Diesel Suspension and Steering-570046

This course is designed to provide students with in-depth knowledge and skills for servicing diesel suspension and steering systems. Safety and proper tool use are emphasized throughout this course. Specific topics include diagnostic and repair of steering systems, suspension systems, wheel alignment, adjustment, wheel and tire maintenance, and frames. As part of this course, students participate in servicing activities associate with suspension and steering systems. This course must follow the guidelines and standards set fort by Automotive Service Excellence (ASE) and National Automotive Technicians Education Foundation (NATEF) minimum standards. Workplace Employability Skills Task lists should be incorporated into the diesel Program.

Career and technical student organizations are integral, co-curricular components of each career and technical education course. These organizations serve as a means to enhance classroom instruction while helping students develop leadership abilities, expand workplace-readiness skills, and broaden opportunities for personal and professional growth.

Safety

**Students will:**

1. Identify and practice general shop safety rules and procedures.
   - Utilizing safe procedures for handling of tools and equipment.
   - Identifying and using proper placement of floor jacks and jack stands.
   - Identifying and using proper procedures for safe lift operation.
   - Utilizing proper ventilation procedures for working within the lab/shop area.
   - Identifying marked safety areas.
   - Identifying the location and the types of fire extinguishers and other fire safety equipment.
   - Demonstrating knowledge of the procedures for using fire extinguishers and other fire safety equipment.
   - Identifying the location and use of eye wash stations.
   - Identifying the location of the posted evacuation routes.
   - Complying with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
   - Identifying and wearing appropriate clothing for lab/shop activities.
   - Securing hair and removing jewelry for lab/shop activities.
   - Demonstrating awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.
   - Demonstrating awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).
   - Locating and demonstrating knowledge of material safety data sheets (MSDS).

Tools and Equipment

2. Identify tools and their usage in automotive applications.
• Identifying standard and metric designation.
• Demonstrating safe handling and use of appropriate tools.
• Demonstrating proper cleaning, storage, and maintenance of tools and equipment.
• Demonstrating proper use of precision measuring tools
  Examples: micrometer, dial-indicator, dial-caliper

**Steering Column**

3. Identify causes of fixed and driver adjustable steering column and shaft noise, looseness, and binding problems; determine needed action.

4. Inspect and service steering shaft U-joint(s), slip joints, bearings, bushings, and seals; phase shaft.

5. Check cab mounting and adjust ride height.

6. Remove the steering wheel (includes steering wheels equipped with electrical/electronic controls and components); install and center the steering wheel. Inspect, test, replace and calibrate steering angle sensor.

7. Disable and enable supplemental restraint system (SRS) in accordance with manufacturers’ procedures.

**Steering Units**

8. Identify causes of power steering system noise, steering binding, darting/oversteer, reduced wheel cut, steering wheel kick, pulling, non-recovery, turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems; determine needed action.

9. Determine recommended type of power steering fluid; check level and condition; determine needed action.

10. Flush and refill power steering system; purge air from system.

11. Perform power steering system pressure, temperature, and flow tests; determine needed action.

12. Inspect, service, or replace power steering reservoir including filter, seals, and gaskets.

13. Inspect power steering pump drive gear and coupling; replace as needed.

14. Inspect, adjust, or replace power steering pump, mountings, and brackets.

15. Inspect and replace power steering system cooler, lines, hoses, clamps/mountings, hose routings, and fittings.

16. Inspect, adjust, repair, or replace integral type power steering gear(s) (single and/or dual) and mountings.
**Steering Linkage**

17. Inspect and align pitman arm; replace as needed.

18. Check and adjust steering (wheel) stops; verify relief pressures.

19. Inspect and lubricate steering components.

**Suspension Systems**

20. Inspect front axles and attaching hardware; determine needed action.

21. Inspect and service kingpins, steering knuckle bushings, locks, bearings, seals, and covers; determine needed action.

22. Inspect shock absorbers, bushings, brackets, and mounts; replace as needed.

23. Inspect leaf springs, center bolts, clips, pins and bushings, shackles, U-bolts, insulators, brackets, and mounts; determine needed action.

24. Inspect axle aligning devices such as radius rods, track bars, stabilizer bars, torque arms, related bushings, mounts, shims, and cams; determine needed action.

25. Inspect tandem suspension equalizer components; determine needed action.

26. Inspect and test air suspension pressure regulator and height control valves, lines, hoses, dump valves, and fittings; adjust, repair or replace as needed.

27. Inspect air springs, mounting plates, springs, suspension arms, and bushings; replace as needed.

28. Measure and adjust ride height; determine needed action.

29. Identify rough ride problems; determine needed action.

**Wheel Alignment Diagnosis, Adjustment and repair**

30. Identify causes of vehicle wandering, pulling, shimmy, hard steering, and off-center steering wheel problems; adjust or repair as needed.

31. Check camber; determine needed action.

32. Check caster; adjust as needed.

33. Check and adjust toe settings.

34. Check rear axle(s) alignment (thrustline/centerline) and tracking; adjust or repair as needed.

35. Identify turning/Ackerman angle (toe-out-on-turns) problems; determine needed action.

36. Check front axle alignment (centerline); adjust or repair as needed.
Wheels and Tires
37. Identify tire wear patterns; check tread depth and pressure determine needed action.

38. Identify wheel/tire vibration, shimmy, pounding, hop (tramp) problems; determine needed action.

39. Remove and install steering and drive axle wheel/tire assemblies; torque mounting hardware to specifications with torque wrench.

39. Inspect tire for proper application, (size, load range, position, and tread design); determine needed action.

40. Inspect wheel/rims for proper application, hand hold alignment, load range, size, and design; determine needed action.

41. Check operation of tire pressure monitoring system (TPMS); determine needed action if applicable.

Frame and Coupling Devices
42. Inspect, service, and/or adjust fifth wheel, pivot pins, bushings, locking mechanisms, and mounting hardware.

43. Inspect and service sliding fifth wheel, tracks, stops, locking systems, air cylinders, springs, lines, hoses, and controls.

44. Inspect frame and frame members for cracks, breaks, corrosion, distortion, elongated holes, looseness, and damage; determine needed repairs.

45. Inspect, install, or repair frame hangers, brackets, and cross members in accordance with manufacturers’ recommended procedures.

46. Inspect, repair, or replace pintle hooks and draw bars, if applicable.