**Florida Department of Education**
**Curriculum Framework**

**Program Title:** **Automotive Collision Technology Technician**
**Program Type:** **Career Preparatory**
**Career Cluster:** **Transportation, Distribution and Logistics**

| Career Certificate Program | | |
|---|---|---|
| Program Number | T401300 | |
| CIP Number | 0647060306 | |
| Grade Level | 30, 31 | |
| Program Length | 1400 hours | |
| Teacher Certification | Refer to the **Program Structure** section | |
| CTSO | SkillsUSA | |
| SOC Codes (all applicable) | For program SOC codes, please see the Program and Course Tables section of the CTE Program Resources page linked below. | |
| CTE Program Resources | http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml | |
| Basic Skills Level | Computation (Mathematics): 9 | Communications (Reading and Language Arts): 9 |

**Purpose**

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in the Transportation, Distribution and Logistics career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Transportation, Distribution and Logistics career cluster.

The content includes but is not limited to basic trade skills; refinishing skills; sheetmetal repair skills; frame and unibody squaring and aligning; use of fillers; paint systems and undercoats; related welding skills; related mechanical skills; trim-hardware maintenance; glass servicing; and other miscellaneous repairs. The course content should also include training in communication, leadership, human relations and employability skills; and safe, efficient work practices.

This program focuses on broad, transferable skills and stresses understanding and demonstration of the following elements of the Automotive industry; planning, management, finance, technical and product skills, underlying principles of technology, labor issues, community issues, and health, safety and environmental issues.

**Additional Information** relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

## Program Structure

This program is a planned sequence of instruction consisting of six occupational completion points.

**NOTE:** It is recommended that students complete **OCP-A (Automotive Collision Repair and Refinishing Helper/Assistant)** and/or demonstrate mastery of the outcomes in **OCP-A (Automotive Collision Repair and Refinishing Helper/Assistant)** prior to enrolling in additional Automotive Collision Technology Technician courses. **The sequence of OCP's, after completing and/or demonstrating mastery of OCP-A (Automotive Collision Repair and Refinishing Helper/Assistant), is at the discretion of the instructor.**

Benchmarks identified with a designation of HP-I and HP-G are ASE tasks.

When offered at the postsecondary level, this program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44 (3) (b), F.S.

To teach the course(s) listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the postsecondary program structure:

| OCP | Course Number | Course Title | Teacher Certification | Length |
|---|---|---|---|---|
| A | ARR0140 | Automotive Collision Repair and Refinishing Helper/Assistant | AUTO IND @7 %7%G<br>AUTO BODY @7 7G | 150 hours |
| B | ARR0141 | Automotive Collision Refinishing Technician | | 450 hours |
| C | ARR0312 | Non-Structural Damage Repair Technician | | 300 hours |
| D | ARR0022 | Damage Analysis and Estimating | | 75 hours |
| E | ARR0112 | Automotive Collision Welding, Cutting and Joining | | 75 hours |
| F | ARR0295 | Structural Damage Repair Technician | | 350 hours |

## National Standards

Programs identified as having Industry or National Standards have been crosswalked with the corresponding standards and/or benchmarks. Industry or National Standards for the Automotive Collision Technology Technician program can be found using the following link: https://www.aseeducationfoundation.org/program-accreditation

**Florida's Career Readiness Skills for CTE Programs**

| Employability Skills | |
|---|---|
| 01.0 | Apply academic skills to workplace scenarios. |
| 01.01 | Use reading skills. |
| 01.02 | Use writing skills. |
| 01.03 | Use mathematical strategies and procedures. |
| 01.04 | Use scientific principles and procedures. |
| 02.0 | Design a solution to an industry problem. |
| 02.01 | Use critical thinking. |
| 02.02 | Use creativity. |
| 02.03 | Make sound decisions. |
| 02.04 | Solve problems. |
| 02.05 | Reason. |
| 02.06 | Plan and organize. |
| 03.0 | Manage resources within an industry project |
| 03.01 | Manage time. |
| 03.02 | Manage money or resources. |
| 03.03 | Manage materials. |
| 03.04 | Manage personnel. |
| 04.0 | Oversee the subcomponents, operations and output of a technical or organizational system. |
| 04.01 | Manage systems. |
| 04.02 | Monitor systems. |
| 04.03 | Improve systems. |
| 05.0 | Use information for decision making. |
| 05.01 | Locate information. |
| 05.02 | Organize information. |
| 05.03 | Use information. |

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| | 05.04 Analyze information. |
| | 05.05 Communicate information. |
| 06.0 | Apply relevant technology to workplace scenarios to aid productivity. |
| | 06.01 Use technology. |
| 07.0 | Interpret and express interpersonal communication. |
| | 07.01 Communicate verbally. |
| | 07.02 Listen actively. |
| | 07.03 Comprehend written material. |
| | 07.04 Convey information in writing. |
| | 07.05 Communicate nonverbally. |
| | 07.06 Interpret nonverbal communication. |
| 08.0 | Interact with others to accomplish workplace goals. |
| | 08.01 Collaborate with others in a team. |
| | 08.02 Respond to customer needs. |
| | 08.03 Exercise leadership. |
| | 08.04 Negotiate to resolve conflict. |
| | 08.05 Respect others. |
| 09.0 | Manage personal behavior to maximize productivity and professional growth. |
| | 09.01 Demonstrate responsibility and self-discipline. |
| | 09.02 Adapt and show flexibility. |
| | 09.03 Work independently. |
| | 09.04 Demonstrate a willingness to learn. |
| | 09.05 Demonstrate integrity. |
| | 09.06 Demonstrate professionalism. |
| | 09.07 Take initiative. |
| | 09.08 Display positive attitude. |
| | 09.09 Take responsibility for professional growth. |

| Job Attainment | |
|---|---|
| 10.0 | Find, assess and apply to job opportunities. |
| 10.01 | Identify online job posts relevant to his or her career aspirations. |
| 10.02 | Compare and contrast the job posts' required qualifications, job duties, compensation, benefits and employers. |
| 10.03 | Define what information, documentation and writing prompts are required for the positions. |
| 11.0 | Communicate personal competence, character and fit for a job opportunity. |
| 11.01 | Develop a resume. |
| 11.02 | Write a cover letter. |
| 11.03 | Curate a professional portfolio that includes work products. |
| 11.04 | Prepare for and experience a mock job interview. |
| 12.0 | Cultivate and leverage relationships to professionally advance. |
| 12.01 | Request a signed reference letter, letter of recommendation and/or an online skill/professionalism endorsement. |
| 12.02 | Develop a plan to cultivate a professional digital footprint. |
| 12.03 | Develop a networking plan for a specific industry of interest. |

**Standards**

After successfully completing this program, the student will be able to perform the following:

01.0 Proficiently explain and apply required shop and personal safety tasks relating to the automotive collision industry.
02.0 Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive collision industry.
03.0 Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services.
04.0 Explain and apply safety precautions; surface preparation; spray gun and related equipment operation; paint mixing, matching and applying; paint defects (causes and cures); and final detailing.
05.0 Explain and apply safety precautions; preparation; outer body panel repairs, replacements, and adjustments; metal finishing and body filling; movable glass and hardware; plastics and adhesives; electrical; and brakes.
06.0 Explain and apply safety precautions; damage analysis; estimating; vehicle construction and parts identification; and customer relations and sales skills.
07.0 Explain and apply safety precautions; metal welding, cutting, and joining.
08.0 Explain and apply safety precautions; frame inspection and repair; unibody and unitized structure inspection, measurement, repair; fixed glass; steering and suspension; heating and air conditioning; cooling systems; drive train; fuel, intake and exhaust systems; and restraint systems.

