, and human resources. The student is expected to:
  - (A) use data to identify areas of operation that need improvement to optimize business operations;
  - (B) identify alternative processes and procedures to improve and optimize business operations; and
  - (C) make data-based decisions on optimizing storage space and distribution routes.
- (9) The student assesses and implements methods to reduce sources of workplace hazards common in the industry in order to promote a safe and accident-free work environment. The student is expected to:
  - (A) identify, assess, and control hazards to maintain safe and healthy working conditions;

- (B) state the role and summarize the benefits of each component in a health, safety, and environmental management system;
  - (C) demonstrate emergency procedures to reduce and mitigate workplace accidents;
  - (D) perform tool, equipment, facility, and personal protective equipment audits and inspections;
  - (E) identify rules and laws designed to promote safety and health in the workplace; and
  - (F) demonstrate knowledge of first aid and cardiopulmonary resuscitation procedures and proper use of safety equipment.
- (10) The student examines the planning, preparation, processing, handling, and storing of goods and materials in warehouses and distribution centers. The student is expected to:
- (A) determine risks or damage from normal rigors such as compression, shock, drop, moisture, corrosion, vibration, temperature, and motion during transportation and handling;
  - (B) discuss the transporting and handling of hazardous materials;
  - (C) explain size, weight, and shape requirements for packaging;
  - (D) discuss handling, storage, and shipping methods for various types of packaging and warehouse and shipping providers;
  - (E) assess requirements for various packaging types;
  - (F) analyze visual design and appearance requirements, including displaying required documentation, handling information, and warnings;
  - (G) create layout plans for processing incoming and outgoing, cross-docking, and storage of products;
  - (H) evaluate material handling and storage equipment;
  - (I) assess the processing of incoming goods and materials using standard industry protocols and procedures; and
  - (J) examine equipment and staffing requirements and develop traffic management plans and work schedules.
- (11) The student reviews issues related to interstate and international trade. The student is expected to:
- (A) define terms commonly used in sales contracts as published by the International Chamber of Commerce;
  - (B) summarize laws and regulations concerning interstate and international trade;
  - (C) explain the role of homeland security in interstate and international trade;
  - (D) evaluate risk factors and social and economic trends such as factors and trends related to risk mitigation, policy change, security, and culture;
  - (E) evaluate documentation and other requirements for interstate and international transportation and logistics; and
  - (F) describe transportation issues such as internal processing, product and supply storage, forecasting, scheduling, cost analysis, documentation confirmation, packing lists, material safety data sheets, product seals, packaging types, packaging labels, and routing issues.

*Source: The provisions of this §127.886 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.887. Introduction to Aircraft Technology (One Credit), Adopted 2024.**

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2025-2026 school year.
- (b) General requirements. This course is recommended for students in Grades 9-12. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Introduction to Aircraft Technology is designed to teach the theory of operation of aircraft airframes, powerplants, and associated maintenance and repair practices. Maintenance and repair practices include knowledge of the general curriculum subjects, powerplant theory and maintenance, and the function, diagnosis, and service of airframe structures, airframe systems and components, and powerplant systems and components of aircraft. Industry-recognized professional licensures, certifications, and registrations are available for students who meet the requirements set forth by the accrediting organization.
  - (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) identify and compare employment opportunities, including entrepreneurship opportunities, and certification requirements for the field of aircraft maintenance and repair;
    - (B) exhibit the ability to cooperate, contribute, and collaborate as a member of a team;
    - (C) identify individual ethical and legal behavior standards according to professional and regulatory agencies;
    - (D) research Federal Aviation Regulations and discuss the impact of the English language proficiency requirements as prescribed by the Federal Aviation Regulations;
    - (E) identify and explain human factors that may impact health and safety in a worksite and how they are addressed by industry standards;
    - (F) explain the role of human factors in maintaining health and safety in the workplace and demonstrate personal responsibility to maintain health and safety in the workplace;
    - (G) identify and explain how employees' personal responsibility and other human factors, including personal attitudes, can affect the success and profitability of a workplace;
    - (H) apply reasoning skills to a variety of simulated workplace situations to make ethical decisions;
    - (I) identify industry standards for employee appearance and health habits;
    - (J) demonstrate appropriate etiquette and behavior;

- (K) identify and demonstrate effective written and oral communication skills; and
  - (L) identify and demonstrate effective listening skills.
- (2) The student relates academic skills to the requirements of aircraft maintenance and repair. The student is expected to:
- (A) demonstrate effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers;
  - (B) identify requirements of work orders and technical documents for repairs;
  - (C) locate and interpret documents, including schematics, charts, graphs, drawings, blueprints, wiring diagrams, service-repair manuals, service bulletins, type certificate data sheets, supplemental type certificates, airworthiness directives, federal aviation regulations, and advisory information;
  - (D) demonstrate proficiency in metric and U.S. customary standard measurement systems;
  - (E) perform precision measurements using engineering scales, dial calipers, and Vernier micrometers to determine if a component is within tolerance of specifications; and
  - (F) use critical-thinking and problem-solving skills to identify aircraft maintenance problems and recommend solutions.
- (3) The student demonstrates an awareness of aviation history. The student is expected to:
- (A) research and discuss the historical interest in flight;
  - (B) describe early aircraft designs such as lighter-than-air or heavier-than-air designs;
  - (C) research and describe the contributions of various pioneers in aviation history, including Charles Taylor;
  - (D) identify driving forces that provide rapid advancements in aircraft design and performance; and
  - (E) describe the contributions of aviation and aerospace to society.
- (4) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for aircraft maintenance and repair, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify and locate aviation regulations prescribed by 14 Code of Federal Regulations Chapter I that govern mechanic privileges related to the construction, maintenance, and service of aircraft;
  - (B) apply the principles of simple machines, basic aerodynamics, aircraft structures, and theory of flight to accomplish an assigned task;
  - (C) identify aircraft categories such as airplane, rotorcraft, glider, and lighter-than-air in federal aviation regulations;
  - (D) explain the certification process, ratings, privileges, and limitations of airmen;
  - (E) identify and compare airframe construction, including wood structures, metal tubular structures, fabric coverings, sheet metal, and composite structures, and basic repair methods and techniques;
  - (F) identify and explain airframe systems and components, including landing gear, hydraulic power, cabin atmosphere control systems, and electrical systems;
  - (G) describe aircraft reciprocating and turbine engine operating theory, functions, and basic repair methods and techniques;

- (H) identify and explain powerplant systems and components, including engine instruments, electrical systems, lubrication systems, ignition and starting systems, cooling systems, exhaust systems, and propellers;
  - (I) explain common aircraft terminology and standard practices required to complete maintenance, modifications, and repairs;
  - (J) identify necessary elements of logbook entries and critique sample logbook entries; and
  - (K) describe inspections required to maintain compliance with airworthiness, safety, health, and environmental regulations.
- (5) The student understands the function and application of the tools, equipment, technologies, and preventative maintenance used in aircraft maintenance and repair. The student is expected to:
- (A) identify and demonstrate basic skills in safely using hand tools, power tools, and equipment commonly employed in the maintenance and repair of aircraft;
  - (B) research and explain the proper handling and disposal of environmentally hazardous materials used in servicing aircraft;
  - (C) research and describe the impact of new and emerging aircraft technologies; and
  - (D) identify and examine the need for preventative maintenance procedures and practices.
- (6) The student uses regulatory and industry standards and demonstrates technical knowledge and skills of the trade, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) start and ground operate an aircraft or simulated aircraft using a high-fidelity flight simulator with a physical yoke and pedal device;
  - (B) research and locate appropriate documentation to perform a function in a written work order and complete the required logbook entry;
  - (C) draw top, side, and front views of various aircraft categories, including airplane, rotorcraft, glider, and lighter-than-air;
  - (D) perform basic airframe and engine inspections according to a checklist;
  - (E) use an engine troubleshooting chart to show the results of simple defects on engine performance; and
  - (F) discuss and describe preventative maintenance plans and systems to keep aircraft systems in operation.

*Source: The provisions of this §127.887 adopted to be effective September 9, 2024, 49 TexReg 6994.*

**§127.888. Aircraft Airframe Technology (Two Credits), Adopted 2024.**

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2025-2026 school year.
- (b) General requirements. This course is recommended for students in Grades 10-12. Prerequisite: Aircraft Maintenance Technology. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.

- (3) Aircraft Airframe Technology is designed to teach the theory of operation of aircraft airframes and associated maintenance and repair practices of Federal Aviation Administration (FAA) airframe curriculum subjects utilizing aircraft, aircraft training devices, or equivalent simulated situations. In this course, the academic and technical skills are separated to reflect the learning outcomes as designed in the FAA Airman Certification Standards. Airframe maintenance and repair practices include knowledge of the theory, function, diagnosis, and service of airframe structures, systems, and components of aircraft. Industry-recognized professional licensures, certifications, and registrations are available for students who meet the requirements set forth by the accrediting organization.
  - (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.
  - (6) The FAA uses standard terms with specific expectations for performance. The terms are defined as follows.
    - (A) Check means to verify proper operation.
    - (B) Inspect means to examine with or without inspection-enhancing tools or equipment.
    - (C) Overhaul means to disassemble, clean, inspect, repair as necessary, and reassemble.
    - (D) Repair means to correct a defective condition.
    - (E) Service means to perform functions that assure continued operation.
    - (F) Troubleshoot means to analyze and identify malfunctions.
  - (7) When a student performs an action, such as checking, inspecting, overhauling, repairing, servicing, troubleshooting, and installing in this course, they are to complete all associated tasks. If an action detects a flaw, defect, or discrepancy in an aircraft or component, that finding could trigger another maintenance action. Actions may include documenting findings through logbook entries, maintenance action forms, installation plans, and work orders.
- (d) Knowledge and skills.
- (1) The student demonstrates professional standards, interpersonal communication, and employability skills as required by business and industry. The student is expected to:
    - (A) identify and compare employment opportunities, including entrepreneurship opportunities, and certification requirements for the field of aircraft maintenance and repair;
    - (B) identify and demonstrate ways to contribute and collaborate as an effective member of a team;
    - (C) identify individual ethical and legal behavior standards according to professional and regulatory agencies;
    - (D) research and discuss the impact of the English language proficiency requirements as prescribed by the Federal Aviation Regulations;
    - (E) identify and explain human factors that may impact health and safety in a worksite and how they are addressed by industry standards;
    - (F) explain the role of human factors in maintaining health and safety in the workplace and demonstrate personal responsibility to maintain health and safety in the workplace;
    - (G) identify and explain how employees' personal responsibility and other human factors, including personal attitudes, can affect the success and profitability of a workplace;

