



El Camino College
COURSE OUTLINE OF RECORD – Official

Course Acronym:	ACRP
Course Number:	1D
Descriptive Title:	Mechanical and Electrical Systems for Collision Repair Technicians
Division:	Industry and Technology
Department:	Automotive Collision Repair/Painting
Course Disciplines:	Automotive Collision Repair
Catalog Description:	This course parallels the Automotive Service Excellence (ASE) B5 certification topics of mechanical damage analysis and correction of: steering and suspension, wheel alignment, air conditioning refrigerant recovery, electrical systems, and passenger restraints and airbags. This course also provides instruction in OBDII scan tool use, hybrid/electric vehicle safety, advanced driver assist systems (ADAS) calibration and interior reconditioning. This course contains Inter-Industry Conference on Auto Collision Repair (I-CAR) curriculum for Non-Structural certification credit, and may include EPA Section 609 certification (air conditioning).
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:	Prior to July 1992
Transfer UC:	No
Effective Date:	
General Education:	ECC

	Term:	
	Other:	
	CSU GE:	
	Term:	
	Other:	
	IGETC:	
	Term:	
	Other:	
	SLO #1 Interior Plastic Repair Students will be able to locate a plastic part's type code and choose the appropriate repair method, tools, and materials. Students will then be able to apply the method and perform the repairs. SLO #2 Suspension Components Students will be able to identify damage to suspension components by measuring and visual inspection of a damaged vehicle. 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 #3 Hybrid & Airbag Safety The student will be able to research, locate, safely disable and enable a hybrid vehicle's high voltage system. The student will also be able to research, safely disable and enable a vehicle's driver airbag.	
	Student Learning Outcomes:	
	Course Objectives:	1. Complete a comprehensive Automotive Collision Repair/Painting safety test with 100% accuracy. 2. Perform an OBDII vehicle repair pre- and post-scan. Decode and analyze the trouble codes and needed corrections. 3. Identify the different generations of AC refrigerant systems and perform a system evacuation. 4. Identify by name misaligned/damaged suspension and steering parts and wheel alignment issues. 5. Analyze/troubleshoot vehicle lighting and charging circuits using a digital volt-ohmmeter (DVOM). 6. Safely deactivate and reactivate a vehicle's airbag system. Locate and identify all parts of the system. 7. Locate a hybrid's high-voltage electrical components, explain the dangers of working with hybrid/electric vehicles, and access disconnect data references. 8. Identify vehicle ADAS system components and explain the importance of their calibration. 9. Remove, repair and recolor components of vehicle interiors and upholstery.
	Major Topics:	I. PERSONAL SAFETY AND SAFE LAB PRACTICES (3 hours, lecture) A. Safety practices B. Shop tour, personal safety equipment C. Vehicle construction history, nomenclature and identification

II. CORE SUPPORT, COWL, FRONT SIDE MEMBERS (6 hours, lecture)

- A. Safety practices
- B. Parts nomenclature, identification of damage
- C. Measuring damage and aligning structural parts
- D. Removal, new parts fit-up, installation/welding
- E. Correcting damage using a frame rack
- F. Cooling system
- G. Air conditioning system

III. CORE SUPPORT, COWL, FRONT SIDE MEMBERS (30 hours, lab)

- A. Safety practices
- B. Parts nomenclature, identification of damage
- C. Measuring damage and aligning structural parts
- D. Removal, new parts fit-up, installation/welding
- E. Correcting damage using a frame rack
- F. Cooling systems
- G. Air conditioning systems

IV. STEERING, SUSPENSION AND ALIGNMENT (3 hours, lab)

- A. Safety practices
- B. Steering and suspension systems and parts nomenclature
- C. Measuring and identifying damage
- D. Removal and installation
- E. Alignment/adjustment
- F. (National Automotive Technicians Education Foundation (NATEF) Mechanical and Electrical Components tasks: Section A, numbers 1-29)

V. STEERING, SUSPENSION AND ALIGNMENT (30 hours, lab)

- A. Safety practices
- B. Steering and suspension systems and parts nomenclature
- C. Measuring and identifying damage
- D. Removal and installation
- E. Alignment/adjustment
- F. (NATEF Mechanical and Electrical Components tasks: Section A, numbers 1-29)

VI. WHEEL ALIGNMENT (3 hours, lecture)

- A. Safety practices
- B. Camber, caster and toe
- C. Measuring, identifying misalignment and damage
- D. Alignment and use of equipment

