

**AUTOMOTIVE TECHNOLOGY 1, 2, 3, 4**  
**ACTIVITY COURSE CODES: 6030, 6031, 6032, 6033**

**PROGRAM DESCRIPTION:** The Automotive Technology program is designed to prepare students to perform entry-level maintenance and repair tasks under the supervision of an experienced technician. Students will have the opportunity to obtain multiple ASE entry-level certifications, as well as other industry certifications.

**OBJECTIVE:** Given the necessary equipment, materials, and instruction, students, on completion of the prescribed course of study, will be able to successfully accomplish the following core competencies.

**COURSE CREDIT:** 540 hours minimum for  
MLR accredited program;  
program; 840 hours for  
AST program

**RESOURCES:** [S.C. Instructional Materials](#), beginning  
on pg. 98, also see Materials and  
Resources

**COMPUTER ACCESS:** 1 computer per student

**MAXIMUM ENROLLMENT:** 16 – 20 per instructor

**A. SHOP AND PERSONAL SAFETY**

**Effective automotive professionals know the academic subject matter, including safety as required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Identify general shop safety rules and procedures. P-1-3
2. Utilize safe procedures for handling of tools and equipment. P-1-3
3. Identify and use proper placement of floor jacks and jack stands. P-1-3
4. Identify and use proper procedures for safe lift operation. P-1-3
5. Utilize proper ventilation procedures for working within the lab/shop area. P-1-3
6. Identify marked safety areas. P-1-3
7. Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment. P-1-3
8. Identify the location and use of eye wash stations. P-1-3
9. Identify the location of the posted evacuation routes. P-1-3
10. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. P-1-3
11. Identify and wear appropriate clothing for lab/shop activities. P-1-3
12. Secure hair and jewelry for lab/shop activities. P-1-3
13. Demonstrate awareness of the safety aspects of supplemental restraint systems

(SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. P-1-3

14. Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.). P-1-3

15. Locate and demonstrate knowledge of material safety data sheets (MSDS). P-1-3

16. Successfully complete a written/online safety exam with a score of 100%. P-1-3

## **B. STUDENT ORGANIZATIONS**

**Effective professionals know the academic subject matter, including professional development, required for proficiency within their area. They will use this knowledge as needed in their role. The following accountability criteria are considered essential for students in any program of study.**

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

## **C. TECHNOLOGY KNOWLEDGE**

**Effective professionals know the academic subject matter, including digital citizenship the ethical use of technology and as needed in their role. The following accountability criteria are considered essential for students in any program of study.**

1. Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation (e.g., keying speed).
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., cyberbullying, piracy; illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).
5. Discuss legal issues and the terms of use related to copyright laws, fair use laws, and ethics pertaining to downloading of images, photographs, documents, video, sounds, music, trademarks, Creative Commons, and other elements for personal use.
6. Describe ethical and legal practices of safeguarding the confidentiality of business- and personal-related information.

7. Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks.
8. Evaluate various solutions to common hardware and software problems.

#### **D. PERSONAL QUALITIES AND EMPLOYABILITY SKILLS**

**Effective professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in any program of study.**

1. Demonstrate punctuality.
2. Demonstrate self-representation.
3. Demonstrate work ethic.
4. Demonstrate respect.
5. Demonstrate time management.
6. Demonstrate integrity.
7. Demonstrate leadership.
8. Demonstrate teamwork and collaboration.
9. Demonstrate conflict resolution.
10. Demonstrate perseverance.
11. Demonstrate commitment.
12. Demonstrate a healthy view of competition.
13. Demonstrate a global perspective.
14. Demonstrate health and fitness.
15. Demonstrate self-direction.
16. Demonstrate lifelong learning.

#### **E. PROFESSIONAL KNOWLEDGE**

**Effective professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in any program of study.**

1. Demonstrate effective speaking and listening skills.
2. Demonstrate effective reading and writing skills.
3. Demonstrate mathematical reasoning.
4. Demonstrate job-specific mathematics skills.
5. Demonstrate critical-thinking and problem-solving skills.
6. Demonstrate creativity and resourcefulness.
7. Demonstrate an understanding of business ethics.
8. Demonstrate confidentiality.
9. Demonstrate an understanding of workplace structures, organizations, systems, and climates.
10. Demonstrate diversity awareness.
11. Demonstrate job acquisition and advancement skills.

