

Automotive Collision Technology Program Elements  
 January 2023

Career Cluster: Transportation - Automotive Collision Repair							
Principles		CTE Concentrator A		CTE Concentrator B		Pathway Capstone	
7215	Principles of Collision Repair	7204	Automotive Body Repair	7206	Plastic Body Repair and Painting Fundamentals	7380	Collision Repair Capstone

7215 Principles of Collision Repair	
<b>Course Description</b>	<i>Principles of Collision Repair provides students an overview of the operating, electrical, and general maintenance systems of the modern automobile. Students will be introduced to the safety and operation of equipment and tools used in the automotive collision industry. Students will study the basics of collision repair, along with learning to perform basic service and maintenance, including the car's starting and charging system.</i>
<b>Pre/Co Req</b>	None
<b>Credits</b>	Credits: 2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
<b>Counts Toward</b>	Counts as a directed elective or elective for all diplomas
<b>VU Courses</b>	AUTO 105: Transportation Fundamentals

CONTENT STANDARDS AND COMPETENCIES	
Competency #	Competency
<b>Domain</b>	<b><i>Collision Repair</i></b>
7215-D1.1	Identify proper shop safety practices while in the labs.
7215-D1.2	Identify tools & fasteners used in automotive repair.
7215-D1.3	Identify and explain how the automotive collision industry is structured.
7215-D1.4	Identify and explain the operation of the 8 major systems of the automobile.
7215-D1.5	Identify and explain what EPA, CAFÉ and NHTSA regulations are and how they affect the automotive industry.
7215-D1.6	Identify and perform basic service and maintenance procedures.
7215-D1.7	Attain readiness to be certified to use an industry standard scanner, like ShopKey Pro exam.

7215-D1.8	Attain readiness to take industry standard safety and pollution prevention certification exams.
7215-D1.9	Attain readiness to take required environmental regulatory exams.
7215-D1.10	Attain readiness to take ICAR Pro Level I Non-Structural and Refinish Certification exam
<b>Domain</b>	<b>Basic Automotive Electrical</b>
7215-D2.1	Demonstrate safe shop practices while working with electrical systems.
7215-D2.2	Describe the basic laws of electricity and circuit construction.
7215-D2.3	Identify Electrical symbols and components.
7215-D2.4	Calculate resistance, current, and voltage problems using Ohms Laws.
7215-D2.5	Perform voltage, current, and resistance measurements using the proper measurement devices.
7215-D2.6	Perform voltage drop testing on multiplex and non-multiplex circuits.
7215-D2.7	Perform basic battery testing and diagnosis.
7215-D2.8	Identify starting and charging system components and circuits.
7215-D2.9	Diagnose starting and charging system faults.
7215-D2.10	Attain readiness to take the Snap On 504 Multimeter exam.

<b>SAMPLE ACTIVITIES</b>			
<b>Domain</b>	<b>Technical Skills</b>	<b>Activity</b>	<b>Assessment / Evaluation</b>
<b>Collision Repair</b>	<ul style="list-style-type: none"> <li>Students can demonstrate proper use and handling of hand and power tools.</li> <li>Students can assess and document vehicle collision damage.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstration and use of various tools in the shop.</li> <li>Students do practice estimates</li> <li>Identify and explain how the automotive collision industry is structured.</li> </ul>	<ul style="list-style-type: none"> <li>Students are given weekly tests where they visually identify tools.</li> <li>Students do estimates and explain the repair process from start to finish.</li> </ul>
<b>Basic Automotive Electrical</b>	<ul style="list-style-type: none"> <li>Students can properly diagnose and charge or jump start a vehicle.</li> <li>Students have a basic understanding of how a vehicle's circuit construction works.</li> </ul>	<ul style="list-style-type: none"> <li>Perform basic battery testing and diagnosis.</li> <li>Describe the basic laws of electricity and circuit construction.</li> </ul>	<ul style="list-style-type: none"> <li>Students will be assessed on following steps and procedures on hooking up a battery charger.</li> </ul>

7204 Automotive Body Repair	
<b>Course Description</b>	<i>Automotive Body Repair provides students with an understanding of the materials, measuring, welding, and information resources applicable to collision repair. Students will study steel and aluminum dent repair, including the welding practices commonly performed within an automotive repair environment. Students will gain basic skills and knowledge in oxy-fuel welding, cutting, brazing and plasma cutting, gas metal arc welding, squeeze type resistance welding, exterior panel welding and I-CAR welding test preparation. Students will also learn the installation of moldings, ornaments, and fasteners with emphasis on sheet metal analysis and safety.</i>
<b>Pre/Co Req</b>	Principles of Collision Repair
<b>Credits</b>	Credits: 2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
<b>Counts Toward</b>	Counts as a directed elective or elective for all diplomas
<b>VU Courses</b>	BODY 100 - Non-Structural Analysis and Damage Repair; BODY 100L - Non-Structural Analysis and Damage Repair Laboratory; WELD 185 - Automotive Welding

