

Colorado CTE Course – Scope and Sequence

Course Name	Maintenance and Light Repair III		Course Details	Credit= 1.0- 2.0 (dependent on time spent on tasks.) Prerequisite: MLR II CTE Credential: CTE Transportation	
			Course = 0.50 Carnegie Unit Credit		
Course Description	The Maintenance and Light Repair III (MLR III) course prepares students for entry into Maintenance and Light Repair IV. Students study and service suspension and steering systems and brake systems. 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
Career Development		Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans. Develop an education and career plan aligned with personal goals and employment in the automotive service industry.	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to: (A) demonstrate the principles of group participation, team concept, and leadership related to	Understand the certification requirements for the ASE Automobile Maintenance and Light Repair Certification. 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.	

			citizenship and career preparation; (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; (D) discuss response plans to emergency situations; (E) identify employers' expectations and appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills; and (F) develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities.	Build personal career development by identifying career interests and strengths. Research local job and internship opportunities and compare the announcements to identified career interests.	
Safety		Understand and demonstrate adherence to industry safety standards.	Students will perform safety examinations and maintain safety records in accordance with industry standards. Student is expected to:	Pass with 100% accuracy a written examination relating to safety issues relating specifically to Maintenance and Light Repair. Maintain a portfolio record of written safety examinations and	

			(A) Use and inspect personal protective equipment. Demonstrate appropriate related safety procedures; (B) Inspect, maintain, and employ safe operating procedures with tools and equipment, such as hand and power tools, ladders, scaffolding, and lifting equipment; (C) Demonstrate continuous awareness of potential hazards to self and others and respond appropriately; (D) Assume responsibilities under HazCom (Hazard Communication) regulations; and (E) Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies to protect coworkers and bystanders from hazards; reporting of	equipment examinations for which the student has passed an operational checkout by the instructor. Demonstrate appropriate use of PPE. Demonstrate safe handling of equipment and materials.	
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			accidents and observed hazards; and regarding emergency response procedures.		
Automotive service foundational employment skills		Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Transportation sector workplace environment. Apply essential technical knowledge and skills common to all pathways in the Transportation sector, following procedures when carrying out experiments or performing technical tasks.	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.		
Tools and Equipment		Use appropriate tools and equipment and perform necessary procedures to maintain, diagnose, service, and repair vehicle systems and components	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	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). Select and use the appropriate measurement device(s) and use mathematical functions necessary to perform required fabrication, maintenance, and operation procedures. Use measurement scales, devices, and systems, such as dial indicators and micrometers, to design, fabricate, diagnose, maintain, and repair vehicles and components following	

			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.	recommended industry standards.	
Suspensions and Steering Systems		Understands and applies knowledge of automotive vehicle suspension and steering systems and components.	Apply knowledge to inspect, service, and repair suspension and steering systems. Student is expected to: (A) demonstrate the function and principles of automotive drivetrain, steering and suspension, brake, and tire and wheel components and systems in accordance with national industry standards; (B) apply knowledge of vehicle restraint systems;	Inspect, service, and repair suspension and steering systems: • Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. (P-1) • Disable and enable supplemental restraint system (SRS). (P-1) • Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellow boots. (P-1) • Determine proper power steering fluid type; inspect fluid level and condition. (P-1)	

			(C) inspect, service, and repair steering and suspension systems; (D) understand power-steering functions and components; and (E) perform pre-alignment inspections.	• Flush, fill, and bleed power steering system. (P-2) • Inspect for power steering fluid leakage; determine necessary action. (P-1) • Remove, inspect, replace, and adjust power steering pump drive belt. (P-1) • Inspect and replace power steering hoses and fittings. (P-2) • Replace power steering pump filter(s). (P-2) • Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. (P-1) • Inspect tie rod ends (sockets), tie rod sleeves, and clamps. (P-1) • Inspect upper and lower control arms, bushings, and shafts. (P-1) • Inspect and replace rebound and jounce bumpers. (P-1) • Inspect track bar, strut rods/radius arms, and related mounts and bushings. (P-1)	
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| | | | | <ul style="list-style-type: none"> • Inspect upper and lower ball joints (with or without wear indicators). (P-1) • Inspect suspension system coil springs and spring insulators (silencers). (P-1) • Inspect suspension system torsion bars and mounts. (P-1) • Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links. (P-1) • Inspect strut cartridge or assembly. (P-1) • Inspect front strut bearing and mount. (P-1) • Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms. (P-1) • Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts. (P-1) • Inspect, remove, and replace shock absorbers; inspect mounts and bushings. (P-1) • Inspect electric power-assisted steering. (P-3) | |
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				• Identify hybrid vehicle power steering system electrical circuits and safety precautions. (P-2) • Describe the function of the power steering pressure switch. (P-3) • Perform pre-alignment inspection and measure vehicle ride height; determine necessary action. (P-1)	
Brake Systems		Apply knowledge to automotive brake systems for service and repair.	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; and	Inspect, service, and repair vehicle brake systems: • Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. (P-1) • Describe procedure for performing a road test to check brake system operation, including an antilock brake system (ABS). (P-1) • Measure brake pedal height, travel, and free play (as applicable); determine necessary action. (P1) • Check master cylinder for external leaks and proper operation. (P-1)	

