Acknowledgments

The components of this instructional framework were developed by the following curriculum development panelists:

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Matthew Ingram, Instructor, Northern Neck Technical Center, Richmond County Public Schools
Danny McQuillen, Instructor, Richmond Technical Center, Richmond Public Schools

Correlations to the Virginia Standards of Learning were reviewed and updated by:
Course Description

Suggested Grade Level: 12
Prerequisites: 8677

This course allows students to apply knowledge and skills learned in Auto Body Technology I and II. This course may also be used as a capstone course in which students may perfect their auto body skills and move toward employment in the industry. Students who successfully complete this program will be prepared to take an industry recognized certification examination and will be prepared for postsecondary education opportunities.

Auto Body Technology III is closely aligned with the 2016 Automotive Service Excellence (ASE) Education Foundation collision repair and refinish program standards.

Note: Legislation enacted in the 2011 Virginia General Assembly (HB 1493) and amended in 2012 (HB 1108) requires where there is a national industry certification for career and technical education instructional personnel or programs for automotive technology, the Board of Education must make such certification mandatory. The provisions of this act shall become effective July 1, 2013. To comply with the requirements, all auto body technology programs
must be ASE Education Foundation accredited and the instructors must be certified by the National Institute for ASE.

“Auto Body Technology III” may be offered as a complement to an existing concentration sequence in any CTE program area. In some instances, where noted, it may be combined with specific courses to create concentration sequences.

As noted in Superintendent's Memo #058-17 (2-28-2017), this Career and Technical Education (CTE) course must maintain a maximum pupil-to-teacher ratio of 20 students to one teacher, due to safety regulations. The 2016-2018 biennial budget waiver of the teacher-to-pupil ratio staffing requirement does not apply.

### Task Essentials Table

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (⊙) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted
- Tasks marked with an asterisk (*) are sensitive.

<table>
<thead>
<tr>
<th>Task Number</th>
<th>8678</th>
<th>Tasks/Competencies</th>
</tr>
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<tbody>
<tr>
<td><strong>STRUCTURAL ANALYSIS AND DAMAGE REPAIR</strong></td>
<td></td>
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<tr>
<td>Practicing Safety</td>
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<td>Select and use personal protective equipment (PPE); take necessary precautions with hazardous operations and materials in accordance with federal, state, and local regulations.</td>
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**Analyzing Frame Damage and Repair**

