

COURSE OUTLINE

Structural Analysis and Damage Repair I - Frames

Course Description

AB 124. Structural Analysis and Damage Repair I - Frames. 3 hours credit.
Prerequisite: AB 101 and AB 103 with a C or better. This course will enable the student to inspect and measure frame damage while following safety practices. The student will use welding applications as needed and will straighten in a line to meet manufacturing specifications.

Course Relevance

The principles learned in this course will allow the student to perform the essential tasks of analyzing, preparing, and then performing damage repair and adjustments. These tasks are essential to those aspiring to work in the auto body repair profession. This course and subsequent courses will be taught according to NATEF (National Automotive Technicians Education Foundation)/ASE (Automotive Service Excellence) standards.

Required Materials

Duffey, J., (2004). *Auto body repair technology* (4th ed.). Albany, NY: Delmar Publishing

Learning Outcomes

The intention is for the student to be able to

1. Explain how impact forces are transmitted through both frames and uni-body construction vehicles
2. Analyze damage using electric and manual measuring systems
3. Diagnose various types of body damages including twist, mashed, sag and side sway
4. Straighten and align frames while using safety practices
5. Apply personal and environmental safety practices

Primary Learning PACT Skills that will be DEVELOPED and/or documented in this course

Through the student's involvement in this course, he/she will develop his/her ability in the following primary PACT skill areas:

1. Field-Related Technology
 - Through "in-lab" exercises, the student will be able to demonstrate their understanding and proper use of measuring equipment.

Secondary skills (developed but not documented):

Math
Reading
Critical Thinking

Problem Solving

Major Summative Assessment Task(s)

These learning outcomes and the primary Learning PACT skills will be demonstrated by

1. Completing a project demonstrating frame set up, measuring, diagnosis, and repair

Course Content

- I. Themes – Key recurring concepts that run throughout this course:
 - A. Safety
 - B. Quality
- II. Issues- Key areas of conflict that must be understood in order to achieve the intended outcomes:
 - A. Difference between full-frame auto body and unibody vehicles
 - B. Computer versus laser measuring system
- III. Concepts – Key concepts that must be understood to address the issues:
 - A. Proper planning techniques of repair
 - B. Proper preparation of material and equipment
 - C. Measuring systems
- IV. Skills/Competencies – Actions that are essential to achieve the course outcomes:
 - A. Diagnose and measure structural damage using tram and self-center gauges according to industry specifications. High Priority-One (HP-1)
 - B. Attach vehicle to anchoring devices (HP-1)
 - C. Determine the extent of the direct and indirect damage and the direction of impact; document the methods (HP-1)
 - D. Protect computers and other electronic control modules during welding procedures according to manufactures specifications

Learning Units

- I. Determine the amount of damage on a full frame vehicle
 - A. How to read tram gauge
 - B. How to read centering gauges
 - C. Introduction to electronic measuring equipment
 - D. Write a repair order and estimate
- II. Determine different types of frame pulling systems
 - A. Demonstrate frame machine set-up
 - B. Demonstrate frame damage pulling techniques
 - C. Demonstrate safety practices
- III. Determine different types of frame damage
 - A. Mash
 - B. Sag
 - C. Sidesway
 - D. Twist
 - E. Diamond

- IV. Demonstrate proper techniques for stress-relieving damaged frame
 - A. Pulling techniques
 - B. Use of heat (torch)
 - C. Cold hammering

Learning Activities

Learning activities will include lectures, demonstration, and performance. Classroom lecture is designed to enable the student to understand the key principles in auto body repair.

Grade Determination

The student will be graded on completion of assessment tasks (learning activities), and written assignment and examinations.