**Florida Department of Education**
**Student Performance Standards**

**Program Title:** **Automotive Collision Technology Technician**
**Career Certificate Program Number:** **T401300**

**Course Description:** The Automotive Collision Repair and Refinishing Helper/Assistant course prepares students for entry into the Automotive Collision and Repair industry. Content emphasizes beginning skills and concepts as a recommended requisite. Students study equipment skills, safety regulations, routine maintenance, and customer service.

**Abbreviations:**
ASE = Supplemental Tasks

***For every task in Automotive Collision Repair and Refinishing Helper/Assistant course, 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; hearing 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 system hazard types (Supplemental Restraint System (SRS), hybrid/electric/alternative fuel vehicles), locations and recommended procedures before inspecting or replacing components.**

| **Course Number: ARR0140**<br>**Occupational Completion Point: A**<br>**Automotive Collision Repair and Refinishing Helper/Assistant – 150 Hours** | | **Priority Number** |
|---|---|---|
| 01.0 | Proficiently explain and apply required shop and personal safety tasks relating to the automotive collision industry. The student will be able to: | |
| 01.01 | Select and use proper personal safety equipment for surface preparation, spray gun and related equipment operation, paint mixing, matching and application, paint defects, and detailing (glove, suits, hoods, eye and ear protection, etc.); take necessary precautions with hazardous operations and materials according to federal, state, and local regulations. | ASE |
| 01.02 | Identify safety and potential health hazards according to OSHA guidelines and the “Right to Know Law”. | |
| 01.03 | Demonstrate knowledge of related Industry Certifications | |
| 01.04 | Research, identify, and interpret the Federal Law as recorded in (29 CFR-1910.6H). | |
| 01.05 | Identify and use appropriate emergency first aid procedures. | |
| 01.06 | Utilize and demonstrate safe procedures for handling of hand tools, lifting tools, jack stands, and related equipment. | ASE |
| 01.07 | Utilize and identify proper PPE, ventilation and safety procedures for working within the lab/shop area, and be | ASE |

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| | able to identify and use fire extinguishers, SDS, posted evacuation routes and eye wash stations. | |
| 02.0 | Explain and apply required tasks associated with the proper use and handling of tools and equipment relating to the automotive collision industry. The student will be able to: | |
| 02.01 | Identify tools and equipment and their appropriate usage in automotive applications. | ASE |
| 02.02 | Identify, apply and use standard and metric measurement skills and designation. | ASE |
| 02.03 | Demonstrate proper cleaning, storage, and maintenance of tools and equipment. | ASE |
| 03.0 | Demonstrate proficiency in preparing vehicle for routine pre/post maintenance and customer services. The student will be able to: | |
| 03.01 | Identify information needed and the service requested on a repair order. | ASE |
| 03.02 | Identify automobiles according to engine location, cylinders, type of drive system, purpose, etc. | |
| 03.03 | Identify purpose and demonstrate proper use of fender covers, floor mats and other vehicle protection equipment. | ASE |
| 03.04 | Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. | ASE |
| 03.05 | Conduct an appropriate pre-service evaluation and report or note any concerns not already on the repair order. | |
| 03.06 | Check operation and status of instrument panel warning lights and gauges. | |
| 03.07 | Locate and use the Vehicle Identification Number (VIN), information placards, decals, tags, as required. | |
| 03.08 | Check fluid levels, replace as required. | |
| 03.09 | Inspect undercar area for leaks, damage, and unusual conditions. | |
| 03.10 | Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear. | |
| 03.11 | Inspect cooling system pipes and hoses for wear, damage, and proper routing. | |
| 03.12 | Reinstall wheel; torque wheel fasteners to specification. | |
| 03.13 | Perform a visual inspection of a disc brake system. | |
| 03.14 | Determine type of battery and charge appropriately. | |
| 03.15 | Inspect and clean battery and battery cable clamp connections. | |
| 03.16 | Perform battery, starting, and charging system tests using appropriate tester. | |
| 03.17 | Start vehicle using an auxiliary power supply. | |
| 03.18 | Maintain or restore electronic memory functions if required. | |

**Course Description:** The Automotive Collision Refinishing Technician course prepares students for entry into the Automotive Collision and Repair industry. Students study safety precautions; surface preparation; spray gun and related equipment operation; paint mixing, matching and applying; paint defects (causes and cures); and final detailing.

**Abbreviations:**
PR = Painting and Refinishing

***For every task in the Automotive Collision Refinishing Technician course, 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 system hazard types (Supplemental Restraint System (SRS), hybrid/electric/alternative fuel vehicles), locations and recommended procedures before inspecting or replacing components.**

| PR Task List: | |
|---|---|
| HP-I = | 53 |
| HP-G = | 31 |
| Total | 84 |

| Course Number: ARR0141<br>Occupational Completion Point: B<br>Automotive Collision Refinishing Technician – 450 Hours | | Priority Number |
|---|---|---|
| 04.0 | Explain and apply safety precautions; surface preparation; spray gun and related equipment operation; paint mixing, matching and applying; paint defects (causes and cures); and final detailing. The student will be able to: | |
| **Safety Precautions** | | |
| 04.01 | Select and use proper personal safety equipment; take necessary precautions with hazardous operations and materials according to federal, state, and local regulations. | HP-I |
| 04.02 | Identify safety and personal health hazards according to OSHA guidelines and the Federal Law as recorded in (29 CFR-1910.1200). | HP-I |
| 04.03 | Inspect spray environment and equipment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards. | HP-I |
| 04.04 | Select and identify 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 |
| **Surface Preparation** | | |
| 04.05 | Inspect, remove, store, and replace exterior trim and components for proper surface preparation. | HP-1 |
| 04.06 | Soap and water wash entire vehicle; use appropriate cleaner to remove contaminants. | HP-1 |
| 04.07 | 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 |
| 04.08 | Remove paint finish as needed. | HP-I |
| 04.09 | Dry or wet sand areas to be refinished. | HP-I |
| 04.10 | Identify and select appropriate sandpaper to featheredge areas to be refinished. | HP-I |

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| 04.11 Apply suitable metal treatment or primer in accordance with total product systems. | HP-I |
| 04.12 Mask and protect other areas that will not be refinished. | HP-I |
| 04.13 Demonstrate different masking techniques (recess/back masking, foam, door type, etc.). | HP-G |
| 04.14 Mix primer, primer-surfacer and primer-sealer following paint manufacturers technical data sheet instructions. | HP-I |
| 04.15 Identify a complimentary color or shade of undercoat to improve coverage. | HP-G |
| 04.16 Apply primer onto surface of repaired area; demonstrating control of primer application by keeping the areas small as possible. | HP-I |
| 04.17 Apply two-component finishing filler to minor surface imperfections. | HP-I |
| 04.18 Block sand area to which primer-surfacer has been applied. | HP-I |
| 04.19 Dry sand area to which finishing filler has been applied. | HP-I |
| 04.20 Remove dust from area to be refinished, including cracks or moldings of adjacent areas. | HP-I |
| 04.21 Clean area to be refinished using a final cleaning solution. | HP-I |
| 04.22 Remove, with a tack rag, any dust or lint particles from the area to be refinished. | HP-I |
| 04.23 Apply suitable primer sealer to the area being refinished. | HP-I |
| 04.24 Scuff sand to remove nibs or imperfections from a sealer. | HP-I |
| 04.25 Apply stone chip resistant coating. | HP-G |
| 04.26 Identify caulking and seam sealers that may need replacement. | HP-G |
| 04.27 Prepare adjacent panels for blending using manufacturers procedures. | HP-I |
| 04.28 Identify the types of rigid, semi-rigid or flexible plastic parts to be refinished; determine the materials needed, preparation, and refinishing procedures. | HP-I |
| 04.29 Identify metal parts to be refinished; determine the materials needed, preparation, and refinishing procedures. | HP-I |
| 04.30 Identify refinishing guidelines for stationary glass flange areas to be refinished. | |
| **Spray Gun and Related Equipment Operation** | |
| 04.31 Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment). | HP-I |
| 04.32 Select spray gun setup (fluid needle, nozzle, and cap) for product being applied. | HP-I |
| 04.33 Test and adjust spray gun using fluid, air and pattern control valves. | HP-I |
| 04.34 Demonstrate an understanding of the operation of pressure spray equipment. | HP-G |
| **Paint Mixing, Matching, and Applying** | |