- (H) apply reasoning skills to a variety of simulated workplace situations in order to make ethical decisions;
  - (I) identify industry standards related to employee appearance and health habits;
  - (J) identify and practice effective written and oral communication skills;
  - (K) identify and practice effective listening skills; and
  - (L) define and apply FAA standard terms that have specific expectations for performance, including check, inspect, overhaul, repair, service, and troubleshoot.
- (2) The student relates academic skills to the requirements of metallic structures. The student is expected to:
- (A) describe best practices for maintenance safety, including the use of personal protective equipment (PPE), and precautions for sheet metal repairs and fabrication;
  - (B) identify characteristics and types of metallic structures;
  - (C) identify types of sheet metal defects and select sheet metal repair materials;
  - (D) explain inspection and testing processes of metal structures;
  - (E) explain the selection of rivets, hardware, and fasteners for a sheet metal repair per FAA-approved data;
  - (F) explain the layout, forming, and drilling of sheet metal components per FAA-approved data; and
  - (G) explain rivet layout, installation, and removal per FAA-approved data.
- (3) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for metallic structures utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) install and remove solid rivets such as universal head, countersink head, and blind rivets;
  - (B) create a drawing of a repair, including the number of rivets and size of sheet metal required, utilizing a manufacturer's structural repair manual;
  - (C) design a rivet pattern for a specific repair;
  - (D) determine the applicability of sheet metal for a repair in a specific application;
  - (E) design a repair using a manufacturer's structural repair manual;
  - (F) sketch and build a piece of sheet metal to fit a prepared area; and
  - (G) determine the extent of damage to a metallic structure and decide if it is repairable.
- (4) The student relates academic skills to the requirements of non-metallic structures. The student is expected to:
- (A) identify and discuss maintenance safety practices for composite materials, composite structures, and windows;
  - (B) identify and discuss tools, inspection techniques, and practices for wood structures, including determining acceptable and unacceptable wood defects;
  - (C) define and explain covering textile terms;
  - (D) identify and explain commonly used covering methods of attachment, including types of approved aircraft covering material and common stitching seams used with aircraft covering;
  - (E) describe inspection methods for textile aircraft coverings;
  - (F) identify and discuss composite repair methods, techniques, fasteners, and practices;

- (G) differentiate between composite structure fiber, core, and matrix materials;
  - (H) identify and discuss types of composite structure defects such as delamination, crush core, and surface gouges;
  - (I) identify inspection and testing of composite structures such as tap testing and ultrasonics;
  - (J) research and describe the care and maintenance of windows;
  - (K) research and describe thermoplastic material inspection and types of thermoplastic material defects;
  - (L) research and describe temporary and permanent window repairs; and
  - (M) research and describe inspection of restraints and upholstery.
- (5) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for non-metallic structures, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) inspect and repair fiberglass, composite, plastic, or glass-laminated structures;
  - (B) clean and inspect acrylic-type windshields;
  - (C) perform a tap test on composite material;
  - (D) locate and explain repair procedures for elongated bolt holes; and
  - (E) perform lay up for a repair to a composite panel, including preparation for vacuum bagging, using a manufacturer's repair manual.
- (6) The student understands the academic knowledge and skills for flight controls. The student is expected to:
- (A) identify and compare types of aircraft control cables and control cable maintenance techniques;
  - (B) identify and explain the function of cable connectors, cable guides, and control stops;
  - (C) identify and explain the function of push-pull tubes and torque tubes;
  - (D) identify bellcranks and explain their function;
  - (E) explain the purpose of maintaining a calibration schedule for cable tension meters and other rigging equipment;
  - (F) explain the use and interpretation of cable tensiometer equipment and a cable tension chart;
  - (G) define and explain flutter and flight control balance;
  - (H) identify and explain primary aircraft flight controls, stabilizer systems, and flight control rigging; and
  - (I) identify and explain secondary and auxiliary control surfaces and other aerodynamic wing features.
- (7) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for flight controls, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify fixed-wing aircraft rigging adjustment locations;
  - (B) inspect and report findings on primary and secondary flight control surfaces;
  - (C) inspect and report findings on primary control cables;
  - (D) adjust and secure a primary flight control cable;

- (E) adjust push-pull flight control systems;
  - (F) check the balance of a flight control surface and balance a control surface;
  - (G) determine allowable axial play limits for a flight control bearing; and
  - (H) identify and locate appropriate data to verify aircraft flight control travel limits.
- (8) The student understands the academic knowledge and skills for airframe inspection. The student is expected to:
- (A) explain the use of inspection requirements under 14 Code of Federal Regulations (CFR) Part 91;
  - (B) discuss maintenance recordkeeping requirements under 14 CFR Part 43;
  - (C) research and describe requirements for complying with airworthiness directives, as found in 14 CFR Part 39;
  - (D) identify and differentiate between FAA-approved data and other data sources such as manufacturer manuals;
  - (E) explain the need for compliance with service letters, service bulletins, instructions for continued airworthiness, and airworthiness directives;
  - (F) explain the purpose and methods of visual inspections;
  - (G) describe the method to select and use checklists and other maintenance publications, including service letters, service bulletins, instructions for continued airworthiness, and airworthiness directives; and
  - (H) describe the importance of maintenance record documentation.
- (9) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for airframe inspection, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) perform a portion of a 100-hour inspection in accordance with 14 CFR Part 43 such as a records check using the appropriate checklist;
  - (B) enter results of a 100-hour inspection, including airworthy and unairworthy conditions, in a maintenance record; and
  - (C) analyze and inspect applicable equipment and documents to determine compliance with a specific airworthiness directive.
- (10) The student understands the academic knowledge and skills for landing gear. The student is expected to:
- (A) identify and discuss safety precautions when using aircraft jacks;
  - (B) identify and discuss safety precautions when working with high pressure fluids and gases;
  - (C) identify and discuss safety precautions in the storage and handling of hydraulic fluids;
  - (D) identify and discuss safety precautions in the operation of retractable landing gear systems around personnel;
  - (E) identify and discuss safety precautions in landing gear, tire, and wheel maintenance operations;
  - (F) describe fixed and retractable landing gear systems and components;
  - (G) explain the necessity of landing gear strut servicing and lubrication;
  - (H) describe and compare the method of inspection of bungee and spring steel landing gear systems;

- (I) describe and compare aircraft steering systems;
  - (J) explain landing gear position and warning system inspection, check, and servicing;
  - (K) explain brake assembly servicing and inspection; and
  - (L) describe and compare brake actuating systems.
- (11) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for landing gear, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) inspect and service landing gear such as fixed or retractable systems;
  - (B) jack an aircraft for a gear retraction check;
  - (C) inspect wheels, brakes, bearings, and tires;
  - (D) bleed air from a hydraulic brake system;
  - (E) inspect a tire for defects;
  - (F) replace shock strut air valve;
  - (G) locate and explain the process for checking landing gear alignment;
  - (H) troubleshoot aircraft steering system issues such as nose-wheel shimmy;
  - (I) identify landing gear position and warning system components;
  - (J) troubleshoot landing gear position and warning systems;
  - (K) inspect a brake for serviceability; and
  - (L) inspect tube landing gear for damage.
- (12) The student understands the academic knowledge and skills for hydraulic and pneumatic systems. The student is expected to:
- (A) describe hydraulic system components, including reservoirs, filters, hoses, lines, fittings, valves, actuators, accumulators, and pumps;
  - (B) explain the function of hydraulic system components, including reservoirs, filters, hoses, lines, fittings, valves, actuators, accumulators, and pumps;
  - (C) explain hydraulic system operation, inspections, operational checks, servicing, and troubleshooting;
  - (D) describe pneumatic system components, including reservoirs, filters, hoses, lines, fittings, valves, actuators, accumulators, and pumps;
  - (E) explain the function of pneumatic system components, including reservoirs, filters, hoses, lines, fittings, valves, actuators, accumulators, and pumps;
  - (F) explain pneumatic system operation, inspections, operational checks, servicing, and troubleshooting;
  - (G) identify types of hydraulic seals and hydraulic seal fluid compatibility;
  - (H) research and identify the risks associated with high pressure gases and fluids;
  - (I) research and identify the risks of not properly relieving system pressure prior to system servicing;
  - (J) research and identify the risks associated with storage and handling of hydraulic fluids; and
  - (K) research and identify the risks of cross-contamination of hydraulic fluids.

