CareerClusters™ PATHWAYS TO COLLEGE & CAREER READINESS
Transportation, Distribution & Logistics

Learning that works for Colorado CTE®

Colorado CTE Course – Scope and Sequence

Course Name	Introduction to Automotive Service	Course Details Course = 0.50 Carnegie Unit Credit	Credit = 1.0
Course Description	This course is designed to give the first-year student a basic understanding and introduction to the occupations of Automotive Service and Repair. This will include studies in the following areas: orientation to automotive related industries; career opportunities in the field; orientation to an automotive shop environment; shop and environmental safety; identifying and using tools related to the industry; hazardous materials and waste management; communications and public relations as it relates to the industry; use of manuals and computers in all areas of the industry; use of precision measuring tools and automotive math; theory, presentation and evaluation of performance tasks in the areas of automobile repair.		
Note:	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.		
SCED Identification #	20103	Schedule calculation based on 60 calendar days of a 90-day semester. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.	

All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at **https://www.cde.state.co.us/standardsandinstruction/essentialskills**

Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
Careers in the Automotive Service Industry		Understand the nature and scope of the Transportation Career Cluster and the role transportation systems play in society and the economy. Understand the roles and responsibilities among trades and professions, including labor/management relationships. Evaluate a wide range of career pathway opportunities for success in transportation careers,	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to: (A) identify career and employment opportunities, including entrepreneurship opportunities, internships, and industry-	Evaluate jobs data and employment projections in the transportation industry from sources such as O*Net OnLine, synthesizing findings from each source. • Determine areas of largest growth within the collision repair and refinishing pathway and discuss the significance of transportation to the local and national economy.	SkillsUSA Personal Skills SkillsUSA 4 Pillars Updates to Student ICAP

		emphasizing those in the automotive service pathway.	recognized certification requirements for the field of automotive technology. (B) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the automotive technology industry; (C) discuss certification opportunities; and (D) develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities.	• Report job requirements and characteristics for selected careers and compare personal interests and aptitudes with job requirements and characteristics of the career selected. Define employment expectations of entry-level employees in local employment situations (hiring requirements, basic job expectations, etc.) Discuss industry certification opportunities and their requirements.	
Safety Standards in the Workplace		Identify employers' expectations regarding safe and appropriate work habits, ethical conduct, and environmental responsibilities in the fields of automotive service. Practice personal and occupational safety and understand the environmental effects of automotive service practices.	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to: (A) demonstrate awareness of workplace safety and environmental	Obtain OSHA 10 certificate and be able to state basic safety requirements for the industry. Comply with personal and environmental safety practices: • Use and inspect personal protective equipment every time equipment is used.	

			responsibilities in automotive service understand the use of personal protective equipment; (B) practice the safe handling and storage of chemicals and hazardous wastes as required by the Occupational Safety and Health Administration (OSHA), Air Resources Board (ARB), Air Quality Management Districts (AQMDs), and other regulatory agencies; (C) identify employers' expectations and appropriate work habits; and (D) apply reasoning skills to a variety of workplace situations in order to make ethical decisions.	• Inspect, maintain, and employ safe operating procedures with tools and equipment, such as hand and power tools, ladders, scaffolding, and lifting equipment. • Assume responsibilities under HazCom (Hazard Communication) regulations. • Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies regarding reporting of accidents and observed hazards, and regarding emergency response procedures. • Utilize MSDSs (material safety data sheets) and identify the health hazards associated with hazardous material. Maintain a portfolio record of written safety examinations and equipment examination for which the student has passed. *NATEF Note: Pass with 100% accuracy a written examination relating to safety*	

				issues relating specifically to Maintenance and Light Repair. Pass with 100% accuracy a performance examination relating to safety issues relating specifically to Maintenance and Light Repair.	
General Industry Terminology and Resources		Describe major vehicle systems and basic and emerging power systems. Discuss and describe resources, information systems and technology related to the fields of automotive service and repair. Demonstrate and apply relevant problem-solving, reading, and writing in-context to the Automotive Industry. Read and interpret service and repair information, technical bulletins, specifications, schematics, and parts catalogs from a variety of sources.	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to: (A) review the competencies related to resources, information systems, and technology; and (B) use appropriate materials and repair technology resources. The student relates core academic skills to the requirements of Automotive service and repair technology. The student is expected to: (A) apply effective oral and written communication skills with individuals from various cultures such as	Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. Identify key scientific principles and how they are used in various systems within an automobile. Identify key industry terms: • Complete from teachers Research repair information from a variety of sources. Describe the information available to the technician and provide a critique on the material presented.	

