

Colorado CTE Course – Scope and Sequence

Course Name	Automotive Service Technology II		Course Details	Credit= 2.0 CTE Credential: CTE Transportation	
			Course = 0.50 Carnegie Unit Credit		
Course Description	Automotive Service Technology (AST) prepares individuals to apply technical knowledge and skills to repair, service, and maintain all types of automobiles at an INTERMEDIATE level. This course builds on concepts learned in Auto Basic, MLR, and/ or Compact Engines. This course is designed to expand the knowledge and skills that the student achieved in Automotive Technology I. Each student will become proficient in advanced skills in the areas of electronic and computerized ignition systems, brake systems, and fuel systems. The students will continue to receive instruction in brakes, electrical/electronic systems, engine performance, and suspension and steering to continue to prepare them for the ASE certification exams.				
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 #	20106	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
Career Development Skills		<p>Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.</p> <p>Develop an education and career plan aligned with personal goals and employment in</p>	<p>The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:</p> <p>(A) demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace such as</p>	<p>Understand the certification requirements for the ASE Automobile and Light Truck Certification Series:</p> <ul style="list-style-type: none"> • Engine Repair • Automatic Transmission/Transaxle • Manual Drive Train & Axels • Suspension & Steering • Brakes • Electrical/Electronic Systems • Heating & Air Conditioning • Engine Performance 	

		<p>the automotive service industry.</p> <p>Understand and demonstrate adherence to industry safety standards.</p>	<p>wearing safety glasses and other personal protective equipment (PPE) and maintaining safety data sheets (SDS);</p> <p>(B) identify employment opportunities, including entrepreneurship opportunities and internships, and industry-recognized certification requirements for the field of automotive technology;</p> <p>(C) demonstrate the principles of group participation, team concept, and leadership related to citizenship and career preparation;</p> <p>(D) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the automotive technology industry;</p> <p>(E) discuss certification opportunities;</p>	<ul style="list-style-type: none"> • Light Vehicle Diesel Engines <p>Maintain a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.</p> <p>Cultivate positive leadership skills. Take part in opportunities to practice and demonstrate personal leadership skills. For example, taking advantage of opportunities provided by a career and technical student organization (CTSO), such as SkillsUSA.</p> <p>Assess situations, apply problem-solving techniques and decision-making skills within the school, community, and workplace.</p> <p>Participate as a team member in a learning environment. Respect the opinions, customs, and individual differences of others.</p> <p>Build personal career development by identifying career interests, strengths, and opportunities for employment and school work-based learning options.</p>	
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			<p>(F) discuss response plans to emergency situations;</p> <p>(G) identify employers' expectations and appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills; and</p> <p>(H) develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities.</p>		
<p>Automotive service foundational employment skills</p>		<p>Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment.</p> <p>Use existing and emerging technology to investigate, research, and produce products and services,</p>	<p>The student relates core academic skills to the requirements of automotive technology. The student is expected to:</p> <p>(A) demonstrate effective written communication skills throughout the course, including documenting on a repair order customer concern/compliant, root cause of the failure, and</p>		

		<p>including new information, as required in the Transportation sector workplace environment.</p> <p>Apply essential technical knowledge and skills common to all pathways in the Transportation sector, following procedures when carrying out experiments or performing technical tasks.</p>	<p>corrective action to complete the repair;</p> <p>(B) estimate the cost of parts and labor operations on repair orders throughout the course, including the flat rate system;</p> <p>(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</p> <p>(D) research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.</p>		
Automotive Service Foundations		Demonstrate understanding and applications of foundational knowledge for service and repairs in	The student demonstrates the technical knowledge and skills that form the core of knowledge of	Demonstrate how to access technical reports, manuals, electronic retrieval systems, and related technical data resources.	SkillsUSA Automotive Service Competition

		<p>the automotive industry.</p>	<p>automotive service. The student is expected to:</p> <p>(A) diagnose the major components of powered vehicles;</p> <p>(B) diagnose automotive chassis and driveline components;</p> <p>(C) locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair information and technical bulletins;</p> <p>(D) locate the manufacturer recommended preventative maintenance schedule;</p> <p>(E) perform a preventative maintenance inspection;</p> <p>(F) perform common fastener and thread repair, including removing broken bolt, restoring internal and external threads, and repairing internal</p>	<p>Test and analyze the elements of precision measuring using standard and metric systems.</p> <p>Demonstrate how to properly document maintenance and repair procedures in accordance with applicable rules, laws, and regulations (e.g., Bureau of Auto Repair [BAR] and Occupational Safety and Health Administration [OSHA]).</p> <p>Perform and document maintenance procedures in accordance with the recommendations of the manufacturer.</p>	
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			<p>threads with thread insert;</p> <p>(G) perform precision measurements and use published specifications to diagnose component wear and determine necessary repairs; and</p> <p>(H) employ critical-thinking skills and structured problem-solving skills to diagnose vehicle malfunctions, solve problems, and make decisions.</p>		
Tools and Equipment		<p>Use appropriate tools and equipment and perform necessary procedures to maintain, diagnose, service, and repair vehicle systems and components.</p>	<p>The student knows the functions and applications of the tools, equipment, technologies, and materials used in automotive technology. The student is expected to:</p> <p>(A) demonstrate the proper and safe use of hand and power tools and equipment commonly employed in the maintenance and repair of vehicles;</p>	<p>Recognize the importance of calibration processes, systems, and techniques using various measurement and testing devices.</p> <p>Demonstrate and use appropriate tools and equipment—such as wrenches, sockets, and pliers—to diagnose, service, repair, and maintain systems and components.</p> <p>Use tools, equipment, and machines to safely measure, test, diagnose, and analyze components and systems (e.g., electrical and electronic circuits, alternating- and direct-current applications, fluid/hydraulic and air/pneumatic systems).</p>	