12. Demonstrate task management skills.
13. Demonstrate customer-service skills.

## **F. TOOLS AND EQUIPMENT**

**Effective automotive professionals demonstrate how to safely use various tools and equipment as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Identify tools and their usage in automotive applications. P-1
2. Identify standard and metric designation. P-1
3. Demonstrate safe handling and use of appropriate tools. P-1
4. Demonstrate proper cleaning, storage, and maintenance of tools and equipment. P-1
5. Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper). P-1

## **G. PREPARING VEHICLE FOR SERVICE AND RETURN TO CUSTOMER**

**Effective automotive professionals demonstrate how to prepare a vehicle for service and return to customer as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Identify information needed and the service requested on a repair order. P-1
2. Identify purpose and demonstrate proper use of fender covers, mats. P-1
3. Demonstrate use of the three C's (concern, cause, and correction). P-1
4. Review vehicle service history. P-1
5. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1
6. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.). P-1

## **H. GENERAL ENGINE REPAIR**

**Effective automotive professionals demonstrate general engine repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Verify operation of the instrument panel engine warning indicators. P-1
3. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. P-1
4. Install engine covers using gaskets, seals, and sealers as required. P-1
5. Verify engine mechanical timing. P-2
6. Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. P-1

7. Identify service precautions related to service of the internal combustion engine of a hybrid vehicle. P-2

## **I. ENGINE REPAIR: CYLINDER HEAD AND VALVE TRAIN**

**Effective automotive professionals demonstrate how to repair cylinder heads and valve trains as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Adjust valves (mechanical or hydraulic lifters). P-3
2. Identify components of the cylinder head and valve train. P-1

## **J. ENGINE REPAIR: LUBRICATION AND COOLING SYSTEMS**

**Effective automotive professionals demonstrate lubrication and cooling systems repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core, and galley plugs; determine necessary action. P-1
2. Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. P-1
3. Remove, inspect, and replace thermostat and gasket/seal. P-1
4. Inspect and test coolant; drain and recover coolant; flush and refill cooling system; use proper fluid type per manufacturer specification; bleed air as required. P-1
5. Perform engine oil and filter change; use proper fluid type per manufacturer specification; reset maintenance reminder as required. P-1
6. Identify components of the lubrication and cooling systems. P-1

## **K. GENERAL AUTOMATIC TRANSMISSION AND TRANSAXLE**

**Effective automotive professionals demonstrate general automatic transmission and transaxle repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Check fluid level in a transmission or a transaxle equipped with a dip-stick. P-1
3. Check fluid level in a transmission or a transaxle not equipped with a dip-stick. P-1
4. Check transmission fluid condition; check for leaks. P-2
5. Identify drive train components and configuration. P-1

## **L. IN-VEHICLE TRANSMISSION/TRANSAXLE**

**Effective automotive professionals demonstrate in-vehicle automatic transmission**

**and transaxle repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Inspect, adjust, and/or replace external manual valve shift linkage, transmission range sensor/switch, and/or park/neutral position switch. P-2
2. Inspect for leakage at external seals, gaskets, and bushings. P-1
3. Inspect, replace and/or align power train mounts. P-2
4. Drain and replace fluid and filter(s); use proper fluid type per manufacturer specification. P-1

#### **M. OFF-VEHICLE TRANSMISSION AND TRANSAXLE**

**Effective automotive professionals demonstrate off-vehicle automatic transmission and transaxle repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Describe the operational characteristics of a continuously variable transmission (CVT). (P-3)
2. Describe the operational characteristics of a hybrid vehicle drive train. (P-3)

#### **N. GENERAL MANUAL DRIVE TRAIN AND AXLES DIAGNOSIS AND REPAIR**

**Effective automotive professionals demonstrate general manual drive train and axles repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Drain and refill manual transmission/transaxle and final drive unit; use proper fluid type per manufacturer specification. P-1
3. Check fluid condition; check for leaks. P-2
4. Identify manual drive train and axle components and configuration. P-1

#### **O. MANUAL DRIVE CHAIN: CLUTCHES**

**Effective automotive professionals demonstrate manual drive train clutches repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Check and adjust clutch master cylinder fluid level; use proper fluid type per manufacturer specification. P-1
2. Check for hydraulic system leaks. P-1

#### **P. MANUAL DRIVE TRAIN: TRANSMISSION/TRANSAXLE**

**Effective automotive professionals demonstrate manual drive train**

**transmission/transaxle repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Describe the operational characteristics of an electronically-controlled manual transmission/transaxle. P-2

**Q. MANUAL DRIVE TRAIN: DRIVE SHAFT, HALF SHAFTS, UNIVERSAL JOINTS AND CONSTANT-VELOCITY (CV) JOINTS (FRONT, REAR, ALL, AND FOUR- WHEEL DRIVE)**