- (13) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for hydraulic and pneumatic systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify different types of hydraulic fluids;
  - (B) install seals and backup rings in a hydraulic component;
  - (C) remove, clean, inspect, and install a hydraulic system filter;
  - (D) service a hydraulic system reservoir;
  - (E) purge air from a hydraulic system;
  - (F) inspect a hydraulic system and a pneumatic system for leaks;
  - (G) troubleshoot a hydraulic system and a pneumatic system for leaks;
  - (H) locate and explain hydraulic fluid servicing instructions;
  - (I) identify and select hydraulic fluid for a given aircraft; and
  - (J) locate installation procedures for a seal, backup ring, or gasket.
- (14) The student understands the academic knowledge and skills for environmental systems. The student is expected to:
- (A) explain the operation and purpose of pressurization systems and bleed air heating systems;
  - (B) explain and compare aircraft instrument cooling methods;
  - (C) differentiate between exhaust heat exchanger system and combustion heater system components, functions, and operations;
  - (D) differentiate between vapor-cycle system and air-cycle system components, function, and operation;
  - (E) explain cabin pressurization systems, components, and operation;
  - (F) differentiate between types of aircraft oxygen systems;
  - (G) differentiate between types of aircraft oxygen system components;
  - (H) identify and assess risks associated with oxygen system maintenance;
  - (I) identify and assess risks associated with the recovery of vapor-cycle refrigerant;
  - (J) identify and assess risks associated with storage, handling, and use of compressed gas cylinders;
  - (K) identify and assess risks associated with disregarding manufacturer's recommended refrigerant servicing procedures; and
  - (L) identify and assess risks associated with maintenance of combustion heaters.
- (15) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for environment systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) inspect and service an oxygen system;
  - (B) clean and inspect emergency oxygen masks and supply hoses;
  - (C) inspect an oxygen system cylinder for serviceability;
  - (D) locate and describe the procedures to troubleshoot a combustion heater;
  - (E) locate and describe the procedures for servicing a refrigerant (vapor-cycle) system;

- (F) locate and describe the troubleshooting procedures for an air-cycle system;
  - (G) inspect a cabin heater system equipped with an exhaust heat exchanger for cracks; and
  - (H) locate troubleshooting procedures for a pressurization system.
- (16) The student understands the academic knowledge and skills for aircraft instrument systems. The student is expected to:
- (A) describe annunciator indicating systems and define the meaning of warning, caution, and advisory lights;
  - (B) differentiate between fuel quantity indicating systems;
  - (C) differentiate between types of gyroscopic instruments; and
  - (D) explain the function and operation of:
    - (i) magnetic compasses and compass swinging procedures;
    - (ii) pressure and temperature indicating instruments;
    - (iii) position indication sensors and instruments;
    - (iv) engine indication and crew alerting systems;
    - (v) instrument vacuum and pneumatic systems;
    - (vi) pitot-static systems;
    - (vii) electronic displays and flight instrument systems;
    - (viii) transponder and encoder systems;
    - (ix) angle of attack and stall warning systems; and
    - (x) takeoff and landing gear configuration warning systems.
- (17) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for aircraft instrument systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) remove and install an aircraft instrument;
  - (B) determine barometric pressure using an altimeter;
  - (C) verify proper range markings on an instrument for a particular aircraft using approved data;
  - (D) locate the procedures for troubleshooting a vacuum-operated instrument system;
  - (E) identify exhaust gas temperature system components;
  - (F) inspect an aircraft's alternate static air source; and
  - (G) locate and explain the adjustment procedures for a stall warning system.
- (18) The student understands the academic knowledge and skills for aircraft communication and navigation systems. The student is expected to:
- (A) describe radio operating principles and radio components;
  - (B) identify and explain mounting requirements of antennas, static discharge wicks, and avionics components;
  - (C) identify the components of communication systems, including very high frequency (VHF), high frequency (HF), satellite communications (SATCOM), and Aircraft Communication Addressing and Reporting System (ACARS);

- (D) explain the basic operation of communications systems, including VHF, HF, SATCOM, and ACARS;
  - (E) identify the components of emergency locator transmitters (ELT) and explain the basic operation of ELTs;
  - (F) identify the components of navigation systems, including distance measuring equipment (DME), instrument landing system (ILS), global positioning system (GPS), automatic direction finder (ADF), and VHF omnidirectional range (VOR);
  - (G) explain the basic operation of navigation systems, including DME, ILS, GPS, ADF, and VOR;
  - (H) identify the components of collision avoidance systems, including radio altimeter (RA), automatic dependent surveillance-broadcast (ADS-B), traffic collision avoidance systems (TCAS), and ground proximity warning system (GPWS);
  - (I) explain the basic operation of collision avoidance systems, including RA, ADS-B, TCAS, and GPWS;
  - (J) identify the components and explain the basic operation of intercom systems;
  - (K) identify the components and explain the basic operation of weather radar;
  - (L) identify the components and explain the basic operation of autopilot and auto-throttle systems;
  - (M) research and identify the risks of improper ELT testing procedures;
  - (N) research and identify the risks of performing maintenance on high power/high frequency systems such as weather radar and SATCOM systems; and
  - (O) research and identify the risks of improper mounting of antennas.
- (19) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for aircraft communication and navigation systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) locate and explain autopilot inspection procedures;
  - (B) identify navigation and communication antennas;
  - (C) perform an operational check of a VHF communications system;
  - (D) locate proper testing procedures for an ELT, inspect ELT batteries for expiration date, and perform an operational check of an ELT; and
  - (E) locate and explain the installation procedures for antennas, including mounting and coaxial connections.
- (20) The student understands the academic knowledge and skills for aircraft fuel systems. The student is expected to:
- (A) identify fuel system types and fuel system components, including filters and selector valves;
  - (B) differentiate between types of aircraft fuel tanks and types of fuel cells;
  - (C) explain fuel flow during fuel transfer, fueling, defueling, and fuel jettisoning;
  - (D) describe characteristics of fuel types;
  - (E) describe fuel system maintenance industry best practices;
  - (F) differentiate between fuel quantity indication methods such as float type, electrical resistance, or visual indicators;
  - (G) research and identify the risks of improper fuel system maintenance;

- (H) research and identify the risks of fuel system contamination and spills;
  - (I) research and identify the risks of fuel system maintenance requiring fuel tank entry; and
  - (J) research and identify the risks when defueling aircraft.
- (21) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for aircraft fuel systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) inspect a metal, bladder, or integral fuel tank;
  - (B) inspect a fuel selector valve;
  - (C) drain a fuel system sump;
  - (D) service a fuel system strainer; and
  - (E) identify and locate fuel system operating instructions, inspection procedures, crossfeed procedures, required placards, and defueling procedures.
- (22) The student understands the academic knowledge and skills for aircraft electrical systems. The student is expected to:
- (A) identify the components of generators, direct current (DC) generation systems, and DC power distribution systems;
  - (B) explain the basic operation of generators, DC generation systems, and DC power distribution systems;
  - (C) identify the components of alternators, alternating current (AC) generation systems, and AC power distribution systems;
  - (D) explain the basic operation of alternators, AC generation systems, and AC power distribution systems;
  - (E) identify the components and explain the basic operation of voltage regulators, over-volt protection, and overcurrent protection;
  - (F) identify the components and explain the basic operation of inverter systems;
  - (G) explain aircraft wiring size and type selection criteria;
  - (H) explain the purpose of aircraft wiring shielding;
  - (I) explain the purpose of aircraft bonding and lightning protection;
  - (J) describe basic electrical system troubleshooting practices;
  - (K) identify soldering preparation techniques, types of solder, and flux usage;
  - (L) identify types of aircraft electrical connectors, splices, terminals, and switches;
  - (M) describe methods of aircraft battery troubleshooting and maintenance;
  - (N) research and identify the risks of testing electrical systems, including energized and non-energized systems;
  - (O) research and identify the risks of connecting and disconnecting external power;
  - (P) research and identify the risks of maintenance in areas containing aircraft wiring;
  - (Q) research and identify the risks of improperly routing and securing wires and wire bundles;
  - (R) research and identify the risks of improper selection or installation of wire terminals; and
  - (S) research and identify the risks of improper soldering practices.

- (23) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for aircraft electrical systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) inspect aircraft wiring installation and routing;
  - (B) perform wire terminating and splicing;
  - (C) identify components using a wiring circuit diagram;
  - (D) connect aircraft wires using a solder joint;
  - (E) troubleshoot a simple airframe electrical circuit;
  - (F) install bonding jumpers to electrically connect two isolated components;
  - (G) measure the resistance of an electrical system component;
  - (H) inspect and test anti-collision, position, and landing lights for proper operation;
  - (I) identify components in an electrical schematic where AC is rectified to a DC voltage;
  - (J) perform a continuity test to verify the condition of a conductor; and
  - (K) perform a test on a conductor for a short to ground.
- (24) The student understands the academic knowledge and skills for ice and rain control systems. The student is expected to:
- (A) explain causes and effects of aircraft icing;
  - (B) identify the components of ice detection systems, aircraft anti-ice systems, and de-ice systems;
  - (C) explain the basic operation of ice detection systems, aircraft anti-ice systems, and de-ice systems;
  - (D) explain wind screen rain control systems, including wiper blade, chemical, and pneumatic bleed air systems;
  - (E) research and identify the risks of improper ice and rain control system testing or maintenance;
  - (F) research and identify the risks of improper storage and handling of deicing fluids; and
  - (G) research and identify the risks of improper selection and use of cleaning materials for heated windshields.
- (25) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for aircraft electrical systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) clean a pneumatic deicer boot;
  - (B) locate and explain the procedures for inspecting an electrically operated windshield wiper system;
  - (C) locate and explain the procedures for replacing blades on a windshield wiper system; and
  - (D) locate and explain the procedures for inspecting a pneumatic rain removal system.
- (26) The student understands the academic knowledge and skills for airframe fire protection systems. The student is expected to:
- (A) explain types of fires and aircraft fire zones;
  - (B) identify the components and explain the basic operation of overheat detection and warning systems;

- (C) identify the components and explain the basic operation of fire detection and warning systems;
  - (D) identify the components and explain the basic operation of smoke and carbon monoxide detection systems;
  - (E) describe types of fire extinguishing systems and extinguishing agents;
  - (F) research and identify the risks of maintenance on circuits associated with fire bottle squibs;
  - (G) research and explain the use of PPE when working on or testing fire extinguishing systems; and
  - (H) explain the risks of exposure to fire extinguishing agents.
- (27) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for airframe fire protection systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) evaluate an installed fire extinguisher system for proper container pressure;
  - (B) locate and explain the procedures for checking a smoke detection system;
  - (C) locate and explain the procedures for inspecting an overheat detection system; and
  - (D) inspect fire protection system cylinders and check for hydrostatic test date.
- (28) The student understands the academic knowledge and skills for rotorcraft fundamentals. The student is expected to:
- (A) explain the characteristics of rotorcraft aerodynamics and flight controls;
  - (B) identify the components and explain the function of rotorcraft transmissions;
  - (C) explain the need for rigging requirements for rotary wing aircraft;
  - (D) identify rotor systems, rotor blade functions, and rotor blade construction;
  - (E) explain the need for helicopter skid shoe and tube inspections;
  - (F) explain causes of rotor system and drive system vibrations;
  - (G) explain the purpose of rotor blade track and balance;
  - (H) research and identify the risks of working around helicopter blades during ground operations;
  - (I) research and identify the risks of improper ground-handling procedures;
  - (J) research and identify the risks of ground operations and functional tests; and
  - (K) research and identify the risks of improper maintenance of rotorcraft systems and components.
- (29) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for rotorcraft fundamentals, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify components of a helicopter rotor system;
  - (B) identify and locate helicopter rotor blade track and balance procedures;
  - (C) identify and locate procedures needed to rig helicopter controls; and
  - (D) identify and locate procedures to track and balance a rotor system.
- (30) The student understands the academic knowledge and skills for water and waste systems. The student is expected to:

- (A) identify the components and explain the basic operation of potable water systems;
  - (B) identify the components and explain the basic operation of lavatory waste systems;
  - (C) describe servicing requirements for water and waste systems; and
  - (D) research and identify the need for PPE to reduce the risks associated with servicing lavatory waste systems.
- (31) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for water and waste systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) locate and explain the procedures for servicing a lavatory waste system; and
  - (B) locate and explain the procedures for servicing a potable water system.

