Scope & Sequence

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Course Name:** Small Engine Technology l  **TSDS PEIMS Code:** 13040000 | | | | | **Course Credit:** 1.0  **Course Requirements:** Recommended for students in Grades 9-12.  **Prerequisites:** None. | |
| **Course Description:** Small Engine Technology I 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. | | | | | | |
| **NOTE:** This is a suggested scope and sequence for the course content. This content will work with any textbook or instructional materials. If locally adapted, make sure all TEKS are covered. | | | | | | |
| **Total Number of Periods**  **Total Number of Minutes**  **Total Number of Hours** | | 175 Periods  7875 Minutes 131.25 Hours\* | | \*Schedule calculations based on 175/180 calendar days. Scope and sequence allows additional time for guest speakers, student presentations, field trips, remediation, extended learning activities, etc. | | |
| **Unit Number, Title, and Brief Description** | | **# of Class Periods\***  (assumes 45-minute periods)  Total minutes per unit | | **TEKS Covered**  **130.445. (c)** **Knowledge and skills** | | |
| **Unit 1: Career Exploration**  Students will focus on expanding their knowledge base and interest in careers and entrepreneurship opportunities in the small engine technology industry. Students will discuss and demonstrate appropriate and proper etiquette and behavior in this and in all units, and will demonstrate proper etiquette and behavior while discovering and using resources available through CTSO or other organization(s) to further develop employability skills. | | 8 periods  360 minutes | | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (A) identify career development and entrepreneurship opportunities in the small engine technology industry;  (B) identify careers in the small engine technology industry;  (D) discuss certification opportunities; and  (H) develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities.  2) The student demonstrates appropriate personal and communication skills. The student is expected to:  (B) demonstrate proper etiquette and behavior.  (4) The student participates in opportunities for leadership development and personal growth. The student is expected to:  (B) use resources available through an organization such as a career and technical student organization to develop employability skills. | | |
| **Unit 2: Small Engine Technology: Yesterday, Today, and Tomorrow**  Students will identify and discuss historical and current issues affecting the small engine technology industry. Students will also discuss and describe how laws, regulations, safety, environmental issues, and emerging technologies may affect the small engine technology industry in the future. | | 8 periods  360 minutes | | (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) 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. | | |
| **Unit 3: Health and Safety**  Students will discuss and identify employers’ expectations regarding safe and appropriate work habits, ethical conduct, and legal responsibilities in the workplace. Students will participate as a class and/or in small groups to model, present, and discuss health and safety scenarios in the workplace as well as response plans to potential emergency situations. | | 15 periods  675 minutes | | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (C) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the small engine technology industry;  (E) demonstrate skills and knowledge related to personal and occupational health and safety in the workplace;  (F) discuss response plans to emergency situations; and  (G) identify employers' expectations, appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills.  (4) 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. | | |
| **Unit 4: Maintenance and Operation**  Students will conduct presentations, discussions, and demonstrations of the proper ways to perform preventative maintenance and use preventative maintenance schedules, determine repair or replacement needs, estimate associated costs, and complete related paperwork. Students will also locate, read, and interpret service repair information and manuals from a variety of sources. | | 18 periods  810 minutes | | (5) 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. | | |
| **Unit 5: Technical Knowledge and Skills**  Students will explore and identify small engines, their design, components, functions, operations, maintenance, characteristics, and repairs. Students will be given multiple opportunities for hands-on presentations, discussions, and demonstrations of the proper ways to identify and safely use the tools, measuring systems, and other equipment and materials commonly used in the field. | | 18 periods  810 minutes | | (8) 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. | | |
| **Unit 6: Mathematics for Small Engines**  Students will be given multiple opportunities to describe, demonstrate and apply relevant problem-solving and mathematical skills in-context as they identify, describe, and perform engine calculations and use diagnostic tools and other materials and equipment. | | 20 periods  900 minutes | | (6) The student applies problem-solving, mathematical, and organizational skills to maintain financial and logistical records. The student is expected to:  (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. | | |
| **Unit 7: Troubleshooting and Preventive Maintenance**  Students will be given multiple opportunities for hands-on presentations, discussions, and demonstrations of the proper ways to troubleshoot and repair small engines, as well as how to perform preventative maintenance, installations, and inspections. Students will continue to identify and demonstrate safe use of the tools, materials, and equipment commonly used in the field. | | 18 periods  810 minutes | | (9) 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; and  (E) perform routine installations, inspections, adjustments, and maintenance on small engines using testing tools and equipment. | | |

|  |  |  |
| --- | --- | --- |
| **Unit 8: Measurements and Maintenance**  Students will demonstrate their knowledge of electrical testing tools and equipment with hands-on presentations, discussions, and performance of precision measurements and inspections. Students will analyze and explain the effects of heating and cooling on small engines in simulated or actual work situations. | 20 periods  900 minutes | (9) The student applies technical knowledge and skills in simulated or actual work situations. The student is expected to:  (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 field in ignition, charging, and starting systems; and  (J) analyze the effects of heating and cooling on small engines. |
| **Unit 9: Technology Tools**  Students will successfully use technology tools such as word processing and presentation software to develop and complete their course culminating leadership project. Students will also explore technology tools such as GIS and GPS; in addition, students will discuss and use other computer-based tools and technology used in this and other industries. | 15 periods  675 minutes | (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;  (7) 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. |
| **Unit 10: Workplace Conduct and Communication**  Students will describe and demonstrate workplace ethics, legal responsibilities, and appropriate personal appearance, habits, and communication skills in various workplace scenarios. Proper workplace conduct and etiquette will be demonstrated in small groups or whole class activities to reinforce the practice of effective speaking and listening skills. | 15 periods  675 minutes | 2) 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; and  (F) demonstrate effective speaking skills through prepared and extemporaneous oral presentations. |
| **Unit 11: Small Engine Technology I Project**  Students will participate in a project-based culminating activity, which will include a written description of their course learning and/or course experiences, as well as a written plan to earn certification and/or begin a career of personal interest in small engine technology or another transportation-related field.  As part of the project, students will demonstrate, describe, and/or discuss developing and maintaining records appropriate to the small engine technology industry. | 20 periods  900 minutes | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (C) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the small engine technology industry;  (H) develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities.  2) 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  (6) The student applies problem-solving, mathematical, and organizational skills to maintain financial and logistical records. The student is expected to:  (B) develop and maintain records appropriate to the small engine technology industry; |