

AUTOMOTIVE COLLISION REPAIR

Senior Level Course Syllabus

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COURSE DESCRIPTION

This course is designed to prepare students to perform unibody structural analysis and damage repair and paint and refinish operations utilizing the I-CAR-Live Curriculum. Other topics covered are Safety, Metal working/metal finishing, body panel replacement and alignment, Plastic repair, math and literacy, and interpersonal character skills for success This course is two semesters meeting every day for a total of 180 days. The classes are 2.5 hours in length for a total number of contact hours of 450.

COURSE SEQUENCE

Introduction to Automotive Collision Repair	Sophomore	9 weeks-AM (Semester 2)	1 unit
Automotive Collision Repair I	Junior	AM Semester 1	2 units
Automotive Collision Repair II	Senior	PM Semester 1	2 units
Automotive Collision Repair III	Senior	PM Semester 2	2 units

INSTRUCTIONAL PHILOSOPHY

I believe in exposing students to a work based environment where they learn to cooperate, motivate, and grow through hands-on experiences along with team work in the shop. My experience in the Collision Repair Industry has afforded me the opportunity to become highly skilled in this field and very knowledgeable on how to become successful in the field.

The Automotive Collision Repair field changes on a daily basis but the fundamental concepts maintain consistency. Students will be exposed to all the facets of this industry. A course syllabus will be provided for each student as a road map of responsibilities and studies. They will be expected to meet the entire course goals as listed below and demonstrate their understanding of the underlying concepts. The instruction will require some lecture, but emphasis will be placed on application of concepts. Due to the shortness of the course some of the topics will be introduced and surveyed. With the state competencies students will be provided ample opportunity to practice for competency. Work will be based on group assignments, individual completion of activities, projects, tests, knowledge of content and demonstration of important skills.

COURSE GOALS

1. Create good safety work habits.
2. Develop collision structural and alignment skills on unibody vehicles.
3. Develop paint and refinish operation skills.
4. Develop basic metalworking skills and body panel replacement and alignment.
5. Develop plastic repair skills.
6. Reinforce literacy and math skills.
7. Improve and reinforce good interpersonal job seeking and job keeping skills.

COURSE REQUIREMENTS

1. \$70.00 fee for supplies, spray respirator with two sets of filters and a paint suit. This fee must be paid before entering the shop.
2. Students must have leather shoes for safety.
3. Safety glasses and a journal notebook will be provided.

EVALUATION

Student evaluation is accomplished with a combination of several categories:

A. Major competencies – 60% weight

These are hands-on skills performed in the lab, observed and evaluated by a rubric. Also included in major competencies is the Employability Rating Sheet that is utilized each 9 weeks with a rating scale.

B. Minor Competencies – 40% weight

This includes mostly competency knowledge in the form of worksheets, quizzes, summaries and tests, as well as, a notebook containing all the handouts will be checked each 9 week period. The journal is kept each day and dated.

ASSESSMENT PLAN

Student assessment will be based on group work, individual completion of daily activities, projects, tests of students' knowledge of content and the demonstration of important skills. Any assignment or test that is missed due to class absence will be made up on the next scheduled class meeting. In the case of an excused absence and the assignment was not made prior to the student absence, the student will be allowed to make up the assignment at a later date as determined by the instructor. This will usually be done on the next scheduled class date.

INSTRUCTIONAL PLAN

The state competencies are categorized into high priority-Individual and High Priority- Group. The group competencies are experienced as class exercises. The individual competencies are practiced by each student in the shop lab. There will be I-Car-Live PowerPoint presentations by the instructor, training videos, training DVD's, reading assignments with worksheets, writing assignments, job sheets for lab work, speakers from industry, and at least one field trip to industry and to the Greenville Tech Automotive Collision Repair program. Students will work as teams on some projects and as individuals on others.

