Course Acronym:	ACRP
Course Number:	1C
Descriptive Title:	Major Collision Analysis and Structural Repair
Division:	Industry and Technology
Department:	Automotive Collision Repair/Painting
Course Disciplines:	Automotive Collision Repair/Painting
Catalog Description:	This course parallels the Automotive Service Excellence (ASE) B4 certification in the topics of: full frame and unibody vehicle construction and damage types, locating and analyzing direct and indirect damage, planning a pull, setting up and using a frame rack with and without computerized measuring systems, and replacing structural parts and panels with Metal Inert Gas (MIG) and Squeeze-Type Resistance Spot Welders (STRSW). The topics of vehicle sectioning, structural glass, suspension components, front-end alignment, and damage estimating are also covered. This course contains Inter-Industry Conference on Auto Collision Repair (I-CAR) curriculum for Non-Structural certification credit and promotes I-CAR steel welding certification standards.
Prerequisite:	Automotive Collision Repair/Painting 1A or Automotive Collision Repair/Painting 4A with a minimum grade of C in prerequisite or equivalent
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	3
Hours Laboratory (per week):	15
Outside Study Hours:	6
Total Course Hours:	324
Course Units:	8
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	
Transfer UC:	No
Effective Date:	
General Education: ECC	

Term:	
Other:	
CSU GE:	
Term:	
Other:	
IGETC:	
Term:	
Other:	
CalGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Measuring Vehicle Damage** Students will be able to identity, differentiate between, and measure direct and indirect vehicle damage. Students will be able to use proper nomenclature to write an informal estimate of what vehicle parts will need to be repaired and what parts need to be replaced. **SLO #2 Types of Frame Damage** Given access to a damaged vehicle, students will be able to recognize one or more of the five types of frame damage and will be able to create a written repair strategy to fix the damage. **SLO #3 Core Support Replacement** Students will be able to create a repair plan for replacing a damaged unibody vehicle's core support that includes analysis of the damage, an ordered list of parts for removal, tools needed to remove the core support, and location and number of welds needed to install the new support.
Course Objectives:	1. Complete a comprehensive automotive collision repair/painting safety test with 100% accuracy. 2. Identify the major panels and structural parts of full-frame and unibody vehicles, and identify the five types of full-frame damage. 3. Locate the direct and indirect damage of a damaged vehicle, and determine the direction and angle of the pull necessary to correct the frame damage. 4. Identify, analyze and measure damage to suspension components. 5. Be able to read a tape measure, tram gauge and self-centering gauges. 6. Safely position and anchor a vehicle on the frame rack 7. Assemble the three dimensional measuring system on a vehicle anchored to the frame rack. Adjust the assembly to determine datum and centerline. 8. Remove and replace welded structural parts. 9. Apply corrosion protection or noise, vibration and harshness (NVH) foams to structural repairs and panels. 10. Remove and replace structural glue-in glass. 11. Use collision estimating guides to formulate estimates.
Major Topics:	**I. PERSONAL SAFETY AND SAFE LAB PRACTICES (3 hours, lecture)**

A. Shop tour
B. General safety practices and personal safety equipment

II. FULL FRAME VEHICLE CONSTRUCTION (3 hours, lecture)

A. Major panels
B. Structural parts
C. Pros and cons of full-frame vehicle construction

III. FULL FRAME VEHICLE CONSTRUCTION (15 hours, lab)

A. Major panels
B. Structural parts
C. Pros and cons of full-frame vehicle construction

IV. UNIBODY PARTS AND CONSTRUCTION (3 hours, lecture)

A. Parts nomenclature
B. History and development of unitized vehicle construction
C. Sub frame vehicle construction
D. Pros and cons of unibody vs. full-frame construction
E. (National Automotive Technicians Education Foundation (NATEF) Structural Damage Analysis and Repair tasks: Section B, numbers 1-22)

V. UNIBODY PARTS AND CONSTRUCTION (15 hours, lab)

A. Parts nomenclature
B. History and development of unitized vehicle construction
C. Sub frame vehicle construction
D. Pros and cons of unibody vs. full-frame construction
E. (NATEF Structural Damage Analysis and Repair tasks: Section B, numbers 1-22)

VI. FRAME DAMAGE TYPES (3 hours, lecture)

A. Mash
B. Side sway
C. Sag/kickup
D. Diamond
E. Twist
F. Causes and identifying characteristics
G. (NATEF Structural Damage Analysis and Repair tasks: Section A, numbers 1-18)

