Arkansas CTE

Automotive Suspension and Steering: Grades 9, 10, 11, 12

Adopted 2013

Identify and demonstrate workplace safety

1.1 Students will be able to identify and demonstrate safe work practices.

1. Identify general shop safety rules and procedures. 1.1.1
2. Utilize safe procedures for handling of tools and equipment. 1.1.2
3. Identify and use proper placement of floor jacks and jack stands. 1.1.3
4. Identify and use proper procedures for safe lift operation. 1.1.4
5. Utilize proper ventilation procedures for working within the lab/shop area. 1.1.5
6. Identify marked safety areas. 1.1.6
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. 1.1.7

1.2 Students will be able to practice personal safety.

1. Identify the location and use of eye wash stations. 1.2.1
2. Identify the location of the posted evacuation routes. 1.2.2
3. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. 1.2.3
4. Identify and wear appropriate clothing for lab/shop activities. 1.2.4
5. Secure hair and jewellery for lab/shop activities. 1.2.5
6. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. 1.2.6
7. Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.). 1.2.7
8. Locate and demonstrate knowledge of material safety data sheets (MSDS). 1.2.8

Demonstrate proper usage of tools and equipment

2.1 Student will demonstrate knowledge of shop tools and equipment.

1. Identify tools and their usage in automotive applications. 2.1.1
2. Identify standard and metric designation. 2.1.2
3. Demonstrate safe handling and use of appropriate tools. 2.1.3

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4. Demonstrate proper cleaning, storage, and maintenance of tools and equipment. 2.1.4
5. Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper). 2.1.5

Develop employability/leadership skills

3.1 Student will demonstrate employability skills.

1. Demonstrate a good work ethic (i.e., relations with other, dependability, attitude, and personal hygiene). 3.1.1
2. Demonstrate teamwork. 3.1.2
3. Demonstrate job-seeking techniques (i.e., write a resume, search for a job, arrange references, and apply interview techniques) 3.1.3
4. Describe legal issues of sexual harassment in the workplace. 3.1.4
5. Identify employment eligibility requirements (e.g. valid driver's license, background check etc.) 3.1.5

3.2 Student will demonstrate leadership skills.

1. Perform basic parliamentary procedures in a group meeting. 3.2.1
2. Demonstrate an understanding of one's personal values, interpersonal skills, etiquette, effectiveness in oral and written communication and courtesy. Develop and maintain a code of professional ethics. 3.2.2
3. Maintain a good professional appearance. 3.2.3
4. Perform basic tasks related to securing and terminating employees. 3.2.4

Diagnose and repair suspension and steering system

4.1 Student will demonstrate initial Suspension and Steering System repair and diagnostic procedures.

1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. 4.1.1
2. Disable and enable supplemental restraint system (SRS). 4.1.2

4.2 Student will demonstrate ability to repair Steering systems.

1. Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots. 4.2.1
2. Determine proper power steering fluid type; inspect fluid level and condition. 4.2.2
3. Flush, fill, and bleed power steering system. 4.2.3
4. Inspect for power steering fluid leakage; determine necessary action. 4.2.4
5. Remove, inspect, replace, and adjust power steering pump drive belt. 4.2.5
6. Inspect and replace power steering hoses and fittings. 4.2.6
7. Replace power steering pump filter(s). 4.2.7

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8. Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. 4.2.8
9. Inspect electric power-assisted steering. 4.2.9
10. Identify hybrid vehicle power steering system electrical circuits and safety precautions. 4.2.10
11. Describe the operation of the power steering pressure switch. 4.2.11

Diagnose and repair front suspension system

5.1 Student will demonstrate initial diagnostic and repair of Front Suspension System.

1. Inspect tie rod ends (sockets), tie rod sleeves, and clamps. 5.1.1
2. Inspect upper and lower control arms, bushings, and shafts. 5.1.2
3. Inspect and replace rebound and jounce bumpers. 5.1.3
4. Inspect track bar, strut rods/radius arms, and related mounts and bushings. 5.1.4
5. Inspect upper and lower ball joints (with or without wear indicators). 5.1.5
6. Inspect suspension system coil springs and spring insulators (silencers). 5.1.6
7. Inspect suspension system torsion bars and mounts. 5.1.7
8. Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links. 5.1.8
9. Inspect strut cartridge or assembly. 5.1.9
10. Inspect front strut bearing and mount. 5.1.10

Diagnose and repair rear suspension system

6.1 Student will demonstrate initial diagnostic procedures for rear suspension.

1. Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms. 6.1.1
2. Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts. 6.1.2
3. Inspect, remove, and replace shock absorbers; inspect mounts and bushings. 6.1.3

Diagnose and repair tire and wheel assembly

7.1 Student will demonstrate initial diagnostic and repair procedures for Tire and Wheel Assembly.

1. Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action. 7.1.1
2. Rotate tires according to manufacturer's recommendations. 7.1.2
3. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). 7.1.3

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4. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. 7.1.4
5. Inspect tire and wheel assembly for air loss; perform necessary action. 7.1.5
6. Repair tire using internal patch. 7.1.6
7. Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps. 7.1.7
8. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. 7.1.8

7.2 Student will demonstrate initial diagnostic and repair procedures for Wheel Alignment.

1. Perform pre-alignment inspection and measure vehicle ride height; determine necessary action. 7.2.1

Diagnose and repair automatic transmission and transaxle

8.1 Student will demonstrate initial diagnostic and repair procedures for Automatic Transmission and Transaxle.

1. Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins 8.1.1
2. Check fluid level in a transmission or a transaxle equipped with a dip-stick. 8.1.2
3. Check fluid level in a transmission or a transaxle not equipped with a dip-stick. 8.1.3
4. Check transmission fluid condition; check for leaks. 8.1.4

8.2 Student will demonstrate initial diagnostic and repair procedures for In-Vehicle Transmission/Transaxle.

1. Inspect, adjust, and replace external manual valve shift linkage, transmission rangesensor/switch, and park/neutral position switch. 8.2.1
2. Inspect for leakage at external seals, gaskets, and bushings. 8.2.2
3. Inspect power train mounts. 8.2.3
4. Drain and replace fluid and filter(s). 8.2.4

8.3 Student will demonstrate initial diagnostic and repair procedures for Off-Vehicle Transmission/Transaxle.

1. Describe the operational characteristics of a continuously variable transmission (CVT). 8.3.1
2. Describe the operational characteristics of a hybrid vehicle drive train. 8.3.2

Prepare vehicle for service

9.1 Student will be able to prepare vehicle for service.

1. Identify information needed and the service requested on a repair order. 9.1.1
2. Identify purpose and demonstrate proper use of fender covers, mats 9.1.2
3. Demonstrate use of the three C's (concern, cause, and correction). 9.1.3

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4. Review vehicle service history. 9.1.4
5. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. 9.1.5

9.2 Student will be able to prepare vehicle for customer.

1. Ensure vehicle is prepared to return to customer per school or company policy (floor mats, steering wheel cover, etc.). 9.2.1