

Colorado CTE Course – Scope and Sequence

Course Name	Maintenance and Light Repair		Course Details	Credit = 1.0 (135 Contact hours required for NATEF Accreditation) CTE Credential= CTE Transportation Recommended Teacher Resource: Automobile Task List, National Automotive Technicians Education Foundation (NATEF), www.natef.org	
			Course = 0.50 Carnegie Unit Credit		
Course Description	Automotive Maintenance and Light Repair (MLR) explores automotive industry standards and terminology, career opportunities and classifications, shop operations and safety, tool identification and usage, diagnostic equipment identification and usage, automotive systems, tires and wheels, hydraulic braking systems, cooling systems, lubrication systems, and preventative maintenance. Also included is basic operation of automotive braking systems--operation, diagnosis and basic repair of disc, drum, and basic hydraulic braking systems. The basics of electrical systems, electronic systems, batteries, starting systems, charging systems, lighting systems, electrical instruments and accessories, and ignition systems will also be studied. This course focuses on the diagnosis and service of suspensions and steering systems and their components. Students who successfully complete all MLR courses will have the knowledge needed to pass the ASE certification exam for MLR. Students who pass the exam and meet the work-based requirement will be eligible and encouraged to enter the workforce as an ASE-Certified MLR Technician.				
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 #	20104	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 Transportation Service		Build personal career development by identifying career interests, strengths, and opportunities.	Understand entry level employment requirements. Student is expected to: (A) Define employment expectations of entry-	Survey local job listings and compare and contrast job listing requirements. Report on hiring trends in the industry, noting: <ul style="list-style-type: none"> • Tool or tasks listed in the job announcements 	SkillsUSA 4 Pillars SkillsUSA Personal Skills (Framework) Job Skill Requirements

			<p>level employees in local employment situations (hiring requirements, basic job expectations, etc.); and</p> <p>(B) Discuss industry certification opportunities and their requirements.</p>	<ul style="list-style-type: none"> • Common language for similar or like position announcements • Common entry-level requirements (education, training, certifications, physical requirements, etc.) • Pay scale variations 	<p>Updates to ICAP</p>
<p>Automotive Safety</p>		<p>Students will perform safety examinations and maintain safety records.</p>	<p>Students will demonstrate shop and personal safety. Student is expected to:</p> <p>(A) identify and properly use, maintain, and store automotive service hand tools, power tools, and shop equipment, and</p> <p>(B) demonstrate continuous awareness of potential hazards to self and others and respond appropriately.</p>	<p>Identify and demonstrate knowledge of how to utilize marked safety areas and equipment, such as location and use of eye wash stations; types of fire extinguishers and other fire safety equipment; posted evacuation routes; and proper ventilation procedures for working within the lab/shop area.</p> <p>Comply with the required use of safety glasses, ear protection, gloves, appropriate clothing, and shoes during lab/shop activities; demonstrate knowledge of procedures for securing hair and jewelry for lab/shop activities.</p> <p>Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic</p>	<p>Obtain OSHA 10 or S/P 2 safety certificate</p>

				<p>brake control systems, and hybrid vehicle high voltage circuits.</p> <p>Locate and demonstrate knowledge of material safety data sheets (MSDS).</p> <p>Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies to protect coworkers and bystanders from hazards; report accidents and observed hazards; and comply with emergency response procedures. Obtain OSHA 10 or S/P 2 safety certificate</p> <p>Pass with 100% accuracy a written examination relating to safety issues relating specifically to Maintenance and Light Repair.</p> <p>Pass with 100% accuracy a performance examination relating to safety issues relating specifically to Maintenance and Light Repair.</p> <p>Maintain a portfolio record of written safety examinations and equipment examination for which the student has passed an operational checkout by the instructor.</p>	
Basics of Service Orders		Students will prepare a vehicle for service.	Identify information needed and the service	See NATEF Task List	

			<p>requested on a repair order.</p> <p>Identify purpose and demonstrate proper use of fender covers, mats.</p> <p>Demonstrate use of the three C's: concern, cause, and correction.</p> <p>Review vehicle service history.</p> <p>Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.</p>		
Basic Shop Tools		<p>Identify and properly use, maintain, and store automotive service hand tools, power tools, and shop equipment.</p>	<p>Identify and use basic hand tools. Student is expected to:</p> <p>(A) Identify tools and their usage in automotive applications.</p> <p>(B) Identify standard and metric designation.</p> <p>(C) Demonstrate safe handling and use of appropriate tools.</p> <p>(D) Demonstrate proper cleaning, storage, and maintenance of tools and equipment.</p> <p>(E) Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).</p>	See NATEF Task List	

<p>Vehicle Service Preparation</p>		<p>Use and apply industry standards to prepare a vehicle for service.</p>	<p>Understand and apply knowledge to properly prepare a vehicle for service. Student is expected to:</p> <ul style="list-style-type: none"> A) Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins; (B) Verify operation of the instrument panel engine warning indicators; (C) Inspect engine assembly for fuel, oil, coolant, and other leaks; and determine necessary action; (D) Identify hybrid vehicle internal combustion engine service precautions; (E) 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; (F) Inspect, replace, and adjust drive belts, 	<p>See NATEF Task List</p>	
---	--	---	--	----------------------------	--

			<p>tensioners, and pulleys; check pulley and belt alignment;</p> <p>(G) Remove, inspect, and replace thermostat and gasket/seal;</p> <p>(H) Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required; and</p> <p>(I) Perform engine oil and filter change.</p>		
Tires and Wheels		<p>Use and apply industry standards to perform a tire and wheel service.</p>	<p>Understand and apply knowledge to perform a tire and wheel service. Student is expected to:</p> <p>(A) Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action;</p> <p>(B) Rotate tires according to manufacturer's recommendations;</p> <p>(C) Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic);</p>	See NATEF Task List	

			<p>(D) Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor;</p> <p>(E) Inspect tire and wheel assembly for air loss; perform necessary action;</p> <p>(F) Repair tire using internal patch;</p> <p>(G) Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps; and</p> <p>(H) Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.</p>		
<p>Engine Service Basics</p>		<p>Use and apply industry standards to perform basic vehicle engine service and maintenance.</p>	<p>Understand routine maintenance services. Student is expected to:</p> <p>(A) Install engine covers using gaskets, seals, and sealers as required;</p> <p>(B) Remove and replace timing belt; verify correct camshaft timing;</p> <p>(C) Perform common fastener and thread repair, to include: remove broken bolt,</p>		

			<p>restore internal and external threads, and repair internal threads with thread insert;</p> <p>(D) 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;</p> <p>(E) Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment;</p> <p>(F) Remove, inspect, and replace thermostat and gasket/seal;</p> <p>(G) Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required; and</p> <p>(H) Perform engine oil and filter change.</p>		