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<th>45</th>
<th>Measure and diagnose structural damage using a tram gauge.</th>
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<tr>
<td>46</td>
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<td>Attach the vehicle to anchoring devices.</td>
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<td>+</td>
<td>Analyze, straighten, and align mash (i.e., collapse) damage.</td>
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<tr>
<td>48</td>
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<td>Remove and replace damaged structural components.</td>
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<td>Replace protective coatings; restore corrosion protection to repaired or replaced frame areas and anchoring locations.</td>
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<td>Analyze and identify misaligned or damaged steering, suspension, and powertrain mounting points.</td>
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<td>Identify heat limitations and monitoring procedures for structural components.</td>
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<tr>
<td>58</td>
<td>Demonstrate an understanding of structural foam applications.</td>
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<tr>
<td>59</td>
<td>Measure and diagnose structural damage using a 3D measuring system (i.e.,</td>
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<td></td>
<td>mechanical, electronic, laser), etc.</td>
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<td>60</td>
<td>Determine the extent of the direct and indirect damage and the direction of</td>
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<td>impact; document the methods and sequence of repair.</td>
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<tr>
<td>61</td>
<td>Analyze and identify crush or collapse zones.</td>
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<td></td>
<td><strong>Analyzing Unibody and Unitized Structure Inspection, Measurement, and Repair</strong></td>
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<tr>
<td>62</td>
<td>Analyze and identify misaligned or damaged steering, suspension, and</td>
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<td></td>
<td>powertrain mounting points that can cause vibration, steering, and chassis</td>
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<td>64</td>
<td>Measure and diagnose unibody damage using tram gauge.</td>
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<tr>
<td>65</td>
<td>Inspect the locations of all suspension, steering, and powertrain component</td>
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<td>attaching points on the vehicle.</td>
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<td>66</td>
<td>Measure and diagnose unibody vehicles using a dedicated (fixture) measuring</td>
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<td>system.</td>
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<td>Diagnose and measure unibody vehicles using a 3D measuring system (i.e.,</td>
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<td>Determine the extent of the direct and indirect damage and the direction of</td>
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<td>impact; plan and document the methods and sequence of repair.</td>
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<tr>
<td>69</td>
<td>Attach anchoring devices to a vehicle, removing or repositioning components</td>
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<td>as necessary.</td>
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<td>70</td>
<td>Straighten and align roof rails or headers and roof panels.</td>
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<td>71</td>
<td>Straighten and align rocker panels and pillars.</td>
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<tr>
<td>72</td>
<td>Straighten and align vehicle openings and floor pans.</td>
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<td>73</td>
<td>Straighten and align quarter panels, wheelhouse assemblies, and rear body sections (including rails, suspension or powertrain mounting points).</td>
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<tr>
<td>74</td>
<td>Straighten and align front-end sections (e.g., aprons, strut towers, upper and lower rails, steering, and suspension or power train mounting points, etc.).</td>
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<tr>
<td>75</td>
<td>Identify substrate and repair or replacement recommendations.</td>
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<tr>
<td>76</td>
<td>Identify heat limitations in unibody vehicles.</td>
<td></td>
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<td>77</td>
<td>Identify cold stress-relief methods.</td>
<td></td>
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<tr>
<td>78</td>
<td>Repair damage using power tools and hand tools to restore proper contours and dimensions.</td>
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<tr>
<td>79</td>
<td>Determine sectioning procedures of a steel body structure.</td>
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<tr>
<td>80</td>
<td>Remove and replace damaged structural components.</td>
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<tr>
<td>81</td>
<td>Restore corrosion protection to repaired or replaced structural areas and anchoring locations.</td>
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<tr>
<td>82</td>
<td>Determine the extent of damage to aluminum structural components; repair, weld, or replace.</td>
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<tr>
<td>83</td>
<td>Analyze and identify crush or collapse zones.</td>
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<tr>
<td>84</td>
<td>Identify considerations for the removal, handling, and installation of advanced glass systems (i.e., rain sensors, navigation, cameras, and collision avoidance systems).</td>
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<tr>
<td>85</td>
<td>Remove and reinstall or replace modular glass using recommended materials.</td>
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<tr>
<td>86</td>
<td>Check for water leaks, dust leaks, and wind noise.</td>
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</tbody>
</table>

Legend: ★Essential ○Non-essential ☹Omitted
Curriculum Framework

STRUCTURAL ANALYSIS AND DAMAGE REPAIR

Practicing Safety

Task Number 39

Select and use personal protective equipment (PPE); take necessary precautions with hazardous operations and materials in accordance with federal, state, and local regulations.

Definition

Procedures include the following:

- Identifying government agencies regulating the auto body repair industry.
- Practicing general safety rules.
- Using PPE.
- Demonstrating fire emergency procedures, including the proper use of fire protection equipment.
- Using chemicals safely.
- Identifying environmental effects of chemicals.
- Using proper chemical disposal techniques.
- Explaining and discussing information on safety data sheets (SDS).
- Identifying toxic substances and considerations in handling them.
- Using electrical safety procedures (including those related to air bag and battery).
- Identifying safe under-hood practices.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
A. Safety Precautions
Task 1

Process/Skill Questions

- How could mishandling hazardous materials affect safety?
- What effect could hazardous materials have on the environment?
- Why are proper disposal procedures important to an auto body business owner?

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**Task Number 40**

**Identify personal health hazards and related safety measures, according to Occupational Safety and Health Administration (OSHA) guidelines and the right-to-know laws.**

**Definition**

Identification should include the different types of solvents, soaps, cleaning solutions, oils, greases, specialty additives, gases, and dusts encountered in the auto body field, along with the hazards and precautions associated with each, in accordance with manufacturer's instructions, government regulations, and instructor’s guidelines. Safety measures should include

- identifying working conditions and safety precautions in the auto body repair lab during vehicle repair
- identifying the different types of fires encountered in the auto body field (classes A, B, C, and D), along with the hazards, precautions, and appropriate type of extinguisher associated with each
- identifying environmental effects of chemicals associated with the auto body field
- identifying the Environmental Protection Agency (EPA) and OSHA regulations and penalties associated with the misuse of chemicals.

