CareerClusters™ PATHWAYS TO COLLEGE & CAREER READINESS
Transportation, Distribution & Logistics

Learning that works for Colorado CTE®

Colorado CTE Course – Scope and Sequence

Course Name	Introduction to Collision Repair and Refinishing	Course Details Course = 0.50 Carnegie Unit Credit	1.0
Course Description	Designed as an orientation to the automotive collision repair industry. Students receive an overview of job possibilities as well as learn various types of techniques or practices used within the automobile collision repair industry including Safety, Non-Structural Repair Preparation, Refinishing Safety, Surface Preparation and Estimating Practices.		
Note:	This is a suggested scope and sequence for the course content. The content will work with any textbook or instructional resource. If locally adapted, make sure all essential knowledge and skills are covered.		
SCED Identification #	20116	Schedule calculation based on 60 calendar days of a 90-day semester. Scope and sequence allows for additional time for guest speakers, student presentations, field trips, remediation, or other content topics.	

All courses taught in an approved CTE program must include Essential Skills embedded into the course content. The Essential Skills Framework for this course can be found at https://www.cde.state.co.us/standardsandinstruction/essentialskills

Instructional Unit Topic	Suggested Length of Instruction	CTE or Academic Standard Alignment	Competency / Performance Indicator	Outcome / Measurement	CTSO Integration
Transportation Career Exploration		Understand the nature and scope of the Transportation Career Cluster and the role transportation systems play in society and the economy. Understand the roles and responsibilities among trades and professions, including labor/management relationships. Evaluate a wide range of career pathway opportunities for success in transportation careers, emphasizing those in the	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to: (A) identify career development and entrepreneurship opportunities related to the field of collision repair and refinishing; and (B) explore career goals, objectives, and strategies	Evaluate jobs data and employment projections in the transportation industry from sources such as O*Net OnLine, synthesizing findings from each source. • Determine areas of largest growth within the collision repair and refinishing pathway and discuss the significance of transportation to the local and national economy. • Report job requirements and	SkillsUSA Personal Skills SkillsUSA 4 Pillars Updates to Student ICAP

		collision refinishing and repair pathway.	as part of a plan for future career opportunities.	characteristics for selected careers and compare personal interests and aptitudes with job requirements and characteristics of the career selected. Define employment expectations of entry-level employees in local employment situations (hiring requirements, basic job expectations, etc.) Discuss industry certification opportunities and their requirements.	
Safety		Identify employers' expectations regarding safe and appropriate work habits, ethical conduct, and environmental responsibilities in the fields of automotive collision repair and refinishing. Practice personal and occupational safety and understand the environmental effects of collision repair and refinishing practices.	The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to: (A) demonstrate awareness of workplace safety and environmental responsibilities in automotive collision and refinishing and understand the use of	Obtain OSHA 10 certificate and be able to state basic safety requirements for the industry. Comply with personal and environmental safety practices: • Use and inspect personal protective equipment every time equipment is used. • Inspect, maintain, and employ safe operating procedures with tools and equipment, such as hand and power tools, ladders,	

			personal protective equipment; (B) practice the safe handling and storage of chemicals and hazardous wastes as required by the Occupational Safety and Health Administration (OSHA), Air Resources Board (ARB), Air Quality Management Districts (AQMDs), and other regulatory agencies; (C) identify employers' expectations and appropriate work habits; and (D) apply reasoning skills to a variety of workplace situations in order to make ethical decisions.	scaffolding, and lifting equipment. • Assume responsibilities under HazCom (Hazard Communication) regulations. • Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies regarding reporting of accidents and observed hazards, and regarding emergency response procedures. • Utilize MSDSs (material safety data sheets), and identify the health hazards associated with hazardous material. • Maintain a portfolio record of written safety examinations and equipment examination for which the student has passed.	
General Industry Terminology and Resources		Discuss and describe resources, information systems and technology related to the fields of	The student demonstrates professional	Research collision repair processes described in textbooks, repair center websites, or by interviewing	

		automotive collision repair and refinishing. Demonstrate and apply relevant problem-solving, reading, and writing in-context to the Collision Industry. Read and interpret service and repair information, technical bulletins, specifications, schematics, and parts catalogs from a variety of sources.	standards/employability skills as required by business and industry. The student is expected to: (A) review the competencies related to resources, information systems, and technology; and (B) use appropriate materials and repair technology resources. The student relates core academic skills to the requirements of collision repair and refinishing technology. The student is expected to: (A) apply effective oral and written communication skills with individuals from various cultures such as fellow workers, management, and customers; (B) use technical writing skills to complete collision repair and refinishing orders and related paperwork; and	technicians. Citing research, create and publish a written, oral, or visual presentation describing the major steps involved in the collision repair process including estimating, disassembling, performing repairs, refinishing, reassembling, detailing, and final inspection. Discriminate between the different types of repair work such as metal work, structural repairs, mechanical and electrical repairs, and refinishing. Use technical vocabulary, technical reports and manuals, electronic systems, and related technical data resources, as appropriate, to determine repairs and estimates. Utilize appropriate terminology to classify and describe vehicles based on vehicle size, roof design, drive system type, and engine location. Compare and contrast the major types of body frames (i.e. body-over-frame, unibody, and space frame). Create a visual display with supporting text to describe the major structural parts, sections, and assemblies of each type of body frame.	