VII. FRAME DAMAGE TYPES (15 hours, lab)

A. Mash
B. Side sway
C. Sag/kickup
D. Diamond
E. Twist
F. Causes and identifying characteristics
G. (NATEF Structural Damage Analysis and Repair tasks: Section A, numbers 1-18)

VIII. DIRECT AND INDIRECT DAMAGE (6 hours, lecture)

A. Locating and analyzing direct damage
B. Reading direct damage for direction and angle of opposing force
C. Locating indirect damage through panel surface disturbances
D. Locating indirect damage through bolt-on panel misalignment
E. Other signs of indirect damage

IX. DIRECT AND INDIRECT DAMAGE (30 hours, lab)

A. Locating and analyzing direct damage
B. Reading direct damage for direction and angle of opposing force
C. Locating indirect damage through panel surface disturbances
D. Locating indirect damage through bolt-on panel misalignment
E. Other signs of indirect damage

X. 2-D & 3-D MEASURING SYSTEMS (6 hours, lecture)

A. Measuring, reading gauges in centimeters and millimeters
B. Reading a frame specifications diagram
C. Using a tram gauge
D. Using self-centering gauges
E. Using a 3-D measuring system
F. Establishing datum and centerline

XI. 2-D AND 3-D MEASURING SYSTEMS (30 hours, lab)

A. Measuring, reading gauges in centimeters and millimeters
B. Reading a frame specifications diagram
C. Using a tram gauge
D. Using self-centering gauges
E. Using a 3-D measuring system
F. Establishing datum and centerline

XII. COMPUTERIZED 3-D MEASURING SYSTEMS (6 hours, lecture)

A. Safety practices
B. Mounting and anchoring a vehicle on the frame rack
C. Measuring in centimeters and millimeters
D. Parts, setup and use of Genesis system
E. Parts, setup and use of a laser measuring system
F. Planning simultaneous pulls

XIII. COMPUTERIZED 3-D MEASURING SYSTEMS (30 hours, lab)

A. Safety practices
B. Mounting and anchoring a vehicle on the frame rack
C. Measuring in centimeters and millimeters
D. Parts, setup and use of Genesis system
E. Parts, setup and use of a laser measuring system
F. Planning simultaneous pulls

XIV. FRAME RACK (6 hours, lecture)

A. Safety practices
B. Parts, accessories, setup and operation
C. Mounting and anchoring a vehicle on the frame rack
D. Driver-spotter trust and communication
E. Planning a pull
F. Pulling and measuring
G. Overpulling

XV. FRAME RACK (45 hours, lab)

A. Safety practices
B. Parts, accessories, setup and operation
C. Mounting and anchoring a vehicle on the frame rack
D. Driver-spotter trust and communication
E. Planning a pull
F. Pulling and measuring
G. Overpulling

XVI. STRUCTURAL PANEL REPLACEMENT (6 hours, lecture)

A. Removal of damaged panel(s)
B. Identification of high strength steel and boron steel, drilling spot welds
C. New panel fit-up and clamping
D. Using STRSW and MIG to weld in replacement panels
E. Finish dressing weld beads
F. Types and application of corrosion protection

XVII. STRUCTURAL PANEL REPLACEMENT (30 hours, lab)

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B. Identification of high strength steel and boron steel, drilling spot welds
C. New panel fit-up and clamping
D. Using STRSW and MIG to weld in replacement panels
E. Finish dressing weld beads
F. Types and application of corrosion protection

XVIII. CORROSION PROTECTION (3 hours, lecture)

A. Pre-accident condition for undercoat on pinch welds
B. Cavity waxes and weld-through primers
C. NVH and structural foams

XIX. CORROSION PROTECTION (15 hours, lab)

A. Pre-accident condition for undercoat on pinch welds
B. Cavity waxes and weld-through primers
C. NVH and structural foams