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| 04.35 Identify color code by manufacturer's vehicle information label. | HP-I |
| 04.36 Shake, stir, reduce, catalyze/activate, and strain refinish materials. | HP-I |
| 04.37 Apply finish using appropriate spray techniques (gun arc, angle, distance, travel speed, and spray pattern overlap) for the finish being applied. | HP-I |
| 04.38 Apply selected product on test or let-down panel; check for color match. | HP-I |
| 04.39 Apply single stage topcoat. | HP-G |
| 04.40 Apply basecoat/clearcoat for panel blending and panel refinishing. | HP-I |
| 04.41 Apply basecoat/clearcoat for overall refinishing. | HP-G |
| 04.42 Remove nibs or imperfections from basecoat. | HP-I |
| 04.43 Identify product expiration dates as applicable. | HP-G |
| 04.44 Refinish plastic parts. | HP-I |
| 04.45 Apply multi-stage coats for panel blending and overall refinishing. | HP-G |
| 04.46 Identify and mix paint using a formula. | HP-I |
| 04.47 Identify poor hiding colors; determine necessary action. | HP-G |
| 04.48 Tint color using formula to achieve a blend-able match. | HP-I |
| 04.49 Identify alternative color formula to achieve a blend-able match. | HP-I |
| 04.50 Identify the materials equipment, and preparation differences between solvent and waterborne technologies. | HP-G |
| **Paint Defects – Causes and Cures** | |
| 04.51 Identify blistering (raising of the paint surface, air entrapment); correct the cause(s) and the condition. | HP-G |
| 04.52 Identify a dry spray appearance in the paint surface; correct the cause(s) and the condition. | HP-I |
| 04.53 Identify the presence of fish-eyes (crater-like openings) in the finish; correct the cause(s) and the condition. | HP-I |
| 04.54 Identify lifting; correct the cause(s) and the condition. | HP-G |
| 04.55 Identify clouding (mottling and streaking in metallic finishes); correct the cause(s) and the condition. | HP-I |
| 04.56 Identify orange peel; correct the cause(s) and the condition. | HP-I |
| 04.57 Identify overspray; correct the cause(s) and the condition. | HP-I |
| 04.58 Identify solvent popping in freshly painted surface; correct the cause(s) and the condition. | HP-G |
| 04.59 Identify sags and runs in paint surface; correct the cause(s) and the condition. | HP-I |
| 04.60 Identify sanding marks or sand-scratch swelling; correct the cause(s) and the condition. | HP-I |

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| 04.61 | Identify contour mapping/edge mapping; correct the cause(s) and the condition. | HP-G |
| 04.62 | Identify color difference (off-shade); correct the cause(s) and the condition. | HP-G |
| 04.63 | Identify tape tracking; correct the cause(s) and the condition. | HP-G |
| 04.64 | Identify low gloss condition; correct the cause(s) and the condition. | HP-G |
| 04.65 | Identify poor adhesion; determine the cause(s) and correct the condition. | HP-G |
| 04.66 | Identify paint cracking (shrinking, splitting, crows-feet or line-checking, micro-checking, etc.); correct the cause(s) and the condition. | HP-G |
| 04.67 | Identify corrosion; correct the cause(s) and the condition. | HP-G |
| 04.68 | Identify dirt or dust in the paint surface; correct the cause(s) and the condition. | HP-I |
| 04.69 | Identify water spotting; correct the cause(s) and the condition. | HP-G |
| 04.70 | Identify finish damage caused by bird droppings, tree sap, and other natural causes; correct the condition. | HP-G |
| 04.71 | Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes); correct the condition. | HP-G |
| 04.72 | Identify die-back conditions (dulling of the paint film showing haziness); correct the cause(s) and the condition. | HP-G |
| 04.73 | Identify chalking (oxidation); correct the cause(s) and the condition. | HP-G |
| 04.74 | Identify bleed-through (staining); correct the cause(s) and the condition. | HP-G |
| 04.75 | Identify pin-holing; correct the cause(s) and the condition. | HP-G |
| 04.76 | Identify buffing-related imperfections (swirl marks, wheel burns); correct the condition. | HP-I |
| 04.77 | Identify pigment flotation (color change through film build); correct the cause(s) and the condition. | HP-G |
| **Final Detail** | | |
| 04.78 | Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc. | HP-G |
| 04.79 | Sand, buff and polish fresh finish to remove defects and texture as required. | HP-I |
| 04.80 | Sand, buff and polish existing finish to recondition defects as required to match existing finish. | HP-I |
| 04.81 | Clean interior, exterior, and glass. | HP-I |
| 04.82 | Clean body openings (door jambs and edges, etc.). | HP-I |
| 04.83 | Remove overspray. | HP-I |
| 04.84 | Perform vehicle clean-up; complete quality control using a checklist. | HP-I |
| 04.85 | Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.). | HP-I |

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| 04.86 Measure and record film thickness before and after buffing. | HP-I |
| 04.87 Perform nib sanding to remove small imperfections as required. | HP-I |

**Course Description:** The Non-Structural Damage Repair Technician course prepares students for entry into the Automotive Collision and Repair industry. Students study safety the preparation; outer body panel repairs, replacements, and adjustments; metal finishing and body filling; movable glass and hardware; plastics and adhesives; electrical; and brakes.

**Abbreviations:**
NAD = Non-Structural Analysis and Damage Repair

***For every task in Non-Structural Damage Repair Technician course, 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; hearing 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 system hazard types (Supplemental Restraint System (SRS), hybrid/electric/alternative fuel vehicles), locations and recommended procedures before inspecting or replacing components.**

| **NAD Task List:** | |
|---|---|
| **HP-I** | **= 50** |
| **HP-G** | **= 33** |
| **Total** | **83** |

| **Course Number: ARR0312<br>Occupational Completion Point: C<br>Non-Structural Damage Repair Technician – 300 Hours** | **Priority Number** |
|---|---|
| 05.0 Explain and apply safety precautions; preparation; outer body panel repairs, replacements, and adjustments; metal finishing and body filling; movable glass and hardware; plastics and adhesives; electrical; and brakes. The student will be able to: | |
| **Safety Precautions** | |
| 05.01 Select and use proper personal safety equipment; take necessary precautions with hazardous operations and materials in accordance with federal, state, and local regulations. | HP-I |
| 05.02 Locate OEM procedures to identify material and composition of the vehicle being repaired (mild steel, high strength steel, ultra-high strength steel, and aluminum, etc.). | HP-I |
| 05.03 Locate procedures and precautions that may apply to the vehicle being repaired. | HP-I |
| 05.04 Identify vehicle system precautions and/or inspections to include but not limited to supplemental restraint system (SRS), advanced driver assistance systems (ADAS), hybrid/alternate fuel vehicles, locations and recommended procedures before inspecting or replacing components. | HP-I |
| **Preparation** | |
| 05.05 Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. | HP-I |