			(C) locate and read documents such as service and repair information, technical bulletins, specifications, schematics, and parts catalogs.	Identify and describe the major parts and components which make up an automobile body, analyzing the purpose of and interrelationships among each component and explaining the sequence in which each is put together in assembly.	
Tools, Equipment, and Materials		Discuss the basic function and application of tools, equipment, and materials used in automotive collision repair and refinishing. Identify types of vehicle construction materials and associated repair methods. Apply mathematics concepts to solve collision repair problems, distinguishing which principles apply to a given automotive problem.	The student knows the basic function and application of tools, equipment, technologies, and materials used in collision repair and refinishing services. The student is expected to: (A) identify hand and power tools and equipment commonly used in collision repair and refinishing; (B) use physical measurement devices typically employed in collision repair to complete accurate field measurements: and (C) determine the appropriate units and record accurate measurements of	Demonstrate safe use the tools, materials, and equipment commonly used in the fields of automotive collision repair and refinishing: • Accurately identify a wide range of hand tools, power tools, and equipment used in the collision repair industry. Hand tools should include wrenches, sockets, screwdrivers, pliers, files, holding tools, punches, chisels, and hammers in metric and/or Society of Automotive Engineers (SAE) sizes where appropriate/. Power tools should include air tools, grinders, polishers, blasters, and spray guns. Equipment should include spray booths,	

			lengths, angles, pressure, volume, and other measurements. The student reviews the technical knowledge and skills of collision repair and refinishing. The student is expected to: (A) demonstrate the safe use of various hand and power tools and equipment commonly used in collision repair and refinishing; and (B) identify types of vehicle construction materials and associated repair methods.	paint drying equipment, straightening systems, and lifts • Assess a variety of situations requiring the use of hand tools, power tools, and equipment. Select the proper tool, critique the readiness of the tool, use the tool to accomplish the desired task, clean the tool, and then return the tool to its proper storage according to correct size and nomenclature. For example, demonstrate the ability to safely use an air ratchet to remove hood hinge bolts. • Distinguish between the various types of fasteners commonly used in vehicle construction, such as bolts, nuts, washers, screws, nonthreaded fasteners, and adhesives, by creating a visual display outlining the properties and uses of each type. Define	

				torque and describe the procedures for applying the appropriate torque to tighten bolts. Demonstrate the ability to accurately remove, reinstall, and select the appropriate fastener in a variety of situations. For example, consult torque specifications to determine the torque value for a given size and grade of bolt and perform proper tightening sequences to secure bolts. Apply mathematics concepts to solve collision repair problems, distinguishing which principles apply to a given automotive problem. Concepts should include, but are not limited to: • Operating with whole numbers, fractions, and decimals. • Performing conversions between fractions, decimals, and percent. For example, convert a decimal to a fraction to prepare a unit for	

				measurement on a fractional scale to the precision of 1/16 of an inch. • Working with units such as feet, inches, meters, centimeters, and millimeters, and determining appropriate units for a given repair task. For example, convert fractions of an inch into millimeters to determine the appropriate size metric wrench to use to loosen a bolt. • Performing proportionate reasoning to estimate quantities.	
Basic Repair and Preparation		Apply scientific principles in relation to chemical, mechanical, and physical functions and in relation to industry and manufacturer standards.	The student understands the technical knowledge and skills of basic collision repair and refinishing systems. The student is expected to: (A) demonstrate an understanding of basic types of repair procedures used in the auto collision industry; and	Demonstrate understanding of basic types of repair procedures in simulated or actual automotive collision repair and refinishing work situations. Compare and contrast the properties and uses of basic materials employed in collision repair processes, such as body fillers, putty, mashing materials, abrasives, sandpapers, primers, paint types, drying and curing materials, and sealers.	