*Source: The provisions of this §127.888 adopted to be effective September 9, 2024, 49 TexReg 6994.*

**§127.889. Aircraft Powerplant Technology (Two Credits), Adopted 2024.**

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2025-2026 school year.
- (b) General requirements. This course is recommended for students in Grades 11 and 12. Prerequisite: Aircraft Maintenance Technology. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Aircraft Powerplant Technology is designed to teach the theory of operation of aircraft powerplants and associated maintenance and repair practices of the Federal Aviation Administration (FAA) powerplant curriculum subjects utilizing aircraft, aircraft training devices, or equivalent simulated situations. In this course, the academic and technical skills are separated to reflect the learning outcomes as designed in the FAA Airman Certification Standards. Powerplant maintenance and repair practices include knowledge of the theory, function, diagnosis, and service of powerplants, systems, and components of aircraft. Industry-recognized professional licensures, certifications, and registrations are available for students who meet the requirements set forth by the accrediting organization.
  - (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.
  - (6) The FAA uses standard terms with specific expectations for performance. The terms are defined as follows.
    - (A) Check means to verify proper operation.
    - (B) Inspect means to examine with or without inspection enhancing tools or equipment.
    - (C) Overhaul means to disassemble, clean, inspect, repair as necessary, and reassemble.
    - (D) Repair means to correct a defective condition.
    - (E) Service means to perform functions that assure continued operation.

- (F) Troubleshoot means to analyze and identify malfunctions.
- (7) When a student performs an action, such as checking, inspecting, overhauling, repairing, servicing, troubleshooting, and installing in this course, they are to complete all associated tasks. If an action detects a flaw, defect, or discrepancy in an aircraft or component, that finding could trigger another maintenance action. Actions may include documenting findings through logbook entries, maintenance action forms, installation plans, and work orders.
- (d) Knowledge and skills.
  - (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:
    - (A) identify and compare employment opportunities, including entrepreneurship opportunities, and certification requirements for the field of aircraft maintenance;
    - (B) identify and demonstrate ways to contribute and collaborate as an effective member of a team;
    - (C) identify individual ethical and legal behavior standards according to professional and regulatory agencies;
    - (D) research and discuss the impact of the English language proficiency requirements as prescribed by the Federal Aviation Regulations;
    - (E) identify and explain human factors that may impact health and safety in a worksite as addressed by industry standards;
    - (F) explain the role of human factors in maintaining health and safety in the workplace and demonstrate personal responsibility to maintain health and safety in the workplace;
    - (G) identify and explain how employees' personal responsibility attitudes can affect the success and profitability of a workplace;
    - (H) apply reasoning skills to a variety of simulated workplace situations in order to make ethical decisions;
    - (I) identify standards of industry related to employee appearance and health habits;
    - (J) identify and practice effective written and oral communication skills;
    - (K) identify and practice effective listening skills; and
    - (L) define and apply FAA standard terms that have specific expectations for performance, including check, inspect, overhaul, repair, service, and troubleshoot.
  - (2) The student relates academic skills to the requirements of reciprocating engines. The student is expected to:
    - (A) identify the components and types of reciprocating internal combustion aircraft engines, including inline, opposed, V-type, and radial engines;
    - (B) explain the operational theory of reciprocating internal combustion aircraft engines, including inline, opposed, V-type, and radial engines;
    - (C) explain the purpose and methods of reciprocating engine preservation;
    - (D) explain the purpose and methods of reciprocating engine maintenance and inspection;
    - (E) locate and explain the procedures for reciprocating engine ground operations;
    - (F) identify the components and explain the basic operation of diesel engines;
    - (G) explain the basic operational theory of diesel engines;
    - (H) research and identify the risks of maintenance that requires moving the propeller;
    - (I) research and identify the risks of ground operating a reciprocating engine;

- (J) research and identify the actions necessary in the event of a reciprocating engine fire; and
  - (K) research and identify the risks in not using the manufacturer's procedures during maintenance.
- (3) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for reciprocating engines, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) perform and document findings from a cylinder assembly inspection;
  - (B) operate and troubleshoot a reciprocating engine;
  - (C) install a wrist pin in a piston;
  - (D) identify the parts of a cylinder and a crankshaft;
  - (E) identify and inspect bearings found in reciprocating engines; and
  - (F) inspect and rig cable and push-pull engine controls.
- (4) The student relates academic skills to the requirements of turbine engines. The student is expected to:
- (A) identify the components and types of turbine engines;
  - (B) explain the basic operational theory of turbine engines;
  - (C) explain the purpose and methods of monitoring turbine engine performance;
  - (D) explain the purpose and methods of turbine engine troubleshooting, maintenance, and inspection;
  - (E) research and explain the causes of turbine engine performance loss;
  - (F) explain the basic operational theory of bleed air systems;
  - (G) explain the purpose and methods of turbine engine preservation;
  - (H) explain the theory and application of auxiliary power units;
  - (I) research and identify the risks of turbine engine operation;
  - (J) research and identify the risks of performing maintenance on a turbine engine;
  - (K) research and identify the actions necessary in the event of a turbine engine fire; and
  - (L) research and identify the risks of foreign object damage (FOD) to turbine engines.
- (5) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for turbine engines, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify different turbine compressors;
  - (B) identify different types of turbine engine blades;
  - (C) identify components of turbine engines;
  - (D) map airflow direction and pressure changes in turbine engines;
  - (E) identify and locate the procedures for the adjustment of a fuel control unit;
  - (F) identify and locate the installation or removal procedures for a turbine engine;
  - (G) identify damaged turbine engine blades; and
  - (H) analyze causes for turbine engine performance loss.
- (6) The student relates academic skills to the requirements of engine inspection. The student is expected to:

- (A) explain the purpose of inspection requirements under 14 Code of Federal Regulations (CFR) Part 43 and 14 CFR Part 91;
  - (B) explain the purpose and methods of identification of life-limited parts and life-limited parts replacement intervals;
  - (C) explain the purpose and types of special inspections such as sudden engine stoppage, hard landings, and foreign object debris (FOD) ingestion;
  - (D) explain the purpose of using FAA-approved data;
  - (E) explain the importance of compliance with service letters, service bulletins, instructions for continued airworthiness, airworthiness directives (AD), and Type Certificate Data Sheets (TCDS);
  - (F) explain the purpose of maintenance recordkeeping requirements under 14 CFR Part 43;
  - (G) explain the purpose of engine component inspection, checking, and servicing;
  - (H) explain the importance of inspecting engine mounts and mounting hardware;
  - (I) research and identify the risks of performing a compression test on a reciprocating engine; and
  - (J) research and identify the risks of performing maintenance on an operating reciprocating engine and a turbine engine.
- (7) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for engine inspection, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) evaluate a powerplant for compliance with FAA-approved or manufacturer data;
  - (B) perform a powerplant records inspection;
  - (C) inspect a powerplant for compliance with applicable ADs;
  - (D) determine powerplant installation eligibility in accordance with the TCDS;
  - (E) inspect engine controls for proper operation and adjustment;
  - (F) inspect an aircraft engine accessory for serviceability;
  - (G) inspect engine records for time or cycles on life-limited parts;
  - (H) perform an engine start and inspect engine operational parameters; and
  - (I) inspect an engine mount to determine serviceability.
- (8) The student relates academic skills to the requirements of engine instrument systems. The student is expected to:
- (A) identify the components of engine instrument systems, including fuel flow, temperature, engine speed, pressure, torque meter, engine pressure ratio (EPR), engine indicating and crew alerting system (EICAS), and electronic centralized aircraft monitor (ECAM);
  - (B) explain the operational theory of engine instrument systems, including fuel flow, temperature, engine speed, pressure, torque meter, EPR, EICAS, and ECAM;
  - (C) describe the types of annunciator indicators and the functions of annunciator indicating systems;
  - (D) define the meaning of annunciator indicating system warning, caution, and advisory lights;
  - (E) identify the components and explain the operational theory of full authority digital engine controls (FADEC);

- (F) explain the purpose and methods of marking engine instrument ranges;
  - (G) research and identify the risks of damaging instrument systems or indicating systems during maintenance; and
  - (H) research and identify the risks of inaccurate engine instrument calibration or inaccurate instrument readings.
- (9) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for engine inspection, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) remove, inspect, and install a fuel-flow transmitter;
  - (B) remove, inspect, and install a fuel-flow gauge;
  - (C) identify components of an electric tachometer system;
  - (D) inspect tachometer markings for accuracy;
  - (E) locate procedures for troubleshooting a turbine EPR system;
  - (F) inspect exhaust gas temperature (EGT) probes;
  - (G) locate and inspect engine low fuel pressure warning system components; and
  - (H) troubleshoot an EGT indicating system.
- (10) The student relates academic skills to the requirements of engine fire protection systems. The student is expected to:
- (A) identify types of fires such as electrical, structural, and petroleum-based fires and explain the purpose of engine fire zones;
  - (B) identify the components and explain the basic operation of fire detection warning systems;
  - (C) explain the purpose of fire detection system maintenance and inspection requirements;
  - (D) identify fire extinguishing agents and types of fire extinguishing systems;
  - (E) explain the purpose and methods of fire extinguishing system maintenance and inspection;
  - (F) research and identify the risks of container discharge cartridges;
  - (G) research and identify the risks of extinguishing agents; and
  - (H) research and identify the risks of maintenance on circuits associated with electrically activated container discharge cartridges.
- (11) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for engine fire protection systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify fire detection sensing units;
  - (B) locate troubleshooting procedures for a fire detection system;
  - (C) inspect fire extinguisher discharge circuit;
  - (D) check operation of fire warning press-to-test and troubleshoot faults; and
  - (E) identify continuous-loop fire detection system components.
- (12) The student relates academic skills to the requirements of engine electrical systems. The student is expected to:

