2013 I-CAR CTE CURRICULUM CROSSWALK

NATEF Collision Repair/Refinishing Standards

I. STRUCTURAL ANALYSIS AND DAMAGE REPAIR

For every task in Structural Analysis and Damage Repair, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing and the use of gloves; respiratory protection; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations. Identify vehicle manufacturer's SRS types, locations and recommended procedures before inspecting or replacing components.

IPS00e, ISS00e, WRK01 modules 1, 2, 3, 4, 5, 6

A. Frame Inspection and Repair	Class Hrs.	Lab Hrs.	Total Hrs.
1. Measure and diagnose structural damage using a tram gauge. ***HP-I***			
DAM02 v.2.1 module 1 | DAM02 v.2.2 modules 2, 3 | MEA01 modules 1, 2 | DAM12 module 1			
2. Attach vehicle to anchoring devices. ***HP-I***			
MEA01 module 6 | SSS01 module 2			
3. Analyze, straighten and align mash (collapse) damage. ***HP-G***			
MEA01 module 4 | SSS01 module 5			
4. Analyze, straighten and align sag damage. ***HP-G***			
MEA01 module 4 | SSS01 module 5			
5. Analyze, straighten and align sideway damage. ***HP-G***			
MEA01 module 4 | SSS01 module 5			
6. Analyze, straighten and align twist damage. ***HP-G***			
MEA01 module 1 | SSS01 module 5			
7. Analyze, straighten and align diamond frame damage. ***HP-G***			
MEA01 module 4 | SSS01 module 5			
8. Remove and replace damaged structural components. ***HP-G***			
SPS03 module 3, 5			
9. Restore corrosion protection to repaired or replaced frame areas. ***HP-I***			
CPS01 module 3			
10. Analyze and identify misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and wheel alignment problems. ***HP-G***			
DAM03 v.2.2 modules 4, 6 | DAM03 v2.4 module 6 | DAM06 module 2			
11. Align or replace misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and wheel alignment problems. ***HP-G***			
DRT01 module 5 | STE01 module 3 | STE02 modules 1, 2, 3 | STE03 modules 1, 2, 3, 4			
12. Identify or repair heat limitations and monitoring procedures for structural components. ***HP-G***			
RC01 module 1 | SPS07 modules 1, 2 | SSS01 module 4			
13. Demonstrate an understanding of structural foam applications. ***HP-G***			
FOM01 1, 2, 3, 4			

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	Class Hrs.	Lab Hrs.	Total Hrs.
14. Measure and diagnose structural damage using a three-dimensional measuring system (mechanical, electronic, laser), etc. ***HP-G***			
DAM02 v2.1 module 1 | DAM02 v2.2 module 3 | MEA01 module 2 | DAM12 module 1			
15. Measure and diagnose structural damage to vehicles using a dedicated (fixture) measuring system. ***HP-G***			
MEA01 module 2			
16. Determine the extent of the direct and indirect damage and the direction of impact; document the methods and sequence of repair. ***HP-I***			
DAM02 v2.1 module 1,3 | DAM02 v2.2 module 2 | FCR01 v2.1 module 2 | FCR01 v2.2 module 2, 3 | SSS01 module 1 | DAM12 module 1			
17. Analyze and identify crush/collapse zones. ***HP-I***			
SPS03 module 3 | SPS08 module 1, 3 | SPS07 module 2 | DAM12 modules 1 & 2			
18. Restore mounting and anchoring locations. ***HP-G***			
CPS01 modules 1, 2 , 3			
Total Hours by NATEF Subtopic			

B. Unibody and Unitized Structure Inspection, Measurement and Repair	Class Hrs.	Lab Hrs.	Total Hrs.
1. Analyze and identify misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and chassis alignment problems. ***HP-G***			
DAM03 v2.2 module 4, 6 | DAM03 v2.4 module 6 | DAM06 module 2			
2. Realign or replace misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering and chassis alignment problems. ***HP-G***			
DRT01 module 5 | STE01 module 3 | STE02 modules 1, 2, 3 | STE03 modules 1, 2, 3, 4			
3. Measure and diagnose unibody damage using tram gauge. ***HP-I***			
MEA01 modules 1, 2			
4. Determine and inspect the locations of all suspension, steering, and powertrain component attaching points on the vehicle. ***HP-G***			
DAM03 module 6 | DAM06 module 2 | DRT01 modules 2, 5 | MEA01 module 6 | STE01 module 3 | STE02 modules 1, 2, 3 | STE03 module 2			
5. Measure and diagnose unibody vehicles using a dedicated (fixture) measuring system. ***HP-G***			
MEA01 module 2			
6. Diagnose and measure unibody vehicles using a three-dimensional measuring system (mechanical, electronic, and laser, etc.). ***HP-G***			
DAM02 v2.1 module 1 | DAM02 v2.2 module 3 | MEA01 module 2 | DAM12 module 1			
7. Determine the extent of the direct and indirect damage and the direction of impact; plan and document the methods and sequence of repair. ***HP-I***			
DAM02 v2.1 module 1, 3 | DAM02 v2.2 module 2 | FCR01 v2.1 module 2 FCR01 v2.2 modules 2, 3 | SSS01 module 1 | DAM12 Module 1			

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NATEF Collision Repair/Refinishing Standards

	Class Hrs.	Lab Hrs.	Total Hrs.
8. Attach anchoring devices to vehicle; remove or reposition components as necessary. ***HP-I***			
MEA01 module 6 | SSS01 module 2			
9. Straighten and align cowl assembly. ***HP-G***			
SPS02 v3.1 module 3 | SPS02 v3.2 module 1, 2 | SSS01 module 5			
10. Straighten and align roof rails/headers and roof panels. ***HP-G***			
EXT02 module 4 | SSS01 module 5			
11. Straighten and align hinge and lock pillars. ***HP-G***			
SPS02 v3.1 modules 3, 4 | SPS02 v3.2 modules 1, 2 | SSS01 module 5			
12. Straighten and align vehicle openings, floor pans, and rocker panels. ***HP-G***			
SPS01 v3.1 modules 2, 3, 4, 6 | SPS01 v3.2 modules 1, 2 | SPS02 v3.1 modules 2, 3, 4, 5 | SPS02 v3.2 modules 1, 2, 3 | SSS01 module 5			
13. Straighten and align quarter panels, wheelhouse assemblies, and rear body sections (including rails and suspension/powertrain mounting points). ***HP-G***			
EXT02 module 5 | SPS01 v3.1 modules 3, 7 | SPS01 v3.2 modules 1, 2 | SSS01 module 5			
14. Straighten and align front-end sections (aprons, strut towers, upper and lower rails, steering, and suspension/powertrain mounting points, etc.). ***HP-G***			
SPS01 v3.1 modules 3, 4 | SPS01 v3.2 modules 1, 2 | SSS01 module 5			
15. Identify substrate and repair or replacement recommendations. ***HP-I***			
FCR01 module 1 | SPS07 modules 1, 2			
16. Identify proper cold stress relief methods. ***HP-I***			
SSS01 module 4			
17. Repair damage using power tools and hand tools to restore proper contours and dimensions. ***HP-I***			
SSS01 module 5			
18. Remove and replace damaged sections of steel body structures. ***HP-G***			
SPS01 v3.1 modules 3, 6 | SPS01 v3.2 modules 1,2 | SPS02 v3.1 modules 2, 3, 4 | SPS02 v3.2 modules 1, 2			
19. Restore corrosion protection to repaired or replaced structural areas. ***HP-I***			
CPS01 module 3			
20. Determine the extent of damage to aluminum structural components; repair, weld, or replace. ***HP-G***			
DAM05 module 3 | SPA01 modules 1, 2 | SSA01 modules 1, 2, 3			
21. Analyze and identify crush/collapse zones. ***HP-I***			
SPS01 v3.1 modules 1, 4, 6 | SPS01 v3.2 modules 1, 2. | SPS07 Module 2 | DAM12 modules 1 & 2			
22. Restore mounting and anchoring locations. ***HP-G***			
CPS01 modules 1, 2, 3			
Total Hours by NATEF Subtopic			

