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San Bernardino Valley College

Course Outline for VEHRST 010
BASIC VEHICLE RESTORATION

I. CATALOG DESCRIPTION:
Department: Automotive
VEHRST 010: Basic Vehicle Restoration
3 hours lecture, 3 hours laboratory = 4 units
Catalog Description: Theory and practical experience in restoring a vehicle to appropriate and safe running condition. Includes instruction in safe work practices, disassembly, cleaning, refinishing of vehicle parts. Design and construction of frame and chassis components will be covered. Body repair and welding will also be included.
Schedule Description: Theory and practical experience in restoring a vehicle. Safe work practices, disassembly, cleaning, body repair, welding and assembly is emphasized.
Prerequisite/Corequisite: None

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS:
Upon completion of this course, the student will be able to:
A. Describe ten characteristics of award winning vehicles.
B. Identify the major components and list eight vehicle systems common to the typical automobile or light truck.
C. List and describe three current publications related to vehicle restoration.
D. Identify and describe twenty different fasteners used a project vehicle.
E. Identify and notify the instructor of potential safety hazards in the shop areas.
F. Perform disassembly operations on a typical restoration project to industry standards.
G. Perform cleaning and refinishing operations on ten chassis or body parts using common methods and machines.
H. Compare and contrast different methods of rust removal from small and large parts.
I. Identify common drum brake systems and perform repairs to acceptable industry standards.
J. Prepare body sheet metal for refinishing using current methods and materials.
K. Compare and contrast at least three different welding methods and materials used in restoration.
L. Prepare a list of hand and power tools used on a lab project including prices and sources of availability.
M. Maintain an annotated notebook of descriptions and disassembly notes, sketches and photos of work in progress on project vehicle.

IV. CONTENT:

A. Restoring vs. Building a Car
   1. Differences in operations
      a. Locating a project vehicle
      b. Choices of body styles
      c. Costs
   2. Similarities
      a. Basic operation
      b. Preparation for refinishing
      c. Meticulous work

B. Automobile-Antique, Classic
   1. Basic systems
      a. Suspension systems
      b. Brake systems
      c. Cooling systems
      d. Engine design and operation
      e. Drive train
      f. Exhaust systems
      g. Electrical systems
      h. Accessories
   2. Original vs. modified original
      a. Chassis and engine
      b. Body and interior

C. Restoration-Assessment of Project Vehicle
   1. Overall condition
      a. Chassis
      b. Drive train
      c. Body metal
      d. Interior and accessories
   2. Replacement parts
      a. Original pieces
      b. New
   3. Written report-estimate
      a. Materials
      b. Timetable for completion
      c. Visualizing completed project
   4. Basic welding
      a. Safe shop practices
      b. Oxyacetylene
      c. Metal inert gas
      d. Practice welding exercises

D. Chassis
   1. Frame
      a. Measurement
      b. Straightening
      c. Repair

d. Cleaning
e. Painting

2. Suspension
   a. Springs
   b. Control arms
   c. Preliminary alignment

3. Brakes
   a. Service brake
   b. Parking brake
   c. Adjustment and road testing

E. Powertrain-Remove, Replace, Repair

1. Engine
   a. Original/replacement
   b. Change of model

2. Transmission
   a. Original/replacement
   b. Change of model

3. Differential
   a. Original/replacement
   b. Change of model

4. Driveline
   a. Original/replacement
   b. Change of model

F. Removal, Replacement of Components

1. Electrical system
   a. Components
   b. Wiring harnesses

2. Upholstery, trim
   a. Seats
   b. Panels, headliner

3. Glass and weatherstripping
   a. Windshield, back glass
   b. Door glass and regulators
   c. Weatherstripping

G. Body Metalwork

1. Surveying collision damage
   a. Front-end
   b. Side
   c. Top
   d. Rear

2. Repair techniques
   a. Using body solder
   b. Using plastic filler
   c. Using fiberglass

3. Panel replacement
   a. Sectioning-panel removal

b. Panel replacement
c. Sealing joints

4. Repairing collision damage
   a. Front-end
   b. Side
   c. Top
   d. Rear
5. Adjustments
   a. Hoods, front fenders
   b. Doors
   c. Trunk lids
   d. Bumpers
   e. Headlights

