



## BODY MECHANICAL AND AIR CONDITIONING

### A. Course Description

- **Credits:** 3.00
- **Lecture Hours/Week:** 1.00
- **Lab Hours/Week:** 2.00
- **OJT Hours/Week:** 0
- **Prerequisites:** None
- **Corequisites:** None
- **MnTC Goals:** None

This course will focus on auto collision related minor mechanical failures. The course will also focus on typical air conditioning procedures related to auto collision such as reclaim, recharge and replace parts as result of a collision contains subject matter related to mechanical repairs as a result of a collision. Prerequisites: None

### B. Course Effective Dates: 3/15/98 – Present

### C. Outline of Major Content Areas

As noted on course syllabus

### D. Learning Outcomes

1. Adjust brake shoes; remove and reinstall brake drums or drum/hub assemblies and wheel bearings HP-G
2. Bleed (manual, pressure, vacuum or surge) hydraulic brake system in accordance with manufacturer's procedures HP-I
3. Check for bent or damaged brake system components HP-G
4. Check parking brake system operation HP-I
5. Clean and inspect caliper mountings for wear and damage HP-I
6. Demonstrate an understanding of advanced restraints systems.
7. Demonstrate an understanding of hybrid cooling systems.
8. Demonstrate an understanding of safe handling procedures associated with high voltage a/c compressors and wiring.
9. Demonstrate an understanding of safe handling procedures associated with high voltage powertrain components.
10. Depressurize ABS hydraulic system according to manufacturer's procedures HP-G
11. Diagnose and repair SRS using fault codes and test equipment HP-G

12. Disarm SRS in accordance with manufacturer's specifications/procedures HP-I
13. Evacuate A/C system; check for leaks HP-G
14. Exhibit utmost professionalism
15. Identify and comply with environmental concerns relating to refrigerants and coolants HP-G
16. Identify and recover refrigerant from A/C system HP-G
17. Identify and replace ABS wheel speed sensor components according to manufacturer's specifications HP-G
18. Identify oil type and maintain correct amount in A/C system according to manufacturer's specifications HP-G
19. Identify the proper procedures for handling brake dust HP-G
20. Identify, handle, store and install appropriate brake fluids; dispose of in accordance with federal, state, and local regulations HP-G
21. Identify, label and store refrigerant HP-G
22. Inspect A/C condenser for damage or restrictions HP-G
23. Inspect and repair A/C component wiring HP-G
24. Inspect and replace engine cooling and heater system hoses and belts HP-G
25. Inspect and replace receiver/drier or accumulator/drier HP-G
26. Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks or wear; tighten loose fittings and supports; replace brake lines (double flare and ISO types), hoses, fittings, and supports HP-G
27. Inspect flexible brake hoses for leaks, kinks, cracks, bulging or wear; remove and replace hoses; tighten loose fittings, and supports HP-G
28. Inspect restraint system mounting areas for damage in accordance with manufacturer's specifications/procedures HP-G
29. Inspect restraint system mounting areas for damage; repair in accordance with manufacturer's specifications/procedures HP-G
30. Inspect, adjust, and replace A/C compressor drive belts; check pulley alignment HP-G
31. Inspect, remove and replace canister, filter, vent, and purge lines of fuel vapor (EVAP) control systems HP-G
32. Inspect, remove and replace engine components of air intake systems HP-G
33. Inspect, remove and replace exhaust pipes, mufflers, converters, resonators, tail pipes, and heat shields HP-G
34. Inspect, remove and replace fuel tank, fuel tank filter, fuel cap, fuel filler hose, and inertia switch; inspect and replace fuel lines and hoses; check fuel for contaminants HP-G
35. Inspect, remove and replace half shafts and axle constant velocity (CV) joints HP-G
36. Inspect, remove and replace sensors and wiring in accordance with manufacturer's

specifications/procedures; ensure sensor orientation HP-G

37. Inspect, remove and replace track and drive assembly, lap retractor, torso retractor, inboard buckle-lap retractor, tensioners and knee bolster (blocker) in accordance with manufacturer's specifications/procedures HP-G
38. Inspect, remove, and replace auxiliary oil/fluid coolers; check oil levels HP-G
39. Inspect, remove, and replace drive shafts and universal joints HP-G
40. Inspect, remove, and replace electric fan sensors; check operation HP-G
41. Inspect, remove, and replace seatbelt and shoulder harness assembly and components in accordance with manufacturer's specifications/procedures HP-G
42. Inspect, remove, and replace seatbelt and shoulder harness assembly and components in accordance with manufacturer's specifications/procedures HP-I
43. Inspect, remove, replace, and dispose of deployed SRS modules in accordance with manufacturer's specifications/procedures HP-G
44. Inspect, remove, replace, and dispose of non-deployed SRS in accordance with manufacturer's specifications/procedures HP-G
45. Inspect, repair or replace A/C system mufflers, hoses, lines, fittings, and seals HP-G
46. Inspect, test, and replace A/C system condenser and mounts HP-G
47. Inspect, test, remove, and replace radiator, pressure cap, coolant recovery system, and water pump HP-G
48. Locate and identify A/C system service ports
49. Maintain and verify correct operation of certified refrigerant recovery and recharging equipment HP-G
50. Pressure test brake hydraulic system; determine needed repair HP-G
51. Recharge A/C system with refrigerant; perform leak test HP-G
52. Recover, refill, and bleed system with proper coolant and check level of protection; leak test system and dispose of materials in accordance with EPA specifications HP-I
53. Recycle refrigerant in accordance with EPA regulations HP-G
54. Reinstall wheel and torque lug nuts according to manufacturer's specifications HP-I
55. Remove and reinstall caliper assembly HP-I
56. Remove and replace A/C compressor; inspect, repair or replace A/C compressor mount HP-G
57. Remove and replace drive axle assembly HP-G
58. Remove and replace electronic sensors, wires, and connectors HP-G
59. Remove and replace fan (both electrical and mechanical), fan pulley, fan clutch, and fan shroud HP-G
60. Remove and replace powertrain assembly; inspect, replace, and align powertrain mounts HP-G
61. Remove, replace, and adjust cables or linkages for throttle valve (TV), kickdown, and

accelerator pedal HP-G

62. Remove, replace, and adjust shift or clutch linkage as required HP-G
63. Test recycled refrigerant for non-condensable gases HP-G
64. Verify proper operation of seatbelt in accordance with manufacturer's specifications/procedures HP-G
65. Verify that SRS is operational HP-I

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

**F. Learner Outcomes Assessment**

As noted on course syllabus

**G. Special Information**

None noted