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NATEF Collision Repair/Refinishing Standards

C. Fixed Glass	Class Hrs.	Lab Hrs.	Total Hrs.
1. Remove and reinstall or replace fixed glass (heated and non-heated) using recommended materials and techniques. ***HP-G***			
GLA02 modules 1, 2, 3 | PWR01 module 3			
2. Remove and reinstall or replace modular glass using recommended materials. ***HP-G***			
GLA02 module 3			
3. Check for water leaks, dust leaks, and wind noise. ***HP-G***			
WNW01 module 1			
Total Hours by NATEF Subtopic			

D. Metal Welding and Cutting	Class Hrs.	Lab Hrs.	Total Hrs.
1. Identify weldable and non-weldable substrates used in vehicle construction. ***HP-I***			
FRC01 module 1			
2. Weld and cut high-strength steel and other steels. ***HP-I***			
SPS07 modules 1, 2 | WCS01 v1.2 modules 1, 2, 3, 4 | WCS01 v1.3 modules 1, 2, 3, 4, 5			
3. Weld and cut aluminum. ***HP-G***			
WCA01 modules 1, 2			
4. Determine the correct GMAW (MIG) welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation. ***HP-I***			
WCS01 module 1			
5. Set up and adjust the GMAW (MIG) welder to "tune" for proper electrode stickout, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded. ***HP-I***			
WCS01 module 1			
6. Store, handle, and install high-pressure gas cylinders. ***HP-I***			
WCS01 module 1			
7. Determine work clamp (ground) location and attach. ***HP-I***			
WCS01 module 1			
8. Use the proper angle of the gun to the joint and direction of gun travel for the type of weld being made in the flat, horizontal, vertical, and overhead positions. ***HP-I***			
WCS01 v2.1 module 1 | WCS01 v1.3 modules 1, 2, 3, 4, 5			
9. Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations. ***HP-I***			
WCS01 module 1			
10. Protect computers and other electronic control modules during welding procedures. ***HP-I***			
WCS01 module 1			
11. Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, clamp or tack as required. ***HP-I***			
SPS01 v3.1 module 1 | SPS01 v3.2 modules 1, 2 | SPS02 v3.1 module 1 | SPS03 modules 2, 3			

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NATEF Collision Repair/Refinishing Standards

	Class Hrs.	Lab Hrs.	Total Hrs.
12. Determine the joint type (butt weld with backing, lap, etc.) for weld being made. HP-I			
SPS01 v3.1 module 1 | SPS01 v3.2 modules 1, 2 | SPS02 v3.1 module 1 | SPS03 modules 2, 3			
13. Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation. HP-I			
SPS01 v3.1 module 1 | SPS01 v3.2 modules 1, 2 | SPS02 v3.1 module 2 | SPS03 modules 2, 3			
14. Perform the following welds: continuous, plug, butt weld with and without backing, and fillet etc. HP-I			
WSC01 v1.2 modules 2, 3, 4 | WCS01 v1.3 modules 1, 2, 3, 4, 5			
15. Perform visual and destructive tests on each weld type. HP-I			
WSC01 v1.2 modules 2, 3, 4 | WSC01 v1.3 modules 2, 3, 4, 5			
16. Identify the causes of various welding defects; make necessary adjustments. HP-I			
WCS01 v1.2 module 1 | WSC01 v1.3 modules 1, 2, 3, 4, 5			
17. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments. HP-I			
WSC01 module 1			
18. Identify cutting process for different substrates and locations; perform cutting operation. HP-I			
SPS07 modules 1, 2 | WCS05 module 4			
19. Identify different methods of attaching structural components (squeeze type resistance spot welding (STRSW), riveting, structural adhesive, silicon bronze, etc.). HP-G			
FCR01 module 1 | EXT02 Module 1			
Total Hours by NATEF Subtopic			
TOTAL HOURS BY NATEF TOPIC			

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NATEF Collision Repair/Refinishing Standards

II. NON-STRUCTURAL ANALYSIS AND DAMAGE REPAIR

For every task in Non-Structural Analysis and Damage Repair (Body Comonents), the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing and the use of gloves; respiratory protection; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations. Identify vehicle manufacturer's SRS types, locations and recommended procedures before inspecting or replacing components.

IPS00e, ISS00e, WRK01 modules 1, 2, 3, 4, 5, 6

A. Preparation	Class Hrs.	Lab Hrs.	Total Hrs.
1. Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. ***HP-I***			
DAM01 v2.4 modules 1, 2 | DAM01 v2.5 modules 1, 2, 3, 4, 5 | DAM10 Module 1 | EXT01 module 1			
2. Inspect, remove, label, store, and reinstall exterior trim and moldings. ***HP-I***			
DAM04 v2.1 module 4 | DAM04 module 3 | DAM10 Module 1 | TRM01 modules 3, 6, 7			
3. Inspect, remove, label, store, and reinstall interior trim and components. ***HP-I***			
ADH01 v1.3 modules 1, 2, 3 | DAM02 v2.1 modules 1, 2, 3 | DAM02 v2.2 module 2 | EXT01 modules 1, 2, 3 4 | EXT02 modules 1, 2, 3, 4, 5			
4. Inspect, remove, label, store, and reinstall body panels and components that may interfere with or be damaged during repair. ***HP-I***			
DAM02 v2.1 module 3 | DAM02 v2.2 module 2 | EXT01 module 2			
5. Inspect, remove, label, store, and reinstall vehicle mechanical and electrical components that may interfere with or be damaged during repair. ***HP-G***			
DAM03 v2.2 modules 1, 2, 3, 4, 5, 6 | DAM03 v2.4 modules 1,7 | DAM04 modules 1, 2, 3 | DAM06 module 2 EXT01 module 3			
6. Protect panels, glass, interior parts, and other vehicles adjacent to the repair area. ***HP-I***			
EXT01 module 1 | EXT02 modules 1, 2, 3, 4, 5			
7. Soap and water wash entire vehicle; complete pre-repair inspection checklist. ***HP-I***			
EDS02 module 3 | REF02 module 1 | REF04 module 1			
8. Prepare damaged area using water-based and solvent-based cleaners. ***HP-I***			
EDS02 module 3 | REF02 module 1 | REF04 module 1			
9. Remove corrosion protection, undercoatings, sealers, and other protective coatings as necessary to perform repairs. ***HP-I***			
DAM02 v2.1 module 2 | DAM02 v2.2 module 1 | EXT01 modules 1, 2, 3, 4 | EXT02 modules 1, 2, 3, 4, 5			
10. Inspect, remove, and reinstall repairable plastics and other components for off-vehicle repair. ***HP-I***			
DAM02 v2.1 module 2 | DAM02 v2.2 module 1 | EXT01 modules 1, 2, 3, 4 | EXT02 modules 1, 2, 3, 4, 5			
Total Hours by NATEF Subtopic			