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| 05.06 | Inspect, remove, store, protect, and replace exterior trim and components necessary for proper surface preparation. | HP-I |
| 05.07 | Inspect, remove, label, store, and reinstall necessary trim and moldings. | HP-I |
| 05.08 | Inspect, remove, label, store, and reinstall body panels and components that may interfere with or be damaged during repair. | HP-I |
| 05.09 | Inspect, remove, protect label, store, and reinstall vehicle mechanical and electrical components that may interfere with or be damaged during repair. | HP-G |
| 05.10 | Protect panels, glass, interior parts, and other vehicles adjacent to the repair area. | HP-I |
| 05.11 | Soap and water wash entire vehicle; complete pre-repair inspection checklist. | HP-I |
| 05.12 | Prepare damaged area using water-based and solvent-based cleaners. | HP-I |
| 05.13 | Remove corrosion protection, under-coatings, sealers, and other protective coatings as necessary to perform repairs. | HP-I |
| 05.14 | Determine the presence of a Tire Pressure Monitoring System (TPMS). | |
| 05.15 | Determine the presence of wheel locks. | HP-G |
| 05.16 | Determine the presence of an air suspension system. | HP-G |
| 05.17 | Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.) | HP-I |
| 05.18 | Identify procedures to reset maintenance indicators. | HP-G |
| 05.19 | Verify status of instrument panel warning lights and gauges. | HP-G |
| 05.20 | Test and replace fuses; confirm proper circuit operation. | HP-G |
| 05.21 | Inspect and replace exterior and courtesy lamps. | HP-G |
| 05.22 | Document damage, unusual conditions, and concerns. | HP-G |
| **Outer Body Panel Repairs, Replacements, and Adjustments** | | |
| 05.23 | Inspect/locate direct, indirect, or hidden damage and direction of impact. | HP-I |
| 05.24 | Inspect, remove and replace mechanically fastened welded steel panel or panel assemblies. | HP-G |
| 05.25 | Determine the extent of damage to aluminum body panels; repair or replace. | HP-G |
| 05.26 | Inspect, remove, replace, and align hood, hood hinges, and hood latch. (when available) | HP-I |
| 05.27 | Inspect, remove, replace, and align deck lid, lid hinges, and lid latch. | HP-I |
| 05.28 | Inspect, remove, replace, and align doors, latches, hinges, and related hardware. (when available) | HP-I |
| 05.29 | Inspect, remove, replace and align tailgates, hatches, lift-gates and sliding doors. (when available) | HP-G |

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| 05.30 Inspect, remove, replace, and align bumper bars, covers, reinforcements, guards, impact absorbers, and mounting hardware. | HP-I |
| 05.31 Inspect, remove, replace and align fenders, and related panels. | HP-I |
| 05.32 Restore corrosion protection during and after the repair. | HP-I |
| 05.33 Identify procedures to replace door skins. | HP-G |
| 05.34 Identify procedures to restore sound deadeners and foam materials. | HP-G |
| 05.35 Identify procedures to perform panel bonding and weld bonding. | HP-G |
| 05.36 Identify procedures to diagnose and repair water leaks, dust leaks, and wind noise. | HP-G |
| 05.37 Identify one-time use fasteners. | HP-G |
| 05.38 Identify procedures to weld damaged or torn steel body panels; repaired broken welds. | HP-G |
| 05.39 Inspect, identify labels/decals and replace as necessary. | HP-G |
| **Metal Finishing and Body Filling** | |
| 05.40 Prepare a panel for body filler by abrading or removing the coatings; featheredge and refine scratches before the application of body filler. | HP-I |
| 05.41 Locate and repair surface irregularities on a damaged body panel using power tools, hand tools, and weld-on pulling attachments. | HP-I |
| 05.42 Demonstrate hammer and dolly techniques. | HP-I |
| 05.43 Identify procedures to Hot or cold shrink stretched panel areas to proper contour. | HP-I |
| 05.44 Identify body filler defects; correct the cause and condition. (Pin-holing, ghosting, staining, over catalyzing, etc.) | HP-I |
| 05.45 Identify different types of body fillers. | HP-G |
| 05.46 Shape body filler to contour; finish sand. | HP-I |
| 05.47 Identify the processes to perform proper metal finishing techniques for ferrous and non-ferrous metals. | HP-G |
| 05.48 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 |
| 05.49 Perform proper metal finishing techniques for aluminum. | HP-G |
| 05.50 Perform proper application of body filler to Aluminum. | HP-G |
| 05.51 Locate and repair surface irregularities and straighten contours on a damaged panel using Glue-Pulling Dent Repair (GDPR). | HP_G |
| 05.52 Mix and apply body filler. | HP-I |
| **Moveable Glass and Hardware** | |

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| 05.53 Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls. | HP-I |
| 05.54 Inspect, adjust, repair, remove, reinstall or replace weather-stripping. | HP-I |
| 05.55 Inspect, repair or replace, and adjust removable power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs. | HP-G |
| 05.56 Inspect, remove, reinstall, and align convertible top and related mechanisms. | HP-G |
| 05.57 Identify procedures to initialize electrical components as needed. | HP-G |
| **Plastics and Adhesives** | |
| 05.58 Identify the types of plastics; determine repair-ability. | HP-I |
| 05.59 Clean and prepare the surface of plastic parts; identify the types of plastic repair procedures. | HP-I |
| 05.60 Repair rigid, semi-rigid, or flexible plastic panels. | HP-I |
| 05.61 Replace bonded rigid exterior composite panels; straighten or align panel supports. | HP-G |
| 05.62 Repair plastic parts by welding (nitrogen, airless). | HP-G |
| 05.63 Perform a single-sided adhesively bonded cosmetic repair. | HP-I |
| 05.64 Perform a double-sided adhesively bonded repair. | HP-I |
| 05.65 Perform an adhesively bonded or welded tab repair. | HP-I |
| 05.66 Shape or reform damaged plastic. | HP-G |
| **Electrical** | |
| 05.67 Demonstrate an understanding of Ohm’s Law. | HP-I |
| 05.68 Check for available voltage, voltage drop and current, and resistance in electrical wiring circuits and components with a digital multimeter (DMM). | HP-I |
| 05.69 Identify processes and procedures to repair wiring and connectors. | HP-I |
| 05.70 Identify processes and procedures to inspect, test, and replace fusible links, circuit breakers, and fuses. | HP-I |
| 05.71 Identify processes and procedures to perform battery state-of-charge test and slow/fast battery charge. | HP-I |
| 05.72 Identify processes and procedures to inspect, clean, repair or replace battery, battery cables, connectors and clamps. | HP-I |
| 05.73 Dispose of batteries according to local, state, and federal requirements. | HP-G |
| 05.74 Identify programmable electrical/electronic components and check for malfunction indicator lamp (MIL) and fault codes; record data for reprogramming before disconnecting battery. | HP-I |
| 05.75 Identify processes and procedures to inspect alignment, adjust, remove and replace alternator (generator), drive belts, pulleys, and fans. | HP-I |

