

AUTOMOTIVE COMPETENCIES

Green River Community College

	For every job, the following safety task must be strictly enforced as a number 1 priority: Comply with the personal and environmental safety practices associated with clothing, eye protection, hand tools, power equipment and handling, storage and disposal, in accordance with federal safety and environmental regulations.
	COMPETENCIES FOR AUTOMOTIVE ATECH 111 -- 3 Credits (min. 11-P1's)
	General Electrical Systems Diagnosis
1.	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
2.	Identify and interpret electrical/electronic system concern; determine necessary action.
3.	Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins.
4.	Locate and interpret vehicle and major component identification numbers
5.	Diagnose electrical/electronic integrity for series, parallel and series-parallel circuits using principles of electricity (Ohm's Law).
6.	Use wiring diagrams during diagnosis of electrical circuit problems.
7.	Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems , including: source voltage, voltage drop, current flow, and resistance.
8.	Remove and replace terminal end from connector; replace connectors and terminal ends.
9.	Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.
10.	Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action.
11.	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
12.	Inspect and test switches, connectors, relays, solid state devices, and wires of electrical/electronic circuits; perform necessary action.
13.	Repair wiring harnesses and connectors (including CAN/BUS systems).
14.	Perform solder repair of electrical wiring.
	Battery Diagnosis and Service
1.	Perform battery state-of-charge test; determine necessary action.
2.	Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action.
3.	Maintain or restore electronic memory functions.
4.	Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs.
5.	Perform battery charge.
6.	Start a vehicle using jumper cables and a battery or auxiliary power supply.
7.	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.
	Starting System Diagnosis and Repair
1.	Perform starter current draw tests; determine necessary action.
2.	Perform starter circuit voltage drop tests; determine necessary action.
3.	Remove and install starter in a vehicle.
	Charging System Diagnosis and Repair
1.	Perform charging system output test; determine necessary action.
2.	Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.
3.	Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment.
4.	Remove, inspect, and install generator (alternator).
5.	Perform charging circuit voltage drop tests; determine necessary action
	Lighting Systems Diagnosis and Repair
1.	Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action.

Gauges, Warning Devices and Driver Information Systems Diagnosis and Repair	
1.	Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action.
2.	Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action.
COMPETENCIES FOR AUTOMOTIVE ATECH 112 -- 3 Credits (min. 11-P1's)	
General Engine Diagnosis	
1.	Identify and interpret engine performance concern; determine necessary action.
2.	Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins.
3.	Locate and interpret vehicle and major component identification numbers
4.	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.
5.	Perform cylinder cranking and running compression tests; determine necessary action.
6.	Perform cylinder leakage test; determine necessary action.
7.	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.
8.	Verify correct camshaft timing.
9.	Verify engine operating temperature; determine necessary action.
10.	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.
Computerized Engine Controls Diagnosis and Repair	
1.	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.
2.	Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.
3.	Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action.
4.	Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.
5.	Access and use service information to perform step-by-step diagnosis.
6.	Perform active tests of actuators using a scan tool; determine necessary action.
7.	Describe the importance of running all OBDII monitors for repair verification.
Ignition System Diagnosis and Repair	
1.	Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns ; determine necessary action.
2.	Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.
3.	Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.
Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair	
1.	Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems ; determine necessary action.
2.	Inspect and test fuel pumps and pump control systems for pressure, regulation and volume; perform necessary action.
3.	Verify idle control operation.
4.	Inspect and test fuel injectors.
5.	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action.
6.	Perform exhaust system back-pressure test; determine necessary action.