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B. Outer Body Panel Repairs, Replacements, and Adjustments	Class Hrs.	Lab Hrs.	Total Hrs.
1. Determine the extent of direct and indirect/hidden damage and direction of impact; develop and document a repair plan. ***HP-I***			
DAM02 v2.1 modules 1, 3 | DAM02 v2.2 module 2 | DAM12 Module 1 | EDS01 module 2 FCR v2.1 modules 2, 3 | STS01 modules 1, 2			
2. Inspect, remove and replace bolted, bonded, and welded steel panel or panel assemblies. ***HP-G***			
ADH01 v1.3 modules 1, 2, 3 | DAM02 v2.1 modules 1, 2, 3 | DAM02 v2.2 module 2 | EXT01 modules 1, 2, 3, 4 | EXT02 modules 1, 2, 3, 4, 5			
3. Determine the extent of damage to aluminum body panels; repair or replace ***HP-G***			
DAM05 module 2 | PRA01 modules 1, 2, 3, 4, 5 | STA01 modules 2, 3			
4. Inspect, remove, replace, and align hood, hood hinges, and hood latch. ***HP-I***			
DAM02 v2.1 module 3 | DAM02 v2.2 module 2 | EXT01 module 2			
5. Inspect, remove, replace, and align deck lid, lid hinges, and lid latch. ***HP-I***			
DAM04 module 3 | EXT01 module 4			
6. Inspect, remove, replace, and align doors, latches, hinges, and related hardware. ***HP-I***			
DAM04 modules 2, 3 | EXT01 modules 3, 4 | EXT02 module 2			
7. Inspect, remove, replace and align tailgates, hatches, liftgates and sliding doors. ***HP-G***			
DAM04 modules 2, 3 | EXT01 modules 3, 4 | EXT02 module 2			
8. Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware. ***HP-I***			
DAM02 module 2 | EXT01 module 2 | EXT02 module 5			
9. Inspect, remove, replace and align fenders, and related panels. ***HP-I***			
DAM02 v2.1 module 3 | DAM02 v2.2 module 2 | EXT01 module 2 | EXT02 module 5			
10. Straighten contours of damaged panels to a suitable condition for body filling or metal finishing using power tools, hand tools, and weld-on pulling attachments. HP-I			
EDS01 modules 2, 3 | STS01 module 2			
11. Weld damaged or torn steel body panels; repair broken welds. ***HP-G***			
EDS02 module 3			
12. Restore corrosion protection. ***HP-I***			
CPS01 modules 3, 4			
13. Replace door skins. ***HP-G***			
ADH01 v1.2 module 1 | ADH01 v1.3 modules 1, 2, 3 | EXT02 module 2			
14. Restore sound deadeners and foam materials. ***HP-G***			
FOM01 modules 1, 2, 3, 4			
15. Perform panel bonding and weld bonding. ***HP-G***			
ADH01 v1.2 module 1 ADH01 modules 1, 2, 3			
16. Diagnose and repair water leaks, dust leaks, and wind noise. ***HP-G***			
WNW01 modules 1, 2, 3			
17. Identify one-time use fasteners. ***HP-G***			
TRM01 module 1			
Total Hours by NATEF Subtopic			

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NATEF Collision Repair/Refinishing Standards

C. Metal Finishing and Body Filling	Class Hrs.	Lab Hrs.	Total Hrs.
1. Remove paint from the damaged area of a body panel. ***HP-I***			
EDS01 module 3 | STS01 module 2			
2. Locate and repair surface irregularities on a damaged body panel. ***HP-I***			
DAM02 v2.1 module 3 | DAM02 v2.2 module 2 | EDS01 modules 2, 3, 4 | FCR v2.1 module 2 | FCR01 v2.2 module 3 | STS01 module 1, 2			
3. Demonstrate hammer and dolly techniques. ***HP-I***			
EDS01 module 2 | STS01 module 2			
4. Heat shrink stretched panel areas to proper contour. ***HP-I***			
EDS01 module 2 | STS01 module 2			
5. Cold shrink stretched panel areas to proper contour. ***HP-I***			
EDS01 module 2 | STS01 module 2			
6. Prepare and apply body filler. ***HP-I***			
EDS01 module 3 | STS01 module 2			
7. Identify different types of body fillers. ***HP-G***			
EDS01 module 3 | STS01 module 3			
8. Rough sand body filler to contour; finish sand. ***HP-I***			
EDS01 module 3 | STS01 module 2			
9. Determine the proper metal finishing techniques for aluminum. ***HP-G***			
DAM05 module 2 | STA01 modules 2, 3			
10. Determine proper application of body filler to aluminum. ***HP-G***			
PRA01 modules 3, 5 | STA01 module 2			
Total Hours by NATEF Subtopic			

D. Movable Glass and Hardware	Class Hrs.	Lab Hrs.	Total Hrs.
1. Inspect, adjust, repair or replace window regulators, run channels, glass power mechanisms, and related controls. ***HP-I***			
DAM04 module 2 | GLA01 module 2 | PWR01 module 5			
2. Inspect, adjust, repair, remove, reinstall or replace weather-stripping. ***HP-G***			
DAM04 module 2 | TRM01 module 3			
3. Inspect, repair or replace, and adjust removable power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs. ***HP-G***			
DAM04 module 2 | GLA01 module 4 | PWR01 module 5			
4. Inspect, remove, reinstall, and align convertible top and related mechanisms ***HP-G***			
DAM02 v2.1 module 3 | DAM02 v2.2 module 2 | EXT01 module 2			
5. Initialize electrical components as needed. ***HP-G***			
GLA01 Module 1, 4 | PWR01 module 6			
Total Hours by NATEF Subtopic			

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E. Metal Welding and Cutting	Class Hrs.	Lab Hrs.	Total Hrs.
1. Identify weldable and non-weldable substrates used in vehicle construction. ***HP-I***			
EXT02 module 1 | FCR01 module 1 | SPS07 modules 1, 2 | ITM01e | ITM02e			
2. Weld and cut high-strength steel and other steels. ***HP-I***			
EXT02 module 1 | WCS01 v1.2 modules 1, 2, 3, 4 | WCS01 v1.3 1, 2, 3, 4, 5			
3. Weld and cut aluminum.			
WCA01 modules 1, 2			
4. Determine the correct GMAW (MIG) welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation. ***HP-I***			
EXT02 module 2 WCS01 module 1			
5. Set up and adjust the GMAW (MIG) welder to "tune" for proper electrode stickout, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded. ***HP-I***			
WCS01 module 1			
6. Store, handle, and install high-pressure gas cylinders. ***HP-I***			
WCS01 module 1			
7. Determine work clamp (ground) location and attach. ***HP-I***			
WCS01 v1.2 module 1			
8. Use the proper angle of the gun to the joint and direction of gun travel for the type of weld being made in the flat, horizontal, vertical, and overhead potions. ***HP-I***			
WCS01 v1.2 module 1 | WCS01 v1.3 modules 1, 2, 3, 4, 5			
9. Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations. ***HP-I***			
EXT02 modules 1, 2, 3, 4, 5 | WCS01 v1.2 module 1 |WCS01 module 1			
10. Protect computers and other electronic control modules during welding procedures. ***HP-I***			
WCS01 module 1			
11. Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, clamp or tack as required. ***HP-I***			
WCS01 v1.2 module 1			
12. Determine the joint type (butt weld with backing, lap, etc.) for weld being made. ***HP-I***			
EXT02 modules 1, 2, 3, 4, 5			
13. Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation. ***HP-I***			
EXT02 modules 1, 2, 3, 4, 5			
14. Perform the following welds: continuous, plug, butt weld with and without backing, fillet, etc. ***HP-I***			
WCS01 v1.2 modules 2, 3, 4			
15. Perform visual and destructive tests on each weld type. ***HP-I***			
WCS01 v1.2 modules 2, 3, 4			

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	Class Hrs.	Lab Hrs.	Total Hrs.
16. Identify the causes of various welding defects; make necessary adjustments ***HP-I***			
WCS01 v1.2 module 1			
17. Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments. ***HP-I***			
WCS01 module 1			
18. Identify cutting process for different substrates and locations; perform cutting operation. ***HP-I***			
SPS07 modules 1, 2 | WCS05 module 4			
19. Identify different methods of attaching non-structural components (squeeze type resistant spot welds (STRSW), riveting, non-structural adhesive, silicon bronze, etc.). ***HP-G***			
FCR01 module 1 | EXT02 module 1			
Total Hours by NATEF Subtopic			