Identification of proper chemical disposal techniques, as documented by EPA, OSHA, and local government regulations, and instructor’s guidelines, should include

- SDS for all nine product identification areas, stored in an easily accessible area
- information on the SDS
- toxic materials used during typical vehicle repair operations
- hazardous waste that might be generated during typical vehicle repair operations
- right-to-know laws and EPA regulations for handling toxic substances, as well as the importance of compliance with them.
Identification of potential electrical hazards during vehicle repair should include

- precautions to be taken during the disabling of airbags, computerized features, and other electrical components
- the basic types of under-hood safety practices required in the auto body field, along with the correct method of operation, the hazards (e.g., moving parts; thermal, chemical, and electrical), and the precautions associated with each, in accordance with instructor’s guidelines.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
A. Safety Precautions
Task 2

Process/Skill Questions

- Whom does OSHA protect?
- What is the importance of the right-to-know laws for the auto body field?
- How are OSHA guidelines enforced?

Task Number 41

Use PPE.

Definition

Using PPE should include identifying the equipment needed for different tasks.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
A. Safety Precautions
Task 1

Process/Skill Questions

- How do toxic chemicals enter the body?
- What tools are the noisiest, and how is hearing loss prevented?
Task Number 42

Use a National Institute for Occupational and Safety Health (NIOSH)-approved air purifying respirator. Inspect its condition and ensure the fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation.

Definition

Procedures should include

- inspecting the condition of the respirator and ensuring the fit and operation
- performing proper maintenance in accordance with OSHA regulations and applicable state and local regulations.

Task Number 43

Identify vehicle system hazard types (supplemental restraint system [SRS], hybrid or electric or alternative fuel vehicles), locations and recommended procedures before inspecting or replacing components.

Definition
Identification should include following the manufacturer’s warning and guidelines regarding procedures and precautions.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
A. Safety Precautions
Task 3

Process/Skill Questions

- How are the safety systems described?
- How are the hazards of working with the safety systems described?
- Where is the information on determining the location of the safety components found?

Task Number 44

Locate procedures and precautions that may apply to the vehicle being repaired.

Definition

Procedures should include

- using technology to determine the repair process
- following manufacturer’s specifications and guidelines.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
A. Safety Precautions
Task 2

Process/Skill Questions

- Why is it important to follow the procedures recommended by the original equipment manufacturer (OEM) during repair?
- Why is it important to use technology during the repair process?
Analyzing Frame Damage and Repair

Task Number 45

Measure and diagnose structural damage using a tram gauge.

Definition

Procedures should include

- knowing the proper locations for placing self-centering gauges for diagnosis
- knowing how to read and set up a tram gauge for upper- and lower- body diagnosis.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 1

Process/Skill Questions

- What is the proper distance for reading the centerline gauges?
- Where does one place a tram gauge for proper reading?

Task Number 46

Attach the vehicle to anchoring devices.

Definition

Attachment should include

- positioning the vehicle on the frame machine safely and correctly
- checking for any wires or lines in the pinch-weld areas where the anchoring will take place
- torqueing anchoring systems, based on manufacturer’s specifications.
Task Number 47

Analyze, straighten, and align mash (i.e., collapse) damage.

Definition

Analysis should include the

- type of damage, as determined by measuring the damaged area
- attachment site and the direction of pull for proper alignment of the damaged area.

Task Number 48

Analyze, straighten, and align sag damage.

Definition

Analysis should include
• visually inspecting the sheet metal alignment
• measuring body dimensions
• determining the location of the sag damage
• identifying where to attach and the direction of the pull to correct the damage.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 4

Process/Skill Questions

• How will the sheet metal alignment appear if the vehicle has sag damage?
• What will the self-centering gauges show if the vehicle has sag damage?

Task Number 49

Analyze, straighten, and align sidesway damage.

Definition

Analysis should include

• visually inspecting sheet metal alignment
• measuring body dimensions
• determining the location of the sidesway damage
• identifying where to attach and the direction of pull to correct the damage.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 5

Process/Skill Questions

• How will the sheet metal alignment appear if the vehicle has sidesway damage?
• What will self-centering gauges show if the vehicle has sidesway damage?
Task Number 50

Analyze, straighten, and align twist damage.

