IDAHO
Division of Career Technical Education

2024 AUTOMOTIVE MAINTENANCE AND LIGHT REPAIR

Program Standards

CONTENT STANDARD 1.0: PROFESSIONAL ORGANIZATIONS AND LEADERSHIP	
Performance Standard 1.1: Student Leadership in Career Technical Student Organizations (CTSO) and Professional Associations	
1.1.1	Explore the role of professional organizations and/or associations in the Automotive Maintenance and Light Repair Industry.
1.1.2	Define the value, role, and opportunities provided through career technical student organizations.
1.1.3	Engage in career exploration and leadership development.
CONTENT STANDARD 2.0: SAFETY PROCEDURES FOR LAB AND TOOLS	
Performance Standard 2.1: General Lab Safety Rules and Procedures	
2.1.1	Identify and use proper placement of floor jacks and jack stands.
2.1.2	Identify and use proper procedures for safe vehicle lift operation.
2.1.3	Identify proper ventilation requirements for working within the lab/shop area.
2.1.4	Identify marked safety areas.
2.1.5	Identify the location and the types of fire extinguishers and other fire safety equipment.
2.1.6	Identify the location of eye wash station(s) and the procedure for proper use.
2.1.7	Identify the location of the posted evacuation routes.
2.1.8	Comply with the required personal protective equipment (PPE) requirements (e.g., safety glasses, ear protection, gloves, shoes).
2.1.9	Secure hair and jewelry for lab/shop activities.
2.1.10	Identify safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits (e.g., high-intensity discharge (HID) lamps, ignition systems, injection systems).
2.1.11	Locate and interpret safety data sheets (SDS).
2.1.12	Handle, store, and dispose of hazardous waste and materials (e.g., batteries, oil, diesel, gasoline, antifreeze).
Performance Standard 2.2: Tool and Equipment Identification and Use	
2.2.1	Identify tools and equipment and their appropriate uses in automotive maintenance and repair.
2.2.2	Identify standard and metric fasteners.
2.2.3	Describe thread repair; identify the required tools needed to perform the repair.
2.2.4	Demonstrate the safe handling and appropriate use of tools and equipment.
2.2.5	Describe the use of, read, and interpret precision measuring tools (e.g., micrometer, dial-indicator, digital/dial-caliper).
2.2.6	Demonstrate cleaning, storage, and maintenance of tools and equipment.
CONTENT STANDARD 3.0: BASIC VEHICLE SERVICE	
Performance Standard 3.1: Vehicle Service Information	
3.1.1	Reference vehicle service information, such as fluid type, vehicle service history when available, service precautions, technical service bulletins, and recalls, including for vehicles equipped with advanced driver assistance systems (ADAS).

3.1.2	Retrieve and record diagnostic trouble codes (DTC), onboard diagnostics (OBD) monitor status, freeze frame data, and clear codes and data when directed.
3.1.3	Locate the vehicle identification number (VIN) and production data code.
3.1.4	Interpret VIN information.
3.1.5	Identify additional vehicle information labels (e.g., tires, emissions).
3.1.6	Reset maintenance notifications/reminders after services are completed.
3.1.7	Verify and interpret vehicle warning indicators (e.g., messages, lights).
3.1.8	Identify policy requirements for the return of a vehicle to a customer (e.g., floor mats, steering wheel cover).
CONTENT STANDARD 4.0: ENGINE REPAIR	
Performance Standard 4.1: General Engine Service	
4.1.1	Inspect engine assembly for fuel, oil, coolant, and other leaks.
4.1.2	Install engine covers, using vehicle-specific gaskets, seals, and sealers as required.
4.1.3	Describe the function of the timing belt/chain.
4.1.4	Inspect, replace, and adjust drive belts (e.g., alternator, power steering pump, air conditioning, stretch-fit serpentine belts), tensioners, and pulleys, checking pulley and belt alignment.
4.1.5	Inspect engine mounts.
4.1.6	Identify service precautions related to service of the internal combustion engine of a hybrid vehicle.
4.1.7	Identify engine block assembly components and configurations.
4.1.8	Identify the cylinder head and valve train components and configurations.
4.1.9	Describe the operation of engines equipped with variable valve timing (VVT) systems.
Performance Standard 4.2: Lubrication and Cooling Systems	
4.2.1	Identify lubrication and cooling system components and configurations.
4.2.2	Perform cooling system pressure check (e.g., inspect and test radiator, coolant recovery tank, heater core, and galley plug) to identify leaks.
4.2.3	Verify the operation of the cooling system (e.g., leak, fans, heater) after service or repair.
4.2.4	Inspect and test the pressure cap.
4.2.5	Determine necessary action to remedy issues related to the radiator, pressure cap, coolant recovery tank, heater core, and galley plug.
4.2.6	Identify causes of engine overheating.
4.2.7	Identify types of water pumps (e.g., gear-driven, belt-driven, chain-driven, electric).
4.2.8	Remove, inspect, and replace the thermostat and gasket/seal.
4.2.9	Inspect and test coolant.
4.2.10	Drain and recover coolant.
4.2.11	Describe procedures for flushing and refilling the cooling system with recommended coolant, using a radiator vacuum tool or bleed air, as required.
4.2.12	Perform oil and filter changes.
CONTENT STANDARD 5.0: AUTOMATIC TRANSMISSION/TRANSAXLE	
Performance Standard 5.1: General Transmission/Transaxle	
5.1.1	Identify drive train and axle components and configurations.
5.1.2	Describe transmission/transaxle fluids, the importance of fluid quality, and differences in electric vehicle (EV)/hybrid transmissions.
5.1.3	Check transmission fluid condition.
5.1.4	Check fluid level in a transmission or transaxle equipped with and without a dipstick; verify the procedure with a scan tool.
5.1.5	Check for transmission fluid leaks.
5.1.6	Describe hydraulic principles (i.e., Pascal's law) at work in a transmission/transaxle.
Performance Standard 5.2: In-Vehicle Transmission/Transaxle	