- (A) identify the components of engine electrical systems, including alternating current generators, direct current generators, alternators, starter generators, voltage regulators, overvoltage protection, and overcurrent protection;
  - (B) explain the operational theory of engine electrical systems, including alternating current generators, direct current generators, alternators, starter generators, voltage regulators, overvoltage protection, and overcurrent protection;
  - (C) explain the procedure for locating the correct electrical wire size needed to fabricate a wire;
  - (D) explain the purpose of engine electrical wiring, switches, and protective devices;
  - (E) research and identify the risks of reversing polarity when performing electrical system maintenance;
  - (F) research and identify the actions necessary in response to a warning or caution annunciator light;
  - (G) research and identify the risks of performing maintenance on energized aircraft systems; and
  - (H) research and identify the risks of improper routing and securing wiring near flammable fluid lines.
- (13) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for engine electrical systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) inspect engine electrical wiring, switches, cable, and protective devices;
  - (B) analyze the suitability of a replacement component by part number;
  - (C) troubleshoot a direct-drive electric starter system;
  - (D) select the appropriate wire size for engine electrical system;
  - (E) repair a broken engine electrical system wire;
  - (F) troubleshoot an electrical system using a schematic or wiring diagram;
  - (G) fabricate a bonding jumper; and
  - (H) inspect engine electrical connectors.
- (14) The student relates academic skills to the requirements of engine lubrication systems. The student is expected to:
- (A) describe types, grades, and uses of engine oil;
  - (B) identify the components and explain the basic operation of lubrication systems, including wet-sumps and dry-sumps;
  - (C) explain the purpose of chip detectors;
  - (D) explain the purpose and methods of lubrication system maintenance, inspection, servicing, and analysis;
  - (E) explain the causes of excessive aircraft engine oil consumption;
  - (F) research and identify the risks of mixing engine oils;
  - (G) research and identify the risks in not using the manufacturer's recommendations regarding the use of engine lubricants; and
  - (H) research and identify the risks of improper handling, storage, and disposal of used lubricating oil.

- (15) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for engine lubrication systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) inspect an oil cooler or oil lines;
  - (B) identify the correct type of oil for a specific engine;
  - (C) identify approved oils for different climatic temperatures;
  - (D) identify and locate procedures for obtaining oil samples;
  - (E) inspect an oil filter or screen based on industry standards;
  - (F) identify oil system components;
  - (G) replace an oil system component;
  - (H) identify oil system flow through the engine;
  - (I) troubleshoot an engine oil pressure malfunction;
  - (J) troubleshoot an engine oil temperature system; and
  - (K) identify types of metal found in an oil filter.
- (16) The student relates academic skills to the requirements of ignition and starting systems. The student is expected to:
- (A) identify the components of ignition systems, including spark plugs, shower of sparks, magnetos, impulse couplings, solid-state ignitions, and FADECs;
  - (B) explain the operational theory of ignition systems and components, including spark plugs, shower of sparks, magnetos, impulse couplings, solid-state ignitions, and FADECs;
  - (C) identify the components and explain the basic operation of engine starters;
  - (D) identify the components and explain the basic operation of turbine engine ignition systems;
  - (E) research and identify the risks of advanced and retarded ignition timing on piston engines;
  - (F) research and identify the risks of maintenance on engines with capacitor discharge ignition systems; and
  - (G) research and identify the risks of working around reciprocating engines with an ungrounded magneto.
- (17) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for ignition and starting systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) remove, clean, inspect, and install a spark plug;
  - (B) inspect an electrical starting system;
  - (C) troubleshoot an electrical starting system;
  - (D) troubleshoot an ignition switch circuit;
  - (E) identify the correct spark plugs used for replacement installation; and
  - (F) identify the correct igniter plug on a turbine engine.
- (18) The student relates academic skills to the requirements of engine fuel and fuel metering systems. The student is expected to:

- (A) explain the purpose of proper fuel to air ratios and fuel metering;
  - (B) identify the components, basic operation, and adjustment of fuel metering systems, including float carburetor, pressure carburetor, continuous-flow fuel injection, FADEC, and hydromechanical fuel control;
  - (C) explain the purpose and basic operation of fuel heaters, lines, pumps, valves, filters, and drains;
  - (D) explain the basic operation of fuel nozzles and manifolds;
  - (E) identify the components and explain the basic operation of turbine engine fuel metering systems;
  - (F) locate and explain inspection requirements for an engine fuel system;
  - (G) explain fuel system operation;
  - (H) research and identify the risks of adjusting turbine engine fuel controls;
  - (I) research and identify the risks of adjusting reciprocating engine fuel controls;
  - (J) research and identify the risks of handling fuel metering system components or fuel control units that may contain fuel; and
  - (K) research and identify the risks of fuel system maintenance.
- (19) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for engine fuel and fuel metering systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify carburetor components;
  - (B) identify fuel and air flow through a float-type carburetor;
  - (C) remove and install a carburetor main metering jet;
  - (D) inspect the needle, seat, and float level on a float-type carburetor;
  - (E) adjust carburetor idle speed and mixture;
  - (F) research and locate procedures for a turbine engine revolutions per minute overspeed inspection;
  - (G) research and locate procedures for adjusting a hydromechanical fuel control unit;
  - (H) explain procedures for removing and installing a turbine engine fuel control unit;
  - (I) identify components of an engine fuel system;
  - (J) identify fuel selector placards;
  - (K) inspect engine fuel system fluid lines and components;
  - (L) locate the procedures for troubleshooting a turbine engine fuel heater system; and
  - (M) inspect fuel selector valve.
- (20) The student relates academic skills to the requirements of reciprocating engine induction and cooling systems. The student is expected to:
- (A) identify the components and explain the theory of operation of reciprocating engine induction and cooling systems;
  - (B) explain the causes and effects of induction system icing;
  - (C) identify the components and explain the theory of superchargers, supercharger controls, turbochargers, turbocharger controls, and intercoolers;
  - (D) identify the components and explain the theory of augments cooling systems;

- (E) identify the components and explain the theory of induction system filtering and carburetor heaters;
  - (F) research and identify the risks of maintenance on turbochargers;
  - (G) research and identify the risks of ground operation of aircraft engines;
  - (H) research and identify the risks of maintenance-related foreign object debris and foreign object damage; and
  - (I) research and identify the risks of chemicals used in liquid cooling systems.
- (21) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for reciprocating engine induction and cooling systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) inspect a carburetor heat system;
  - (B) inspect an alternate air valve for proper operation;
  - (C) inspect an induction system drain for proper operation;
  - (D) service an induction air filter;
  - (E) inspect an induction system for obstruction;
  - (F) inspect an air intake manifold for leaks;
  - (G) locate the proper specifications for coolant used in a liquid-cooled engine;
  - (H) inspect reciprocating engine cooling ducting and baffle seals for damage;
  - (I) identify components of a turbocharger induction system;
  - (J) identify exhaust augments-cooled engine components;
  - (K) inspect and repair a cylinder baffle;
  - (L) inspect a cowl flap system for normal operation; and
  - (M) inspect cylinder cooling fins for damage.
- (22) The student relates academic skills to the requirements of turbine engine air systems. The student is expected to:
- (A) identify the components and explain the operational theory of air cooling systems, turbine engine induction systems, turbine engine bleed air systems and turbine engine anti-ice systems;
  - (B) explain the purpose and theory of turbine engine cowling air flow and turbine engine internal cooling;
  - (C) identify the components and purpose of turbine engine baffle and methods of seal installation;
  - (D) identify and explain the purpose of turbine engine insulation blankets and shrouds;
  - (E) research and identify the risks of maintenance on compressor bleed air systems; and
  - (F) research and identify the risks of ground operation of aircraft engines following other than manufacturer's instructions.
- (23) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for turbine engine air systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify location of turbine engine insulation blankets;
  - (B) identify turbine engine cooling air flow;

- (C) inspect rigid or flexible turbine engine cooling ducting or baffle seals; and
  - (D) identify turbine engine ice and rain protection system components.
- (24) The student relates academic skills to the requirements of engine exhaust and reverser systems. The student is expected to:
- (A) identify the components of reciprocating engine exhaust systems, turbine engine exhaust systems, noise suppression systems, and thrust reversers;
  - (B) explain the operational theory of reciprocating engine exhaust systems, turbine engine exhaust systems, noise suppression systems, and thrust reversers;
  - (C) research and identify the risks of maintenance and inspection of exhaust system components;
  - (D) research and identify the risks of operating reciprocating engines with exhaust systems leaks and exhaust system failures; and
  - (E) research and identify the risks of ground operation of aircraft engines.
- (25) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for engine exhaust and reverser systems, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify the type of exhaust system on a particular aircraft;
  - (B) inspect exhaust system;
  - (C) locate and explain procedures for testing and troubleshooting a turbine thrust reverser system; and
  - (D) perform a pressure leak check of a reciprocating engine exhaust system.
- (26) The student relates academic skills to the requirements of propellers. The student is expected to:
- (A) explain the theory and operation of propellers;
  - (B) identify types of propellers and blade design;
  - (C) explain the theory and operation of constant speed propellers, pitch control systems, and propeller governors;
  - (D) explain the theory and operation of turbine engine propeller beta range operation;
  - (E) explain the purpose and methods of propeller servicing, maintenance, and inspections;
  - (F) identify and locate procedures for removal and installation of a propeller;
  - (G) explain the purpose of propeller TCDS;
  - (H) explain the theory and operation of propeller synchronization systems and propeller ice control systems; and
  - (I) research and identify the risks of propeller ground operation, maintenance, and inspections.
- (27) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for propellers, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) check blade static tracking;
  - (B) inspect a propeller for condition and airworthiness;
  - (C) measure propeller blade angle;
  - (D) locate and explain the procedures for balancing a fixed-pitch propeller;

- (E) identify propeller range of operation; and
- (F) determine what minor propeller alterations are acceptable using the propeller specifications, TCDS, and listings.