Definition

Analysis should include

- visually inspecting sheet metal alignment
- measuring the body dimensions
- determining the location of the twist damage
- identifying where to attach and the direction of pull to correct the damage.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 6

Process/Skill Questions

- How will the sheet metal alignment appear if the vehicle has twist damage?
- What will self-centering gauges show if the vehicle has twist damage?

Task Number 51

Analyze, straighten, and align diamond frame damage.

Definition

Analysis should include

- visually inspecting sheet metal alignment
- measuring body dimensions
- determining the location of the diamond frame damage
- identifying where to attach and the direction of pull to correct the damage.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 7
Process/Skill Questions

- How will the sheet metal alignment appear if the vehicle has diamond frame damage?
- What will self-centering gauges show if the vehicle has diamond frame damage?

Task Number 52

Remove and replace damaged structural components.

Definition

Procedures should include

- identifying the damaged structural components
- explaining the attachment type and location
- performing the adhesive or resistance spot weld
- using tools needed for removal and replacement.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 8

Process/Skill Questions

- What method should be used to remove a welded structural component?
- How would one remove and install an adhesive-mounted structural component?

Task Number 53

Replace protective coatings; restore corrosion protection to repaired or replaced frame areas and anchoring locations.

Definition

Procedures should include following manufacturer’s specifications and guidelines.
Task Number 54

Analyze and identify misaligned or damaged steering, suspension, and powertrain mounting points.

Definition

Procedures should include visually inspecting

- wheels, drive shaft, and upper and lower control arms for damage that causes vibrations
- steering components for damage that causes alignment problems.

Process/Skill Questions

- What suspension parts should be inspected for possible alignment problems?
- Why is it important to visually inspect suspension components?
Align or replace misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and wheel-alignment problems.

Definition

Process should include removing and installing replacement components of the steering system and driveline system (e.g., drive shaft, wheel assemblies, upper and lower control arms, tie rod).

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 11

Process/Skill Questions

- How is a wheel assembly removed and installed?
- What type of alignment problem would a bent tie rod end cause?

Task Number 56

Align or replace misaligned or damaged steering, suspension, and powertrain mounting points that can cause vibration, steering, and wheel alignment problems.

Definition

Procedures should include removing and installing replacement components of the steering system and driveline system (e.g., drive shaft, wheel assemblies, upper and lower control arms, tie rod).

Process/Skill Questions

- How is a wheel assembly removed and installed?
- What type of alignment problem would a bent tie rod end cause?

Task Number 57
Identify heat limitations and monitoring procedures for structural components.

Definition

Identification should include the reasons for limiting heat while repairing structural components, according to manufacturer’s repair specifications.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 12

Process/Skill Questions

• When should heat be applied to structural components?
• How should heat be applied to structural components

Task Number 58

Demonstrate an understanding of structural foam applications.

Definition

Demonstration should include determining the location of structural foam.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 13

Process/Skill Questions

• How is structural foam applied?
• What are the benefits of structural foam?
• What tools are needed to apply structural foam?
Task Number 59

Measure and diagnose structural damage using a 3D measuring system (i.e., mechanical, electronic, laser), etc.

Definition

Procedures should include

- how a universal measuring system works
- where and how to attach the targets for proper reading, as specified by the system’s manufacturer.

Process/Skill Questions

- Where are the proper mounting locations for a universal measuring system?
- What are some advantages of using a universal measuring system?

Task Number 60

Determine the extent of the direct and indirect damage and the direction of impact; document the methods and sequence of repair.

Definition

Procedures should include

- how the dedicated fixture is attached
- how to read the fixture’s attachments to perform the appropriate repairs.

Development of a repair plan should include measuring and visually inspecting the vehicle to determine the extent of direct and indirect damage and the direction of impact.
Process/Skill Questions

- What are the advantages of a dedicated measuring system?
- How does one know if a vehicle is out of alignment when using a dedicated measuring system?
- Why is a repair plan necessary for proper repairs?

Task Number 61

Analyze and identify crush or collapse zones.