CONTENT STANDARDS AND COMPETENCIES	
Competency #	Competency
<b>Domain</b>	<b><i>Metal Body Repair</i></b>
7204-D1.1	Demonstrate proper shop safety practices while in the lab(s). This includes wearing safety glasses (goggles) at all times while in the lab(s).
7204-D1.2	Define and describe different types of metals. This includes the identification of the various types of metals used on automobiles.
7204-D1.3	Gauge metals. This includes the proper use of specific measuring tools used to gauge metals.
7204-D1.4	Remove and install moldings and ornaments. This includes the proper removal, installation, inspection, and replacement (if necessary) of moldings and ornaments.
7204-D1.5	Identify fasteners and their use. This includes all the various fasteners used on the automobile to attach a variety of body panels and pieces to the body and/or frame of the vehicle.
7204-D1.6	Use and identify hand and power tools. This includes safely and properly using the tools.
7204-D1.7	This also includes proper storing and oiling of air tools
7204-D1.8	Perform minor damage repair. This includes properly mixing and applying body filler), sanding, priming, etc. in order to prepare the surface for painting.

<b>Domain</b>	<b>Automotive Welding</b>
7204-D2.1	Demonstrate the proper safety procedures in oxy-fuel, gas metal arc welding, plasma cutting, squeeze type resistance and exterior panel welding.
7204-D2.2	Set up and shut down an oxy-fuel station properly and safely.
7204-D2.3	Perform soldering and brazing with oxy-fuel equipment.
7204-D2.4	Perform square cut, bevel cut and hole cut with hand-held oxy-fuel cutting torch and plasma cutting equipment.
7204-D2.5	Weld butt, lap and tee joints in the vertical and overhead positions with GMAW.
7204-D2.6	Perform welds with a squeeze type resistance welder.
7204-D2.7	Perform the replacement of body panels, both in steel and plastic parts.
7204-D2.8	Perform all welds necessary for I-CAR welder qualification.
7204-D2.9	Attain readiness to take ICAR Steel Welding Certification exam.

<b>SAMPLE ACTIVITIES</b>			
<b>Domain</b>	<b>Technical Skills</b>	<b>Activity</b>	<b>Assessment / Evaluation</b>
<b>Metal Body Repair</b>	<ul style="list-style-type: none"> <li>Students can perform procedures for body filler application and finishing.</li> <li>Students can demonstrate proper use and handling of hand and power tools.</li> </ul>	<ul style="list-style-type: none"> <li>Perform minor damage repair. This includes properly mixing and applying body filler, sanding, priming, etc. in order to prepare the surface for painting.</li> <li>Demonstration of tool and equipment identification.</li> </ul>	<ul style="list-style-type: none"> <li>Students are given practice panels to perform these steps.</li> <li>Lab tool identification test.</li> </ul>
<b>Automotive Welding</b>	<ul style="list-style-type: none"> <li>Students can identify and perform common welds using MIG welding equipment.</li> <li>Students can demonstrate procedures for sheet metal panel replacement (bolt on and weld).</li> </ul>	<ul style="list-style-type: none"> <li>Students perform a series of practice welds on practice panels.</li> <li>Perform the replacement of body panels, both in steel and plastic parts.</li> </ul>	<ul style="list-style-type: none"> <li>Weld butt, lap and tee joints in the vertical and overhead positions with GMAW.</li> <li>Students will be graded on their ability to identify and reproduce factory welds.</li> </ul>

7206 Plastic Body Repair and Paint Fundamentals	
<b>Course Description</b>	<i>Plastic Body Repair and Paint Fundamentals introduces the types of fiberglass and plastic materials used in auto body repair and considerations for automotive painting. Students will explore methods for repairing fiberglass and plastic damage, like welding, reinforcing, repairing holes, and retexturing plastic. Students will be asked to demonstrate the proper use of primers and sealers, spraying techniques, and an understanding of various paint finishes.</i>
<b>Pre/Co Req</b>	Principles of Collision Repair; Automotive Body Repair
<b>Credits</b>	Credits: 2 semester course, 2 semesters required, 1 credit per semester, 2 credits maximum
<b>Counts Toward</b>	Counts as a directed elective or elective for all diplomas
<b>VU Course Alignment</b>	