**Effective automotive professionals demonstrate manual drive train for front, rear, all, and four-wheel drive engines repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Inspect, remove, and/or replace bearings, hubs, and seals. P-2
2. Inspect, service, and/or replace shafts, yokes, boots, and universal/CV joints. P-2
3. Inspect locking hubs. P-3
4. Check for leaks at drive assembly and transfer case seals; check vents; check fluid level; use proper fluid type per manufacturer specification. P-2

**R. MANUAL DRIVE TRAIN: DIFFERENTIAL CASE ASSEMBLY**

**Effective automotive professionals demonstrate manual drive train transmission/transaxle repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Clean and inspect differential case; check for leaks; inspect housing vent. P-1
2. Check and adjust differential case fluid level; use proper fluid type per manufacturer specification. P-1
3. Drain and refill differential housing. P-1
4. Inspect and replace drive axle wheel studs. P-1

**S. GENERAL SUSPENSION AND STEERING SYSTEMS**

**Effective automotive professionals demonstrate general suspension and steering system repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Disable and enable supplemental restraint system (SRS); verify indicator lamp operation. P-1
3. Identify suspension and steering system components and configurations. P-1

## **T. RELATED SUSPENSION AND STEERING SERVICE DIAGNOSIS AND REPAIR**

**Effective automotive professionals demonstrate related suspension and steering system repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots. P-1
2. Inspect power steering fluid level and condition. P-1
3. Flush, fill, and bleed power steering system; use proper fluid type per manufacturer specification. P-2
4. Inspect for power steering fluid leakage. P-1
5. Remove, inspect, replace, and/or adjust power steering pump drive belt. P-1
6. Inspect and replace power steering hoses and fittings. P-2
7. Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm, mountings, and steering linkage damper. P-1
8. Inspect tie rod ends (sockets), tie rod sleeves, and clamps. P-1
9. Inspect upper and lower control arms, bushings, and shafts. P-1
10. Inspect and replace rebound bumpers. P-1
11. Inspect track bar, strut rods/radius arms, and related mounts and bushings. P-1
12. Inspect upper and lower ball joints (with or without wear indicators). P-1
13. Inspect suspension system coil springs and spring insulators (silencers). P-1
14. Inspect suspension system torsion bars and mounts. P-1
15. Inspect and/or replace front/rear stabilizer bar (sway bar) bushings, brackets, and links. P-1
16. Inspect, remove, and/or replace strut cartridge or assembly; inspect mounts and bushings. P-2
17. Inspect front strut bearing and mount. P-1
18. Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms. P-1
19. Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts. P-1
20. Inspect, remove, and/or replace shock absorbers; inspect mounts and bushings. P-1
21. Inspect electric power steering assist system. P-2
22. Identify hybrid vehicle power steering system electrical circuits and safety precautions. P-2
23. Describe the function of suspension and steering control systems and components, (i.e. active suspension, and stability control). P-3

## **U. SUSPENSION AND STEERING: WHEEL ALIGNMENT**

**Effective automotive professionals demonstrate wheel alignment repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Perform pre-alignment inspection; measure vehicle ride height. P-1

2. Describe alignment angles (camber, caster and toe). P-1

## **V. SUSPENSION AND STEERING: WHEELS AND TIRES**

**Effective automotive professionals demonstrate wheel and tire repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Inspect tire condition; identify tire wear patterns; check for correct tire size, application (load and speed ratings), and air pressure as listed on the tire information placard/label. P-1
2. Rotate tires according to manufacturer's recommendations including vehicles equipped with tire pressure monitoring systems (TPMS). P-1
3. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly. P-1
4. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. P-1
5. Inspect tire and wheel assembly for air loss; determine necessary action. P-1
6. Repair tire following vehicle manufacturer approved procedure. P-1
7. Identify indirect and direct tire pressure monitoring systems (TPMS); calibrate system; verify operation of instrument panel lamps. P-2
8. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system (TPMS) including relearn procedure. P-1

## **W. GENERAL BRAKE SYSTEMS**

**Effective automotive professionals demonstrate general brake systems diagnostic skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Describe procedure for performing a road test to check brake system operation including an anti-lock brake system (ABS). P-1
3. Install wheel and torque lug nuts. P-1
4. Identify and Interpret brake system concerns; determine needed action. P-1