Definition

Analysis should include

- identifying the location and purpose of a crush zone
- explaining manufacturer’s recommendations for repairing crush zone areas.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
B. Frame Inspection and Repair
Task 16

Process/Skill Questions

- Why do vehicles have crush zones?
- Where are crush zones located?
- How are crush zones repaired?

Analyzing Unibody and Unitized Structure Inspection, Measurement, and Repair

Task Number 62
Analyze and identify misaligned or damaged steering, suspension, and powertrain mounting points that can cause vibration, steering, and chassis alignment problems.

Definition

Procedures should include inspection of the following:

- Suspension system (i.e., control arms, ball joints, steering knuckles, hubs, suspension springs, shock absorbers)
- Steering system (i.e., rack and pinion, steering shaft, pitman arm, idler arm, inner and outer tie-rod ends, center link, steering stabilizers)
- Powertrain components (i.e., engine components and mounts, transmission components and mounts, drive axles)

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 1

Process/Skill Questions

- Which parts or components can cause vibration?
- Which parts or components can cause alignment issues?
- Which parts can be realigned?
- Which parts might need replacement?

Task Number 63

Align or replace misaligned or damaged steering, suspension, and powertrain mounting points that can cause vibration, steering, and chassis alignment problems.

Definition

Procedures should include the steps to realign or replace the following parts and components, according to manufacturers’ specifications:
- Suspension system (i.e., control arms, ball joints, steering knuckles, hubs, suspension springs, shock absorbers)
- Steering system (i.e., rack and pinion, steering shaft, pitman arm, idler arm, inner and outer tie-rod ends, center link, steering stabilizers)
- Powertrain components (i.e., engine components and mounts, transmission components and mounts, drive axles)

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 2

Process/Skill Questions

- What parts can be realigned?
- What parts have to be replaced?
- What are the repair procedures for a damaged part?

Task Number 64

Measure and diagnose unibody damage using tram gauge.

Definition

Procedures should include

- identifying tram gauge types
- reading a tram gauge
- setting up and measuring, using a tram gauge
- setting up and reading a self-centering gauge.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 3

Process/Skill Questions

- What is a tram gauge?
- What are self-centering gauges?
Task Number 65

Inspect the locations of all suspension, steering, and powertrain component attaching points on the vehicle.

Definition

Inspection should include

- bolts and fasteners
- insertion points for bolts or fasteners
- welds, sealers, and corrosion protection damage
- bent or kinked panels.

Process/Skill Questions

- Where are attaching points?
- Why are attaching points important?
- What are the steps to inspect attaching points?

Task Number 66

Measure and diagnose unibody vehicles using a dedicated (fixture) measuring system.

Definition

Procedures should include

- setting up a dedicated measuring system
- reading a dedicated measuring system.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 4

Process/Skill Questions


- What is a dedicated measuring system?
- Why are accurate measurements important for unibody repair?

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**Task Number 67**

**Diagnose and measure unibody vehicles using a 3D measuring system (i.e., mechanical, electronic, and laser, etc.).**

**Definition**

Procedures should include

- various types of universal measuring systems
- setting up a universal measuring system
- reading a universal measuring system.

**ASE Education Foundation**

2016 Collision Master Task List

I. Structural Analysis and Damage Repair

C. Unibody and Unitized Structure Inspection, Measurement, and Repair

Task 5

**Process/Skill Questions**

- What is a universal measuring system?
- What are the types of universal measuring systems?
- Why are accurate measurements important for unibody repair?

---

**Task Number 68**

**Determine the extent of the direct and indirect damage and the direction of impact; plan and document the methods and sequence of repair.**

**Definition**

Development of a repair plan should include
• determining the point of impact
• determining if the damaged area needs to be repaired or replaced
• using the first-in, last-out rule.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 6

Process/Skill Questions

• What is direct damage?
• What is indirect damage?
• How is the point of impact determined?

Task Number 69

Attach anchoring devices to a vehicle, removing or repositioning components as necessary.

Definition

Attachment should include

• identifying the proper location for anchoring devices
• determining any components that need removal or repositioning for attachment of anchoring device
• following safety precautions when anchoring a vehicle
• attaching anchor devices to a vehicle and frame rack.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 7

Process/Skill Questions

• What anchoring devices are available?
• Where should anchoring devices be attached?
• How should anchoring devices be attached?
Task Number 70

Straighten and align roof rails or headers and roof panels.