F. Plastic and Adhesives	Class Hrs.	Lab Hrs.	Total Hrs.
1. Identify the types of plastics; determine repairability. ***HP-I***			
DAM02 module 2 | PLA01 modules 1, 3 | PLA02 modules 1, 4 | PLA03 module 1			
2. Clean and prepare the surface of plastic parts; identify the types of plastic repair procedures. ***HP-I***			
PLA01 modules 1, 2 | PLA02 modules 1, 2 | PLA03 mod 1			
3. Repair rigid, semi-rigid, or flexible plastic panels. ***HP-I***			
PLA01 module 2 | PLA02 modules 2, 3 | PLA03 modules 2, 3			
4. Remove or repair damaged areas from rigid exterior composite panels. ***HP-G***			
EXT02 module 2 | PLA02 module 3 | PLA03 module 3			
5. Replace bonded rigid exterior composite body panels; straighten or alig panel supports. ***HP-G***			
EXT02 module 2 | PLA03 modules 3, 4			
Total Hours by NATEF Subtopic			
TOTAL HOURS BY NATEF TOPIC			

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NATEF Collision Repair/Refinishing Standards

III. MECHANICAL AND ELECTRICAL COMPONENTS

For every task in Mechanical and Electrical Components, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing and the use of gloves; respiratory protection; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations. Identify vehicle manufacturer's SRS types, locations and recommended procedures before inspecting or replacing components.

IPS00e, ISS00e, WRK01 modules 1, 2, 3, 4, 5, 6

A. Suspension and Steering	Class Hrs.	Lab Hrs.	Total Hrs.
1. Perform visual inspection and measuring checks to identify steering and suspension collision damage. ***HP-G***			
DAM06 Module 2 | STE04			
2. Identify one–time use fasteners. ***HP-I***			
STE02 modules 1, 3			
3. Clean, inspect, and prepare reusable fasteners. ***HP-I***			
TRM01 module 1			
4. Remove, replace, inspect or adjust power steering pump, pulleys, belts, hoses, fittings and pump mounts. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE03 module 4			
5. Remove and replace power steering gear (non-rack and pinion type). ***HP-G***			
STE03 module 4			
6. Inspect, remove, and replace power rack and pinion steering gear and related components. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE03 module 3			
7. Inspect and replace parallelogram steering linkage components. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE03 module 2			
8. Inspect, remove and replace upper and lower control arms and related coponents. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE02 modules 1, 2			
9. Inspect, remove and replace steering knuckle/spindle/hub assemblies (icluding bearings, races, seals, etc.). ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE01 module 3 | STE02 module 1			
10. Inspect, remove and replace front suspension system coil springs and spring insulators (silencers). ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE02 modules 1, 3			
11. Inspect, remove, replace, and adjust suspension system torsion bars, and inspect mounts. ***HP-G***			
STE02 modules 1, 3			
12. Inspect, remove and replace stabilizer bar bushings, brackets, and links. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE02 module 1			
13. Inspect, remove and replace MacPherson strut cartridge or assembly, upper bearing, and mount. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE02 module 1			

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NATEF Collision Repair/Refinishing Standards

	Class Hrs.	Lab Hrs.	Total Hrs.
14. Inspect, remove, and replace rear suspension system transverse links, control arms, stabilizer bars, bushings, and mounts. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE02 module 1			
15. Inspect, remove, and replace suspension system leaf spring(s) and related components. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE02 module 3			
16. Inspect axle assembly for damage and misalignment. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE03 module 4			
17. Inspect, remove and replace shock absorbers. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE02 module 3			
18. Diagnose, inspect, adjust, repair or replace active suspension systems and associated lines and fittings. ***HP-G***			
STE05 module 3			
19. Measure vehicle ride height and wheel base; determine needed repairs. ***HP-I***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE05 module 3			
20. Inspect, remove, replace, and align front and rear frame (cradles/sub). ***HP-G***			
DAM03 module 6			
21. Diagnose and inspect steering wheel, steering column, and components. ***HP-G***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE03 module 1			
22. Verify proper operation of steering system. ***HP-G***			
STE03 module 3			
23. Diagnose front and rear suspension system noises and body sway problems; determine needed repairs. ***HP-G***			
STE02 modules 1, 2			
24. Diagnose vehicle wandering, pulling, hard steering, bump steer, memory steering, torque steering, and steering return problems; determine needed repairs. ***HP-G***			
STE03 Module 4 | STE04 v5.1 module 3 & 5			
25. Demonstrate an understanding of suspension and steering alignments (caster, camber, toe, SAI etc.). ***HP-G***			
STE04 module 4			
26. Diagnose tire wear patterns; determine needed repairs. ***HP-I***			
DAM03 v2.2 module 6 | DAM06 module 2 | STE01 module 2			
27. Inspect tires; identify direction of rotation and location; check tire size, tire pressure monitoring system (TPM) and adjust air pressure. HP-I			
DAM03 v2.2 module 6 | DAM06 module 2 | STE01 modules 1, 2, 3			
28. Diagnose wheel/tire vibration, shimmy, tire pull (lead), wheel hop problems; determine needed repairs. HP-G			
STE01 modules 1, 2			
29. Measure wheel, tire, axle, and hub runout; determine needed repairs. HP-I			
DAM03 v2.2 module 6 | DAM06 module 2 | STE01 modules 1, 2, 3			
30. Reinstall wheels and torque lug nuts. HP-I			
STE01 module 2			
Total Hours by NATEF Subtopic			

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NATEF Collision Repair/Refinishing Standards

B. Electrical	Class Hrs.	Lab Hrs.	Total Hrs.
1. Check for available voltage, voltage drop and current, and resistance in electrical wiring circuits and components with a DMM (digital multimeter). ***HP-I***			
ELE01 module 1 | ELE02 module 1 | LSC01 modules 1, 2, 3, 4			
2. Repair electrical circuits, wiring, and connectors. ***HP-I***			
ELE01 module 2 | LSC01 modules 1, 4			
3. Inspect, test, and replace fusible links, circuit breakers, and fuses. ***HP-I***			
DAM03 module 3 | ELE01 module 2			
4. Perform battery state-of-charge test and slow/fast battery charge. ***HP-I***			
LSC01 module 1			
5. Inspect, clean, repair or replace battery, battery cables, connectors clamps. ***HP-I***			
DAM03 module 3 | LSC01 module 1			
6. Dispose of batteries and battery acid according to local, state, and federal requirements. ***HP-I***			
LSC01 module 1			
7. Identify programmable electrical/electronic components and check for m function indicator lamp (MIL); record data for reprogramming before disconnecting battery. ***HP-I***			
PWR01 Module 4 | IRP00 | ELE03			
8. Inspect alignment, adjust, remove and replace alternator (generator), drive belts, pulleys, and fans. ***HP-I***			
ELE01 module 1 | ELE02 module 1 | LSC01 modules 1, 2, 3, 4			
9. Check operation and aim headlamp assemblies and fog/driving lamps; determine needed repairs. ***HP-I***			
DAM03 module 3 | LSC01 modules 4, 5			
10. Inspect, test, and repair or replace switches, relays, bulbs, sockets, connectors, and wires of interior and exterior light circuits. ***HP-I***			
DAM03 module 3 | ELE01 module 2 | ELE02 module 3 | LSC01 modules 4, 5			
11. Remove and replace horn(s); check operation. ***HP-I***			
PWR01 module 7			
12. Check operation of wiper/washer systems; determine needed repairs. ***HP-I***			
PWR01 module 2			
13. Check operation of power side and tailgate window; determine needed repairs. ***HP-I***			
GLA01 modules 2, 3 | PWR01 module 6			
14. Inspect, remove and replace power seat, motors, linkages, cables, etc. ***HP-G***			
PWR01 module 4			
15. Inspect, remove and replace components of electric door and hatch/trun lock. ***HP-G***			
ELE02 module 3 | PWR01 module 6			
16. Inspect, remove and replace components of keyless lock/unlock devices and alarm systems. ***HP-G***			
DAM03 v.2.4 module 5 | PWR01 module 5			

