# Scope & Sequence

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| Course Name: Automotive Technology II: Automotive Service **TSDS PEIMS Code:** 13039700 | | | **Course Credit:** 2.0  **Course Requirements:** Recommended Grade Placement: 11-12.  **Prerequisites:** Automotive Technology I: Maintenance and Light Repair. |
| **Course Description:** 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. | | | |
| **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** | 350 Periods  15,750 Minutes  262.50 Hours\* | \*Schedule calculations based on 175/180 calendar days. For 0.5 credit courses, schedule is calculated out of 88/90 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**  **130.450. (c) Knowledge and skills** | |
| **Unit 1: Professional Standards and Career Exploration**  Students will expand their knowledge base and interest in careers and entrepreneurship opportunities in the automotive technology industry. Students will discuss and demonstrate the principles of group participation and teamwork and effective and appropriate communication in this and in all units as they develop personal and career goals and increase their interpersonal skills. Students will explore and discuss employers’ expectations and industry-recognized certification opportunities and requirements as they continue to develop their plans, goals, and objectives for future career and educational opportunities. | 10 periods  450 minutes | (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:  (B) identify employment opportunities, including entrepreneurship opportunities and internships, and industry-recognized certification requirements for the field of automotive technology;  (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 automotive technology industry;  (E) discuss certification opportunities;  (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. | |
| **Unit 2: 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 and safety equipment in the workplace as well as response plans to potential emergency situations. Students will examine and discuss safety data sheets, and observe and discuss the proper handling and disposal of environmentally hazardous materials used in servicing vehicles. Students will be given multiple “hands on” opportunities to observe, discuss, and demonstrate the proper use of hand and power tools and other equipment commonly employed in the maintenance and repair of vehicles. | 40 periods  1,800 minutes | (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);  (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 automotive technology industry;  (F) discuss response plans to emergency situations; and  (G) identify employers' expectations and appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills.  (4) 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; and  (C) demonstrate proper use of diagnostic tools and equipment. | |
| **Unit 3: Academic and Communication Skills in Automotive Technology**  Students will explore, discuss, and demonstrate the academic and communication skills required for a successful career in automotive technology. Students will be given multiple opportunities to demonstrate and apply relevant problem-solving, communication, and academic skills in-context as they demonstrate occupational tasks such as documenting work/repair orders, researching applicable vehicle and service information, and locating, reading, and interpreting other service and repair information such as schematics, charts, diagrams, graphs, parts catalogs, and technical bulletins. Students will discuss and predict what other core academic skills will be necessary for a successful career in automotive technology. | 30 periods  1,350 minutes | (2) 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/compliant, 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.  (4) The student knows the functions and applications of the tools, equipment, technologies, and materials used in automotive technology. The student is expected to:  (D) locate, read, and interpret service repair information such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair bulletins. | |
| **Unit 4: Automotive Service and Preventative Maintenance**  Students will be given multiple opportunities to increase and demonstrate their knowledge of automotive service and preventive maintenance schedules, inspections, repairs, and replacements with “hands-on” activities and demonstrations and in simulated or actual automotive technology work task situations. Students will successfully explain and perform preventative maintenance activities as well as explain and diagnose major components of powered vehicles. Students will also use problem-solving skills to diagnose vehicle malfunctions and make decisions, perform precision measurements using published specifications to diagnose component wear and determine necessary repairs, locate, read, and interpret service repair information, and perform services/repairs as assigned. | 50 periods  2,250 minutes | (3) 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.  (4) 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. | |
| **Unit 5: Brakes**  Students will be given multiple “hands-on” opportunities to demonstrate their technical knowledge of brake systems, parts, and components. Students will apply and explain their technical knowledge and skills in activities, discussions, repairs, re-assemblies, and inspections and/or in simulated or actual automotive technology work task situations, as well as have opportunities to safely learn and demonstrate the proper handling and disposal of materials related to brake systems and servicing. Students will also discuss and describe the procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS), identify traction control and vehicle stability control system components, and bleed and flush brake systems. | 40 periods  1,800 minutes | (4) 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; and  (C) demonstrate proper use of diagnostic tools and equipment.  (7) 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. | |
| **Unit 6: Electronics**  Students will be given multiple opportunities to demonstrate their knowledge of electrical components, equipment, circuits, and electronic systems as well as associated repairs and replacement with “hands-on” activities, demonstrations, presentations, discussions, and inspections in simulated or actual automotive technology work task situations. Students will also perform tests, inspections, and repairs, and perform slow and fast battery charges according to manufacturer recommendations as well as demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. Students will discuss and identify system voltage and safety precautions associated with high-intensity discharge headlights, disable and enable airbag system for vehicle service and verify indicator lamp operation, remove and reinstall a door panel, and describe the operation of keyless entry and remote-start systems. | 40 periods  1,800 minutes | (4) 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; and  (C) demonstrate proper use of diagnostic tools and equipment.  (6) 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 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. | |
| **Unit 7: Heating and Air Conditioning**  Students will be given multiple opportunities to safely demonstrate the proper use of tools, equipment, and the handling and disposal of hazardous materials related to heating and air conditioning in “hands-on” activities, presentations, discussions, and inspections in simulated or actual automotive technology work situations. Students will apply their technical knowledge and skills to identify air-conditioning, heating, and accessory system problems, perform inspections, and replace filters as assigned. Students will also identify and discuss hybrid vehicle A/C system electrical circuits and safety precautions. | 40 periods  1,800 minutes | (4) 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; and  (10) 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. | |
| **Unit 8: Engines and Engine Performance**  Students will be given multiple opportunities to demonstrate their technical knowledge and skills related to engines and engine performance, components, diagnostics, sensors, and systems with “hands-on” activities, presentations, discussions, and inspections in simulated or actual automotive technology work situations. Students will safely perform tests and inspections as well as repairs/replacements as indicated and/or assigned, and be given multiple opportunities to safely demonstrate the proper use of tools, equipment, and other materials in simulated or actual automotive technology work task situations. | 50 periods  2,250 minutes | (4) 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; and  (C) demonstrate proper use of diagnostic tools and equipment.  (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) 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.  (9) 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. | |
| **Unit 9: Suspension Systems and Tires**  Students will be given multiple opportunities to demonstrate and apply their technical knowledge and skills related to suspension systems and tires with “hands-on” activities, presentations, discussions, and inspections in simulated or actual automotive technology work task situations. Students will inspect and replace hoses, fittings, wheel bearings, and shock absorbers as well as dismount, inspect, and remount a tire on a wheel equipped with tire pressure monitoring system (TPMS). Students will also perform all assigned tire inspections, including checking for air loss, correct size and application, condition and wear patterns, and alignment while continuing to demonstrate the safe and proper use of tools and equipment, and the proper handling and disposal of environmentally hazardous materials. | 50 periods  2,250 minutes | (4) 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.  (5) 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. | |