

# Dakota County Technical College

## AUTM 2011: Suspension, Steering and Alignment

### A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 1

Lab Hours/Week: 2

OJT Hours/Week: \*.\*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course teaches suspension systems using leaf springs, coil springs, McPherson struts, and torsion bars. Steering systems using manual and power rack and pinion, recirculating ball steering gears. Alignment angles and their relationship to vehicle handling. Prerequisites: AUTM2100

**B. COURSE EFFECTIVE DATES:** 06/01/2010 - Present

**C. OUTLINE OF MAJOR CONTENT AREAS**

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

1. Adjust manual or power non-rack-and-pinion worm bearing preload and sector lash
2. Check SAI (steering axis inclination) and included angle; determine necessary action
3. Check and adjust caster; perform necessary action
4. Check and adjust front and rear wheel camber; perform necessary action
5. Check and adjust front wheel toe and center steering wheel
6. Check and adjust rear wheel toe
7. Check for front wheel setback; determine necessary action
8. Check front cradle (subframe) alignment; determine necessary action
9. Check rear wheel thrust angle; determine necessary action
10. Check toe-out-on-turns (turning radius); determine necessary action
11. Complete work order to include customer information vehicle identifying information, customer concern, related service history, cause, and correction
12. Determine proper power steering fluid type; inspect fluid level and condition
13. Diagnose and adjust components of electronically controlled steering systems using a scan tool; determine necessary action
14. Diagnose power steering fluid leakage; determine necessary action
15. Diagnose power steering gear (non-rack-and-pinion) binding, uneven turning effort, looseness, hard steering, noises, and fluid leakage concerns; determine necessary action
16. Diagnose power steering gear (rack-and-pinion) binding, uneven turning effort, looseness, hard steering, and fluid leakage concerns; determine necessary action
17. Diagnose short and long arm suspension system noises, body sway, and uneven riding height concerns; determine necessary action
18. Diagnose steering column noises, looseness, and binding concerns (including tilt mechanisms); determine necessary action
19. Diagnose strut suspension system noises, body sway, and uneven riding height concerns; determine necessary action
20. Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action
21. Disable and enable supplemental restraint system (SRS)
22. Flush, fill, and bleed power steering system
23. Identify and interpret suspension and steering concern; determine necessary action
24. Identify hybrid vehicle power steering system electrical circuits, service and safety precautions
25. Inspect and replace manual or power rack-and-pinion steering gear inner tie-rod ends (sockets) and bellows boots
26. Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper
27. Inspect and replace power steering hoses and fittings
28. Inspect and test non-hydraulic electric-power assist steering
29. Inspect steering shaft universal joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action
30. Inspect, remove, and replace shock absorbers
31. Inspect, replace, and adjust tie-rod ends (sockets), tie-rod sleeves, and clamps
32. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals)
33. Lubricate suspension and steering systems
34. Measure vehicle riding height; determine necessary action
35. Perform prealignment inspection; perform necessary action

36. Remove and reinstall power steering pump pulley; check pulley and belt alignment
37. Remove and replace manual or power rack-and-pinion steering gear; inspect mounting bushings and brackets
38. Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring)
39. Remove, inspect, and install coil springs and spring insulators
40. Remove, inspect, and install leaf springs, leaf spring insulators (silencers) shackles, brackets, bushings and mounts
41. Remove, inspect, and install short and long arm suspension system coil springs and spring insulators
42. Remove, inspect, and install stabilizer bar bushings, brackets, and links
43. Remove, inspect, and install steering knuckle assemblies
44. Remove, inspect, and install strut cartridge or assembly, strut coil spring, and insulators (silencers)
45. Remove, inspect, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount
46. Remove, inspect, and install transverse links, control arms, bushings, and mounts
47. Remove, inspect, and install upper and lower ball joints
48. Remove, inspect, and install upper and lower control arms, bushings, shafts, and rebound bumpers
49. Remove, inspect, and service or replace front and rear wheel bearings
50. Remove, inspect, install, and adjust strut rods (compression/tension) and bushings
51. Remove, inspect, install, and adjust suspension system torsion bars; inspect mounts
52. Remove, inspect, replace and adjust power steering pump belt
53. Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins
54. Test and diagnose components of electronically controlled suspension systems using a scan tool; determine necessary action
55. Balance wheel and tire assembly (static and dynamic)
56. Diagnose tire pull (lead) problem; determine necessary action
57. Diagnose tire wear patterns; determine necessary action
58. Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action
59. Inspect tires; check and adjust air pressure
60. Measure wheel, tire, axle, and hub runout; determine necessary action
61. Rotate tires according to manufacturer's recommendations
62. Dismount, inspect, and remount tire on wheel equipped with tire pressure sensor
63. Dismount, inspect, and remount tire on wheel
64. Inspect and repair tire and wheel assembly for air loss; perform necessary action
65. Inspect, diagnose, and calibrate tire pressure monitoring system
66. Reinstall wheel; torque lug nuts
67. Repair tire using internal patch

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

None

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

As noted on course syllabus

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

None noted