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| 05.76 | Check operation and aim headlamp assemblies and fog/driving lamps; determine needed repairs. | HP-I |
| 05.77 | Identify processes and procedures to inspect, test, and repair or replace bulbs, sockets, connectors, and ground wires of interior and exterior light circuits. | HP-I |
| 05.78 | Identify processes and procedures to remove and replace horn(s); check operation. | HP-I |
| 05.79 | Identify processes and procedures to check operation of wiper/washer systems; determine needed repairs. | HP-I |
| 05.80 | Identify processes and procedures to check operation of power side and tailgate window; determine needed repairs. | HP-I |
| 05.81 | Identify processes and procedures to inspect, remove and replace power seat, motors, linkages, cables, etc. | HP-G |
| 05.82 | Identify processes and procedures to inspect, remove and replace components of electric door and hatch/trunk lock. | HP-G |
| 05.83 | Identify processes and procedures to inspect, remove and replace components of keyless lock/unlock devices and alarm systems. | HP-G |
| 05.84 | Identify processes and procedures to inspect, remove and replace components of electrical sunroof and convertible/retractable hard top. | HP-G |
| 05.85 | Identify processes and procedures to identify processes and procedures to check operation of electrically heated mirrors, windshields, back lights, panels, etc.; determine needed repairs. | HP-I |
| 05.86 | Identify processes and procedures to demonstrate the proper self-grounding procedures (anti-static) for handling electronic components. | HP-I |
| 05.87 | Identify processes and procedures to check for module communication errors using a scan tool. | HP-G |
| 05.88 | Identify processes and procedures to use wiring diagrams, component location, and diagnostic flow charts during diagnosis of electrical circuit problems. | HP-G |
| 05.89 | Identify processes and procedures to identify safe disabling techniques of high voltage systems on hybrid/electric vehicles. | HP-G |
| 05.90 | Identify processes and procedures to identify potential safety and material handling concerns associated with high voltage hybrid/electric vehicle battery systems. | HP-G |
| **Brakes** | | |
| 05.91 | Identify processes and procedures to inspect brake lines, hoses, and fittings for damage or wear; tighten fittings and supports; replace brake lines (double flare and ISO types). | HP-G |
| 05.92 | Identify processes and procedures to replace hoses, fittings, seals, and supports. | HP-G |
| 05.93 | Identify processes and procedures to identify, handle, store, and fill with appropriate brake fluids. | HP-G |
| 05.94 | Identify processes and procedures to bleed (manual, pressure, or vacuum) hydraulic brake system. | HP-I |
| 05.95 | Identify processes and procedures to pressure test brake hydraulic system; determine necessary action. | HP-G |
| 05.96 | Identify processes and procedures to adjust brake shoes or pads; remove and reinstall brake drums or drum/hub assemblies. | HP-G |
| 05.97 | Identify processes and procedures to remove, clean and inspect caliper and rotor assembly and mountings for | HP-G |

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| | wear and damage; reinstall. | |
| 05.98 | Identify processes and procedures to inspect parking brake system operation; repair or adjust as necessary; verify operation. | HP-G |
| 05.99 | Identify processes and procedures to identify the proper procedures for handling brake dust. | HP-G |
| 05.100 | Identify processes and procedures to check for bent or damaged brake system components. | HP-G |
| 05.101 | Identify processes and procedures to demonstrate an understanding of various types of advanced braking systems (ABS, electronic parking brake, hydraulic, electronic, traction and stability control). | HP-G |
| 05.102 | Perform vehicle clean-up; complete quality control using a checklist on operations performed. | HP-I |

**Course Description:** The Damage Analysis and Estimating course prepares students for entry into the Automotive Collision and Repair industry. Students study damage analysis; estimating; vehicle construction and parts identification; and customer relations and sales skills.

**Abbreviations:**
DEC = Damage Analysis, Estimating and Customer Service

***For every task in Damage Analysis and Estimating course, 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 system hazard types (Supplemental Restraint System (SRS), hybrid/electric/alternative fuel vehicles), locations and recommended procedures before inspecting or replacing components.**

| **DEC Task List:** | |
|---|---|
| **HP-I** | **= 30** |
| **HP-G** | **= 35** |
| **Total** | **65** |

| **Course Number: ARR0022<br>Occupational Completion Point: D<br>Damage Analysis and Estimating – 75 Hours** | | **Priority Number** |
|---|---|---|
| 06.0 | Explain and apply safety precautions; damage analysis; estimating; vehicle construction and parts identification; and customer relations and sales skills. The student will be able to: | |
| **Safety Precautions** | | |
| 06.01 | Select and use proper personal safety equipment; take necessary precautions with hazardous operations and materials in accordance with federal, state, and local regulations. | HP-I |
| 06.02 | Locate OEM procedures to identify material and composition of the vehicle being repaired (mild steel, high strength, ultra-high strength steel, and aluminum, etc.). | HP-I |
| 06.03 | Locate procedures and precautions that may apply to the vehicle being repaired. | HP-I |
| 06.04 | Identify vehicle systems precautions and/or inspections to include but not limited to supplemental restraint system (SRS), advanced driver assistance systems (ADAS), hybrid/alternate fuel vehicles, locations and recommended procedures before inspecting of replacing components. | HP-I |

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| **Damage Analysis** | | |
| 06.05 | Position the vehicle for inspection under proper lighting; take phots to identify the vehicle and document damage. | HP-I |
| 06.06 | Identify vehicle for inspection by providing access to damaged areas. | HP-G |
| 06.07 | Analyze damage to determine appropriate methods for overall repairs. | HP-I |
| 06.08 | Determine the direction, point(s) of impact, and extent of direct, indirect, and inertia damage. | HP-G |
| 06.09 | Gather details of the incident/accident necessary to determine the full extent of vehicle damage. | HP-G |
| 06.10 | Identify and record pre-existing damage. | HP-I |
| 06.11 | Identify and record prior repairs. | HP-G |
| 06.12 | Perform visual inspection of structural components. | HP-G |
| 06.13 | Identify structural damage using measuring tools and equipment. | HP-I |
| 06.14 | Perform visual inspection of non-structural components. | HP-I |
| 06.15 | Determine parts, components, material type(s) and procedures necessary for a proper repair. | HP-I |
| 06.16 | Identify type and condition of finish; determine if refinishing is required. | HP-I |
| 06.17 | Identify suspension, electrical, and mechanical component physical damage. | HP-G |
| 06.18 | Identify safety systems physical damage. | HP-G |
| 06.19 | Identify interior component damage. | HP-I |
| 06.20 | Identify damage to add-on accessories and modifications. | HP-G |
| 06.21 | Identify single (one time) use components. | HP-G |
| 06.22 | Inspect under-hood area for leaks, damage, and unusual conditions. | |
| 06.23 | Determine fluid type requirements and identify fluid. | |
| 06.24 | Identify and document illuminated malfunction indicator lamp(s) (MIL). | HP-I |
| 06.25 | Perform a pre-repair inspection of the vehicle with the customer. Record fit and finish concerns (color mismatch, factory gaps, unrelated prior damage and prior repairs). | HP-G |
| **Estimating** | | |
| 06.26 | Determine telematic/connectivity of the vehicle and place in service mode. | HP-G |
| 06.27 | Determine and record customer/vehicle owner information. | HP-I |
| 06.28 | 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 |
| 06.29 | Identify and record vehicle options, including trim level, paint code, transmission, accessories, and modifications. | HP-I |