XX. SUSPENSION (3 hours, lecture)

	A. Safety practices B. Types and parts of suspension systems C. Measurement and damage analysis D. Removal and replacement of damaged components **XXI. SUSPENSION (15 hours, lab)** A. Safety practices B. Types and parts of suspension systems C. Measurement and damge analysis D. Removal and replacement of damaged components **XXII. STRUCTURAL GLASS (3 hours, lecture)** A. Glass removal tools B. Removal and installation of glue-in glass C. Leak detection D. Sensors and defrosters **XXIII. STRUCTURAL GLASS (15 hours, lab)** A. Glass removal tools B. Removal and installation of glue-in glass C. Leak detection D. Sensors and defrosters **XXIV. DAMAGE ESTIMATING (3 hours, lecture)** A. Using collision estimating guides B. Estimating procedure and nomenclature C. Calculating labor and material costs D. Adding mechanical and sublet operations E. State and federal laws, repair fraud **XXV. DAMAGE ESTIMATING (15 hours, lab)** A. Using collision estimating guides B. Estimating procedure and nomenclature C. Calculating labor and material costs D. Adding mechanical and sublet operations E. State and federal laws, repair fraud
Total Lecture Hours:	54
Total Laboratory Hours:	270
Total Hours:	324
A.1. Primary Methods of Evaluation (Part 1 - CCN courses only):	

A.2. Primary Method of Evaluation (Part 2 - all courses; choose one):	3) Skills demonstration
Typical Assignment Using Primary Method of Evaluation:	Measure, cut and fit up a new replacement quarter panel section for STRSW welding. Obtain instructor approval, make tack welds, then prove by rear door alignment that your fit-up is accurate to factory panel gap and flushness specs.
Critical Thinking Assignment 1:	Appraise the damage to a vehicle assigned to you. Prepare an informal one-page estimate listing the steps needed to repair the damage and the tools, materials and estimated number of hours needed to complete the repair. Submit estimate to the instructor.
Critical Thinking Assignment 2:	In a one-page report, analyze and explain how failing to follow manufacturer specs during structural panel replacement can endanger the lives of the vehicle's passengers. Include in your explanation how making a vehicle stronger than it originally was (more welds than it originally came with) can be just as dangerous as adding too few. Submit report to the instructor.
Other Evaluation Methods:	Class Performance, Completion, Homework Problems, Matching Items, Multiple Choice, Objective Exam, Other Exams, Performance Exams, Quizzes
Instructional Methods:	Demonstration, Group Activities, Guest Speakers, Lab, Lecture, Multimedia presentations
If other:	
Work Outside of Class:	Answer questions, Problem solving activity, Required reading, Study
If Other:	
Up-To-Date Representative Texts:	Joe Baker. Auto Collision Repair and Refinishing. 4th edition. Goodheart-Willcox. 2025.
Alternative Texts:	
Required Supplementary Readings:	
Other Required Materials:	Safety glasses Ear protection Dust mask Leather gloves
Requisite:	Prerequisite
Category:	sequential
Requisite course(s): List both prerequisites and corequisites in this box.	Automotive Collision Repair/Painting-1A Automotive Collision Repair/Painting-4A
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	**Understand the difference between full frame and unitized constructed vehicles.** ACRP 4A -Differentiate between a full frame and unitized construction vehicle and be able to identify by proper name the major parts, panels and structural components of each.

	ACRP 1A -Differentiate between a full frame and unitized construction vehicle. **Ability to use hand, pneumatic, electric and hydraulic tools used in industry.** ACRP 4A -Identify and use hand, pneumatic, electric and hydraulic tools used in industry. ACRP 1A -Identify and use hand, pneumatic, electric and hydraulic tools used in industry. **Ability to metal finish a damaged steel body panel back to its original condition using only hand tools and no fillers.** ACRP 4A -Metal finish a damaged steel body panel back to its original condition using only hand tools and no fillers. ACRP 1A -Metal finish a damaged steel body panel back to its original condition using only hand tools and no fillers. **Ability to grind a body panel surface for preparation for plastic filler.** ACRP 4A -Grind a body panel surface for preparation for plastic filler. ACRP 1A -Grind a body panel surface for preparation for plastic filler. **Ability to set up and operate a MIG (Metal Inert Gas) electric welder.** ACRP 1A -Set up, operate and disassemble an oxy/acetylene and a MIG (Metal Inert Gas) electric welding outfit.
Requisite Skill:	Prerequisite
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	If a student has taken an equivalent course at another college or has automotive collision repair experience, the student will be prepared to enroll in this course. Students must have collision repair experience in order to succeed in this course.
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	

Enrollment Limitations Impact:	
Course Created by:	Kenneth Zion
Date:	09/01/1982
Original Board Approval Date:	
Last Reviewed and/or Revised by:	Patricia Fairchild
Date:	10/29/2025
Last Board Approval Date:	01/21/2026
Effective Term:	FA 2026