H. Refinishing Shop Equipment
1. Overview
   a. Major components
   b. Safety considerations
   c. Materials handling
2. Characteristics of great paint jobs
   a. Great preparation of surfaces
   b. Selection of good quality materials
   c. Good application techniques

I. Refinishing Materials and Their Applications
1. Preparation for painting
   a. Present condition
   b. Selection of a “system”
   c. Following paint makers directions
2. Sanding
   a. Types and grits of abrasives
   b. Hand and power sanding techniques
   c. Guide coat procedures
3. Primers
   a. Undercoats
   b. Surfacers
   c. Glazing putties
4. Thinners, reducers, additives
   a. Temperature considerations
   b. Topcoat additives
   c. Fish eye elimination
   d. Mixing percentages
5. Masking
   a. Types of tape and paper
   b. Application techniques
6. Spray guns and application techniques
   a. Types of spray guns, spray cans
   b. Atomization and vaporization

c. Applying the paint
d. Correct patterns
e. Cleaning the gun
f. Practice panels

7. Metal conditioning and priming
   a. Selection of materials
   b. Conditioner mixing and application
   c. Primer mixing and application
   d. Drying
8. Color and types of paint
   a. Solid and metallic colors
   b. Basecoat material types

J. Refinishing the Vehicle
1. Final preparation steps
   a. Cleaning booth
   b. Assembling tools and materials
   c. Final blow down
2. Mixing materials
   a. Reading temperature
   b. Selecting correct thinner/reducer
   c. Measuring viscosity
3. Application techniques
   a. Test spray pattern
   b. Starting and ending points
   c. Air pressure
   d. Single stage application
   e. Basecoat/clearcoat application
   f. When things go wrong
   g. Drying
4. Final steps
   a. Color sanding
   b. Buffing, sealing, waxing
   c. Showtime preparation

V. METHODS OF INSTRUCTION:
The methods of instruction include, but not limited to:
A. Lecture and direct laboratory demonstration by the instructor.
B. Guided laboratory practice by the student.
C. Presentations and demonstrations by field experts.

VI. TYPICAL ASSIGNMENTS:
A. Read assigned pages from textbooks and prepare to discuss topics in classroom discussion.
Typical Questions: What do the letters VOC mean?

B. Select a vehicle you think would make a good restoration project. Describe it and its present condition as completely as you can. Be prepared to present this information during a class discussion period.
C. Generate a list of sources that provide original color paint for a specified vehicle restoration project.
D. Disassemble a front suspension. Attach identification tags to each piece and sketch all parts on notebook size paper.
E. With instructor assistance, generate a list of 1950's Ford front suspension replacement parts and repair or machining required of others to bring them to factory tolerances.
F. Clean front suspension parts to a level appropriate for paint primer application.
G. Mask and prime suspension parts.

VII. EVALUATION(S):
A. Methods of Evaluation:
1. Oral and written tests;
2. Demonstrate manipulative skills according to industry standards in the performance task;
3. Active participation in all discussion periods;
4. Progress presentation(s)
5. A comprehensive written final exam.
Typical Questions:
a. List five points of procedure when performing disassembly operations.
b. Describe three methods of welding a crack in a fender.
B. Frequency of Evaluation:
1. Weekly assignments
2. One midterm exam
3. One final exam

VIII. TYPICAL TEXT(S):
How to Restore Your Collector Car, Tom Brownell, Motorbooks International, 1999
How to Restore Metal Automotive Trim, Jeff Lilly, Motorbooks Internatioinal, 1997

IX. OTHER SUPPLIES REQUIRED OF STUDENTS:
Safety glasses, notebook