

# Dakota County Technical College

## **ASEP 2107: Steering and Suspension**

### **A. COURSE DESCRIPTION**

Credits: 2

Lecture Hours/Week: 1

Lab Hours/Week: 1

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course covers the principles of operation, removal, reconditioning, installation, and adjustments of GM steering and suspension systems. It includes comprehensive training on power/manual steering gears, power/manual rack and pinion systems, suspension repairs, wheel alignment, wheel balance, and vibration diagnosis. Prerequisites: None

**B. COURSE EFFECTIVE DATES:** 03/16/1998 - Present

**C. OUTLINE OF MAJOR CONTENT AREAS**

## **D. LEARNING OUTCOMES (General)**

1. Comply with personal and environmental safety practices
2. Identify and interpret suspension and steering concern; determine necessary action
3. Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins
4. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals)
5. Disable and enable supplemental restraint system (SRS)
6. Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring)
7. Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action
8. Diagnose power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action
9. Diagnose power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action
10. Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action
11. Adjust manual or power non-rack and pinion worm bearing preload and sector lash
12. Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets
13. Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots
14. Inspect power steering fluid levels and condition
15. Flush, fill, and bleed power steering system
16. Diagnose power steering fluid leakage; determine necessary action
17. Remove, inspect, replace, and adjust power steering pump belt
18. Remove and reinstall power steering pump
19. Remove and reinstall power steering pump pulley; check pulley and belt alignment
20. Inspect and replace power steering hoses and fittings
21. Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper
22. Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps
23. Test and diagnose components of electronically controlled steering systems using a scan tool; determine necessary action
24. Diagnose short and long arm suspension system noises, body sway, and uneven riding height concerns; determine necessary action
25. Diagnose strut suspension system noises, body sway, and uneven riding height concerns; determine necessary action
26. Remove, inspect, and install upper and lower control arms, bushings, shafts, and rebound bumpers
27. Remove, inspect and install strut rods (compression/tension) and bushings
28. Remove, inspect, and install upper and/lower ball joints
29. Remove, inspect, and install steering knuckle assemblies
30. Remove, inspect, and install short and long arm suspension system coil springs and spring insulators
31. Remove, inspect, install, and adjust suspension system torsion bars; inspect mounts
32. Remove, inspect, and install stabilizer bar bushings, brackets, and links
33. Remove, inspect, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount
34. Lubricate suspension and steering systems

35. Remove, inspect, and install coil springs and spring insulators
36. Remove, inspect, and install transverse links, control arms, bushings, and mounts
37. Remove, inspect, and install leaf springs, leaf spring insulators (silencers), shackles, brackets, bushings, and mounts
38. Remove, inspect, and install strut cartridge or assembly, strut coil spring, and insulators (silencers)
39. Inspect, remove, and replace shock absorbers
40. Remove, inspect, and service or replace front and rear wheel bearings
41. Test and diagnose components of electronically controlled suspension systems using a scan tool; determine necessary action
42. Differentiate between steering and suspension concerns using principles of steering geometry (caster, camber, toe, etc.)
43. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action
44. Perform pre-alignment inspection; perform necessary action
45. Measure vehicle riding height; determine necessary action
46. Check and adjust front and rear wheel camber; perform necessary action
47. Check and adjust caster; perform necessary action
48. Check and adjust front wheel toe; adjust as needed
49. Center steering wheel
50. Check toe-out-on-turns (turning radius); determine necessary action
51. Check SAI (steering axis inclination) and include angle; determine necessary action
52. Check and adjust rear wheel toe
53. Check rear wheel thrust angle; determine necessary action
54. Check for front wheel setback; determine necessary action
55. Check front cradle (sub frame) alignment; determine necessary action
56. Diagnose tire wear patterns; determine necessary action
57. Inspect tires; check and adjust air pressure
58. Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action
59. Rotate tires according to manufacturer's recommendations
60. Measure wheel, tire, axle, and hub run out; determine necessary action
61. Diagnose tire pull (lead) problem; determine necessary action
62. Balance wheel and tire assembly (static and dynamic)
63. Dismount, inspect, repair, and remount tire on wheel
64. Reinstall wheel; torque lug nuts
65. Inspect and repair tire

#### **E. Minnesota Transfer Curriculum Goal Area(s) and Competencies**

None

#### **F. LEARNER OUTCOMES ASSESSMENT**

As noted on course syllabus

#### **G. SPECIAL INFORMATION**

None noted