			<p>(B) discuss and demonstrate the proper handling and disposal of environmentally hazardous materials used in servicing vehicles;</p> <p>(C) demonstrate proper use of diagnostic tools and equipment; and</p> <p>(D) locate, read, and interpret service repair information such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair bulletins.</p>	<p>Select and use the appropriate measurement device(s) and use mathematical functions necessary to perform required fabrication, maintenance, and operation procedures.</p> <p>Use measurement scales, devices, and systems, such as dial indicators and micrometers, to design, fabricate, diagnose, maintain, and repair vehicles and components following recommended industry standards.</p>	
Career Development Skills		<p>Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.</p> <p>Develop an education and career plan aligned with personal goals and employment in</p>	<p>The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:</p> <p>(A) demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace such as wearing safety glasses</p>	<p>Understand the certification requirements for the ASE Automobile and Light Truck Certification Series:</p> <ul style="list-style-type: none"> • Engine Repair • Automatic Transmission/Transaxle • Manual Drive Train & Axels • Suspension & Steering • Brakes • Electrical/Electronic Systems • Heating & Air Conditioning • Engine Performance 	

		<p>the automotive service industry.</p> <p>Understand and demonstrate adherence to industry safety standards.</p>	<p>and other personal protective equipment (PPE) and maintaining safety data sheets (SDS);</p> <p>(B) identify employment opportunities, including entrepreneurship opportunities and internships, and industry-recognized certification requirements for the field of automotive technology;</p> <p>(C) demonstrate the principles of group participation, team concept, and leadership related to citizenship and career preparation;</p> <p>(D) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the automotive technology industry;</p> <p>(E) discuss certification opportunities;</p>	<ul style="list-style-type: none"> • Light Vehicle Diesel Engines <p>Maintain a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.</p> <p>Cultivate positive leadership skills. Take part in opportunities to practice and demonstrate personal leadership skills. For example, taking advantage of opportunities provided by a career and technical student organization (CTSO), such as SkillsUSA.</p> <p>Assess situations, apply problem-solving techniques and decision-making skills within the school, community, and workplace.</p> <p>Participate as a team member in a learning environment. Respect the opinions, customs, and individual differences of others.</p> <p>Build personal career development by identifying career interests, strengths, and opportunities for employment and school work-based learning options.</p>	
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			<p>(F) discuss response plans to emergency situations;</p> <p>(G) identify employers' expectations and appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills; and</p> <p>(H) develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities.</p>		
Engine Performance		<p>Explain and apply proficiently the diagnosis, service and repair of engines, ignition, fuel, air induction, exhaust, computer-engine and emission control systems.</p>	<p>The student applies the technical knowledge and skills related to engine performance in simulated or actual work situations. The student is expected to:</p> <p>(A) describe the importance of operating all on board diagnostics II (OBDII) monitors for repair verification;</p> <p>(B) perform cylinder power balance test;</p>	<p>Demonstrate ASE performance Indicators: See ASE Test and Specifications Task Lists</p>	

			<p>(C) perform cylinder cranking and running compression tests;</p> <p>(D) perform cylinder leakage test;</p> <p>(E) verify engine operating temperature;</p> <p>(F) remove and replace spark plugs and inspect secondary ignition components for wear and damage; and</p> <p>(G) retrieve and record diagnostic trouble codes and OBD II monitor status, freeze frame data, and clear trouble codes when applicable.</p>		
HVAC		Apply the technical knowledge and skills related to heating ventilation and air conditioning (HVAC) automotive repair in simulated or actual work situations.	Explain and apply proficiently the diagnosis, service and repair of heating and air conditioning, refrigeration, compressors, compressor clutches, evaporators, receiver driers, accumulators, condensers, heating and engine cooling, related control systems,	Demonstrate ASE performance Indicators: See ASE Test and Specifications Task Lists	

			<p>refrigerant recovery, and recycling and handling. The student is expected to:</p> <p>(A) identify, locate, and replace cabin air filters;</p> <p>(B) inspect air conditioning (A/C) condenser for airflow restrictions;</p> <p>(C) identify the source of A/C system odors; and</p> <p>(D) identify hybrid vehicle A/C system electrical circuits and safety precautions.</p>		
<p>Light Diesel Engines (Optional)</p>		<p>Understand and apply technical skills to diesel engine services.</p>	<p>The student demonstrates technical knowledge and skills of diesel equipment technology. The student is expected to:</p> <p>(A) describe the function of the major components of diesel-powered vehicles such as engines, fuel injection systems, lubrication,</p>	<p>Demonstrate ASE performance Indicators: See ASE Test and Specifications Task Lists</p>	

			<p>cooling, electrical, air-conditioning systems, air induction, exhaust, and emissions;</p> <p>(B) describe the function of the chassis components such as braking, steering, transmission, drivetrain, suspension systems, pneumatics, and hydraulics;</p> <p>(C) locate, read, and interpret documents such as schematics, charts, diagrams, graphs, parts catalogs, and service-repair information and technical bulletins; and</p> <p>(D) demonstrate precision measurement procedures to diagnose component wear, compare measurements to published specifications, and determine necessary repairs.</p>		