			fellow workers, management, and customers; (B) use technical writing skills to complete service and repair orders and related paperwork; and (C) locate and read documents such as service and repair information, technical bulletins, specifications, schematics, and parts catalogs. 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.		
Tool, Equipment and Materials		Discuss the basic function and application of tools, equipment, and materials	The student knows the functions and applications of the tools, equipment, technologies,	Demonstrate common tools and equipment used within the industry: • precision measuring tools (i.e. micrometer,	

		used in automotive service and repair. Apply mathematics concepts to solve automotive repair problems, distinguishing which principles apply to a given automotive problem.	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. 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.	dial-indicator, dialcaliper) • Complete with recommendations	
Engine Basics		Understand and apply scientific principles and technical knowledge in relation to internal combustion engines, chassis,	The student applies technical knowledge and skills in simulated or actual work situations.	Demonstrate understanding of automotive engines. Compare and contrast the properties of common available options on the	

		and power train components and systems. Identify air-conditioning, heating and accessory system components in automobiles.	The student is expected to: (A) demonstrate an understanding of the operation theory of internal combustion engines; (B) identify air-conditioning, heating, and accessory system components; and (C) inspect and identify chassis and power train components and systems.	market and identify their features and function. Explain how engines work: • Describe the physical and mechanical principles of engine operation (i.e., motion, friction, thermodynamics). • Show how to calculate displacement and compare and contrast displacement, horsepower and torque. • Compare and contrast two-cycle and four-cycle engines and their operating principles. • Describe the features, benefits and application of engine types. • Explain principles of engine lubrication and cooling.	
Brakes		Understand and apply scientific principles and technical knowledge of brake system components, ABS, and hydraulic brakes systems.	The student applies technical knowledge and skills in simulated or actual work situations. The student is expected to:	Explain how braking systems work and the application of Pascal's law to identify pressure concerns in the brake system using hydraulic principles.	

			(A) identify brake system components, including drum, disc, power assist, and anti-lock braking system (ABS); and (B) demonstrate an understanding of basic concepts related to hydraulic brakes systems, including Pascal's Theory of Hydraulics.	Research and report on a braking concern caused by a malfunction in a car's hydraulic brake system. Identify the chief complaint/concern and how can a technician use this information to troubleshoot. Create a brake system inspection checklist.	
Electronics		Understand and apply scientific principles and technical knowledge of electrical theory and electrical and electronic systems.	The student applies technical knowledge and skills in simulated or actual work situations. The student is expected to: (A) 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; and (B) explain and perform a "jump-start" of a vehicle using jumper cables and a booster battery or an auxiliary power supply according to manufacturer	Build a simple battery using household items. Measure voltage, voltage drop, and amperage. Explain how Ohm's law applies to the experiment and considerations for the automotive industry. Research and report on the development of batteries within the automotive industry. Create a simple infographic that explains battery function and choice to a customer. Research or examine a case study on a common electrical or electronics issue in automobiles today. Report on the findings and include recommendations for technicians.	

			recommended procedures.		
Preventative Maintenance			The student applies technical knowledge and skills in simulated or actual work situations. The student is expected to: (A) identify cooling and lubrication system components; (B) identify steering and suspension components, including power steering; (C) 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; (D) compare the preventative maintenance schedules for a variety of vehicles based on their use; (E) perform a preventative	Perform a basic vehicle maintenance: • Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. • Verify operation of the instrument panel engine warning indicators. • Inspect engine assembly for fuel, oil, coolant, and other leaks; and determine necessary action. • Install engine covers using gaskets, seals, and sealers as required. • Remove and replace timing belt; verify correct camshaft timing. • Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. • Identify hybrid vehicle internal combustion	

			maintenance inspection; and (F) perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations.	engine service precautions. • Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action. • Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. • Remove, inspect, and replace thermostat and gasket/seal. • Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required. • Perform engine oil and filter change Perform a tire service: • Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and	

				adjust air pressure; determine necessary action. • Rotate tires according to manufacturer's recommendations. • Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). • Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. • Inspect tire and wheel assembly for air loss; perform necessary action. • Repair tire using internal patch. • Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps. • Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.	

Customer Service and Parts		Understand basic industry procedures for ordering and locating parts as well as documenting repair orders. identify and apply the technical writing, preparation and mathematical skills necessary to complete paperwork associated with various customer service scenarios in automotive services.	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; and (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.	Prepare a vehicle for service: • Identify information needed and the service requested on a repair order. • Identify purpose and demonstrate proper use of fender covers, mats. • Demonstrate use of the three C's: concern, cause, and correction. • Review vehicle service history. • Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. Demonstrate how to properly document maintenance and repair procedures in accordance with applicable rules, laws, and regulations (e.g., Bureau of Auto Repair [BAR], Occupational Safety and Health Administration [OSHA], etc.)	

			standard systems as appropriate. The student applies technical knowledge and skills in simulated or actual work situations. The student is expected to: (2) The student demonstrates appropriate personal and communication skills. The student is expected to: (E) demonstrate advanced technical writing and preparation skills. (3) 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; and		

			(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. 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.		