CONTENT STANDARDS AND COMPETENCIES	
Competency #	Competency
<b>Domain</b>	<b><i>fiberglass and Plastic Body Repair</i></b>
7206-D1.1	Demonstrate proper shop safety practices while in the lab(s). This includes: always wearing safety glasses while in the lab(s).
7206-D1.2	Define hazards and safety of materials. This includes proper handling, storing and use of materials and chemicals used.
7206-D1.3	Select tools and equipment. This includes selecting and properly using tools and equipment for the job.
7206-D1.4	Describe use of composite material.
7206-D1.5	Identify different types of damage.
7206-D1.6	Select related material in composite repair.
7206-D1.7	Repair fiberglass and plastic damage. This includes several methods such as welding, reinforcing, repairing holes and retexturing plastics.
<b>Domain</b>	<b><i>Paint Fundamentals</i></b>
7206-D2.1	Define and demonstrate metal conditioners as they relate to the different metals
7206-D2.2	Demonstrate use of primers and sealers according to their uses (per manufacturer's specifications) as a base for final finishes. This includes the proper mixing and application of both primers and sealers.

7206-D2.3	Discuss and know the difference between enamel, urethane, and lacquer finishes and their applications.
7206-D2.4	Determine the proper amount of paint needed for a specific job.
7206-D2.5	Select the proper type of thinner or reducer needed for a specific job.
7206-D2.6	Demonstrate proper spraying techniques using production type equipment for spraying
7206-D2.7	lacquer and enamel finishes.
7206-D2.8	Demonstrate the proper use and application of base coat/clear coat systems.
7206-D2.9	Clean and maintain spray equipment to remove excess materials remaining after spraying.
7206-D2.10	Properly and safely handle, store, and remove toxic body shop materials.

<b>SAMPLE ACTIVITIES</b>			
<b>Domain</b>	<b>Technical Skills</b>	<b>Activity</b>	<b>Assessment / Evaluation</b>
<b><i>Fiberglass and Plastic Body Repair</i></b>	<ul style="list-style-type: none"> <li>Students can identify and recognize the different types of fiberglass and plastic parts.</li> </ul>	<ul style="list-style-type: none"> <li>Repair fiberglass and plastic damage. This includes several methods such as welding, reinforcing, repairing holes and retexturing plastics.</li> </ul>	<ul style="list-style-type: none"> <li>Work on practice bumpers and other plastic and fiberglass pieces including customers vehicles.</li> </ul>
<b><i>Paint Fundamentals</i></b>	<ul style="list-style-type: none"> <li>Students can demonstrate use of primers and sealers according to their uses (per manufacturer's specifications) as a base for final finishes. This includes the proper mixing and application of both primers and sealers.</li> </ul>	<ul style="list-style-type: none"> <li>Mixing room instruction.</li> <li>Practice simulations on paint spray simulator equipment.</li> </ul>	<ul style="list-style-type: none"> <li>Technical Skills Evaluation.</li> </ul>

7380 Collision Repair Capstone	
<b>Course Description</b>	<i>This course further explores important skills and competencies within the Automotive Body Technology Pathway. Topics such as Automotive Painting Technology, Collision Damage Appraising, and Fiberglass Plastic Repair. Additionally, Co-Op and Internship opportunities will be available for students.</i>
<b>Pre/Co Req</b>	Principles of Collision Repair; Plastic Body Repair and Paint Fundamentals; Automotive Body Repair
<b>Credits</b>	Credits: 2 semester course, 2 semester required, 1-3 credits per semester, 6 credits max
<b>Counts Toward</b>	Counts as a Directed Elective or Elective for all diplomas
<b>VU Courses</b>	BODY 150 - Painting and Refinishing; BODY 150L - Painting and Refinishing Laboratory
<b>Promoted Certifications</b>	ASE B2; ASE B3; ASE B4; ASE A5