5.2.1	Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.
5.2.2	Describe relearn procedures.
5.2.3	Drain and replace fluid and filter(s).
Performance Standard 5.3: Off-Vehicle Transmission/Transaxle	
5.3.1	Describe the basic operational characteristics of a continuously variable transmission (CVT).
5.3.2	Describe the basic operational characteristics of hybrid and electric vehicle (EV) drive trains.
CONTENT STANDARD 6.0: MANUAL DRIVE TRAIN AND AXLES	
Performance Standard 6.1: General Drive Train	
6.1.1	Check fluid condition and for leaks.
6.1.2	Drain and refill manual transmission/transaxle and final drive unit.
Performance Standard 6.2: Clutch Systems	
6.2.1	Check and adjust the clutch master cylinder fluid level.
6.2.2	Check for hydraulic system leaks.
Performance Standard 6.3: Drive Shaft and Half Shaft, Universal and Constant Velocity (CV) Joint	
6.3.1	Inspect front and rear wheel bearings.
6.3.2	Diagnose, inspect, service, and replace shafts, yokes, boots, and universal/CV joints.
6.3.3	Check for leaks at drive assembly and transfer case seals; check vents; check fluid level.
Performance Standard 6.4: Differential Case Assembly	
6.4.1	Inspect differential housing, check for leaks, and inspect the housing vent.
6.4.2	Check and adjust differential housing fluid level.
6.4.3	Drain and fill differential housing, per manufacturer specification.
Performance Standard 6.5: Drive Axle	
6.5.1	Inspect and replace drive axle wheel studs.
6.5.2	Describe the function of wheel bearings.
Performance Standard 6.6: Four-Wheel Drive/All-Wheel Drive	
6.6.1	Identify concerns related to variations in tire circumference and/or final drive ratios.
6.6.2	Check transfer case/four-wheel drive fluid levels.
CONTENT STANDARD 7.0: SUSPENSION AND STEERING SERVICE AND REPAIR	
Performance Standard 7.1: General Suspension and Steering Systems	
7.1.1	Identify and inspect suspension and steering system components and configurations.
7.1.2	Disable and enable supplemental restraint system (SRS) and verify indicator lamp operation.
7.1.3	Compare electric and hydraulic power steering.
Performance Standard 7.2: Wheel Alignment Conditions	
7.2.1	Describe four-wheel alignment angles (e.g., camber, caster, toe) and effects on vehicle handling/tire wear.
7.2.2	Perform pre-alignment inspection and measure vehicle ride height, suggesting appropriate service.
Performance Standard 7.3: Wheel and Tire	
7.3.1	Describe the tire sidewall markings in detail, including the P-metric size, treadwear, temperature, traction rating, and tire production date.
7.3.2	Measure tread depth, using a tread-depth tool.
7.3.3	Determine necessary action to remedy issues related to tire condition.
7.3.4	Rotate tires, including using a tire pressure monitoring system (TPMS) relearn procedure, according to the manufacturer's recommendations.
7.3.5	Dismount, inspect, and remount tire on the wheel, including for those using TPMS.
7.3.6	Balance wheel and tire assembly.