Definition

Procedures should include

- determining the extent of damage
- attaching a pulling or straightening device
- measuring to ensure alignment
- locating roof rails or headers and roof panels.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 8

Process/Skill Questions

- Where are roof rails or headers and roof panels located?
- What techniques can be used for straightening roof rails or headers and roof panels?

Task Number 71

Straighten and align rocker panels and pillars.

Definition

Procedures should include

- determining the extent of damage
- attaching a pulling or straightening device
- measuring to ensure alignment
- locating hinge and lock pillars.
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 9

Process/Skill Questions

- Where are hinge and lock pillars located?
- What techniques can be used for straightening hinge and lock pillars?

Task Number 72

Straighten and align vehicle openings and floor pans.

Definition

Procedures should include

- determining the extent of damage
- attaching a pulling or straightening device
- measuring to ensure alignment
- locating openings, floor pans, and rocker panels.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 10

Process/Skill Questions

- Where are openings, floor pans, and rocker panels located?
- What techniques can be used for straightening openings, floor pans, and rocker panels?

Task Number 73

Straighten and align quarter panels, wheelhouse assemblies, and rear body sections (including rails, suspension or powertrain mounting points).

Definition
Procedures should include

- determining the extent of damage
- attaching a pulling or straightening device
- measuring to ensure alignment
- locating quarter panels, wheelhouse assemblies, and rear body sections (including rails, suspension or powertrain mounting points, etc.).

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 11

Process/Skill Questions

- Where are quarter panels, wheelhouse assemblies, and rear body sections located?
- What techniques can be used for straightening quarter panels, wheelhouse assemblies, and rear body sections?

Task Number 74

Straighten and align front-end sections (e.g., aprons, strut towers, upper and lower rails, steering, and suspension or power train mounting points, etc.).

Definition

Procedures should include

- determining the extent of damage
- attaching a pulling or straightening device
- measuring to ensure alignment
- locating front-end sections (e.g., aprons, strut towers, upper and lower rails, steering, suspension or power train mounting points).
Process/Skill Questions

- Where are front-end sections located?
- What techniques can be used for straightening front-end sections?

---

Task Number 75

Identify substrate and repair or replacement recommendations.

Definition

Identification should include following OEM recommendations.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 13

Process/Skill Questions

- Why is important to follow OEM recommendations?
- How does one determine the best material to use?

---

Task Number 76

Identify heat limitations in unibody vehicles.

Definition

Identification should include the

- type of steel or aluminum alloy being heated
- recommended heat limitations for each alloy
- use of heat crayon or non-contact thermometer to determine the amount of heat being applied.

Process/Skill Questions
Why must one identify the type of steel or alloy being heated?
What is the process for determining the amount of heat being applied?

---

Task Number 77

Identify cold stress-relief methods.

Definition

Identification should include using hammers to stress-relieve metal.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 14

Process/Skill Questions

- When should cold stress-relief methods be used?
- Why are cold stress-relief methods used?

---

Task Number 78

Repair damage using power tools and hand tools to restore proper contours and dimensions.

Definition

Procedures should include following tools and technique specifications.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 15

Process/Skill Questions
• What are the proper tools to be used for this repair?
• How are the repair dimensions determined?

Task Number 79

Determine sectioning procedures of a steel body structure.

Definition

Determination should include following OEM specifications.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 16

Process/Skill Questions

• What is a sleeve? Why is it necessary? Can it be used?
• Where is the sectioning location?

Task Number 80

Remove and replace damaged structural components.

Definition

Procedures should include

• locating spot welds
• drilling and separating spot welds
• removing sealers and adhesives
• separating continuous metal inert gas (MIG) welds
• preparing the replacement panel for installation
• positioning and measuring the replacement panel to ensure proper fit
• using a MIG welder or other attachment method for repair.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair  
C. Unibody and Unitized Structure Inspection, Measurement, and Repair  
Task 17

Process/Skill Questions

- What are spot welds?
- How should spot welds be removed?
- How should the replacement panel be prepared for installation?
- What other methods can be used to attach the panel?

Task Number 81

Restore corrosion protection to repaired or replaced structural areas and anchoring locations.

Definition

Procedures should include following manufacturer’s specifications.