*Source: The provisions of this §127.889 adopted to be effective September 9, 2024, 49 TexReg 6994.*

**§127.890. Aircraft Maintenance Technology (One Credit), Adopted 2024.**

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2025-2026 school year.
- (b) General requirements. This course is recommended for students in Grades 9-12. Recommended prerequisites: Introduction to Aircraft Technology. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Aircraft Maintenance Technology is designed to teach the theory of operation, general maintenance, and repair practices of Federal Aviation Administration (FAA) general curriculum subjects utilizing aircraft, aircraft training devices, or equivalent simulated situations. In this course, the academic and technical skills are separated to reflect the learning outcomes as designed in the FAA airman certification standards. Maintenance and repair practices include knowledge of the function, diagnosis, and service of aircraft and their associated equipment. Industry-recognized professional licensures, certifications, and registrations are available for students who meet the requirements set forth by the accrediting organization.
  - (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.
  - (6) The FAA uses standard terms with specific expectations for performance. The terms are defined as follows.
    - (A) Check means to verify proper operation.
    - (B) Inspect means to examine with or without inspection enhancing tools or equipment.
    - (C) Overhaul means to disassemble, clean, inspect, repair as necessary, and reassemble.
    - (D) Repair means to correct a defective condition.
    - (E) Service means to perform functions that assure continued operation.
    - (F) Troubleshoot means to analyze and identify malfunctions.
  - (7) When a student performs an action, such as checking, inspecting, overhauling, repairing, servicing, troubleshooting, and installing in this course, they are to complete all associated tasks. If an action detects a flaw, defect, or discrepancy in an aircraft or component, that finding could trigger another maintenance action. Actions may include documenting findings through logbook entries, maintenance action forms, installation plans, and work orders.
- (d) Knowledge and skills.

- (1) The student demonstrates professional standards, interpersonal communication, and employability skills as required by business and industry. The student is expected to:
  - (A) identify employment opportunities, including entrepreneurship opportunities, and certification requirements for the field of aircraft maintenance and repair;
  - (B) identify and demonstrate ways to contribute and collaborate as an effective member of a team;
  - (C) identify individual ethical and legal behavior standards according to professional and regulatory agencies;
  - (D) research and discuss the impact of the English language proficiency requirements as prescribed by the Federal Aviation Regulations;
  - (E) identify and explain the technical knowledge and skills related to human factors in health and safety in the worksite as addressed by industry standards;
  - (F) explain the role of human factors in maintaining health and safety in the workplace and demonstrate personal responsibility to maintain health and safety in the worksite;
  - (G) identify and explain how employees' personal responsibility attitudes can affect the success and profitability of a worksite;
  - (H) apply reasoning skills to a variety of workplace situations to make ethical decisions;
  - (I) identify industry standards related to employee appearance and health habits;
  - (J) practice effective written and oral communication skills;
  - (K) identify and practice effective listening skills; and
  - (L) define and apply FAA standard terms that have specific expectations for performance, including check, inspect, overhaul, repair, service, and troubleshoot.
- (2) The student relates academic skills to the requirements of human factors. The student is expected to:
  - (A) describe safety culture and organizational structures in the work environment;
  - (B) identify and explain types of human error and human factor principles;
  - (C) identify and discuss the chain-of-events theory, including pre-conditions and conditions for unsafe acts;
  - (D) identify and discuss the 12 common causes of mistakes in the aviation workplace; and
  - (E) research and discuss the purpose of safety management systems in the aviation workplace.
- (3) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for human factors, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
  - (A) complete and submit a malfunction and defect report; and
  - (B) research and report on information regarding human factor errors.
- (4) The student relates academic skills to the requirements of aviation mathematics. The student is expected to:
  - (A) perform algebraic operations involving addition, subtraction, multiplication, and division, using positive and negative numbers;
  - (B) determine areas and volumes of various geometric shapes;
  - (C) solve ratio, proportion, and percentage problems; and

- (D) extract roots and raise numbers to a given power.
- (5) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for aviation mathematics, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) compute the volume of a shape such as a baggage compartment, a fuel tank, or an engine cylinder;
  - (B) compute the area of an aircraft wing;
  - (C) convert between fractions and decimals;
  - (D) compute torque value conversions between inch-pounds and foot-pounds; and
  - (E) compute the compression ratio of a reciprocating engine cylinder.
- (6) The student relates academic skills to the requirements of fundamentals of electricity and electronics. The student is expected to:
- (A) explain electron theory, including magnetism, capacitance, induction, direct current electrical circuits, and alternating current electrical circuits;
  - (B) explain electrical theories and laws, including Ohm's Law, Kirchhoff's Law, Watt's Law, Faraday's Law, Lenz's Law, and right-hand rule;
  - (C) identify and explain electrical measurement principles and related tools and procedures for measuring voltage, current, resistance, and power;
  - (D) compare types of batteries; and
  - (E) compare series circuits and parallel circuits.
- (7) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for fundamentals of electricity and electronics, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) use multimeters to perform circuit continuity tests, test a switch and fuse, and measure voltage, current, and resistance;
  - (B) interpret aircraft electrical circuit diagrams and symbols;
  - (C) inspect and service an aircraft battery; and
  - (D) identify faults in circuits by using appropriate troubleshooting techniques.
- (8) The student relates academic skills to the requirements of physics for aviation. The student is expected to:
- (A) explain the theory of flight, including lift, weight, thrust, and drag, as related to Bernoulli's Principle, Newton's Laws of Motion, and fluid mechanics;
  - (B) describe the function and operation of aircraft flight controls and additional aerodynamic devices, including vortex generators, wing fences, and stall strips; and
  - (C) analyze and compare standard atmospheric factors affecting atmospheric conditions, including the relationship between temperature, density, weight, and volume.
- (9) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for physics for aviation, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) determine density and pressure altitude;
  - (B) identify changes to pressure and velocity of a fluid as it passes through a venturi;
  - (C) calculate force, area, and pressure for a given scenario related to aircraft maintenance; and

- (D) calculate the lift of an aircraft and determine if the aircraft will climb, descend, or maintain altitude given its weight.
- (10) The student relates academic skills to the requirements of weight and balance. The student is expected to:
  - (A) describe the purpose of weighing an aircraft and determining the aircraft's center of gravity;
  - (B) explain the procedures for weighing an aircraft, including the general preparation for weighing, with emphasis on aircraft weighing area considerations;
  - (C) explain the procedures for calculating center of gravity, including arm, positive and negative moment, center of gravity, and moment index; and
  - (D) explain adverse loading considerations, proper empty weight configuration, and ballast placement.
- (11) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for weight and balance, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
  - (A) calculate aircraft weight and balance, including equipment changes, empty weight, and empty weight center of gravity; and
  - (B) locate datum, weight and balance information, placarding, and limitation requirements for an aircraft in an appropriate reference such as the type certificate data sheet.
- (12) The student relates academic skills to the requirements of aircraft drawings. The student is expected to:
  - (A) identify and use aircraft drawing terminology; and
  - (B) interpret aircraft drawings, blueprints, sketches, charts, graphs, and system schematics related to repairs, alterations, and inspections.
- (13) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for aircraft drawings, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
  - (A) identify and describe the meaning of lines and symbols used in an aircraft drawing;
  - (B) interpret dimensions used in an aircraft drawing;
  - (C) identify changes to aircraft drawings; and
  - (D) identify material requirements indicated by an aircraft drawing.
- (14) The student relates academic skills to the requirements of regulations, forms, and publications. The student is expected to:
  - (A) identify recency of experience requirements, the privileges and limitations of mechanic certificates, and how to reestablish privileges once they are lost;
  - (B) define maintenance terminology as defined in 14 Code of Federal Regulations (CFR) Part 1, including time in service, maintenance, preventive maintenance, major alteration, major repair, minor alteration, and minor repair;
  - (C) describe requirements for maintenance record entries for approval for return to service after maintenance, alterations, and inspections;
  - (D) identify compliance requirements for manufacturer-specified maintenance methods, techniques, practices, and inspection intervals;
  - (E) explain FAA-approved maintenance data, including maintenance manuals and other methods acceptable by the administrator; and

- (F) describe mechanic change of address notification procedures.
- (15) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for regulations, forms, and publications, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
  - (A) evaluate a 100-hour inspection aircraft maintenance record entry for accuracy;
  - (B) locate applicable FAA aircraft specifications and FAA Type Certificate Data Sheets (TCDS) for an aircraft or component;
  - (C) determine the conformity of aircraft instrument range markings and placarding;
  - (D) use a manufacturer's illustrated parts catalog to locate specific part numbers for aircraft parts such as door handles, rudder pedals, or seat latches;
  - (E) determine whether a given repair or alteration is major or minor; and
  - (F) explain the difference between approved data such as data required for major repairs or alterations and acceptable data such as data required for minor repairs or alterations.
- (16) The student relates academic skills to the requirements of fluid lines and fittings. The student is expected to:
  - (A) identify rigid tubing and flexible hose materials, applications, sizes, and fittings;
  - (B) describe rigid tubing and flexible hose fabrication, installation, and inspection techniques;
  - (C) explain the importance of properly using a torque wrench and torque seal when securing fluid hose and line fittings; and
  - (D) analyze and describe the risks associated with high-pressure hydraulic system configuration prior to and during maintenance.
- (17) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for fluid lines and fittings, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
  - (A) fabricate and install a rigid line with a flare and a bend;
  - (B) fabricate and install a flexible hose; and
  - (C) perform a rigid line and flexible hose inspection.
- (18) The student relates academic skills to the requirements of aircraft materials, hardware, and processes. The student is expected to:
  - (A) identify and describe material markings and hardware markings commonly used in aircraft;
  - (B) compare suitability and compatibility of materials and hardware used for maintenance;
  - (C) explain forces placed on aircraft materials, including tension, compression, torsion, bending, strain, and shear;
  - (D) identify safety wire and safety clip requirements and techniques;
  - (E) identify cotter pin requirements and techniques;
  - (F) describe precision measurement tools, principles, and procedures;
  - (G) explain soldering preparation, types of solder, and flux usage;
  - (H) analyze torquing tools, principles, and procedures and the relationship between torque and fastener preload; and
  - (I) differentiate between the characteristics of acceptable and unacceptable welds.

