UNIBODY/FRAME/WHEEL ALIGNMENT II — ABCT 2212

A. Course Description
   - Credits: 6.00
   - Lecture Hours/Week: 1.00
   - Lab Hours/Week: 5.00
   - OJT Hours/Week: 0
   - Prerequisites: None
   - Corequisites: None
   - MnTC Goals: None

   This course is a continuation of ABCT2108 with additional technical information and procedures. Students will be using frame repair equipment, various measuring equipment to include universal measuring, centerline gauges, and lazer measuring and applying all previous training on damaged vehicle repairs. Prerequisites: ABCT1111, ABCT1212 or BSEP1301, ABCT1120, ABCT2108, and ABCT2106.

B. Course Effective Dates: 8/19/02 – Present

C. Outline of Major Content Areas
   - As noted on course syllabus

D. Learning Outcomes
   1. Adjust caster on suspension systems with caster adjustments HP-I
   2. Adjust front and rear wheel camber on suspension systems with camber adjustments HP-I
   3. Center steering wheel HP-I
   4. Check and adjust wheel toe; determine needed adjustment or repair HP-I
   5. Check caster on adjustable and non-adjustable suspension systems; determine needed repairs HP-I
   6. Check for front wheel setback; determine needed repairs HP-I
   7. Check front and rear wheel camber on adjustable and non-adjustable suspension systems; determine needed repairs HP-I
   8. Diagnose MacPherson strut suspension system noises and body sway problems; determine needed repairs HP-G
   9. Diagnose manual and power steering gear (non-rack and pinion type) noises, binding, uneven turning effort, looseness, hard steering and fluid leakage problems; determine needed repairs HP-G
   10. Diagnose non-MacPherson front and rear suspension system noises and body sway problems; determine needed repairs HP-G
   11. Diagnose power rack and pinion steering gear noises, vibration, looseness, hard steering, and fluid leakage
12. Diagnose steering column damage, looseness, and binding problems (including tilt mechanisms); determine needed repairs HP-G
13. Diagnose tire pull (lead) problems; determine corrective actions HP-G
14. Diagnose tire wear patterns; determine needed repairs HP-I
15. Diagnose vehicle wandering, pulling, hard steering, bump steer, memory steering, torque steering, and steering return problems; determine needed repairs HP-G
16. Diagnose wheel/tire vibration, shimmy, and tramp (wheel hop) problems; determine needed repairs HP-G
17. Diagnose, inspect, adjust, repair or replace components of electronically controlled suspension systems HP-G
18. Exhibit professionalism
19. Identify SAI (steering axis inclination)/KPI (king pin inclination) related problems; determine needed repairs HP-I
20. Identify suspension system fasteners that should not be reused HP-G
21. Identify thrust angle related problems; determine needed repairs HP-I
22. Identify tow-out-on-turns (turning radius) related problems; determine needed repairs HP-I
23. Inspect alignment, adjust tension, and replace power steering pump belts HP-G
24. Inspect and adjust (where applicable) steering linkage geometry (attitude/parallelism) HP-G
25. Inspect and replace pitman arm HP-G
26. Inspect and replace power steering hoses and fittings HP-G
27. Inspect and replace rack and pinion steering gear, tie rod ends, and bellows boots HP-G
28. Inspect and replace relay (center link/intermediate) rod - HP-G
29. Inspect axle assembly for damage and misalignment HP-G
30. Inspect tires, identify direction of rotation, and location; check and adjust air pressure HP-I
31. Inspect, remove and replace MacPherson strut cartridge or assemble, upper bearing, and mount HP-G
32. Inspect, remove and replace air shock absorbers, load-leveling devices, air springs, and associated lines and fittings HP-G
33. Inspect, remove and replace front suspension system coil springs and spring insulators (silencers) HP-G
34. Inspect, remove and replace idler arm and mountings HP-G
35. Inspect, remove and replace shock absorbers HP-G
36. Inspect, remove and replace steering knuckle/spindle/hum assemblies (including bearings, races, seals, etc) HP-G
37. Inspect, remove and replace steering linkage damper HP-G
38. Inspect, remove and replace steering shaft U-joint(s), flexible coupling(s), collapsible columns, and steering wheels HP-G
39. Inspect, remove and replace tie rod sleeves, clamps, and tie rod ends HP-G
40. Inspect, remove and replace upper and lower ball joints HP-G
41. Inspect, remove and replace upper and lower control arms HP-G
42. Inspect, remove, and replace rear suspension system transverse links, control arms, stabilizer bars, bushings, and mounts HP-G
43. Inspect, remove, and replace stabilizer bar bushings, brackets, and links HP-G
44. Inspect, remove, and replace suspension system leaf spring(s), leaf spring insulators (silencers), shackles, brackets, bushings, and mounts HP-G
45. Inspect, remove, replace, and adjust suspension system torsion bars, and inspect mounts HP-G
46. Inspect, remove, replace, and align front and rear frame (cradles/stub) HP-G
47. Measure vehicle ride height; determine needed repairs HP-I
48. Measure wheel, tire, axle, and hub runout; determine needed repairs HP-I
49. Perform completed vehicle cleanup procedure
50. Perform final measuring inspection
51. Perform frame damage estimates
52. Perform frame damage quick checks
53. Perform frame rail cutting
54. Perform frame rail measuring for cutting methods
55. Perform frame rail metal finishing techniques
56. Perform frame rail pulling
57. Perform frame rail remeasure
58. Perform frame rail welding setup
59. Perform frame repair parts identification
60. Perform frame repair parts removal
61. Perform frame repair set up
62. Perform heat control methods
63. Perform initial frame damage examination
64. Perform method of measuring recording process
65. Perform new part refinish preparation process
66. Perform new rail corrosion protection techniques
67. Perform new rail preparation techniques
68. Perform part fitup inspection
69. Perform parts reinstallation
70. Perform proper internal corrosion protection techniques
71. Perform pulling clamp hookup
72. Perform refinishing process
73. Perform repair or replace method of decision
74. Perform repair process plan
75. Perform repair remeasure
76. Perform safe frame repair practices
77. Perform suitable measuring
78. Perform total body verification measuring
79. Perform total time of repair statement
80. Perform vehicle anchoring techniques
81. Perform vehicle frame rack mounting procedures
82. Perform vehicle frame rack removal
83. Perform vehicle lift contact points procedures
84. Perform weld joint inspection
85. Perform weld nugget cleanup
86. Perform welding
87. Perform welding procedure setup
88. Perform work area cleanup
89. Reinstall wheels and torque lug nuts according to manufacturer's specifications HP-I
90. Remove and replace power rack and pinion steering gear; inspect and replace mounting bushings and brackets; ensure proper mounting location HP-G
91. Remove and replace power steering gear (non-rack and pinion type) HP-G
92. Remove and replace power steering pump, pulleys; inspect pump mounts HP-G

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

F. Learner Outcomes Assessment
   As noted on course syllabus

G. Special Information
   None noted