			(D) bleed and flush brake system.	• Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action. (P-1) • Select, handle, store, and fill brake fluids to proper level. (P-1) • Identify components of brake warning light system. (P-3) • Bleed and/or flush brake system. (P-1) • Test brake fluid for contamination. (P-1) • Remove, clean, inspect, and measure brake drum diameter; determine necessary action. (P-1) • Refinish brake drum and measure final drum diameter; compare with specifications. (P-1) • Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. (P-1)	
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				• Inspect wheel cylinders for leaks and proper operation; remove and replace as need (P-2) • Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments. (P-2) • Install wheel and torque lug nuts. (P-1) • Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action. (P-1) • Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action. (P-1) • Remove, inspect, and replace pads and retaining hardware; determine necessary action. (P-1) • Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks. (P-1) • Clean and inspect rotor, measure rotor thickness,	
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				thickness variation, and lateral runout; determine necessary action. (P-1) • Remove and reinstall rotor. (P-1) • Refinish rotor on vehicle; measure final rotor thickness and compare with specification (P-1) • Refinish rotor off vehicle; measure final rotor thickness and compare with specifications. (P-1) • Retract and re-adjust caliper piston on an integral parking brake system. (P-3) • Check brake pad wear indicator; determine necessary action. (P-2) • Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations. (P-1)	
Related Brake System Components		Understands and applies knowledge of automotive vehicle related braking systems and components.	The student applies the technical knowledge and skills related to brakes in simulated or actual work situations. The student is expected to:	Inspect, service, and repair related vehicle brake systems: • Check brake pedal travel with, and without, engine running to verify proper power boost operation. (P-2)	

			(A) identify and check vehicle power booster system and components; (B) identify and check wheel and hub bearings; (C) identify and check parking break operation; (D) identify and check the operation of brake stop light system; and (E) identify traction control and vehicle stability control system components.	• Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster. (P-1) • Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings. (P-1) • Check parking brake cables and components for wear, binding, and corrosion; clean lubricate, adjust or replace as needed. (P-2) • Check parking brake operation and parking brake indicator light system operation; determine necessary action. (P-1) • Check operation of brake stop light system. (P-1) • Replace wheel bearing and race. (P-2) • Identify traction control/vehicle stability control system components. (P-3) • Describe the operation of a regenerative braking system. (P-3)	
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Academic Standards Alignment

Colorado CTE courses are required to integrate academic and essential skills into course content. The following academic standards have been identified as aligned to this course and should be integrated throughout instruction.

[CO CTE Academic Standards Resources](#) (Rubrics, integration strategies, etc) [CDE Colorado Academic Standards Online](#) (Online standards lookup tool)

Reading, Writing, & Communicating

Standard 1: Oral Expression and Listening

- **Prepared Graduate 1:** Collaborate effectively as group members or leaders who listen actively and respectfully; pose thoughtful questions, acknowledge the ideas of others; and contribute ideas to further the group's attainment of an objective.

Standard 2: Reading for All Purposes .

- **Prepared Graduate 4:** Read a wide range of informational texts to build knowledge and to better understand the human experience.
- **Prepared Graduate 5:** Understand how language functions in different contexts, command a variety of word-learning strategies to assist comprehension, and make effective choices for meaning or style when writing and speaking.

Standard 3: Writing and Composition

- **Prepared Graduate 9:** Demonstrate mastery of their own writing process with clear, coherent, and error-free polished products.

Standard 4: Research Inquiry and Design

- **Prepared Graduate 10:** Gather information from a variety of sources; analyze and evaluate its quality and relevance; and use it ethically to answer complex questions.

Note: Mathematics and Science standards will be added in the future. Visit the [Colorado Academic Standards](#) page for the most current version.