ANCHOR PROJECT

Seniors will be issued a new automobile fender on which they will safely perform basic skills in these areas: metal working/metal finishing; surface preparation; spray gun and related equipment operations; paint mixing, matching, applying, and blending; solve paint defect problems; and final detail. Students will use their accumulative skills to repair the damaged panel from start to finish. The damage will be created by the instructor. A rubric will be used to assess and grade each progressive operation of the project. The student will be required to create a work order on which they must document all material used to perform the project, and document the amount of hours spent on each operation for a total of cost and time spent. The student will be permitted to keep the finished project. For extra credit, any student may create a powerpoint presentation of their project in the presence of the class.

COMPETENCIES TO BE MASTERED

GENERAL 5.0 HOURS		
Competency	Priority	Hours
Class orientation: handbook, rules, procedures and expectations	HP-1	5.0
STRUCTURAL ALIGNMENT UNIBODY 115.0 HOURS		
*185 hours are required for certification in structural. 70 hours of structurals is presented at the Junior course level.		
Competency	Priority	Hours
UNIBODY AND UNITIZED STRUCTURE INSPECTION, MEASUREMENT, AND REPAIR		
Analyze and Identify misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and chassis alignment problems.	HP-G	5.0

Realign or replace misaligned or damaged steering, suspension, and powertrain components that can cause vibration, steering, and chassis alignment problems.	HP-G	n/a
Measure and diagnose unibody damage using a tram gauge.	HP-G	7.5
Determine and inspect the locations of all suspension, steering, and powertrain component attaching points on the vehicle.	HP-G	5.0
Measure and diagnose unibody vehicles using a dedicated (fixture) measuring system.	HP-G	2.5
Diagnose and measure unibody vehicles using a three-dimensional measuring system (Mechanical, electronic, laser, etc.).	HP-G	7.5
Determine the extent of the direct and indirect damage and the direction of the impact; Plan and document the methods and sequence of repair.	HP-1	7.5
Attach anchoring devices to vehicles; remove or reposition components as necessary.	HP-1	7.5
Straighten and align cowl assembly.	HP-G	2.5
Straighten and align roof rails/headers and roof panels.	HP-G	2.5
Straighten and align hinge and lock pillars.	HP-G	2.5
Straighten and align vehicle openings, floor pans, and rocker panels.	HP-G	5.0
Straighten and align quarter panels, wheelhouse assemblies, and rear body section (including rails and suspension/powertrain mounting points).	HP-G	10.0
Straighten and align front-end sections (aprons, strut towers, upper and lower rails, steering, and suspension/Powertrain mounting points, etc.)	HP-G	10.0
Identify substrate and repair or replacement recommendations.	HP-1	5.0
Identify proper cold stress relief methods.	HP-1	2.5
Repair damage using power tools and hand tools to restore proper contours and dimensions.	HP-1	7.5
Remove and replace damaged sections of steel body structures.	HP-G	7.5
Restore corrosion protection to repaired or replaced structural areas.	HP-1	5.0
Determine the extent of damage to aluminum structural components; repair, weld, or replace.	HP-G	2.5
Analyze and identify crush/collapse zones.	HP-1	2.5
Restore mounting and anchoring locations.	HP-G	2.5
STRUCTURAL FIXED GLASS 5.0 hours		
Remove and reinstall or replace fixed glass (heated and non-heated) using recommended materials and techniques.	HP-G	2.5
Remove and reinstall or replace modular glass using recommended materials.	HP-G	2.5
PAINTING AND REFINISHING (NATEF) 267.5 HOURS		
*Total certification hours for paint and refinishing are 300. The remainder of the hours are presented at the Sophomore course level.		
Competency	Priority	Hours
SAFETY 7.5 hours		

Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations.	HP-1	2.5
Inspect spray environment and equipment to ensure compliance with federal, state, and local regulations, and for safety and cleanliness hazards.	HP-1	2.5
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-1	1.0
Select and use a NIOSH approved supplied air (Fresh Air Make-up) personal respirator system. Perform proper maintenance in accordance with OSHA Regulation 1910.134 applicable state and local regulation.	HP-1	1.5
SURFACE PREPARATION 82.5 hours		
Inspect, remove, store, and replace exterior trim and components necessary for proper surface preparation.	HP-1	5.0
Inspect and identify Substrate, type of finish, surface condition, and film thickness; develop and document a plan for refinishing using a total product system.	HP-1	7.5
Strip paint to bare substrate (paint removal).	HP-1	7.5
Dry or wet sand areas to be refinished.	HP-1	5.0
Featheredge damaged areas to be finished.	HP-1	5.0
Apply suitable metal treatment or primer in accordance with total product systems.	HP-1	5.0
Mix primer, primer-surface, or primer-sealer.	HP-1	5.0
Apply primer onto the surface of the repaired area.	HP-1	5.0
Apply two-component finishing filler to minor surface imperfections.	HP-1	2.5
Dry or wet sand area to which primer-surface has been applied.	HP-1	5.0
Dry sand area to which two-component finishing filler has been applied.	HP-1	5.0
Remove dust from the area to be refinished, including cracks or moldings of adjacent areas.	HP-1	2.5
Clean area to be refinished using a final cleaning solution.	HP-1	1.0
Remove, with tack rag, any dust or lint particles from the area to be refinished.	HP-1	1.5
Apply suitable sealer to the area being refinished.	HP-1	5.0
Scuff sand to remove nibs or imperfections from a sealer.	HP-1	2.5
Apply stone chip-resistant coating.	HP-G	1.0
Restore corrosion-resistant coatings, caulking, and seam sealers to repaired areas.	HP-G	1.5
Prepare adjacent panels for blending.	HP-1	2.5
Identify the types of rigid, semi-rigid, or flexible plastic parts to be refinished; determine the materials, preparation, and refinishing procedures.	HP-1	5.0
Identify aluminum parts to be refinished; determine the materials, preparation, and refinishing procedures.	HP-G	2.5
SPRAY GUN AND RELATED EQUIPMENT OPERATIONS 12.5 hours		
Inspect, clean, and determine condition of spray guns and related equipment (air hoses, regulators, air lines, air source, and spray environment).	HP-1	5.0
Check and adjust spray gun operation for HVLP (High volume, low pressure) or compliant spray guns.	HP-1	2.5
Set-up (fluid needle, nozzle, and cap), test and adjust spray gun using fluid, air, and pattern control valves.	HP-1	5.0

Demonstrate an understanding of the operation of pressure spray equipment.	HP-G	n/a
PAINT MIXING, MATCHING AND APPLYING 65 hours		
Identify type and color code by manufacturer s vehicle information label.	HP-1	2.5
Shake, stir, reduce, catalyze/activate, and strain refinish materials.	HP-1	2.5
Apply finish using appropriate spray techniques (gun arc, gun angle, gun distance, gun speed, and spray pattern overlap) for the finish being applied.	HP-1	7.5
Apply selected product on test and let-down panel; check for color match.	HP-1	7.5
Apply a single stage topcoat.	HP-1	7.5
Apply basecoat/clearcoat for panel blending or panel refinishing	HP-1	7.5
Apply basecoat/clearcoat for overall refinishing.	HP-G	7.5
Remove nibs or imperfections from the basecoat.	HP-1	2.5
Refinish rigid or semi-rigid plastic parts.	HP-G	2.5
Refinish flexible plastic parts.	HP-1	2.5
Apply multi-stage coats for panel blending or overall refinishing.	HP-G	n/a
Identify and mix paint using a formula.	HP-1	5.0
Identify poor hiding colors, determine necessary action.	HP-G	2.5
Tint color using formula to achieve a blendable match.	HP-1	5.0
Identify alternative color formulas to achieve a blendable match.	HP-1	2.5
PAINT DEFECTS-CAUSES AND CURES 77.5 hours		
Identify blistering, determine the causes and correct the condition.	HP-G	2.5
Identify blushing, determine the causes and correct the condition.	HP-G	2.5
Identify a dry spray appearance in the paint surface, determine the causes and correct the condition.	HP-G	2.5
Identify the presence of fish-eyes in the finish, determine the causes and correct the condition.	HP-1	2.5
Identify lifting, determine the causes and correct the condition.	HP-G	2.5
Identify clouding, determine the causes and correct the condition.	HP-1	2.5
Identify orange peel, determine the causes and correct the condition.	HP-1	2.5
Identify overspray, determine the causes and correct the condition.	HP-1	2.5
Identify solvent popping in freshly painted surfaces, determine the causes and correct the condition.	HP-G	2.5
Identify sags and runs in the paint surface, determine the causes and correct the condition.	HP-1	5.0
Identify sanding marks or sand scratch swelling, determine the causes and correct the condition.	HP-G	2.5
Identify contour mapping/edge mapping while finish is drying, determine the causes and correct the condition.	HP-G	2.5
Identify color differences (off-shade), determine the causes and correct the condition.	HP-G	2.5
Identify tape tracking, determine the causes and correct the condition.	HP-G	2.5
Identify low gloss conditions, determine the causes and correct the condition.	HP-G	2.5