			(B) demonstrate an understanding of basic preparation, application, and refinishing with various paint products. Perform and document repair procedures in accordance with manufacturer recommendations and industry standards: (A) explain and practice the recommended procedures and practices of various manufacturers; (B) use reference books and materials, technical service bulletins, and other related documents to determine repairs and rate of pay; and (C) document repair procedures accurately as required by the Bureau of Automotive Repair and other regulatory agencies	Describe and demonstrate common procedures used by collision repair centers to clean and properly dispose of materials and supplies. Gather information from a variety of print and digital sources, such as textbooks, original equipment manufacturer (OEM) manuals, and online instructional materials, as well as firsthand experiences observing a qualified technician on the basic steps necessary to prepare non-structural body components for repair. Write a summary of the steps involved in the process, as if explaining the process to a new automotive collision repair student, and be able to perform each step: • Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. • Inspect, remove, label, store, and reinstall exterior trim and moldings. • Protect panels, glass, interior parts, and	

				other vehicles adjacent to the repair area. • Soap and water wash entire vehicle; complete pre-repair inspection checklist.	
Basic Welding Techniques		Demonstrate the different types of welding and heat processes used in repair processes and procedures.	The student knows the basic function and application of tools, equipment, technologies, and materials used in collision repair and refinishing services. The student is expected to: (A) identify hand and power tools and equipment commonly used in collision repair and refinishing; (B) identify proper welding and cutting techniques and processes used in collision repair; (C) identify environmentally hazardous materials and appropriate handling methods used in collision repair and refinishing technologies.	Demonstrate the different types of welding and heat processes used in repair processes and procedures: • Demonstrate the principles of metal welding and cutting. Prepare and analyze vehicles for repair. • Perform outer body panel repairs, replacements, and adjustments. • Prepare vehicles for metal finishing and body filling.	
Repair and Refinish Techniques			The student reviews the technical knowledge and skills of collision repair	Read and interpret textbooks, OEM manuals, and other instructional materials to	

			and refinishing. The student is expected to: (A) demonstrate the safe use of various hand and power tools and equipment commonly used in collision repair and refinishing; (B) identify types of vehicle construction materials and associated repair methods; (C) remove paint from the damaged area of a body panel; (D) identify and repair surface irregularities on a damaged body panel; (E) demonstrate hammer and dolly techniques for dent repair; (F) prepare damaged area using water-based and solvent-based cleaners; (G) identify, prepare, and apply body filler; and (H) rough sand body filler to contour panel and finish sand for the application of primer.	determine the basic steps necessary to properly repair surface irregularities on a damaged body panel. Apply the appropriate tools, equipment, and procedures to safely perform panel repairs: • Remove paint from the damaged area of the body panel. • Locate and repair surface irregularities on a damaged body panel. • Heat shrink stretched panel areas to proper contour. • Identify different types of body fillers. • Prepare and apply body filler. • Rough sand body filler to contour; finish sand.	

Paint and Refinish Basics		Read and interpret textbooks, OEM manuals, and other instructional materials to determine the basic steps necessary to prepare a surface for painting. Apply the appropriate tools, equipment, and procedures to safely prepare a surface for painting.	The student reviews the technical knowledge and skills of collision repair and refinishing. The student is expected to: (A) demonstrate the proper preparation, application, and refinishing of various paint products; (B) apply finish using appropriate spray techniques such as gun arc, angle, distance, travel speed, and spray pattern overlap for the finish being applied; (C) apply basecoat and clear coat for overall refinishing; and (D) sand, buff, and polish fresh or existing finish to remove defects as required.	Demonstrate understanding of basic preparation, application, and refinishing with various paint products: • Identify, use, and repair plastics and adhesives. • Prepare surfaces for painting and finishing. • Practice operation of spray guns and related equipment. • Practice mixing, matching, and applying paint. • Prepare vehicles for final detail. • Analyze the causes and cures of paint defects.	
Parts and Estimating		Understand the process of creating and following an estimate for repair within the industry.	ıdent relates core nic skills to the ements of collision repair inishing technology. The t is expected to: apply effective oral and ı communication skills with uals from various cultures	Gather information from a variety of print and digital sources (such as OEM manuals and online instructional materials) as well as firsthand experiences observing a qualified technician on preparing a vehicle for damage analysis. Create a flow chart that will show the	

			s fellow workers, ement, and customers; use technical writing skills plete collision repair and ning orders and related work; and ocate and read documents s service and repair ation, technical bulletins, cations, schematics, and atalogs. udent understands the cal knowledge and skills of ollision repair and ning systems. The student cted to: estimate parts and labor n collision repair and ning orders	entire process of analyzing damage and estimating costs. Write an accompanying text that describes how key steps are accomplished, that is, what the technician should do and observe at each step. Steps include but are not limited to the following: • Position the vehicle for inspection. • Prepare vehicle for inspection by providing access to damaged areas. • Analyze damage to determine appropriate methods for overall repairs. • Determine the direction, point(s) of impact, and extent of direct, indirect, and inertia damage. • Gather details of the incident/accident necessary to determine the full extent of vehicle damage. • Identify and record pre-existing damage. Identify and record prior repairs	