Emissions Control Systems Diagnosis and Repair	
1.	Diagnose emissions and driveability problems caused by malfunctions in the exhaust gas recirculation (EGR) system; determine necessary action.
2.	Inspect and test catalytic converter efficiency.
3.	Diagnose emissions and driveability problems resulting from malfunctions in the evaporative emissions control system; determine necessary action.
4.	Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.
5.	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.
Engine Related Service	
1.	Adjust valves on engines with mechanical or hydraulic lifters.
2.	Remove and replace timing belt; verify correct camshaft timing.
3.	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.
4.	Perform engine oil and filter change.
5.	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.
6.	Remove and replace thermostat and gasket/seal.
COMPETENCIES FOR AUTOMOTIVE ATECH 116 -- 2 Credits (min. 17-P1's)	
General Suspension and Steering Systems Diagnosis	
1.	Identify and interpret suspension and steering concern; determine necessary action.
2.	Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins.
3.	Locate and interpret vehicle and major component identification numbers .
Steering Systems Diagnosis and Repair	
1.	Disable and enable supplemental restraint system (SRS).
2.	Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring).
3.	Determine proper power steering fluid type; inspect fluid level and condition.
4.	Remove, inspect, replace, and adjust power steering pump belt.
5.	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.
Suspension Systems Diagnosis and Repair	
1.	Diagnose short and long arm suspension system noises, body sway, and uneven riding height concerns; determine necessary action.
2.	Diagnose strut suspension system noises, body sway, and uneven riding height concerns; determine necessary action.
3.	Remove, inspect, and install upper and/or lower ball joints.
4.	Remove, inspect, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.
5.	Inspect, remove, and replace shock absorbers.
6.	Remove, inspect, and service or replace front and rear wheel bearings.
Wheel Alignment Diagnosis, Adjustment, and Repair	
1.	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action.
2.	Perform prealignment inspection and measure vehicle ride height; perform necessary action.
3.	Prepare vehicle for wheel alignment on the alignment machine; perform four wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel.
4.	Check rear wheel thrust angle; determine necessary action.
Wheel and Tire Diagnosis and Repair	
1.	Inspect tire condition; identify tire wear patterns; check and adjust air pressure; determine necessary action.
2.	Rotate tires according to manufacturer's recommendations.
3.	Dismount, inspect, and remount tire on wheel; Balance wheel and tire assembly (static and dynamic).

4.	Reinstall wheel; torque lug nuts.
5.	Inspect tire and wheel assembly for air loss; perform necessary action.
6.	Repair tire using internal patch.
COMPETENCIES FOR AUTOMOTIVE ATECH 117 -- 2 Credits (min. 15-P1's)	
General Brake Systems Diagnosis	
1.	Identify and interpret brake system concern; determine necessary action.
2.	Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.
3.	Locate and interpret vehicle and major component identification numbers .
4.	Measure brake pedal height, travel, and free play (as applicable); determine necessary action.
5.	Check master cylinder for internal/external leaks and proper operation; determine necessary action.
6.	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
7.	Select, handle, store, and fill brake fluids to proper level.
8.	Bleed and/or flush brake system.
Hydraulic System Diagnosis and Repair	
1.	Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).
2.	Remove, bench bleed, and reinstall master cylinder.
3.	Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.
4.	Select, handle, store, and fill brake fluids to proper level.
5.	Bleed (manual, pressure, vacuum or surge) brake system.
Drum Brake Diagnosis and Repair	
1.	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.
2.	Remove, clean, inspect, and measure brake drums; determine necessary action.
3.	Refinish brake drum; measure final drum diameter.
4.	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
5.	Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings.
6.	Install wheel, torque lug nuts, and make final checks and adjustments.
Disc Brake Diagnosis and Repair	
1.	Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.
2.	Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing; determine necessary action.
3.	Clean and inspect caliper mounting and slides for wear and damage; determine necessary action.
4.	Remove, clean, and inspect pads and retaining hardware; determine necessary action.
5.	Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.
6.	Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation; determine necessary action
7.	Remove and reinstall rotor.
8.	Refinish rotor on vehicle; measure final rotor thickness.
9.	Refinish rotor off vehicle; measure final rotor thickness.
Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair	
1.	Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.
2.	Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust wheel bearings.
3.	Check parking brake and indicator light system operation; determine necessary action.
4.	Check operation of brake stop light system; determine necessary action.
5.	Remove and reinstall sealed wheel bearing assembly.

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6.	Inspect and replace wheel studs.
Antilock Brake and Traction Control Systems	
1.	Identify and inspect electronic brake control system components; determine necessary action.
2.	Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.
3.	Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).

Approved 9/18/09