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| 06.30 | Identify safety systems; determine replacement items. | HP-G |
| 06.31 | Apply appropriate estimating and parts nomenclature (terminology). | HP-I |
| 06.32 | Determine and apply appropriate estimating sequence. | HP-I |
| 06.33 | Utilize estimating guide procedure pages. | HP-I |
| 06.34 | Apply estimating guide footnotes and headnotes as needed. | HP-I |
| 06.35 | Identify operations requiring labor value judgment. | HP-G |
| 06.36 | Select appropriate labor value for each operation (structural, non-structural, mechanical, and refinish). | HP-I |
| 06.37 | Select and price OEM parts, optional OEM parts, aftermarket parts, recyclable/used parts, remanufactured, rebuilt, and reconditioned parts; verify availability, compatibility, and condition. | HP-G |
| 06.38 | Locate and use technical service bulletins (TSBs). | HP-G |
| 06.39 | Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information. | HP-G |
| 06.40 | Determine price and source of necessary sublet operations. | HP-G |
| 06.41 | Determine labor value, prices, charges, allowances, or fees for non-included operations and miscellaneous items. | HP-G |
| 06.42 | Recognize and apply overlap deductions, included operations, and additions. | HP-I |
| 06.43 | Determine additional material and charges. | HP-G |
| 06.44 | Determine refinishing material and charges. | HP-I |
| 06.45 | Apply math skills to establish charges and totals. | HP-I |
| 06.46 | Identify procedural differences between computer generated and manually written estimates. | HP-G |
| 06.47 | Identify procedures to restore corrosion protection; establish labor values, and material charges. | HP-G |
| 06.48 | Determine the cost effectiveness of the repair and determine the approximate vehicle retail, and repair value. | HP-G |
| 06.49 | Recognize the differences in estimation procedures when using different information provider systems. | HP-G |
| 06.50 | Verify accuracy of estimate compared to the actual repair and replacement operations. | HP-G |
| 06.51 | Document observed damage, unusual conditions, and concerns. | HP-G |
| **Vehicle Construction and Parts Identification** | | |
| 06.52 | Identify type of vehicle construction (unibody, body-over-frame). | HP-G |
| 06.53 | Recognize the different damage characteristics of a unibody and body-over-frame vehicles. | HP-G |
| 06.54 | Identify impact energy absorbing components. | HP-G |
| 06.55 | Identify steel types; determine repair-ability. | HP-G |
| 06.56 | Identify different types of substrates (steel types, aluminum, magnesium, plastic, composites, etc.); determine | HP-G |

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| | repairability. | |
| 06.57 | Identify add-on accessories. | HP-G |
| **Customer Relations and Sales Skills** | | |
| 06.58 | Introduce yourself, acknowledge and greet customer/client/visitor; offer assistance. | HP-G |
| 06.59 | Listen to customer/client; collect information and identify customers/client's concerns, needs and expectations. | HP-G |
| 06.60 | Establish cooperative attitude with customer/client. | HP-G |
| 06.61 | Deal with dissatisfied customer/client, seek resolution. | HP-G |
| 06.62 | Identify customer/client preferred communication method; follow up to keep customer/client informed about parts and the repair process. | HP-G |
| 06.63 | Recognize basic claims handling procedures; explain to customer/client. | HP-G |
| 06.64 | Project positive attitude and professional appearance. | HP-I |
| 06.65 | Provide and review warranty information. | HP-G |
| 06.66 | Provide and review technical and consumer protection information. | HP-G |
| 06.67 | Estimate and explain duration of out-of-service time. | HP-G |
| 06.68 | Demonstrate negotiation skills to obtain a mutual agreement. | HP-G |
| 06.69 | Interpret and explain manual or computer-assisted estimate to customer/client. | HP-G |
| 06.70 | Perform vehicle clean-up; complete quality control using a checklist on operations performed. | HP-I |

**Course Description:** The Automotive Collision Welding, Cutting and Joining course prepares students for entry into the Automotive Collision and Repair industry. Students study basic welding skills specifically related to automotive collision and repair; safety precautions; metal welding, cutting, and joining.

**Abbreviations:**
WCJ = Welding, Cutting and Joining

***For every task in Automotive Collision Welding, Cutting and Joining course, 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 system hazard types (Supplemental Restraint System (SRS), hybrid/electric/alternative fuel vehicles), locations and recommended procedures before inspecting or replacing components.**

| **WCJ Task List:** | |
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| | **HP-I = 17** |
| | **HP-G = 04** |
| **Total** | **21** |

| Course Number: ARR0112<br>Occupational Completion Point: E<br>Automotive Collision Welding, Cutting and Joining – 75 Hours | Priority Number |
|---|---|
| 07.0 Explain and apply safety precautions; metal welding, cutting, and joining. The student will be able to: | |
| **Safety Precautions** | |
| 07.01 Select and use proper personal safety equipment; take necessary precautions with hazardous operations and materials in accordance with federal, state, and local regulations. | HP-I |
| 07.02 Locate OEM procedures to identify materials and composites of the vehicle being repaired (mild steel, high strength steel, ultra-high strength steel, aluminum, etc.). | HP-I |
| 07.03 Locate procedures and precautions that may apply to the vehicle being repaired. | HP-I |
| 07.04 Identify vehicle systems precautions and/or inspections to include but not limited to supplemental restraint system (SRS), advanced driver assistance systems (ADAS), hybrid/alternative fuel vehicles, locations and recommended procedures before inspecting or replacing components. | HP-I |
| 07.05 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 |
| **Metal Welding, Cutting, and Joining** | |
| 07.06 Identify the considerations for cutting, removing, and welding various types of steel, aluminum, and other metals. | HP-G |
| 07.07 Determine the correct GMAW welder type, electrode/wire type, diameter, and gas to be used in a specific welding situation. | HP-I |
| 07.08 Set up, attach work clamp (ground), and adjust the GMAW welder to "tune" for proper electrode stick-out, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded. | HP-I |
| 07.09 Store, handle, and install high-pressure gas cylinders; test for leaks. | HP-I |
| 07.10 Determine the proper angle of the gun to the joint and direction of gun travel for the type of weld being made. | HP-G |
| 07.11 Protect adjacent panels, glass, vehicle interior, etc., from welding and cutting operations. | HP-I |
| 07.12 Identify hazards; foam coatings and flammable materials prior to welding/cutting procedures. | HP-G |
| 07.13 Protect computers and other electronics/wires during welding procedures. | HP-I |
| 07.14 Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, and clamp or tack as required. | HP-I |
| 07.15 Determine the joint type (butt weld with backing, lap, etc.) for weld being made. | HP-I |
| 07.16 Determine the type of weld (continuous, stitch weld, plug, etc.) for each specific welding operation. | HP-I |
| 07.17 Perform the following welds: plug, butt weld with and without backing, and fillet, etc., in the flat, horizontal, vertical, and overhead positions. | HP-I |
| 07.18 Perform visual evaluation and destructive test on each weld type. | HP-I |

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| 07.19 | Identify the causes of various welding defects; make necessary adjustments. | HP-I |
| 07.20 | Identify cause of contact tip burn-back and failure of wire to feed; make necessary adjustments. | HP-I |
| 07.21 | Identify cutting process for different substrates and locations; perform cutting operation | HP-I |
| 07.22 | Identify different methods of attaching structural components (squeeze type resistance spot welding (STRSW), riveting, structural adhesive, MIG bronze, rivet bonding, weld bonding, etc.). | HP-G |
| 07.23 | Perform vehicle clean-up; complete quality control using a checklist on operations performed. | HP-I |

**Course Description:** The Structural Damage Repair Technician course prepares students for entry into the Automotive Collision and Repair industry. Students study frame inspection and repair; unibody and unitized structure inspection, measurement, and repair; fixed glass; steering and suspension; heating and air conditioning; cooling systems; drive train; fuel, intake and exhaust systems; and restraint systems.