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NATEF Collision Repair/Refinishing Standards

	Class Hrs.	Lab Hrs.	Total Hrs.
17. Inspect, remove and replace components of electrical sunroof and converible/retractable hard top. ***HP-G***			
DAM04 module 2 | GLA01 module 4			
18. Check operation of electrically heated mirrors, windshields, back lights, panels, etc.; determine needed repairs. ***HP-I***			
DAM04 v.2.1 modules 2, 3 | DAM04 v.2.2 module 2 | GLA02 module 3 | PWR01 module 3			
19. Demonstrate the proper self-grounding procedures for handling electronic components. ***HP-I***			
ELE02 module 4 | RES01 Module 1			
20. Check for module communication errors using a scan tool. ***HP-G***			
ELE03 module 1			
21. Use wiring diagrams and diagnostic flow charts during diagnosis of electrical circuit problems. ***HP-G***			
ELE01 module 2			
22. Identify safe disabling techniques of high voltage systems on hybrid vehicles ***HP-G***			
ALT01 module 3 | ALT02 module 2 | ALT03			
23. Identify potential safety and environmental concerns associated with hybrid vehicle systems. ***HP-G***			
ALT01 module 3 | ALT02 modules 1, 3 | ALT03			
Total Hours by NATEF Subtopic			

C. Brakes	Class Hrs.	Lab Hrs.	Total Hrs.
1. Inspect brake lines, hoses, and fittings for leaks, dents, kinks, rust, cracks or wear; tighten fittings and supports; replace brake lines (double flare and ISO types), hoses, fittings, seals, and supports. ***HP-I***			
BRA01 module 1 | DAM03 v.2.2 module 5 | DAM03 v.2.4 module 7			
2. Identify, handle, store, and install appropriate brake fluids; dispose of in accordance with federal, state, and local regulations. ***HP-G***			
BRA01 module 1			
3. Bleed (manual, pressure, or vacuum) hydraulic brake system. ***HP-I***			
BRA01 module 1			
4. Pressure test brake hydraulic system; determine needed repair. ***HP-G***			
ABR01 module 2 | BRA01 Module 1			
5. Adjust brake shoes or pads; remove and reinstall brake drums or drum/hub assemblies and wheel bearings. ***HP-I***			
BRA01 module 2			
6. Remove, clean and inspect caliper and rotor assembly and mountings for wear and damage; reinstall. ***HP-I***			
BRA01 module 2			

	Class Hrs.	Lab Hrs.	Total Hrs.
7. Check parking brake system operation. ***HP-I***			
ABR01 module 1 | BRA01 module 3			
8. Identify the proper procedures for handling brake dust. ***HP-G***			
BRA01 module 2			
9. Check for bent or damaged brake system components. ***HP-G***			
ABR01 module 1 | BRA01 module 2 DAM03 v.2.2 module 5 | DAM03 v.2.4 module 7			
10. Demonstrate an understanding of various types of advanced braking sytems (ABS, hydraulic, electronic, traction and stability control). ***HP-G***			
ABR01 modules 1, 2, 3, 4			
Total Hours by NATEF Subtopic			

D. Heating and Air Conditioning	Class Hrs.	Lab Hrs.	Total Hrs.
1. Identify and comply with environmental regulations relating to refrigerants and coolants. ***HP-G***			
AIR01 modules 2, 3 | HEA01 module 4 | WKR01 module 6			
2. Maintain and verify correct operation of certified refrigerant recovery and recharging equipment. ***HP-G***			
AIR01 modules 2, 3			
3. Locate and identify A/C system service ports. ***HP-I***			
AIR01 module 3 | DAM03 v.2.2 module 1 | DAM03 v.2.4 module 2			
4. Identify, recover, label and store refrigerant from A/C system. ***HP-G***			
AIR01 module 4 | DAM03 v.2.2 module 1 | DAM03 v.2.4 module 2			
5. Recycle refrigerant in accordance with EPA regulations. ***HP-G***			
AIR01 module 4 | DAM03 v.2.2 module 1 | DAM03 v.2.4 module 2			
6. Evacuate and recharge A/C system; check for leaks. ***HP-I***			
AIR01 module 4			
7. Select oil type and maintain correct amount in A/C system. ***HP-I***			
AIR01 module 2			
8. Inspect, adjust, and replace A/C compressor drive belts; check pulley alignment. ***HP-G***			
AIR01 module 5 | DAM03 v.2.2 module 1 | DAM03 v.2.4 module 2			
9. Remove and replace A/C compressor; inspect, repair or replace A/C compressor mount. ***HP-G***			
AIR01 module 5 | DAM03 v.2.2 module 1 | DAM03 v.2.4 module 2			
10. Inspect, repair or replace A/C system mufflers, hoses, lines, fittings, orifice tube, expansion valve, and seals. ***HP-G***			
AIR01 module 5 | DAM03 v.2.2 module 1 | DAM03 v.2.4 module 2			
11. Inspect, test, and replace A/C system condenser and mounts. ***HP-G***			
AIR01 module 5 | DAM03 v.2.2 module 1 | DAM03 v.2.4 module 2			

	Class Hrs.	Lab Hrs.	Total Hrs.
12. Inspect and replace receiver/drier or accumulator/drier. HP-G			
AIR01 module 5 | DAM03 v.2.2 module 1 | DAM03 v.2.4 module 2			
13. Inspect and repair A/C component wiring. HP-G			
AIR01 module 6 | ELE01 modules 1, 2			
14. Demonstrate an understanding of safe handling procedures associated with high voltage A/C compressors and wiring. HP-G			
ALT02 module 1 | ALT03			
Total Hours by NATEF Subtopic			

E. Cooling Systems	Class Hrs.	Lab Hrs.	Total Hrs.
1. Check engine cooling and heater system hoses and belts; determine needed repairs. ***HP-I***			
DAM03 v.2.2 module 1 | DAM03 v.2.4 modules 1, 2 | HEA01 modules 3, 7			
2. Inspect, test, remove, and replace radiator, pressure cap, coolant recovery system, and water pump. ***HP-G***			
DAM03 module 1 | HEA01 module 2			
3. Recover, refill, and bleed system with proper coolant and check level of protection; leak test system and dispose of materials in accordance with EPA regulations. ***HP-I***			
DAM03 module 1 | HEA01 modules 4, 7			
4. Remove, inspect and replace fan (both electrical and mechanical), fan sensors, fan pulley, fan clutch, and fan shroud; check operation. ***HP-G***			
HEA01 module 1			
5. Inspect, remove, and replace auxiliary oil/fluid coolers; check oil levels. ***HP-G***			
HEA01 module 5			
6. Demonstrate an understanding of hybrid cooling systems. ***HP-G***			
ALT01 module 1 | ALT03 Module 3			
Total Hours by NATEF Subtopic			

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F. Drive Train	Class Hrs.	Lab Hrs.	Total Hrs.
1. Remove, replace, and adjust shift or clutch linkage as required. ***HP-G***			
DRT01 module 3			
2. Remove, replace, and adjust cables or linkages for throttle valve (TV), kickdown, and accelerator pedal. ***HP-G***			
DRT01 module 3			
3. Remove and replace electronic sensors, wires, and connectors. ***HP-G***			
ELE01 modules 1, 2 | ELE02 module 1			
4. Remove and replace powertrain assembly; inspect, replace, and align powertrain mounts. ***HP-G***			
DAM03 v.2.2 module 4 | DAM03 v.2.4 module 6 | DRT01 module 2			
5. Remove and replace drive axle assembly. ***HP-G***			
DRT01 module 4			
6. Inspect, remove and replace half shafts and axle constant velocity (CV) joints. ***HP-G***			
DAM03 v.2.2 module 4 | DAM03 v.2.4 module 6 | DRT01 module 4			
7. Inspect, remove and replace drive shafts and universal joints. ***HP-G***			
DAM03 v.2.2 module 4 | DAM03 v.2.4 module 6 | DRT01 module 4			
8. Demonstrate an understanding of safe handling procedures associated with high voltage powertrain components. ***HP-G***			
ALT03 Module 2 & 3			
Total Hours by NATEF Subtopic			