VII. WHEEL ALIGNMENT (15 hours, lab)

- A. Safety practices
- B. Camber, caster and toe
- C. Measuring, identifying misalignment and damage

- D. Alignment and use of equipment

VIII. SIDE DAMAGE: CENTER PILLAR, QUARTER PANEL (6 hours, lecture)

- A. Safety practices
- B. Identification and location of parts and damage
- C. Vehicle disassembly, planning a vehicle section replacement
- D. Straightening and measuring damage on the frame rack
- E. Replacement section cutting, fit-up and clamping
- F. Section welding and alignment verification
- G. Finish grinding and corrosion protection restoration

IX. SIDE DAMAGE: CENTER PILLAR, QUARTER PANEL (30 hours, lab)

- A. Safety practices
- B. Identification and location of parts and damage
- C. Vehicle disassembly, planning a vehicle section replacement
- D. Straightening and measuring damage on the frame rack
- E. Replacement section cutting, fit-up and clamping
- F. Section welding and alignment verification
- G. Finish grinding and corrosion protection restoration

X. ROOF DAMAGE (3 hours, lecture)

- A. Safety practices
- B. Identification and location of damage
- C. Sunroof/moonroof removal and installation
- D. Vehicle disassembly, planning a roof replacement
- E. Bracing the vehicle, cutting, fit-up and clamping of replacement roof
- F. Welding and alignment verification, finish grinding
- G. Convertible tops - parts, mechanisms, replacement, adjustment

XI. ROOF DAMAGE (15 hours, lab)

- A. Safety practices
- B. Identification and location of damage
- C. Sunroof/moonroof removal and installation
- D. Vehicle disassembly, planning a roof replacement
- E. Bracing the vehicle, cutting, fit-up and clamping of replacement roof
- F. Welding and alignment verification, finish grinding
- G. Convertible tops - parts, mechanisms, replacement, adjustment

XII. REAR DAMAGE: REAR BODY PANEL, FLOOR (3 hours, lecture)

- A. Safety practices
- B. Identification and location of parts and damage
- C. Vehicle disassembly, planning a vehicle section replacement
- D. Straightening and measuring damage on a frame rack
- E. Replacement section cutting, fit-up and clamping
- F. Section welding and alignment verification
- G. Finish grinding and corrosion protection restoration

XIII. REAR DAMAGE: REAR BODY PANEL, FLOOR (15 hours, lab)

- A. Safety practices
- B. Identification and location of parts and damage
- C. Vehicle disassembly, planning a vehicle section replacement
- D. Straightening and measuring damage on a frame rack
- E. Replacement section cutting, fit-up and clamping
- F. Section welding and alignment verification
- G. Finish grinding and corrosion protection restoration

XIV. STRUCTURAL GLASS (3 hours, lecture)

- A. Safety practices
- B. Laminated vs. safety glass
- C. Tools and equipment including pneumatic saws and induction heaters
- D. Full- and partial cutout methods
- E. Customer service- dealing with broken glass
- F. Checking for leaks, panel flange misalignment/uncorrected body damage
- G. Sealants and chemicals

XV. STRUCTURAL GLASS (15 hours, lab)

- A. Safety practices
- B. Laminated vs. safety glass
- C. Tools and equipment including pneumatic saws and induction heaters
- D. Full- and partial cutout methods
- E. Customer service- dealing with broken glass
- F. Checking for leaks, panel flange misalignment/uncorrected body damage
- G. Sealants and chemicals

XVI. AIRBAGS AND SUPPLEMENTAL RESTRAINT SYSTEMS (SRS) (3 hours, lecture)

- A. Safety practices
- B. Passenger restraint systems and parts, active and passive
- C. Airbag deactivation, proper handling and storage, reactivation
- D. Identifying damage
- E. Replacing SRS parts
- F. (NATEF Mechanical and Electrical Components tasks: Section H, numbers 1-9)

XVII. AIRBAGS AND SUPPLEMENTAL RESTRAINT SYSTEMS (SRS) (15 hours, lab)

- A. Safety practices
- B. Passenger restraint systems and parts, active and passive
- C. Airbag deactivation, proper handling and storage, reactivation
- D. Identifying damage
- E. Replacing SRS parts
- F. (NATEF Mechanical and Electrical Components tasks: Section H, numbers 1-9)

XVIII. ELECTRIC CIRCUITS (4.5 hours, lecture)

- A. Safety practices
- B. Theory and nomenclature

- C. Batteries
- D. Diagnostic equipment
- E. Charging circuits
- F. Light circuits
- G. Circuit testing
- H. (NATEF Mechanical and Electrical Components tasks: Section B, numbers 1-21)

