



UNIBODY/FRAME/WHEEL ALIGNMENT I

A. Course Description

- **Credits:** 4.00
- **Lecture Hours/Week:** 1.00
- **Lab Hours/Week:** 3.00
- **OJT Hours/Week:** 0
- **Prerequisites:** None
- **Corequisites:** None
- **MnTC Goals:** None

This course will focus on unibody, full frame repair and alignment using various alignment, measuring and pulling equipment. This course will also contain wheel alignment procedures and terminology relating to collision damaged vehicles. Prerequisites: ABCT1111, ABCT1212 or BSEP1301, and ABCT1120.

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

C. Outline of Major Content Areas

As noted on course syllabus

D. Learning Outcomes

1. Analyze and identify crush/collapse zones. HP-I
2. Attach body anchoring devices; remove or reposition components as necessary HP-I
3. Attach frame anchoring devices HP-I
4. Demonstrate an understanding of structural foam applications. HP-G
5. Demonstrate parts removal procedures
6. Demonstrate proper frame heating procedure
7. Demonstrate proper frame rail sectioning
8. Demonstrate proper frame welding procedures
9. Determine and inspect the locations of all suspension, steering, and powertrain component attaching points on the body HP-G
10. Determine the extent of damage to structural steel body panels; repair or replace HP-I
11. Determine the extent of the direct and indirect damage and the direction of impact; plan the methods and sequence of repair HP-I
12. Diagnose and analyze unibody vehicle dimensions using a tram gauge HP-I
13. Diagnose and measure structural damage using tram and self-centering gauges

according to industry specifications HP-I

14. Diagnose and measure unibody vehicles using a dedicated (fixture) measuring system HP-G
15. Diagnose and measure unibody vehicles using a universal measuring system (mechanical, electronic, laser) HP-G
16. Exhibit shop professionalism
17. Identify final frame repair inspection procedures
18. Identify frame damage analysis
19. Identify frame dimension specification manual usage
20. Identify frame repair equipment maintenance
21. Identify frame repair hookups
22. Identify frame repair measuring equipment
23. Identify frame repair setup procedures
24. Identify frame repair types of pulling equipment
25. Identify frame types
26. Identify heat limitations in frame repair HP-G
27. Identify history of automotive frame/unibody development
28. Identify misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and 4-wheel alignment problems; realign or replace in accordance with vehicle manufacturer's specifications/procedures HP-G
29. Identify misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and wheel alignment problems; align or replace in accordance with vehicle manufacturer's specifications/procedures HP-G
30. Identify parts removal procedures
31. Identify proper frame heating procedures
32. Identify proper frame rail sectioning
33. Identify proper frame welding procedures
34. Identify safe repair practices
35. Identify various frame anchoring methods
36. Perform final frame repair inspection procedures
37. Perform frame damage analysis
38. Perform frame dimension specification manual usage
39. Perform frame hookups
40. Perform frame repair equipment maintenance
41. Perform frame repair setup
42. Perform safe frame repair practices
43. Remove and replace damage frame horns, side rails, and cross members according to manufacturer's specifications/procedures HP-G

44. Remove and replace damaged sections of structural steel body panels in accordance with manufacturer's specifications/procedures HP-G
45. Remove creases and dents using power tools and hand tools to restore damaged areas to proper contours and dimensions HP-I
46. Repair or replace weakened or cracked frame members in accordance with vehicle manufacturer's specifications/procedures HP-G
47. Restore corrosion protection to repaired or replaced frame areas HP-G
48. Restore corrosion protection to repaired or replaced unibody structural areas HP-G
49. Restore mounting and anchoring locations. HP-G
50. Straighten and align body openings, floor pans, and rocker panels HP-G
51. Straighten and align cowl assembly HP-G
52. Straighten and align diamond frame damage HP-G
53. Straighten and align front-end sections (aprons, strut towers, upper and lower rails, steering, and suspension/power train mounting points, etc.) HP-G
54. Straighten and align hinge and lock pillars HP-G
55. Straighten and align mash (collapse) damage HP-G
56. Straighten and align quarter panels, wheelhouse assemblies, and rear body sections (including rails and suspension/powertrain mounting points) HP-G
57. Straighten and align roof rails/headers and roof panels HP-G
58. Straighten and align sag damage HP-G
59. Straighten and align sideway damage HP-G
60. Straighten and align twist damage HP-G
61. Use proper cold stress relief methods HP-G
62. Use proper heat stress relief methods in high strength steel in accordance with manufacturer specifications/procedures HP-G
63. Utilize frame anchoring equipment
64. Utilize frame repair measuring equipment

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

F. Learner Outcomes Assessment

As noted on course syllabus

G. Special Information

None noted