G. Fuel, Intake and Exhaust Systems	Class Hrs.	Lab Hrs.	Total Hrs.
1. Inspect, remove and replace exhaust pipes, mufflers, converters, resonators, tail pipes, and heat shields. ***HP-G***			
DAM03 v.2.2 module 3 | DAM03 v.2.4 modules 3, 6 | DRE01 module 1 | FUE01 module 2			
2. Inspect, remove and replace fuel tank, tank filter, cap, filler hose, pump/ sending unit and inertia switch; inspect and replace fuel lines and hoses. ***HP-G***			
DAM03 v.2.2 module 3 | DAM03 v.2.4 module 6 | DRE01 module 2 | FUE01 module 1			
3. Inspect, remove and replace engine components of air intake systems. ***HP-G***			
DRE01 modules 1, 2			
4. Inspect, remove and replace canister, filter, vent, and purge lines of fuel vapor (EVAP) control systems. ***HP-G***			
DRE01 module 2 | FUE01 module 1			
Total Hours by NATEF Subtopic			

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H. Restraint Systems	Class Hrs.	Lab Hrs.	Total Hrs.
1. Inspect, remove, and replace seatbelt and shoulder harness assembly and components. ***HP-G***			
DAM11 | DAM04 module 1 | RES01 modules 3, 4			
2. Inspect restraint system mounting areas for damage; repair as needed. ***HP-G***			
DAM04 module 1 | RES01 module 3 | DAM11			
3. Verify proper operation of seatbelt. ***HP-I***			
RES01 module 3 | DAM11			
4. Disable and enable Supplemental Restraint System (SRS). ***HP-G***			
RES01 module 1 | DAM11			
5. Inspect, remove and replace Supplemental Restraint Systems (SRS) sensors and wiring; ensure sensor orientation. ***HP-G***			
DAM04 module 1 | RES01 module 1 | DAM11			
6. Verify that Supplemental Restraint System (SRS) is operational. ***HP-I***			
RES01 module 2 | DAM11			
7. Inspect, remove, replace and dispose of deployed and non-deployed airbag(s) and pretensioners. ***HP-G***			
DAM04 module 1 | RES01 modules 1, 4			
8. Use Diagnostic Trouble Codes (DTC) to diagnose and repair the Supplemental Restraint System (SRS). ***HP-G***			
RES01 module 2			
9. Demonstrate an understanding of advanced restraint systems. ***HP-G***			
RES02 modules 1, 2, 3, 4 | DAM11			
Total Hours by NATEF Subtopic			
TOTAL HOURS BY NATEF TOPIC			

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NATEF Collision Repair/Refinishing Standards

IV. PAINTING AND REFINISHING

For every task in Painting and Refinishing, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing and the use of gloves; respiratory protection; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

IPS00e, ISS00e, WRK01 modules 1, 2, 3, 4, 5, 6

A. Safety Precautions	Class Hrs.	Lab Hrs.	Total Hrs.
1. Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations. ***HP-I***			
EDS02 module 1 | REF01 module 4 | REF03 modules 2, 4 | WKR01 module			
2. Identify safety and personal health hazards according to OSHA guidelines and the "Right to Know Law". ***HP-I***			
WKR01 module 1			
3. Inspect spray environment and equipment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards. ***HP-I***			
EDS02 module 1 | REF01 module 3 | WKR01 module 2			
4. Select and use a NIOSH approved air purifying respirator. Inspect condition and ensure fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. ***HP-I***			
WKR01 module 4			
5. Select and use a NIOSH approved supplied air (Fresh Air Make-up) respirator system. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. ***HP-I***			
EDS02 module 1 | REF01 module 2 | WKR01 module 4			
6. Select and use the proper personal safety equipment for surface preparation, spray gun and related equipment operation, paint mixing, matching and application, paint defects, and detailing (gloves, suits, hoods, eye and ear protection, etc.). ***HP-I***			
EDS02 modules 1, 2, 3, 4, 5, 6, 7 | REF02 module 2 | REF03 modules 2, 4 | WKR01 module 4			
Total Hours by NATEF Subtopic			

B. Surface Preparation	Class Hrs.	Lab Hrs.	Total Hrs.
1. Inspect, remove, store, and replace exterior trim and components necessary for proper surface preparation. ***HP-I***			
DAM04 v.2.1 module 4 | DAM04 v.2.2 module 3 | TRM01 modules 3, 6, 7			
2. Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants. ***HP-I***			
EDS02 module 3 | REF02 module 1 | REF04 module 1			
3. Inspect and identify type of finish, surface condition, and film thickness; develop and document a plan for refinishing using a total product system. ***HP-G***			
DAM01 v.2.4 module 3 | DAM01 v.2.5 module 4 | EDS02 module 3 | REF02 module 1			

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	Class Hrs.	Lab Hrs.	Total Hrs.
4. Strip paint to bare substrate (paint removal). HP-I EDS02 module 3 | REF02 module 2			
5. Dry or wet sand areas to be refinished. HP-I EDS02 module 3 | REF02 module 4 | REF03 module 2			
6. Featheredge areas to be refinished. HP-I EDS02 module 3 | REF02 module 4			
7. Apply suitable metal treatment or primer in accordance with total product systems. HP-I CPS01 module 3 | EDS02 module 4 | REF02 module 4			
8. Mask and protect other areas that will not be refinished. HP-I EDS02 module 3 | REF02 module 2			
9. Mix primer, primer-surfacer or primer-sealer. HP-I EDS02 module 4 | REF01 module 5 | REF02 module 4 |REF03 module 4			
10. Identify a complimentary color or shade of undercoat to improve coverage. HP-G REF03 Module 2			
11. Apply primer onto surface of repaired area. HP-I EDS02 module 4 | REF02 module 4			
12. Apply two-component finishing filler to minor surface imperfections. HP-I EDS01 module 3 |STS01 module 2			
13. Block sand area to which primer-surfacer has been applied. HP-I EDS02 module 4 | REF02 module 4			
14. Dry sand area to which finishing filler has been applied. HP-I EDS01 module 3 | STS01 module 2			
15. Remove dust from area to be refinished, including cracks or moldings of adjacent areas. HP-I EDS02 module 3 | REF02 module 4 | REF03 modules 3, 4			
16. Clean area to be refinished using a final cleaning solution. HP-I EDS02 module 3 | REF03 module 3			
17. Remove, with a tack rag, any dust or lint particles from the area to be refinished. HP-I EDS02 module 5 | REF02 modules 3, 4 | REF03 module 4			
18. Apply suitable sealer to the area being refinished. HP-I EDS02 module 4 | REF03 module 4			
19. Scuff sand to remove nibs or imperfections from a sealer. HP-I EDS02 module 4			

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	Class Hrs.	Lab Hrs.	Total Hrs.
20. Apply stone chip resistant coating. ***HP-G***			
CPS01 module 4 | EDS02 module 5 | REF03 module 3			
21. Restore caulking and seam sealers to repaired areas. ***HP-G***			
CPS01 modules 3, 4 | EDS02 modules 4, 5 | REF02 module 5			
22. Prepare adjacent panels for blending. ***HP-I***			
EDS02 module 5 | REF02 modules 4, 5			
23. Identify the types of rigid, semi-rigid or flexible plastic parts to be refinished; determine the materials needed, preparation, and refinishing procedures. ***HP-I***			
EDS02 module 5 | REF02 module 4			
24. Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures. ***HP-I***			
EDS02 module 4 | REF02 modules 1, 4			
Total Hours by NATEF Subtopic			