CONTENT STANDARDS AND COMPETENCIES	
Competency #	Competency
<b>Domain</b>	<b><i>Painting and Refinishing</i></b>
7206-C-D1.1	Demonstrate proper shop safety practices while in the lab(s). This includes wearing safety glasses (goggles) at all times while in the lab(s).
7206-C-D1.2	Prepare surfaces for refinishing. This includes proper mixing and application of primer as well as sanding, cleaning, masking, etc.
7206-C-D1.3	Spray Automotive Paint. This includes the knowledge of how to properly set up, use, clean and maintain a spray gun and its related equipment (i.e. air hoses, air source(s), air lines, etc.).
7206-C-D1.4	Spot Refinishing. This includes properly matching paint colors and types in order to apply paint to one area of the automobile so that there is no evidence of the repair.
7206-C-D1.5	Tint and Blend Colors. This includes being able to properly match paint color and type of that already on the vehicle. This also includes the ability to blend paint while applying it to the vehicle.
7206-C-D1.6	Compound (buff), polish and clean up the job. This includes buffing and polishing the vehicle after wet sanding to remove any defects and bring out paint shine. This also includes cleaning body openings (door jambs, edges, etc.) as well as the entire exterior to make the vehicle deliverable to its owner after repairs are completed.

<b>Domain</b>	<b><i>Collision Damage Appraising</i></b>
7206-C-D2.1	Demonstrate proper shop safety practices while in the lab(s). This includes wearing safety glasses (goggles) at all times while in the lab(s).
7206-C-D2.2	Inspect and record damage on a damaged vehicle. Diagnose and measure structural damage using various measuring devices.
7206-C-D2.3	Calculate paint and materials needed. This includes determining the proper type and amount of paint and related materials needed to make the repair.
7206-C-D2.4	Estimate repairable damage. This includes determining all damage that needs to be repaired or determining if the vehicle is “totaled” or a “total loss”.
7206-C-D2.5	Record labor times and parts pieces from cash guides on estimate form. Calculate data on estimate form.
7206-C-D2.6	Demonstrate proper shop safety practices while in the lab(s). This includes wearing safety glasses (goggles) at all times while in the lab(s).
<b>Domain</b>	<b><i>Metalwork and Filler</i></b>
7206-C-D3.1	Perform metal straightening and filling metals. This includes heat or cold shrinking of stretched metal panels, mixing and applying body filler (bondo) while shaping during curing as well as rough sanding cured body filler to contour and then finish sanding.
7206-C-D3.2	Remove dents in body panels. This includes properly repairing, filling, etc. dents as well as sanding the filler to the contour of the vehicle.
7206-C-D3.3	Demonstrate body-filling techniques. This includes mixing, proper application and sanding of body filler.
7206-C-D3.4	Select proper tools and materials needed to repair damaged sheet metal. This includes knowing what each tool is for and how to properly use it.



<b>SAMPLE ACTIVITIES</b>			
<b>Domain</b>	<b>Technical Skills</b>	<b>Activity</b>	<b>Assessment / Evaluation</b>
<b>Painting and Refinishing</b>	<ul style="list-style-type: none"> <li>• Students can demonstrate paint preparation and paint application procedures.</li> <li>• Students can recognize and use proper safety procedures and practices in a shop environment.</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare surfaces for refinishing. This includes proper mixing and application of primer as well as sanding, cleaning, masking, etc.</li> <li>• Safety glass demonstration.</li> <li>• Personal safety equipment demonstrations.</li> <li>• Electricity and water safety instruction.</li> <li>• Grounding equipment safety instruction.</li> </ul>	<ul style="list-style-type: none"> <li>• Students are given practice panels that they do starting from bare metal to clear coat using the steps and procedures they have learned.</li> <li>• Written safety evaluation.</li> </ul>
<b>Collision. Damage Appraising</b>	<ul style="list-style-type: none"> <li>• Students can assess and document vehicle collision damage.</li> </ul>	<ul style="list-style-type: none"> <li>• Estimate repairable damage. This includes determining all damage that needs to be repaired or determining if the vehicle is a "total loss."</li> </ul>	<ul style="list-style-type: none"> <li>• Students do a practice estimate with times and parts provided and are graded on the accuracy of their estimate.</li> </ul>
<b>Metalwork and Filler</b>	<ul style="list-style-type: none"> <li>• Students can demonstrate proper procedures for sheet metal repair.</li> <li>• Student can perform proper procedures for body filler application and finishing</li> </ul>	<ul style="list-style-type: none"> <li>• Perform metal straightening and filling metals. This includes heat or cold shrinking of stretched metal panels, mixing and applying body filler (bondo) while shaping during curing as well as rough sanding cured body filler to contour and then finish sanding.</li> <li>• Demonstrate body-filling techniques, including mixing, proper application and sanding.</li> </ul>	<ul style="list-style-type: none"> <li>• Students will be graded on the procedures while straightening and shrinking metal on practice vehicles.</li> <li>• Students will be assessed on following steps and procedures while mixing and applying body filler.</li> </ul>