Identify poor adhesion, determine the causes and correct the condition.	HP-G	2.5
Identify paint cracking (shrinking, splitting, crows feet or line-checking, micro-checking, etc) , determine the causes and correct the condition.	HP-G	2.5
Identify corrosion, determine the causes and correct the condition.	HP-G	2.5
Identify dirt or dust in the paint surface, determine the causes and correct the condition.	HP-1	5.0
Identify water spotting, determine the causes and correct the condition.	HP-G	2.5
Identify finish damage caused by bird droppings, tree sap, and other natural causes, correct the condition	HP-G	2.5
Identify finish damage caused by airborne contaminants (acids, soot, rail dust, and other industrial-related causes), correct the condition.	HP-G	2.5
Identify die-back conditions (dulling of the paint film showing haziness), determine the causes and correct the condition.	HP-G	2.5
Identify chalking (oxidation), determine the causes and correct the condition.	HP-G	2.5
Identify bleed-through (staining), determine the causes and correct the condition.	HP-G	2.5
Identify pin-holing, determine the causes and correct the condition.	HP-G	2.5
Identify buffing-related imperfections (swirl marks, wheel burns), correct the condition.	HP-1	5.0
Identify pigment flotation (color change through film build), determine the causes and correct the condition.	HP-G	2.5
FINAL DETAIL 22.5 hours		
Apply decals, transfers, tapes, woodgrains, pinstripes (painted and taped), etc.	HP-G	5.0
Buff and polish finish to remove defects as required.	HP-1	7.5
Remove overspray.	HP-1	5.0
Perform pre-delivery detail and inspection.	HP-1	5.0
MATHEMATICAL RELATED ACADEMIC SKILLS 12.5 HOURS		
Competency	Priority	Hours
Solve automotive collision repair related problems using whole numbers, fractions, decimals, percentage, ratio/proportion, and English and metric measurements.	HP-1	7.5
Perform numeracy lessons from "Work Keys."	HP-1	5.0
LANGUAGE RELATED ACADEMIC SKILLS 22.5 HOURS		
Competency	Priority	Hours
Using clear, concise, complete, and grammatically accurate sentences and paragraphs, write a journal every day (first 5 minutes of class) 90 days total	HP-1	7.5

Exercise comprehension skills by reading Collision related articles and summarizing. Includes journaling.	HP-1	10.0
Perform literacy problems in "Work Keys"	HP-1	5.0
OTHER REPAIR SKILLS HOURS 22.5		
Competency	Priority	Hours
Perform basic metalworking skills.	HP-1	10.0
Perform basic plastic repair skills.	HP-1	5.0
Perform body panel replacement and alignment skills.	HP-1	7.5
WORKPLACE SKILLS 5.0 HOURS		
Competency	Priority	Hours
Workplace training, employment skills	HP-1	5.0
GRAND TOTAL		450

RESOURCES

- I-Car Live curriculum
- Field trips to industry
- Guest speakers from industry
- Textbooks/ Workbooks
- DVD (Training Videos)
- Computer/projector
- Mitchell Crash Manuals
- Motor Crash Manuals
- Car-O-Liner Frame and Structural Data