## **X. BRAKES: HYDRAULIC SYSTEMS**

**Effective automotive professionals demonstrate hydraulic brake systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Describe proper brake pedal height, travel, and feet. P-1
2. Check master cylinder for external leaks and proper operation. P-1
3. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, and loose fittings/supports. P-1

4. Select, handle, store, and fill brake fluids to proper level; use proper fluid type per manufacturer specification. P-1
5. Identify components of hydraulic brake warning light system. P-3
6. Bleed and/or flush brake system. P-1
7. Test brake fluid for contamination. P-1

## **Y. DRUM BRAKES**

**Effective automotive professionals demonstrate drum brake diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Remove, clean, and inspect brake drum; measure brake drum diameter; determine serviceability. P-1
2. Refinish brake drum and measure final drum diameter; compare with specification. P-1
3. Remove, clean, inspect, and/or replace brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. P-1
4. Inspect wheel cylinders for leaks and proper operation; remove and replace as needed. P-2
5. Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments. P-1

## **Z. DISC BRAKES**

**Effective automotive professionals demonstrate disc brake diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Remove and clean caliper assembly; inspect for leaks, damage, and wear; determine needed action. P-1
2. Inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.
3. Remove and inspect, and/or replace brake pads and retaining hardware; determine necessary action. P-1
4. Lubricate and reinstall caliper, brake pads, and related hardware; seat brake pads; inspect for leaks. P-1
5. Clean and inspect rotor and mounting surface; measure rotor thickness, thickness variation, and lateral runout; determine needed action. P-1
6. Remove and reinstall/replace rotor. P-1
7. Refinish rotor on vehicle; measure final rotor thickness and compare with specification. P-1
8. Retract and re-adjust caliper piston on an integrated parking brake system. P-2
9. Check brake pad wear indicator; determine needed action. P-1
10. Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations. P-1

## **AA. BRAKES: POWER-ASSIST UNITS**

**Effective automotive professionals demonstrate power assist units diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Check brake pedal travel with and without engine running to verify proper power booster operation. P-2
2. Identify components of the brake power assist system (vacuum and hydraulic); check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster. P-1

## **BB. BRAKES: RELATED SYSTEMS (I.E. WHEEL BEARINGS, PARKING BRAKES, ELECTRICAL)**

**Effective automotive professionals demonstrate brakes-related systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings. P-1
2. Check parking brake system components for wear, binding, and corrosion; clean, lubricate, adjust and/or replaced as needed. P-2
3. Check parking brake operation and parking brake indicator light system operation; determine needed action. P-1
4. Check operation of brake stop light system. P-1
5. Replace wheel bearing and race. P-2
6. Inspect and replace wheel studs. P-1

## **CC. BRAKES: ELECTRONIC BRAKE, TRACTION CONTROL (TCS), STABILITY CONTROL (ESC) SYSTEMS**

**Effective automotive professionals demonstrate electronic brakes, traction, and stability control systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Identify traction control/vehicle stability control system components. P-3
2. Describe the operation of a regenerative braking system. P-3

## **DD. GENERAL ELECTRICAL/ELECTRONIC SYSTEMS**

**Effective automotive professionals demonstrate general electrical/electronic systems diagnostic and repair skills as needed in their role. The following**

**accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Research vehicle service information including vehicle service history, service precautions, and technical service bulletins. P-1
2. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law). P-1
3. Use wiring diagrams to trace electrical/electronic circuits. P-1
4. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance. P-1
5. Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. P-1
6. Use a test light to check operation of electrical circuits. P-2
7. Use fused jumper wires to check operation of electrical circuits. P-2
8. Measure key-off battery drain (parasitic draw). P-1
9. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. P-1
10. Repair and/or replace connectors, terminal ends, and wiring of electrical/electronic systems (including solder repair) P-1
11. Identify electrical/electronic system components and configuration. P-1

#### **EE. ELECTRICAL/ELECTRONIC SYSTEMS: BATTERY SERVICE**

**Effective automotive professionals demonstrate battery service diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Perform battery state-of-charge test; determine necessary action. P-1
2. Confirm proper battery capacity for vehicle application; perform battery capacity and load test; determine necessary action. P-1
3. Maintain or restore electronic memory functions. P-1
4. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. P-1
5. Perform slow/fast battery charge according to manufacturer's recommendations. P-1
6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. P-1
7. Identify safety precautions for high voltage systems on electric, hybrid-electric, and diesel vehicles. P-2
8. Identify electrical/electronic modules, security systems, radios, and other accessories that require re-initialization or code entry after reconnecting vehicle battery. P-1
9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. P-2