C. Spray Gun and Related Equipment Operation	Class Hrs.	Lab Hrs.	Total Hrs.
1. Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment). ***HP-I***			
EDS02 module 2 | REF01 module 1			
2. Select spray gun setup (fluid needle, nozzle, and cap) for product being applied. ***HP-I***			
EDS02 module 2 | REF01 module 1 | REF02 module 3			
3. Test and adjust spray gun using fluid, air and pattern control valves. ***HP-I***			
EDS02 module 2 | REF01 module 1 | REF02 module 3			
4. Demonstrate an understanding of the operation of pressure spray equipment. ***HP-G***			
EDS02 module 2 | REF01 module 1			
Total Hours by NATEF Subtopic			

D. Paint Mixing, Matching, and Applying	Class Hrs.	Lab Hrs.	Total Hrs.
1. Identify color code by manufacturer's vehicle information label. ***HP-I***			
DAM01 module 4 | EDS02 module 3 | REF03 module 1			
2. Shake, stir, reduce, catalyze/activate, and strain refinish materials. ***HP-I***			
CPS01 modules 3, 4 | EDS02 modules 4, 5 | REF02 module 5			
3. Apply finish using appropriate spray techniques (gun arc, angle, distance, travel speed, and spray pattern overlap) for the finish being applied. ***HP-I***			
EDS02 module 2 | REF02 module 3			
4. Apply selected product on test or let-down panel; check for color match. ***HP-I***			
REF03 module 2			
5. Apply single stage topcoat. ***HP-G***			
EDS02 module 5 | REF03 module 4			
6. Apply basecoat/clearcoat for panel blending and panel refinishing. ***HP-I***			
EDS02 module 5 | REF03 modules 3, 4			

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NATEF Collision Repair/Refinishing Standards

	Class Hrs.	Lab Hrs.	Total Hrs.
7. Apply basecoat/clearcoat for overall refinishing. ***HP-G***			
EDS02 module 5 | REF03 module 4			
8. Remove nibs or imperfections from basecoat. ***HP-I***			
REF04 module 2			
9. Refinish rigid or semi-rigid plastic parts. ***HP-G***			
EDS02 module 5 | REF03 modules 3, 4			
10. Refinish flexible plastic parts. ***HP-I***			
EDS02 module 5 | REF03 modules 3, 4			
11. Apply multi-stage coats for panel blending and overall refinishing. ***HP-G***			
EDS02 module 5 | REF03 module 4			
12. Identify and mix paint using a formula. ***HP-I***			
EDS02 module 4 | REF01 module 5			
13. Identify poor hiding colors; determine necessary action. ***HP-G***			
EDS02 module 6 | REF03 module 3			
14. Tint color using formula to achieve a blendable match. ***HP-I***			
EDS02 module 4 | REF03 module 5			
15. Identify alternative color formula to achieve a blendable match. ***HP-I***			
EDS02 module 5 | REF03 module 2			
16. Identify the materials equipment, and preparation differences between solvent and waterborne technologies. ***HP-G***			
REF07			
Total Hours by NATEF Subtopic			

E. Paint Defects-Causes and Cures	Class Hrs.	Lab Hrs.	Total Hrs.
1. Identify blistering (raising of the paint surface, air entrapment); determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF03 module 3			
2. Identify a dry spray appearance in the paint surface; determine the cause(s and correct the condition. ***HP-I***			
EDS02 module 6 | REF03 module 3			
3. Identify the presence of fish-eyes (crater-like openings) in the finish; determine the cause(s) and correct the condition. ***HP-I***			
EDS02 module 6 | REF03 module 3			
4. Identify lifting; determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF03 module 3			
5. Identify clouding (mottling and streaking in metallic finishes); determine the cause(s) and correct the condition. ***HP-I***			
EDS02 module 6			
6. Identify orange peel; determine the cause(s) and correct the condition. ***HP-I***			
EDS02 module 6 | REF03 module 3 | REF04 module 2			
7. Identify overspray; determine the cause(s) and correct the condition. ***HP-I***			
DAM01 v.2.4 module 3 | DAM01 v.2.5 module 4 | EDS02 module 6 | REF04 module 2			

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NATEF Collision Repair/Refinishing Standards

	Class Hrs.	Lab Hrs.	Total Hrs.
8. Identify solvent popping in freshly painted surface; determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF03 module 3			
9. Identify sags and runs in paint surface; determine the cause(s) and correct the condition. ***HP-I***			
EDS02 module 6 REF03 module 3 REF04 module 2			
10. Identify sanding marks or sandscratch swelling; determine the cause(s) and correct the condition. ***HP-I***			
DAM01 v.2.4 module 3 | DAM01 v.2.5 module 4 | EDS02 module 6 | REF03 module 3 | REF04 module 2			
11. Identify contour mapping/edge mapping while finish is drying; determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF02 module 1			
12. Identify color difference (off-shade); determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF03 module 1			
13. Identify tape tracking; determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF03 module 3			
14. Identify low gloss condition; determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF03 module 3 | REF04 module 2			
15. Identify poor adhesion; determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 |REF03 module 3			
16. Identify paint cracking (shrinking, splitting, crowsfeet or line-checking, micro-checking, etc.); determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6			
17. Identify corrosion; determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF02 module 3 | REF03 module 3			
18. Identify dirt or dust in the paint surface; determine the cause(s) and correct the condition. ***HP-I***			
DAM01 v.2.4 module 3 | DAM01 v.2.5 module 4 | EDS02 module 6 | REF03 module 3 | REF04 modules 1, 2			
19. Identify water spotting; determine the cause(s) and correct the condition. ***HP-G***			
REF04 module 2			
20. Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition. ***HP-G***			
DAM01 v.2.4 module 3 | DAM01 v.2.5 module 4 | REF04 module 2			
21. Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition. ***HP-G***			
DAM01 v.2.4 module 3 | DAM01 v.2.5 module 4 | REF04 module 2			
22. Identify die-back conditions (dulling of the paint film showing haziness); determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF03 module 3			

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	Class Hrs.	Lab Hrs.	Total Hrs.
23. Identify chalking (oxidation); determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6			
24. Identify bleed-through (staining); determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6			
25. Identify pin-holing; determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6			
26. Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition. ***HP-I***			
REF04 module 2			
27. Identify pigment flotation (color change through film build); determine the cause(s) and correct the condition. ***HP-G***			
EDS02 module 6 | REF03 module 3			
Total Hours by NATEF Subtopic			

F. Final Detail	Class Hrs.	Lab Hrs.	Total Hrs.
1. Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc. ***HP-G***			
TRM01 module 4			
2. Sand, buff and polish fresh or existing finish to remove defects as required ***HP-I***			
REF04 module 2			
3. Clean interior, exterior, and glass. ***HP-I***			
REF04 module 3			
4. Clean body openings (door jambs and edges, etc.). H***P-I***			
REF04 module 3			
5. Remove overspray. ***HP-I***			
EDS02 module 6 | REF04 module 2			
6. Perform vehicle clean-up; complete quality control using a checklist. ***HP-I***			
REF04 module 3			
Total Hours by NATEF Subtopic			
TOTAL HOURS BY NATEF TOPIC			

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V. DAMAGE ANALYSIS, ESTIMATING AND CUSTOMER SERVICE

For every task in Damage Analysis, Estimating and Customer Service, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing and the use of gloves; respiratory protection; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