ASE Education Foundation  
2016 Collision Master Task List  
I. Structural Analysis and Damage Repair  
C. Unibody and Unitized Structure Inspection, Measurement, and Repair  
Task 18

Process/Skill Questions

- What coatings are used to restore corrosion protection, and why is it important?
- What equipment is used?

Task Number 82

Determine the extent of damage to aluminum structural components; repair, weld, or replace.

Definition

Determination should include
• analyzing the panel for either repair or replacement
• describing proper methods for aluminum repair.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 20

Process/Skill Questions

• How does one determine whether the substrate is aluminum?
• What are the procedures for aluminum repair?

Task Number 83

Analyze and identify crush or collapse zones.

Definition

Analysis should include locating crush zones and identifying damage (e.g., buckling, cracked paint or sealer).

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
C. Unibody and Unitized Structure Inspection, Measurement, and Repair
Task 20

Process/Skill Questions

• What are crush zones?
• Where are crush zones located?
• Why are crush zones important?

Stationary Glass
Task Number 84

Identify considerations for the removal, handling, and installation of advanced glass systems (i.e., rain sensors, navigation, cameras, and collision avoidance systems).

Definition

Identification should include

- deciding on the removal process
- determining the correct bonding procedures
- identifying advanced glass systems.

Task Number 85

Remove and reinstall or replace modular glass using recommended materials.

Definition

Procedures should include

- deciding on the removal process
- determining the correct bonding procedures
- identifying modular glass systems.
Process/Skill Questions

- How is modular glass determined?
- How is the installation or removal procedure determined?

Task Number 86

Check for water leaks, dust leaks, and wind noise.

Definition

Procedures should include

- inspecting seals and weather stripping
- checking panel alignment
- checking the application of seam sealers.

ASE Education Foundation
2016 Collision Master Task List
I. Structural Analysis and Damage Repair
D. Stationary Glass
Task 3

Process/Skill Questions

- What is the best way to determine whether there is a water leak?
- What are the defects to look for in seals and weather strips?
- How does one determine whether there is a wind noise or a wind rush?

SOL Correlation by Task

| 39 | Select and use personal protective equipment (PPE); take necessary precautions with hazardous operations and materials in accordance with federal, state, and local regulations. | English: 12.5
<p>| History and Social Science: GOVT.8, |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>40</td>
<td>Identify personal health hazards and related safety measures, according to Occupational Safety and Health Administration (OSHA) guidelines and the right-to-know laws.</td>
<td>GOVT.9, GOVT.15, VUS.8, WHII.8</td>
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<tr>
<td></td>
<td></td>
<td>Science: CH.1</td>
</tr>
<tr>
<td>41</td>
<td>Use PPE.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>History and Social Science: VUS.8, WHII.8</td>
</tr>
<tr>
<td>42</td>
<td>Use a National Institute for Occupational and Safety Health (NIOSH)-approved air purifying respirator. Inspect its condition and ensure the fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation.</td>
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<td></td>
<td>English: 12.5</td>
</tr>
<tr>
<td>43</td>
<td>Identify vehicle system hazard types (supplemental restraint system [SRS], hybrid or electric or alternative fuel vehicles), locations and recommended procedures before inspecting or replacing components.</td>
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<td></td>
<td></td>
<td>English: 12.5</td>
</tr>
<tr>
<td>44</td>
<td>Locate procedures and precautions that may apply to the vehicle being repaired.</td>
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<td></td>
<td></td>
<td>English: 12.2, 12.5</td>
</tr>
<tr>
<td>45</td>
<td>Measure and diagnose structural damage using a tram gauge.</td>
<td></td>
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<tr>
<td>46</td>
<td>Attach the vehicle to anchoring devices.</td>
<td></td>
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<td>47</td>
<td>Analyze, straighten, and align mash (i.e., collapse) damage.</td>
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<tr>
<td>48</td>
<td>Analyze, straighten, and align sag damage.</td>
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<tr>
<td>49</td>
<td>Analyze, straighten, and align sidesway damage.</td>
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<td>50</td>
<td>Analyze, straighten, and align twist damage.</td>
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<tr>
<td>51</td>
<td>Analyze, straighten, and align diamond frame damage.</td>
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<td>52</td>
<td>Remove and replace damaged structural components.</td>
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<td>53</td>
<td>Replace protective coatings; restore corrosion protection to repaired or replaced frame areas and anchoring locations.</td>
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<td></td>
<td></td>
<td>English: 12.5</td>
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<tr>
<td>54</td>
<td>Analyze and identify misaligned or damaged steering, suspension, and powertrain mounting points.</td>
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<tr>
<td>55</td>
<td>Align or replace misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and wheel-alignment problems.</td>
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<td>Align or replace misaligned or damaged steering, suspension, and powertrain mounting points that can cause vibration, steering, and wheel alignment problems.</td>
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<td>57</td>
<td>Identify heat limitations and monitoring procedures for structural components.</td>
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<tr>
<td>58</td>
<td>Demonstrate an understanding of structural foam applications.</td>
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<td>Measure and diagnose structural damage using a 3D measuring system (i.e., mechanical, electronic, laser), etc.</td>
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<td>Determine the extent of the direct and indirect damage and the direction of impact; document the methods and sequence of repair.</td>
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<td>Measure and diagnose unibody damage using tram gauge.</td>
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<td>Inspect the locations of all suspension, steering, and powertrain component attaching points on the vehicle.</td>
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<td>Measure and diagnose unibody vehicles using a dedicated (fixture) measuring system.</td>
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<td>67</td>
<td>Diagnose and measure unibody vehicles using a 3D measuring system (i.e., mechanical, electronic, and laser, etc.).</td>
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Repair damage using power tools and hand tools to restore proper contours and dimensions.