- (19) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for aircraft materials, hardware, and processes, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) select aircraft materials and hardware such as bolts, turnbuckles, washers, and rivets based on manufacturer's markings appropriate for a specific scenario;
  - (B) install safety wire on hardware such as nuts, bolts, and turnbuckles;
  - (C) install cotter pins on hardware such as nuts and bolts;
  - (D) check for proper calibration of a precision-measurement tool and record precision measurements with an instrument that has a Vernier scale;
  - (E) determine required torque values and properly torque aircraft hardware; and
  - (F) inspect welds and differentiate between acceptable and unacceptable welds.
- (20) The student relates academic skills to the requirements of ground operations and servicing. The student is expected to:
- (A) describe proper towing and securing procedures for aircraft using approved data;
  - (B) describe proper aircraft ground servicing, including oil, oxygen, hydraulic, pneumatic, and deicing systems and fueling and defueling procedures;
  - (C) differentiate between characteristics of aviation gasoline, turbine fuels, and fuel additives;
  - (D) explain engine starting, ground operation, and aircraft taxiing procedures;
  - (E) explain airport operation area procedures and air traffic control communications, including runway incursion prevention;
  - (F) identify the types and classes of fire extinguishers;
  - (G) analyze the importance of proper tool and hardware use and accountability;
  - (H) describe the need for proper material handling and parts protection;
  - (I) identify hazardous materials, locate the appropriate safety data sheet (SDS), and select the indicated personal protection equipment (PPE); and
  - (J) analyze and describe the potential effects of foreign object damage (FOD) on aircraft.
- (21) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for ground operations and servicing, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) perform a foreign object damage (FOD) control procedure;
  - (B) connect external power to an aircraft;
  - (C) prepare an aircraft for towing;
  - (D) use appropriate hand signals for the movement of aircraft;
  - (E) identify different grades of aviation fuel and select an approved fuel for an aircraft;
  - (F) prepare an aircraft for fueling and inspect an aircraft fuel system for water and foreign object debris (FOD) contamination;
  - (G) follow a checklist to start up or shut down an aircraft reciprocating or turbine engine;
  - (H) identify procedures for extinguishing fires in an engine induction system;
  - (I) secure an aircraft by locating and following the correct procedures for a turbine-powered aircraft after engine shutdown; and

- (J) locate and explain procedures for securing a turbine-powered aircraft after engine shutdown.
- (22) The student relates academic skills to the requirements of cleaning and corrosion control. The student is expected to:
- (A) explain the need for aircraft cleaning procedures;
  - (B) explain corrosion theory, including types and effects of corrosion, corrosion-prone areas in aircraft, and corrosion preventive maintenance procedures;
  - (C) describe corrosion identification and inspection techniques, corrosion removal and treatment procedures, the selection of optimal corrosion preventive compounds (CPC), and the frequency of corrosion treatment;
  - (D) describe the use of high-pressure application equipment;
  - (E) identify and discuss the effects of improper use of cleaners on aluminum or composite materials;
  - (F) explain accelerated corrosion caused by dissimilar metals and the role of protective barriers, including conversion coatings, materials used for protection of airframe structures, and primer materials, to mitigate this risk;
  - (G) identify topcoat materials and discuss concerns regarding surface preparation for a desired finishing material, effects of ambient conditions on finishing materials, and effects of improper surface preparation on finishing materials; and
  - (H) identify health concerns when using paints, solvents, and finishing materials and processes, including the use of PPE.
- (23) The student uses regulatory and industry standards and demonstrates technical knowledge and skills for cleaning and corrosion control, utilizing aircraft, aircraft training devices, or equivalent simulated situations. The student is expected to:
- (A) identify types of protective finishes;
  - (B) inspect finishes for corrosion and identify, select, and use aircraft corrosion prevention and cleaning materials; and
  - (C) apply aircraft corrosion prevention and coating materials.

*Source: The provisions of this §127.890 adopted to be effective September 9, 2024, 49 TexReg 6994.*

#### **§127.920. Advanced Transportation Systems Laboratory (One Credit), Adopted 2024.**

- (a) Implementation. The provisions of this section shall be implemented by school districts beginning with the 2025-2026 school year.
- (b) General requirements. This course is recommended for students in Grades 11 and 12 as a corequisite course for students participating in a coherent sequence of career and technical education courses in the Transportation, Distribution, and Logistics Career Cluster. This course provides an enhancement opportunity for students to develop the additional skills necessary to pursue industry certification. Recommended prerequisite: a minimum of one credit from the courses in the Transportation, Distribution, and Logistics Career Cluster. Corequisites: Automotive Technology II: Automotive Service, Diesel Equipment Technology II, Collision Repair, Paint and Refinishing, Aircraft Airframe Technology, Aircraft Maintenance Technology, or Aircraft Powerplant Technology. This course must be taken concurrently with a corequisite course and may not be taken as a stand-alone course. Districts are encouraged to offer this lab in a consecutive block with the corequisite course to allow students sufficient time to master the content of both courses. 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 and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
  - (2) The Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Advanced Transportation Systems Laboratory provides the opportunity to extend knowledge of the major transportation systems and the principles of diagnosing and servicing these systems. Topics in this course may include alternative fuels such as hybrid, bio diesel, hydrogen, compressed natural gas (CNG), liquidized natural gas (LNG), propane, and solar; total electric vehicles and power trains; advanced transportation systems such as collision avoidance, telematics, vehicle stability control, navigation, vehicle-to-vehicle communications; and other technologies. This study will allow students to have an increased understanding of science, technology, engineering, and mathematics in all aspects of these systems. This will reinforce, apply, and transfer academic knowledge and skills to a variety of relevant activities, problems, and settings.
  - (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 the technical knowledge and skills related to health and safety in the workplace such as safety glasses and other personal protective equipment (PPE) and safety data sheets (SDS);
    - (B) identify employment opportunities, including entrepreneurship opportunities and internships, and industry-recognized certification requirements in the transportation field of study;
    - (C) demonstrate the principles of group participation, team concept, and leadership related to citizenship and career preparation;
    - (D) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the transportation industry;
    - (E) discuss certification opportunities;
    - (F) discuss response plans to emergency situations;
    - (G) identify employers' expectations and appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills; and
    - (H) develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities.
  - (2) The student demonstrates an understanding of the technical knowledge and skills that form the core of knowledge of transportation services. The student is expected to:
    - (A) extend knowledge of new and emerging transportation technologies related to the corequisite course and its industry such as hybrid, avionics, unmanned aerial systems, collision avoidance, and light duty diesel systems;
    - (B) demonstrate advanced technical skills related to the corequisite course and its industry;

- (C) demonstrate an understanding of the use of advanced tools and equipment; and
  - (D) demonstrate an understanding of research and development in the transportation industry of the corequisite course.
- (3) The student develops an elevated aptitude for the essential knowledge and skills listed for the corequisite course. The student is expected to:
- (A) demonstrate deeper understanding of the corequisite course;
  - (B) develop hands-on skills at an industry-accepted standard; and
  - (C) exhibit progress toward achieving industry-recognized documentation of specific expertise in a transportation field or skill.

*Source: The provisions of this §127.920 adopted to be effective September 9, 2024, 49 TexReg 6994.*

**§127.921. Practicum in Transportation Systems (Two Credits), Adopted 2015.**

- (a) Implementation.
- (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 11 and 12. The practicum course is a paid or unpaid capstone experience for students participating in a coherent sequence of career and technical education courses in the Transportation, Distribution, and Logistics Career Cluster. 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.
- (c) 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 Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Practicum in Transportation Systems is designed to give students supervised practical application of knowledge and skills. Practicum experiences can occur in a variety of locations appropriate to the nature and level of experience such as internships, mentorships, independent study, or laboratories. The Practicum can be either school lab based or worked based.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 as required by business and industry. The student is expected to:

- (A) adhere to policies and procedures;
  - (B) demonstrate positive work attitudes and behaviors, including demonstrating punctuality, time management, initiative, and cooperation;
  - (C) accept constructive criticism;
  - (D) apply ethical reasoning to a variety of situations in order to make ethical decisions;
  - (E) complete tasks with the highest standards to ensure quality products and services;
  - (F) model professional appearance, including using appropriate dress, grooming, and personal protective equipment; and
  - (G) comply with safety rules and regulations to maintain safe and healthy working conditions and environments in the practicum setting.
- (2) The student applies concepts of critical thinking and problem solving. The student is expected to:
- (A) analyze elements of a problem to develop creative and innovative solutions;
  - (B) critically analyze information to determine its relevance to the problem-solving task;
  - (C) compare and contrast alternatives using a variety of problem-solving and critical-thinking skills; and
  - (D) conduct technical research to gather information necessary for decision making.
- (3) The student demonstrates leadership and teamwork skills in collaborating with others to accomplish goals and objectives. The student is expected to:
- (A) analyze leadership characteristics related to trusting others, maintaining a positive attitude and integrity, and accepting key responsibilities in a work situation;
  - (B) demonstrate teamwork skills through working cooperatively with others to achieve tasks;
  - (C) demonstrate teamwork processes that promote team building, consensus, continuous improvement, respect for the opinions of others, cooperation, adaptability, and conflict resolution;
  - (D) demonstrate responsibility for group and individual work tasks;
  - (E) establish and maintain effective working relationships in order to accomplish objectives and tasks;
  - (F) demonstrate effective working relationships using interpersonal skills;
  - (G) use positive interpersonal skills to work cooperatively with others;
  - (H) negotiate effectively to arrive at decisions;
  - (I) demonstrate respect for individuals, including those from different cultures, genders, and backgrounds; and
  - (J) demonstrate sensitivity to and value for diversity.
- (4) The student demonstrates oral and written communication skills in creating, expressing, and interpreting information and ideas, including technical terminology and information. The student is expected to:
- (A) demonstrate the use of content, technical concepts, and vocabulary when analyzing information and following directions;
  - (B) employ verbal skills when obtaining and conveying information;
  - (C) use informational texts, Internet websites, and technical materials to review and apply information sources for occupational tasks;

- (D) evaluate the reliability of information from informational texts, Internet websites, and technical materials and resources;
  - (E) interpret verbal and nonverbal cues or behaviors to enhance communication;
  - (F) apply active listening skills to obtain and clarify information; and
  - (G) use academic skills to facilitate effective written and oral communication.
- (5) The student demonstrates technical knowledge and skills required to pursue a career in the transportation systems. The student is expected to:
- (A) develop advanced technical knowledge and skills related to the student's personal career goals;
  - (B) evaluate technical skill proficiencies; and
  - (C) accept critical feedback provided by the supervisor.
- (6) The student documents technical knowledge and skills. The student is expected to:
- (A) update a professional portfolio to include information such as:
    - (i) attainment of technical skill competencies, licensures or certifications, recognitions, awards, and scholarships;
    - (ii) extended learning experiences such as community service and active participation in career and technical student organizations and professional organizations;
    - (iii) abstract of technical competencies mastered during the practicum;
    - (iv) resume;
    - (v) samples of work; and
    - (vi) evaluation from the practicum supervisor; and
  - (B) present the portfolio to interested stakeholders.

