

AUTOMOTIVE COLLISION REPAIR

Junior Level Course Syllabus

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COURSE DESCRIPTION

This course is designed to prepare students using the I-Car-Live Curriculum presenting numerous competencies to perform structural repairs on body-over-frame vehicles, and welding and cutting steel and aluminum. Other topics covered are safety, automotive construction and repair materials, and automotive tools and equipment review. Language and math skills are reinforced using "WorkKeys" and other assignments. Interpersonal job skills will be reinforced and assessed on an employability rating sheet each quarter. This course is two semesters meeting every other day for a total of 90 days. The classes are 2.5 hours in length for a total number of contact hours of 225.

COURSE SEQUENCE

Introduction to Automotive Collision Repair	Sophomore	9 weeks-AM (Semester 1)	1 unit
Automotive Collision Repair I	Junior	AM Semester 2	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 and organizational skills.
2. To acquire a more detailed knowledgeable of automotive body and structural components and repair materials
3. To acquire a more detailed knowledge of automotive body working tools, equipment, and new optional equipment.
4. Become knowledgeable of automotive repair materials and fasteners.
5. Develop collision welding and cutting skills on steel and aluminum.
6. Develop collision structural and alignment skills.
7. Reinforce literacy and math skills.
8. Improve and reinforce good interpersonal job seeking and job keeping skills.

COURSE REQUIREMENTS

1. \$50.00 fee for supplies, welding respirator with two sets of filter and a paint suit. This fee must be paid before entering the shop.
2. A 3-ring notebook to keep handouts will also be provided
3. Students must have leather shoes for safety.
4. Safety glasses and ear protection 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's 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 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. Students will work as teams on some projects and as individuals on others.

ANCHOR PROJECT

Using the skills learned in welding and structural alignment, the students will perform a body over frame type of frame sectioning. A simulated box section made of sheet metal will be MIG welded together, cut and sectioned back together using the proper tools, welding and I-CAR procedures. A rubric will be provided to assess and grade the project.

Write a report or do a powerpoint presentation on the project to include: a step by step procedure, time required for each process, special techniques, paint and materials, and tools and equipment. In addition, provide reasons for the choice of procedures, techniques, materials, and tools used.

COMPETENCIES TO BE MASTERED

GENERAL 40 HOURS		
Competency	Priority	Hours
Class orientation: handbook, rules, procedures and expectations	HP-1	7.5
Follow EPA and OSHA personal and work safety rules and procedures throughout all shop exercises.	HP-1	15.0
Identify advanced tools and equipment	HP-1	5.0
Identify advanced automotive construction	HP-1	7.5
Identify automotive repair materials and fasteners	HP-1	5.0
TOTAL		40.0
WELDING AND CUTTING 80 HOURS		
Competency	Priority	Hours
Perform Oxy/Acet set-up, heat, braze, and cut metall identify weldable and non-weldable substrates used in vehicle construction.	HP-1	7.5

Identify weldable and non-weldable substrates used in vehicle construction.	HP-1	2.5
Weld and cut high-strength steel and other steels.	HP-G	5.0
Weld and cut aluminum	HP-1	7.5
Set up and adjust the (MIG) welder to “tune” for proper electrode sickout, voltage, polarity, flow rate, and wire-feed speed required for the substrate being welded.	HP-1	6.0
Store, handle, and install high-pressure gas cylinders.	HP-1	2.0
Determine work clamp (ground) attachment.	HP-1	1.0
Use the proper angle and direction of the gun of travel of the type of weld being made in the flat, horizontal, vertical, and overhead.	HP-1	4.0
Protect adjacent panels, and vehicle operations.	HP-1	2.0
Protect computers and other electronic control modules during welding tasks.	HP-1	2.0
Clean and prepare the metal, fit-up, apply weld-thru primer, clamp or tac as needed	HP-1	6.0
Determine the joint-type (but weld with backing, lap, etc.) for weld being made.	HP-1	4.0
Determine the type of weld (butt weld with backing, lap, etc.) for weld made	HP-1	4.0
Determine the type of weld (continuous, stitch weld, plug, butt weld with and without backing, and filet)	HP-1	2.0
Perform the following welds: continuous, plug, but with backing and without, and filet etc	HP-1	14.0
Perform visual and destructive tests on each weld type.	HP-1	3.0
Identify the causes of welding defects and Make adjustments.	HP-1	2.0
Identify cause of contact burn-back and failure of wire to feed; make adjustments.	HP-1	2.0
Identify the cutting process for different substrates and locations. Perform cutting operations	HP-1	2.0
TOTAL		75.0
STRUCTURAL ANALYSIS AND DAMAGE REPAIR		
BODY OVER FRAME VEHICLES 72 HOURS		
Competency	Priority	Hours
Measure and diagnose structural damage using tape and tram gauge	HP-1	7.5
Attach vehicle to anchoring devices and download.	HP-1	7.0
Analyze, straighten, and align a mash.	HP-G	2.5
Analyze, straighten, and align sag damage.	HP-G	2.5
Analyze, straighten, and align sway damage	HP-G	2.5
Analyze, straighten, and align twist damage	HP-G	2.5
Analyze, straighten, and align diamond frame damage.	HP-G	2.5
Remove and replace damaged structural components.	HP-G	2.5
Restore corrosion protection to repaired areas.	HP-1	2.5

Analyze and identify misaligned or damaged steering, suspension, and powertrain components that can cause vibration and wheel alignment issues.	HP-G	5.0
Identify heat limitations for structural components.	HP-1	2.5
Demonstrate the use of structural foam.	HP-G	2.5
Measure and diagnose structural damage using tape and tram gauge (mechanical, electronic, laser, etc.).	HP-G	7.5
Measure and diagnose structural damage using a dedicated (fixture) system.	HP-G	2.5
Determine the extent of the direct and Indirect damage and the direction of impact; document the methods and sequence of repairs	HP-G	7.5
Analyze and identify crush/collapse zones.	HP-1	5.0
Restore mounting and anchoring locations.	HP-G	5.0
TOTAL		69.5
MATHEMATICAL RELATED ACADEMIC SKILLS		
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	1.5
TOTAL		9.0
LANGUAGE RELATED ACADEMIC SKILLS		
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	1.5
Exercise comprehension skills by reading Collision related articles and summarizing. One each week for 18 weeks- 30 minutes	HP-1	9.0
Perform literacy problems in "Work Keys"	HP-1	5.0
TOTAL		15.5

RESOURCES

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