XIX. ELECTRIC CIRCUITS (15 hours, lab)

- A. Safety practices
- B. Theory and nomenclature
- C. Batteries
- D. Diagnostic equipment
- E. Charging circuits
- F. Light circuits
- G. Circuit testing
- H. (NATEF Mechanical and Electrical Components tasks: Section B, numbers 1-21)

XX. HYBRID AND ELECTRIC VEHICLE SAFETY (3 hours, lecture)

- A. Safety practices and equipment
- B. Overview of electrical circuits and 12-volt electrical system
- C. Hybrid and electric vehicle parts and systems, dangers
- D. System deactivation and reactivation
- E. (NATEF Mechanical and Electrical Components tasks: Section B, numbers 22-23)

XXI. HYBRID AND ELECTRIC VEHICLE SAFETY (15 hours, lab)

- A. Safety practices and equipment
- B. Overview of electrical circuits and 12-volt electrical system
- C. Hybrid and electric vehicle parts and systems, dangers
- D. System de- and reactivation
- E. (NATEF Mechanical and Electrical Components tasks: Section B, numbers 22-23)

XXII. CORROSION PROTECTION (1.5 hours, lecture)

- A. Safety practices
- B. Corrosion protection types, uses and application
- C. Application equipment and techniques

XXIII. CORROSION PROTECTION (15 hours, lab)

- A. Safety practices
- B. Corrosion protection types, uses and application
- C. Application equipment and techniques

XXIV. ALUMINUM AND COMPOSITE STRUCTURAL COMPONENTS (6 hours, lecture)

- A. Safety practices
- B. Simple identification of aluminum, fiberglass and composite parts vs. steel
- C. Identification using repair guides

	D. Allowable repair, sectioning and replacement of composite parts such as core supports E. Refinishing considerations for fiberglass and composites F. Galvanic corrosion, mounting aluminum parts to steel XXV. ALUMINUM AND COMPOSITE STRUCTURAL COMPONENTS (30 hours, lab) A. Safety practices B. Simple identification of aluminum, fiberglass and composite parts vs. steel C. Identification using repair guides D. Allowable repair, sectioning and replacement of composite parts such as core supports E. Refinishing considerations for fiberglass and composites F. Galvanic corrosion, mounting aluminum parts to steel XXVI. UPHOLSTERY AND INTERIORS (6 hours, lecture) A. Parts removal and reinstallation B. Cleaning, stain removal C. Reconditioning, recoloring D. Seat recovering XXVII. UPHOLSTERY AND INTERIORS (30 hours, lab) A. Parts removal and reinstallation B. Cleaning, stain removal C. Reconditioning, recoloring D. Seat recovering
Total Lecture Hours:	54
Total Laboratory Hours:	270
Total Hours:	324
Primary Method of Evaluation:	3) Skills demonstration
Typical Assignment Using Primary Method of Evaluation:	Remove and replace a glue-in (structural) windshield on a collision-damaged vehicle. Detail the procedures and list the tools required for the removal and replacement of the windshield in a one-page report.
Critical Thinking Assignment 1:	Given a damaged plastic interior part, locate the part's content code, choose the appropriate repair tools and materials and perform the repair.
Critical Thinking Assignment 2:	Given a damaged vehicle, identify damage to suspension components by measuring and visual inspection. Use proper nomenclature to write an informal one-page estimate listing which parts need to be repaired and replaced using correct parts nomenclature.
Other Evaluation Methods:	Class Performance, Completion, Homework Problems, Matching Items, Multiple Choice, 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 Textbooks:	Joe Baker. Auto Collision Repair and Refinishing. 4th ed. The Goodheart-Willcox Company, Inc., 2025.
Alternative Textbooks:	
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 or Automotive Collision Repair/Painting-4A
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).	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. Understand the difference between a frame and unitized constructed vehicle. 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 set up and operate MIG welding equipment. ACRP 1A -Set up, operate and disassemble an oxy/acetylene and a MIG (Metal Inert Gas) electric welding outfit. Ability to list and explain various types of improper repairs and repair fraud. ACRP 1A -Based upon industry standards, list and explain various types of improper repairs and repair fraud.
Requisite Skill:	or equivalent
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 basic collision experience, the student will be prepared to enroll in this course. It is important that students have basic automotive collision experience 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:	09/01/1984
Original Board Approval Date:	
Last Reviewed and/or Revised by:	Patricia Fairchild
Date:	10/19/2025
Last Board Approval Date:	01/21/2026 eff FA 2026