*Source: The provisions of this §127.921 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.922. Extended Practicum in Transportation Systems (One Credit), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 11 and 12. The practicum course is a paid or unpaid capstone experience for students participating in a coherent sequence of career and technical education courses in the Transportation, Distribution, and Logistics Career Cluster. Corequisite: Practicum in Transportation Systems. This course must be taken concurrently with Practicum in Transportation Systems and may not be taken as a stand-alone course. Students shall be awarded one credit for successful completion of this course. A student may repeat this course once for credit provided that the student is experiencing different aspects of the industry and demonstrating proficiency in additional and more advanced knowledge and skills.
- (c) 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 Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Extended Practicum in Transportation Systems is designed to give students supervised practical application of knowledge and skills. Practicum experiences can occur in a variety of locations appropriate to the nature and level of experience such as internships, mentorships, independent study, or laboratories. Extended Practicum in Transportation Systems can be either school lab based or worked based.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 implements advanced professional communications strategies. The student is expected to:
    - (A) demonstrate verbal and non-verbal communication consistently in a clear, concise, and effective manner;
    - (B) analyze, interpret, and effectively communicate information, data, and observations;
    - (C) observe and interpret verbal and nonverbal cues and behaviors to enhance communication; and
    - (D) apply active listening skills to obtain and clarify information.
  - (2) The student applies concepts of critical thinking and problem solving. The student is expected to:
    - (A) employ critical-thinking skills with increased fluency both independently and in groups to solve problems and make decisions;
    - (B) analyze elements of a problem to develop creative and innovative solutions; and
    - (C) demonstrate the use of content, technical concepts, and vocabulary when analyzing information and following directions.
  - (3) The student understands and applies proper safety techniques in the workplace. The student is expected to:
    - (A) understand and consistently follow workplace safety rules and regulations, including Occupational Safety and Health Administration regulations; and
    - (B) demonstrate knowledge of procedures for reporting and handling accidents and safety incidents.
  - (4) The student understands the professional, ethical, and legal responsibilities in transportation systems. The student is expected to:
    - (A) demonstrate a positive, productive work ethic by performing assigned tasks as directed;
    - (B) apply ethical reasoning to a variety of situations in order to make ethical decisions; and
    - (C) comply with all applicable rules, laws, and regulations in a consistent manner.
  - (5) The student participates in a transportation systems experience. The student is expected to:
    - (A) conduct, document, and evaluate learning activities in a supervised transportation systems experience;

- (B) develop advanced technical knowledge and skills related to the student's occupational objective;
- (C) demonstrate growth of technical skill competencies;
- (D) evaluate strengths and weaknesses in technical skill proficiency; and
- (E) collect representative work samples.

*Source: The provisions of this §127.922 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.923. Practicum in Distribution and Logistics (Two Credits), Adopted 2015.**

- (a) Implementation.
  - (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 11 and 12. The practicum course is a paid or unpaid capstone experience for students participating in a coherent sequence of career and technical education courses in the distribution and logistics industry. 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.
- (c) 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 Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Practicum in Distribution and Logistics is designed to give students supervised practical application of knowledge and skills. Practicum experiences can occur in a variety of locations appropriate to the nature and level of experience such as internships, mentorships, independent study, or laboratories. The Practicum can be either school lab based or work based.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 applies concepts of critical thinking and problem solving. The student is expected to:
    - (A) analyze elements of a problem to develop creative and innovative solutions;
    - (B) critically analyze information to determine its relevance to the problem-solving task;
    - (C) compare and contrast alternatives using a variety of problem-solving and critical-thinking skills; and
    - (D) conduct technical research to gather information necessary for decision making.

- (2) The student demonstrates leadership and teamwork skills in collaborating with others to accomplish goals and objectives. The student is expected to:
  - (A) analyze leadership characteristics related to trusting others, maintaining a positive attitude and integrity, and accepting key responsibilities in a work situation;
  - (B) demonstrate teamwork skills through working cooperatively with others to achieve tasks;
  - (C) demonstrate teamwork processes that promote team building, consensus, continuous improvement, respect for the opinions of others, cooperation, adaptability, and conflict resolution;
  - (D) demonstrate responsibility for group and individual work tasks;
  - (E) establish and maintain effective working relationships in order to accomplish objectives and tasks;
  - (F) demonstrate effective working relationships using interpersonal skills;
  - (G) use positive interpersonal skills to work cooperatively with others;
  - (H) negotiate effectively to arrive at decisions;
  - (I) demonstrate respect for individuals, including those from different cultures, genders, and backgrounds; and
  - (J) demonstrate sensitivity to and value for diversity.
- (3) The student demonstrates oral and written communication skills in creating, expressing, and interpreting information and ideas, including technical terminology and information. The student is expected to:
  - (A) demonstrate the use of content, technical concepts, and vocabulary when analyzing information and following directions;
  - (B) employ verbal skills when obtaining and conveying information;
  - (C) use informational texts, Internet websites, and technical materials to review and apply information sources for occupational tasks;
  - (D) evaluate the reliability of information from informational texts, Internet websites, and technical materials and resources;
  - (E) interpret verbal and nonverbal cues or behaviors to enhance communication;
  - (F) apply active listening skills to obtain and clarify information; and
  - (G) use academic skills to facilitate effective written and oral communication.
- (4) The student demonstrates technical knowledge and skills required to pursue a career in the distribution and logistics industries. The student is expected to:
  - (A) develop advanced technical knowledge and skills related to the student's personal career goals;
  - (B) evaluate technical skill proficiencies; and
  - (C) accept critical feedback provided by the supervisor.
- (5) The student documents technical knowledge and skills. The student is expected to:
  - (A) update a professional portfolio to include information such as:
    - (i) attainment of technical skill competencies, licensures or certifications, recognitions, awards, and scholarships;

- (ii) extended learning experiences such as community service and active participation in career and technical student organizations and professional organizations;
  - (iii) abstract of technical competencies mastered during the practicum;
  - (iv) resume;
  - (v) samples of work; and
  - (vi) evaluation from the practicum supervisor; and
- (B) present the portfolio to interested stakeholders.

*Source: The provisions of this §127.923 adopted to be effective August 1, 2025, 50 TexReg 4421.*

**§127.924. Extended Practicum in Distribution and Logistics (One Credit), Adopted 2015.**

- (a) Implementation.
- (1) The provisions of this section shall be implemented by school districts beginning with the 2017-2018 school year.
  - (2) School districts shall implement the employability skills student expectations listed in §127.15(d)(2) of this chapter (relating to Career and Technical Education Employability Skills) as an integral part of this course.
- (b) General requirements. This course is recommended for students in Grades 11 and 12. The practicum course is a paid or unpaid capstone experience for students participating in a coherent sequence of career and technical education courses in the Transportation, Distribution, and Logistics Career Cluster. Corequisite: Practicum in Distribution and Logistics. This course must be taken concurrently with Practicum in Distribution and Logistics and may not be taken as a stand-alone course. Students shall be awarded one credit for successful completion of this course. A student may repeat this course once for credit provided that the student is experiencing different aspects of the industry and demonstrating proficiency in additional and more advanced knowledge and skills.
- (c) 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 Transportation, Distribution, and Logistics Career Cluster focuses on planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.
  - (3) Extended Practicum in Distribution and Logistics is designed to give students supervised practical application of knowledge and skills. Practicum experiences can occur in a variety of locations appropriate to the nature and level of experience such as internships, mentorships, independent study, or laboratories. Extended Practicum in Distribution and Logistics can be either school lab based or work based.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other organizations that foster leadership and career development in the profession such as student chapters of related professional associations.
  - (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 implements advanced professional communications strategies. The student is expected to:

- (A) demonstrate verbal and non-verbal communication consistently in a clear, concise, and effective manner;
  - (B) analyze, interpret, and effectively communicate information, data, and observations;
  - (C) observe and interpret verbal and nonverbal cues and behaviors to enhance communication; and
  - (D) apply active listening skills to obtain and clarify information.
- (2) The student applies concepts of critical thinking and problem solving. The student is expected to:
- (A) employ critical-thinking skills with increased fluency both independently and in groups to solve problems and make decisions;
  - (B) analyze elements of a problem to develop creative and innovative solutions; and
  - (C) demonstrate the use of content, technical concepts, and vocabulary when analyzing information and following directions.
- (3) The student understands and applies proper safety techniques in the workplace. The student is expected to:
- (A) understand and consistently follow workplace safety rules and regulations, including Occupational Safety and Health Administration regulations; and
  - (B) demonstrate knowledge of procedures for reporting and handling accidents and safety incidents.
- (4) The student understands the professional, ethical, and legal responsibilities in distribution and logistics systems. The student is expected to:
- (A) demonstrate a positive, productive work ethic by performing assigned tasks as directed;
  - (B) apply ethical reasoning to a variety of situations in order to make ethical decisions; and
  - (C) comply with all applicable rules, laws, and regulations in a consistent manner.
- (5) The student participates in a distribution and logistics experience. The student is expected to:
- (A) conduct, document, and evaluate learning activities in a supervised distribution and logistics experience;
  - (B) develop advanced technical knowledge and skills related to the student's occupational objective;
  - (C) demonstrate growth of technical skill competencies;
  - (D) evaluate strengths and weaknesses in technical skill proficiency; and
  - (E) collect representative work samples.

*Source: The provisions of this §127.924 adopted to be effective August 1, 2025, 50 TexReg 4421.*