Determine sectioning procedures of a steel body structure.

Remove and replace damaged structural components.

Restore corrosion protection to repaired or replaced structural areas and anchoring locations.

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Identify considerations for the removal, handling, and installation of advanced glass systems (i.e., rain sensors, navigation, cameras, and collision avoidance systems).

Remove and reinstall or replace modular glass using recommended materials.

Check for water leaks, dust leaks, and wind noise.

Teacher Resources

Transportation Career Modules

The following transportation career modules were correlated to this course in March 2012 as part of Careers in Transportation Curriculum Project funded by the US Department of Transportation. Modules include field-tested activities and lesson plans that require students to apply knowledge and skills learned in this course and may encourage students to explore related careers in the Transportation, Distribution, and Logistics Career Cluster.

Click on the link to access the Careers in Transportation Curriculum Project site and scroll down to search for modules by ID number and title.

Related Career Module(s):

- ID#: ALL205-101; Title: Introduction to Transportation, Distribution and Logistics
- ID#: ALL506-102 Title: What Is Transportation?
- ID#: ALL205-101 Title: Introduction to Transportation, Distribution and Logistics
- ID#: SS615-201 Title: Transportation Industry Studies
- ID#: TO110-219 Title: Road Trip!
- ID#: TO201-122 Title: Inflated Tire Safety
- ID#: TO204-104 Title: Trucking 101
- ID#: TO619-110 Title: Alternative Fuels
Customer Service Infusion Units

Customer Service Infusion Units (CSIU) were designed to be infused with designated CTE courses to help students in those programs achieve additional, focused, validated tasks/competencies in customer service. These units are not mandatory, and, as such, the tasks/competencies are marked as "optional," to be taught at the instructor's discretion. Teachers can find the infusion/unit in the course listing.

Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked "optional." Teachers can find the infusion/unit in the course listing.
Appendix: Credentials and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- ASE Certification Examinations
- ASE Entry-Level Certification Examinations
- College and Work Readiness Assessment (CWRA+)
- Collision Repair and Refinishing Technology Assessment
- Collision Repair Assessment
- Customer Service Examination
- Customer Service Specialist (CSS) Examination
- Mobile Communications and Electronics Installer (MCEI) Examination
- National Career Readiness Certificate Assessment
- Non-Structural Technician-ProLevel 1 Certification Test
- Professional Communications Certification Examination
- Refinish Technician-ProLevel 1 Certification Test
- Workplace Readiness Skills for the Commonwealth Examination

<table>
<thead>
<tr>
<th>Career Cluster: Transportation, Distribution and Logistics</th>
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<tbody>
<tr>
<td><strong>Pathway</strong></td>
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