**Abbreviations:**
SAD = Structural Analysis and Damage Repair
ASE = Supplemental Tasks

***For every task in Structural Damage Repair Technician course, 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 system hazard types (Supplemental Restraint System (SRS), hybrid/electric/alternative fuel vehicles), locations and recommended procedures before inspecting or replacing components.**

| **SAD Task List:** | |
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| **HP-I** | **= 30** |
| **HP-G** | **= 83** |
| **Total** | **113** |

| **Course Number: ARR0295<br>Occupational Completion Point: F<br>Structural Damage Repair Technician – 350 Hours** | | **Priority Number** |
|---|---|---|
| 08.0 | Explain and apply safety precautions; frame inspection and repair; unibody and unitized structure inspection, measurement, repair; fixed glass; steering and suspension; heating and air conditioning; cooling systems; drive train; fuel, intake and exhaust systems; and restraint systems. The student will be able to: | |
| **Safety Precautions** | | |
| 08.01 | Select and use proper personal safety equipment; take necessary precautions with hazardous operations and materials in accordance with federal, state, and local regulations. | HP-I |
| 08.02 | Locate OEM procedures to identify material and composition of the vehicle being repaired (mild steel, high strength steel, ultra-high strength steel, aluminum, etc.). | |
| 08.03 | Locate procedures and precautions that may apply to the vehicle being repaired. | HP-I |
| 08.04 | Identify vehicle systems precautions and/or inspections to include but not limited to supplemental restraint | HP-I |

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| | system (SRS), driver assistance system (ADAS), hybrid/alternative fuel vehicles, locations and recommended procedures before inspecting or replacing components. | |
| 08.05 | 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 |
| **Frame Inspection and Repair** | | |
| 08.06 | Measure and diagnose structural damage using a tram gauge. | HP-I |
| 08.07 | Identify processes and procedures to Attach vehicle to anchoring devices. | HP-G |
| 08.08 | Identify processes and procedures to Analyze, straighten and align mash (collapse) damage. | HP-G |
| 08.09 | Identify processes and procedures to Analyze, straighten and align sag damage. | HP-G |
| 08.10 | Identify processes and procedures to Analyze, straighten and align side sway damage. | HP-G |
| 08.11 | Identify processes and procedures to Analyze, straighten and align twist damage. | HP-G |
| 08.12 | Identify processes and procedures to Analyze, straighten and align diamond frame damage. | HP-G |
| 08.13 | Identify processes and procedures to Remove and replace damaged structural components. | HP-G |
| 08.14 | Identify processes and procedures to Replace protective coatings, restore corrosion protection to repaired or replaced frame areas and anchoring locations. | HP-G |
| 08.15 | Identify processes and procedures to Analyze and identify misaligned or damaged steering, suspension, and powertrain mounting points. | HP-G |
| 08.16 | Identify processes and procedures to Align or replace misaligned or damaged steering, suspension, and powertrain mounting points that can cause vibration, steering, and wheel alignment problems. | HP-G |
| 08.17 | Identify heat limitations and monitoring procedures for structural components. | HP-G |
| 08.18 | Demonstrate an understanding of foam applications. | HP-G |
| 08.19 | Measure and diagnose structural damage using a measuring system (mechanical, electronic, laser), etc. | HP-G |
| 08.20 | Determine the extent of the direct and indirect damage and the direction of impact; document the methods and sequence of repair. | HP-I |
| 08.21 | Analyze and identify crush/collapse zones. | HP-I |
| **Unibody and Unitized Structure Inspection, Measurement, and Repair** | | |
| 08.22 | Analyze and identify misaligned or damaged steering, suspension, and powertrain mounting points that can cause vibration,, steering and chassis alignment problems. | HP-G |
| 08.23 | Measure and diagnose unibody damage using a metric tape and tram gauge. | HP-I |
| 08.24 | Measure and diagnose unibody vehicles using a dedicated (fixture) measuring system. | HP-G |
| 08.25 | Diagnose and measure unibody vehicles using a three-dimensional measuring system (mechanical, electronic, and laser, etc.). | HP-G |

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| 08.26 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 |
| 08.27 Attach anchoring devices to vehicle; remove or reposition components as necessary. | HP-G |
| 08.28 Identify processes and procedures to straighten and align roof rails/headers and roof panels. | HP-G |
| 08.29 Straighten and align rocker panels and pillars. | HP-G |
| 08.30 Straighten and align vehicle openings, and floor pans. | HP-G |
| 08.31 Straighten and align quarter panels, wheelhouse assemblies, and rear body sections (including rails and suspension/powertrain mounting points). | HP-G |
| 08.32 Straighten and align front-end sections (aprons, strut towers, upper and lower rails, steering, and suspension/powertrain mounting points). | HP-G |
| 08.33 Identify substrate and repair or replacement recommendations. | HP-I |
| 08.34 Identify proper cold stress relief methods. | HP-I |
| 08.35 Repair damage using power tools and hand tools to restore proper contours and dimensions. | HP-I |
| 08.36 Determine sectioning procedures of a steel body structure. | HP-I |
| 08.37 Identify processes and procedures to restore corrosion protection to repaired or replaced structural areas, and anchoring locations. | HP-G |
| 08.38 Determine the extent of damage to aluminum structural components; repair, weld, or replace. | HP-I |
| 08.39 Analyze and identify crush/collapse zones. | HP-I |
| **Stationary Glass** | |
| 08.40 Identify considerations for removal, handling, one time use parts, and installation of advanced glass systems (comfort and safety features). | HP-G |
| 08.41 Identify processes and procedures to remove and reinstall or replace modular glass using recommended materials. | HP-G |
| 08.42 Check for water leaks, dust leaks, and wind noise. | HP-I |
| 08.43 Identify considerations for pre-scan, post-scan, and recalibration procedures. | HP-G |
| **Suspension and Steering** | |
| 08.44 Perform visual inspection and measuring checks to identify steering and suspension collision damage. | HP-G |
| 08.45 Identify one–time use fasteners. | HP-I |
| 08.46 Clean, inspect, and prepare reusable fasteners. | HP-I |
| 08.47 Identify processes and procedures to remove, replace, inspect or adjust power steering pump, pulleys, belts, hoses, fittings and pump mounts. | HP-G |
| 08.48 Identify processes and procedures to remove and replace power steering gear (non-rack and pinion type). | HP-G |

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| 08.49 | Identify processes and procedures to inspect, remove, and replace power rack and pinion steering gear and related components. | HP-G |
| 08.50 | Identify processes and procedures to inspect and replace parallelogram steering linkage components. | HP-G |
| 08.51 | Identify processes and procedures to inspect, remove and replace upper and lower control arms and related components. | HP-G |
| 08.52 | Identify processes and procedures to inspect, remove and replace steering knuckle/spindle/hub assemblies (including bearings, races, seals, etc.). | HP-G |
| 08.53 | Identify processes and procedures to inspect, remove and replace front suspension system coil springs and spring insulators (silencers). | HP-G |
| 08.54 | Identify processes and procedures to inspect, remove, replace, and adjust suspension system torsion bars, and mounts. | HP-G |
| 08.55 | Identify processes and procedures to inspect, remove and replace stabilizer bar bushings, brackets, and links. | HP-G |
| 08.56 | Identify processes and procedures to inspect, remove and replace MacPherson strut or assembly, upper bearing, and mount. | HP-G |
| 08.57 | Identify processes and procedures to inspect, remove, and replace rear suspension system transverse links, control arms, stabilizer bars, bushings, and mounts. | HP-G |
| 08.58 | Identify processes and procedures to inspect, remove, and replace suspension system leaf spring(s) and related components. | HP-G |
| 08.59 | Identify processes and procedures to inspect axle assembly for damage and misalignment. | HP-G |
| 08.60 | Identify processes and procedures to inspect, remove and replace shock absorbers. | HP-G |
| 08.61 | Identify processes and procedures to diagnose, inspect, adjust, repair or replace active suspension systems and associated lines and fittings. | HP-G |
| 08.62 | Identify processes and procedures to measure vehicle ride height and wheel base; determine necessary action. | HP-I |
| 08.63 | Identify processes and procedures to inspect, remove, replace, and align front and rear frame (cradles/sub). | HP-G |
| 08.64 | Identify processes and procedures to diagnose and inspect steering wheel, steering column, and components. | HP-G |
| 08.65 | Identify processes and procedures to verify proper operation of steering systems including electronically controlled, hydraulic and electronically assisted steering systems. | HP-G |
| 08.66 | Identify processes and procedures to diagnose front and rear suspension system noises and body sway problems; determine necessary action. | HP-G |
| 08.67 | Diagnose vehicle wandering, pulling, hard steering, bump steer, memory steering, torque steering, and steering return problems; determine necessary action. | HP-G |
| 08.68 | Demonstrate an understanding of wheel suspension and steering alignments (caster, camber, toe, SAI etc.). | HP-G |
| 08.69 | Diagnose tire wear patterns; determine cause. | HP-G |
| 08.70 | Identify processes and procedures to inspect tires; identify direction of rotation and location; check tire size, tire pressure monitoring system (TPM) and adjust air pressure. | HP-G |