7.3.7	Inspect tire and wheel assembly for air loss.
7.3.8	Determine necessary action to remedy tire air loss.
7.3.9	Describe the procedure for repairing a tire according to the tire manufacturer.
Performance Standard 7.4: Related Suspension and Steering	
7.4.1	Inspect rack and pinion steering gear inner tie rod ends (i.e., sockets) and bellows boots.
7.4.2	Inspect power steering fluid level and condition.
7.4.3	Flush, fill, and bleed power steering system.
7.4.4	Identify proper fluid type according to the manufacturer's specifications.
7.4.5	Inspect for power steering and electric steering fluid leakage.
7.4.6	Inspect and replace power steering hoses and fittings.
7.4.7	Inspect pitman arm, relay (center link/intermediate) rod, idler arm, mountings, and steering linkage damper.
7.4.8	Inspect tie rod ends (i.e., sockets), tie rod sleeves, and clamps.
7.4.9	Inspect upper and lower control arms, bushings, and shafts.
7.4.10	Inspect and replace rebound bumpers.
7.4.11	Inspect track bar, strut rods/radius arms, and related mounts and bushings.
7.4.12	Inspect upper and lower ball joints (with or without wear indicators).
7.4.13	Inspect suspension system coil springs and spring insulators (silencers).
7.4.14	Inspect suspension system torsion bars and mounts.
7.4.15	Inspect and/or replace front/rear stabilizer bar (sway bar) bushings, brackets, and links.
7.4.16	Inspect, remove, and/or replace strut cartridge or assembly, inspecting mounts and bushings.
7.4.17	Inspect front strut bearing and mount.
7.4.18	Inspect components of suspension systems (e.g., coil, leaf, torsion).
7.4.19	Describe the function of electronically controlled suspension and steering systems and components (e.g., active suspension, stability control).
7.4.20	Inspect, remove, and/or replace shock absorbers, inspecting mounts and bushings.
CONTENT STANDARD 8.0: BRAKE SYSTEMS	
Performance Standard 8.1: General Brake Systems	
8.1.1	Identify brake system components and configuration.
8.1.2	Describe procedure for performing a road test to check brake system operation, including the anti-lock brake system (ABS).
8.1.3	Describe basic hydraulic principles at work in brake systems.
8.1.4	Install wheel and torque lug nuts.
Performance Standard 8.2: Hydraulic System	
8.2.1	Describe brake pedal height, travel, and feel.
8.2.2	Check master cylinder for internal/external leaks and proper operation.
8.2.3	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks bulging, wear, loose fittings, and support.
8.2.4	Select, handle, store, and fill brake fluids to proper level.
8.2.5	Identify components of hydraulic brake warning light system.
8.2.6	Bleed and/or flush brake system.
8.2.7	Test brake fluid for contaminants, water, and boiling point, using a refractometer.
Performance Standard 8.3: Drum Brakes	
8.3.1	Remove, clean, inspect, and measure brake drum diameter and determine serviceability.
8.3.2	Refinish brake drum and measure final drum diameter, comparing with specifications.
8.3.3	Remove, clean, inspect, and replace brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates.

8.3.4	Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.
8.3.5	Pre-adjust brake shoes and parking brake, installing brake drums or drum/hub assemblies and wheel bearings and make final checks and adjustments.
Performance Standard 8.4: Disc Brakes	
8.4.1	Remove and clean caliper assembly, inspecting for leaks and damage/wear to caliper housing.
8.4.2	Inspect caliper mounting.
8.4.3	Remove, inspect, and replace brake pads and retaining hardware, cleaning and lubricating caliper slides, cleaning rotor mounting surface, removing and replacing rotor.
8.4.4	Describe the procedure for burnishing brake pads against the rotor.
8.4.5	Refinish the rotor on and off vehicle, measuring final rotor thickness and comparing with specifications.
8.4.6	Retract and readjust caliper piston on an integral/electric parking brake system.
Performance Standard 8.5: Power Assist Units	
8.5.1	Identify components of the brake power-assist system (vacuum and hydraulic) and the electronic power brake assist system.
8.5.2	Check brake pedal free-travel with and without engine running to verify proper power booster operation.
8.5.3	Check vacuum supply, with a manifold or auxiliary pump, to a vacuum-type power booster.
Performance Standard 8.6: Miscellaneous Brakes Systems	
8.6.1	Identify electronic brake control system components and describe their functions (i.e., ABS [anti-lock braking system], TCS [traction control system], ESC [electronic stability control]).
8.6.2	Describe the function of serviceable and non-serviceable wheel bearings.
8.6.3	Check parking brake operation, cables, indicator lamp, and components for wear, binding, and corrosion, cleaning, lubricating, adjusting or replacing, as needed.
8.6.4	Check operation of the external brake light system.
8.6.5	Describe the operation of a regenerative braking system.
CONTENT STANDARD 9.0: ELECTRICAL/ELECTRONIC SYSTEM	
Performance Standard 9.1: General Electronic Systems Service	
9.1.1	Identify electrical/electronic system components (e.g., alternator, fuse, diode) and configurations.
9.1.2	Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's law).
9.1.3	Interpret wiring diagrams to trace electrical/electronic circuits.
9.1.4	Demonstrate proper use of digital multi-meter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance.
9.1.5	Describe shorts, grounds, opens, and resistance problems and causes.
9.1.6	Describe the function of electrical testing equipment (e.g., test light, oscilloscope, short finder, logic probe).
9.1.7	Check basic operations of electrical circuits, using appropriate testing equipment.
9.1.8	Describe the procedure for measuring key-off battery drain (i.e., parasitic draw).
9.1.9	Inspect and test fusible links, circuit breakers, and fuses.
9.1.10	Repair wire, using solder and heat shrink.
Performance Standard 9.2: Battery Service	
9.2.1	Perform battery state-of-charge test.
9.2.2	Perform battery capacity and load test, verifying proper battery capacity for vehicle application.