## **FF. ELECTRICAL/ELECTRONIC SYSTEMS: STARTING SYSTEMS**

**Effective automotive professionals demonstrate starting system diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Perform starter current draw test; determine necessary action. P-1
2. Perform starter circuit voltage drop tests; determine necessary action. P-1
3. Inspect and test starter relays and solenoids; determine necessary action. P-2
4. Remove and install starter in a vehicle. P-1
5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action. P-2
6. Demonstrate knowledge of an automatic idle-stop/start-stop system. P-3

## **GG. ELECTRICAL/ELECTRONIC SYSTEMS: CHARGING SYSTEM**

**Effective automotive professionals demonstrate charging system diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Perform charging system output test; determine necessary action. P-1
2. Inspect, adjust, and/or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment. P-1
3. Remove, inspect, and/or replace generator (alternator). P-2
4. Perform charging circuit voltage drop tests; determine necessary action. P-2

## **HH. ELECTRICAL/ELECTRONIC SYSTEMS: LIGHTING, INSTRUMENT CLUSTER, DRIVER INFORMATION, AND BODY ELECTRICAL SYSTEMS**

**Effective automotive professionals demonstrate body electrical systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. P-1
2. Aim headlights. P-2
3. Identify system voltage and safety precautions associated with high-intensity discharge headlights. P-2
4. Disable and enable supplemental restraint system (SRS); verify indicator lamp operation. P-2
5. Remove and reinstall door panel. P-1
6. Describe the operation of keyless entry/remote-start systems. P-3
7. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. P-1
8. Verify windshield wiper and washer operation; replace wiper blades. P-1

## **II. GENERAL HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)**

**Effective automotive professionals demonstrate general heating, ventilation, and air conditioning diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Research vehicle service information, including refrigerant/oil type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Identify heating, ventilation and air conditioning (HVAC) components and configuration. P-1

### **JJ. HVAC: REFRIGERATION SYSTEM COMPONENTS**

**Effective automotive professionals demonstrate refrigeration system components diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Inspect and replace A/C compressor drive belts, pulleys, and tensioners; visually inspect A/C components for signs of leaks; determine necessary action. P-1
2. Identify hybrid vehicle A/C system electrical circuits and the service/safety precautions. P-2
3. Inspect A/C condenser for airflow restrictions; determine necessary action. P-1

### **KK. HVAC: HEATING, VENTILATION, AND ENGINE COOLING SYSTEMS**

**Effective automotive professionals demonstrate heating, ventilation, and engine cooling systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Inspect engine cooling and heater systems hoses and pipes; determine necessary action. P-1

### **LL. HVAC: OPERATING SYSTEMS AND RELATED CONTROLS**

**Effective automotive professionals demonstrate HVAC operating systems and related controls diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; determine necessary action.

2. Identify the source of A/C system odors.

## **MM. GENERAL ENGINE PERFORMANCE**

**Effective automotive professionals demonstrate general engine performance diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Perform engine absolute manifold pressure tests (vacuum/boost); document results. P-2
3. Perform cylinder power balance test; document results. P-2
4. Perform cylinder cranking and running compression tests; document results. P-2
5. Perform cylinder leakage test; document results. P-2
6. Verify engine operating temperature. P-1
7. Remove and replace spark plugs; inspect secondary ignition components for wear and damage. P-1

## **NN. COMPUTERIZED CONTROLS**

**Effective automotive professionals demonstrate engine performance, computerized controls, diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Retrieve and record diagnostic trouble codes (DTC), OBD monitor status, and freeze frame data; clear codes when applicable. P-1
2. Describe the use of the OBD monitors for repair verification. P-1

## **OO. FUEL, AIR INDUCTION, AND EXHAUST SYSTEMS**

**Effective automotive professionals demonstrate engine performance, fuel, air induction, and exhaust, systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Replace fuel filter(s) where applicable. P-2
2. Inspect, service, or replace air filters, filter housings, and intake duct work. P-1
3. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action. P-1
4. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; determine necessary action. P-1
5. Check and refill diesel exhaust fluid (DEF). P-2

## **PP. EMISSIONS CONTROL SYSTEMS**

**Effective automotive professionals demonstrate engine performance, emissions control systems diagnostic and repair skills as needed in their role. The following accountability criteria are considered essential for students in the Automotive Technology program of study.**

1. Inspect, test, and service positive crankcase ventilation (PCV) filter/breather, valve, tubes, orifices, and hoses; perform necessary action. P-2

[Course Academic Standards and Indicators](#)

[Additional Materials/Resources](#)