IPS00e, ISS00e, WRK01 modules 1, 2, 3, 4, 5, 6

A. Damage Analysis	Class Hrs.	Lab Hrs.	Total Hrs.
1. Position the vehicle for inspection. ***HP-G***			
DAM01 module 3 | DAM10 module 1			
2. Prepare vehicle for inspection by providing access to damaged areas. ***HP-G***			
DAM01 module 3			
3. Analyze damage to determine appropriate methods for overall repairs. ***HP-I***			
DAM01 module 3 | DAM10 module 1, 2 | DAM12			
4. Determine the direction, point(s) of impact, and extent of direct, indirect, and inertia damage. ***HP-G***			
DAM01 module 3 | DAM10 module 1 | DAM12			
5. Gather details of the incident/accident necessary to determine the full extent of vehicle damage. ***HP-G***			
DAM01 module 3 | DAM10 module 1			
6. Identify and record pre-existing damage. ***HP-I***			
DAM01 module 3			
7. Identify and record prior repairs. ***HP-G***			
DAM01 module 4			
8. Perform visual inspection of structural components and members. ***HP-G***			
DAM01 Module 3 | DAM12			
9. Identify structural damage using measuring tools and equipment. ***HP-I***			
DAM01 module 3 | DAM12 | MEA01			
10. Perform visual inspection of non-structural components and members. ***HP-I***			
DAM01 module 3 | DAM10 module 1			
11. Determine parts, components, material type(s) and procedures necessary for a proper repair. ***HP-I***			
DAM01 module 3 | DAM05 | DAM10 | DAM12			
12. Identify type and condition of finish; determine if refinishing is required. ***HP-I***			
DAM01 module 4			
13. Identify suspension, electrical, and mechanical component physical damage. ***HP-G***			
ELE01, DAM03, DAM06			

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	Class Hrs.	Lab Hrs.	Total Hrs.
14. Identify safety systems physical damage. ***HP-G***			
DAM11 | DAM03			
15. Identify interior component damage. ***HP-I***			
DAM04			
16. Identify damage to add-on accessories and modifications. ***HP-G***			
DAM01 | DAM10			
17. Identify single (one time) use components. ***HP-G***			
TRM01			
Total Hours by NATEF Subtopic			

B. Estimating	Class Hrs.	Lab Hrs.	Total Hrs.
1. Determine and record customer/vehicle owner information. ***HP-I***			
DAM01 module 2			
2. Identify and record vehicle identification number (VIN) information, including nation of origin, make, model, restraint system, body type, production date, engine type, and assembly plant. ***HP-I***			
DAM01 module 3			
3. Identify and record vehicle options, including trim level, paint code, transmission, accessories, and modifications. ***HP-I***			
DAM01 module 4			
4. Identify safety systems; determine replacement items. ***HP-G***			
DAM01 module 5 | DAM03 | DAM11			
5. Apply appropriate estimating and parts nomenclature (terminology). ***HP-I***			
DAM01 module 3 , 4 , 5			
6. Determine and apply appropriate estimating sequence. ***HP-I***			
DAM01 module 3			
7. Utilize estimating guide procedure pages. ***HP-I***			
DAM01 module 1			
8. Apply estimating guide footnotes and headnotes as needed. ***HP-I***			
DAM01 module 3			
9. Estimate labor value for operations requiring judgment. ***HP-G***			
DAM01 module 3			
10. Select appropriate labor value for each operation (structural, non-structural, mechanical, and refinish). ***HP-I***			
DAM01 module 3 , 4 , 5			
11. Select and price OEM parts; verify availability, compatibility, and condition. ***HP-G***			
DAM01 module 3			
12. Select and price alternative/optional OEM parts; verify availability, compatibility and condition. ***HP-G***			
DAM01 module 3			
13. Select and price aftermarket parts; verify availability, compatibility, and condition. ***HP-G***			
DAM01 module 3			

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	Class Hrs.	Lab Hrs.	Total Hrs.
14. Select and price recyclable/used parts; verify availability, compatibility an condition. ***HP-G***			
DAM01 module 3			
15. Select and price remanufactured, rebuilt, and reconditioned parts; verify availability, compatibility and condition. ***HP-G***			
DAM01 module 3			
16. Determine price and source of necessary sublet operations. ***HP-G***			
DAM01 module 5			
17. Determine labor value, prices, charges, allowances, or fees for non-included operations and miscellaneous items. ***HP-G***			
DAM01 module 3, 4, 5			
18. Recognize and apply overlap deductions, included operations, and additions ***HP-I***			
DAM01 module 3 body, module 4 Refinish, sealers, nvh			
19. Determine additional material and charges. ***HP-G***			
DAM01 module 3			
20. Determine refinishing material and charges. ***HP-I***			
DAM01 module 4 | IRT00			
21. Apply math skills to establish charges and totals. ***HP-I***			
DAM01 module 5			
22. Interpret computer-assisted and manually written estimates; verify the information is current. ***HP-I***			
n/a			
23. Identify procedural differences between computer-assisted systems and manually written estimates. ***HP-G***			
n/a			
24. Identify procedures to restore corrosion protection; establish labor values, and material charges. ***HP-G***			
DAM01 module 4 | CPS01			
25. Determine the cost effectiveness of the repair and determine the approximate vehicle retail, and repair value. ***HP-G***			
n/a			
26. Recognize the differences in estimation procedures when using different information provider systems. ***HP-G***			
n/a			
27. Verify accuracy of estimate compared to the actual repair and replacement operations. ***HP-G***			
QUA01 module 3			
Total Hours by NATEF Subtopic			

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NATEF Collision Repair/Refinishing Standards

C. Vehicle Construction and Parts Identification	Class Hrs.	Lab Hrs.	Total Hrs.
1. Identify type of vehicle construction (space frame, unibody, body-over frame). ***HP-G***			
IVT02 | FCR01			
2. Recognize the different damage characteristics of space frame, unibody, and body-over-frame vehicles. ***HP-G***			
IVT02 | FCR01			
3. Identify impact energy absorbing components. ***HP-G***			
ICM00e | SPS07 module 1 | DAM10 DAM12			
4. Identify steel types; determine repairability. ***HP-G***			
ICM00e | SPS07 module 1 | SSS01			
5. Identify aluminum/magnesium components; determine repairability. ***HP-G***			
ICM00e | DAM05 module 1 | DAM12 module 2			
6. Identify plastic/composite components; determine repairability. ***HP-G***			
ICM00e | PLA03			
7. Identify vehicle glass components and repair/replacement procedures. ***HP-G***			
IVT02e | ITM01e | GLA01 | GLA02			
8. Identify add-on accessories. ***HP-G***			
TRM01 module 6 | DAM10 module 3			
Total Hours by NATEF Subtopic			

D. Customer Relations and Sales Skills	Class Hrs.	Lab Hrs.	Total Hrs.
1. Acknowledge and/or greet customer/client. ***HP-I***			
n/a			
2. Listen to customer/client; collect information and identify customers/client's concerns, needs and expectations. ***HP-I***			
CUS01 module 1			
3. Establish cooperative attitude with customer/client. ***HP-I***			
CUS01 module 1			
4. Identify yourself to customer/client; offer assistance. ***HP-I***			
n/a			
5. Deal with angry customer/client. H***P-I***			
CUS01 module 1			
6. Identify customer/client preferred communication method; follow up to keep customer/client informed about parts and the repair process. ***HP-G***			
DAM01			

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NATEF Collision Repair/Refinishing Standards

D. Customer Relations and Sales Skills	Class Hrs.	Lab Hrs.	Total Hrs.
7. Recognize basic claims handling procedures; explain to customer/client. ***HP-G***			
IRP00e			
8. Project positive attitude and professional appearance. ***HP-I***			
n/a oa			
9. Provide and review warranty information. ***HP-I***			
IRP00e			
10. Provide and review technical and consumer protection information. ***HP-G***			
IRP00e			
11. Estimate and explain duration of out-of-service time. ***HP-G***			
12. Apply negotiation skills to obtain a mutual agreement. ***HP-G***			
CUS01 module 1			
13. Interpret and explain manual or computer-assisted estimate to customer/ client. ***HP-I***			
DAM01 module 1			
Total Hours By NATEF Subtopic			
TOTAL HOURS BY NATEF TOPIC			