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| 08.71 Identify processes and procedures to diagnose wheel/tire vibration, shimmy, tire pull (lead), wheel hop problems; determine needed repairs. | HP-G |
| 08.72 Measure wheel, tire, axle, and hub runout; determine needed repairs. | HP-G |
| 08.73 Reinstall wheels and torque lug nuts. | HP-I |
| 08.74 Identify processes and procedures to perform initialization or calibration procedures following suspension and/or steering system repairs. | HP-G |
| 08.75 Perform a tire pressure monitoring system (TPMS) calibration. | HP-G |
| 08.76 Lift the vehicle for inspection, service and repair by properly raising and supporting the vehicle. | HP-G |
| **Heating and Air Conditioning** | |
| 08.77 Identify processes and procedures to comply with environmental regulations relating to refrigerants and coolants. | HP-G |
| 08.78 Maintain and verify correct operation of certified refrigerant recovery and recharging equipment. | HP-G |
| 08.79 Locate and identify A/C system service ports. | HP-I |
| 08.80 Identify processes and procedures to identify refrigerant contamination, recover, label, store, and recycle refrigerant from an A/C system. | HP-G |
| 08.81 Identify processes and procedures to select refrigerant, evacuate, and recharge an A/C system; check for leaks. | HP-I |
| 08.82 Identify processes and procedures to select oil type and install correct amount in A/C system. | HP-I |
| 08.83 Identify processes and procedures to inspect, adjust, and replace A/C compressor drive belts; check pulley alignment. | HP-G |
| 08.84 Identify processes and procedures to remove and replace A/C compressor; inspect, repair or replace A/C compressor mount. | HP-G |
| 08.85 Identify processes and procedures to inspect, repair or replace A/C system mufflers, hoses, lines, fittings, orifice tube, expansion valve, and seals. | HP-G |
| 08.86 Identify processes and procedures to inspect, test, and replace A/C system condenser and mounts. | HP-G |
| 08.87 Identify processes and procedures to inspect and replace receiver/drier or accumulator/drier. | HP-G |
| 08.88 Identify processes and procedures to inspect and repair A/C component wiring. | HP-G |
| 08.89 Demonstrate an understanding of safe handling procedures associated with high voltage A/C compressors and wiring. | HP-G |
| 08.90 Identify processes and procedures to inspect and protect open A/C system components from contaminants during repairs. | HP-G |
| **Cooling Systems** | |
| 08.91 Check engine cooling and heater system hoses and belts; determine necessary action. | HP-I |

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| 08.92 Identify processes and procedures to inspect, test, remove, and replace radiator, pressure cap, coolant system components, and water pump. | HP-G |
| 08.93 Identify processes and procedures to 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 |
| 08.94 Identify processes and procedures to remove, inspect and replace fan (both electrical and mechanical), fan sensors, fan pulley, fan clutch, and fan shroud; check operation. | HP-G |
| 08.95 Identify processes and procedures to inspect, remove, and replace auxiliary oil/fluid coolers; check oil levels. | HP-G |
| 08.96 Demonstrate an understanding of hybrid/electric cooling systems. | HP-G |
| **Drive Train** | |
| 08.97 Identify processes and procedures to remove, replace, and adjust shift or clutch linkage as required. | HP-G |
| 08.98 Identify processes and procedures to remove and replace electronic sensors, wires, and connectors. | HP-G |
| 08.99 Identify processes and procedures to remove and reinstall powertrain assembly; inspect, replace, and align powertrain mounts. | HP-G |
| 08.100 Identify processes and procedures to remove and replace drive axle assembly. | HP-G |
| 08.101 Identify processes and procedures to inspect, remove and replace half shafts and axle constant velocity (CV) joints. | HP-G |
| 08.102 Identify processes and procedures to inspect, remove and replace drive shafts and universal joints. | HP-G |
| 08.103 Demonstrate an understanding of safe handling procedures associated with high voltage powertrain components. | HP-G |
| **Fuel, Intake and Exhaust Systems** | |
| 08.104 Identify processes and procedures to inspect, remove and replace exhaust pipes, mufflers, converters, resonators, tail pipes, and heat shields. | HP-G |
| 08.105 Identify processes and procedures to inspect, remove and replace fuel/DEF tank, tank filter, cap, filler hose, pump/sending unit and inertia switch; inspect and replace fuel lines and hoses. | HP-G |
| 08.106 Identify processes and procedures to identify processes and procedures to inspect, remove and replace engine components of air intake systems. | HP-G |
| 08.107 Identify processes and procedures to inspect, remove and replace canister, filter, vent, and purge lines of fuel vapor (EVAP) control systems. | HP-G |
| **Restraint Systems** | |
| 08.108 Identify processes and procedures to inspect, remove, and replace seatbelt and shoulder harness assembly and components. | HP-G |
| 08.109 Identify processes and procedures to inspect restraint system mounting areas for damage; repair as needed. | HP-G |
| 08.110 Identify processes and procedures to inspect the operation of the seatbelt system. | HP-I |
| 08.111 Identify processes and procedures to disable and enable Supplemental Restraint System (SRS). | HP-G |

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| 08.112 Identify processes and procedures to inspect, protect, remove and replace Supplemental Restraint Systems (SRS) sensors and wiring; ensure sensor orientation. | HP-G |
| 08.113 Identify processes and procedures to verify that Supplemental Restraint System (SRS) is operational. | HP-I |
| 08.114 Identify processes and procedures to inspect, remove, replace and dispose of deployed and non-deployed airbag(s) and pre-tensioners. | HP-G |
| 08.115 Identify processes and procedures to use Diagnostic Trouble Codes (DTC) to diagnose and repair the Supplemental Restraint System (SRS). | HP-G |
| 08.116 Demonstrate an understanding of advanced restraint systems. | HP-G |
| 08.117 Identify components of Supplemental Restraint Systems (SRS). | HP-G |
| 08.118 Demonstrate an understanding of advanced restraint and occupant classification systems (OCS). | HP-G |
| 08.119 Identify processes and procedures to disable supplemental restraint systems (SRS) in accordance with manufacturers' procedures. | HP-I |
| 08.120 Perform vehicle clean-up; complete quality control checklist on operations performed | HP-1 |

## Additional Information

### Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools, and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate, and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

### Special Notes

Benchmarks identified with a designation of HP-I and HP-G are ASE tasks.

### Career and Technical Student Organization (CTSO)

CTSOs are co-curricular career and technical student organizations providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered. Other CTSOs not listed in this curriculum framework or recognized by the Florida Department of Education are permissible provided they support student mastery over the standards and benchmarks of this curriculum framework.

### Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

### Basic Skills

In Career Certificate Programs offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Computation (Mathematics) and Communications (Reading and Language Arts). These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02, Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01, F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College System Institution must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91, F.S.

### Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.