9.2.3	Maintain or restore electronic memory.
9.2.4	Inspect and clean batteries, fill battery cells, and check battery cables, connectors, clamps, and hold-downs.
9.2.5	Perform slow/fast battery charge, according to battery manufacturer recommendations.
9.2.6	Jump-start a vehicle, using jumper cables and a booster battery or an auxiliary power supply.
9.2.7	Identify electronic modules, security systems, radios, and other accessories that require re-initialization or code entry after reconnecting the vehicle battery.
Performance Standard 9.3: Starting System	
9.3.1	Perform starter current draw test.
9.3.2	Perform starter circuit-voltage drop tests.
9.3.3	Describe procedures for the removal and installation of a starter in a vehicle.
9.3.4	Inspect and test switches, connectors, and wires of starter control circuits (e.g., relays, solenoid).
9.3.5	Describe the operation of an automatic idle-start/stop-stop system.
Performance Standard 9.4: Charging System	
9.4.1	Perform charging system output test.
9.4.2	Describe procedures for inspection and function of the charging system.
9.4.3	Perform charging circuit voltage drop tests.
Performance Standard 9.5: Lighting Systems	
9.5.1	Inspect interior and exterior lamps and sockets, including headlights and auxiliary lights (fog lights/driving lights), replacing as needed.
9.5.2	Aim headlights.
Performance Standard 9.6: Accessories	
9.6.1	Describe vehicle comfort, convenience, access, safety, and related systems operation.
9.6.2	Describe the removal and reinstallation of the interior panel.
9.6.3	Identify tools and fasteners associated with panel removal and reinstallation.
9.6.4	Describe the operation of keyless entry/remote-start systems.
9.6.5	Verify windshield wiper and washer operation, replacing wiper blades.
CONTENT STANDARD 10.0: HEATING AND AIR CONDITIONING SYSTEMS	
Performance Standard 10.1: A/C Systems	
10.1.1	Identify heating, ventilation, and air conditioning (HVAC) refrigerant types, components, and configurations.
10.1.2	Identify steps for an A/C performance test and the operation of air conditioning refrigerant recovery machines.
10.1.3	Inspect A/C heater ducts, doors, hoses, cabin filters, and outlets and determine necessary remedy.
Performance Standard 10.2: Refrigeration System Components	
10.2.1	Inspect the A/C condenser for airflow restrictions and describe remedies.
10.2.2	Inspect the operation of the evaporator housing condensation drain.
CONTENT STANDARD 11.0: ENGINE PERFORMANCE	
Performance Standard 11.1: Ignition System	
11.1.1	Identify ignition system components and configurations.
11.1.2	Remove and replace spark plugs, inspecting secondary ignition components for wear and damage.
Performance Standard 11.2: Computerized Controls	
11.2.1	Identify computerized control system components and configurations.
11.2.2	Scan for diagnostic trouble codes, on-board diagnostic (OBD) monitor status, and freeze-frame data, clearing codes when applicable.

11.2.3 Describe the importance of operating all OBD monitors (e.g., drive cycles) for repair verification.

Performance Standard 11.3: Fuel, Air Induction, and Exhaust Systems

11.3.1 Identify fuel, air induction, and exhaust system components and configurations.
11.3.2 Replace fuel filter(s) when needed.
11.3.3 Inspect, service, or replace air filters, filter housing, and intake duct work.
11.3.4 Inspect the integrity of the exhaust manifold, exhaust pipes muffler, catalytic converter, resonator, tailpipe, system hangers, brackets, clamps, and heat shields, repairing or replacing as needed.

Performance Standard 11.4: Emissions Control Systems

11.4.1 Identify emission control system components and configurations.
11.4.2 Inspect, test, and service positive crankcase ventilation (PCV) filter/breather, valve, tubes, orifices, and hoses, performing necessary action.
11.4.3 Describe the process for checking and filling diesel exhaust fluid (DEF).

IDCTE Document Control Information

Program Standard Revision: TI Automotive Collision Repair

Date	Standard #	Original	Summary of Change	Revised By	Approved By