Course ID Number: AUTO 088

Course Description: An introduction to practical experience in the repair and maintenance of small air-cooled and outboard engines, including engine overhaul, testing, and troubleshooting.

RATIONALE:

Course ID Number: Deleting the repeatability (#3) on AUTO 088 to conform with the current curriculum requirements.

Course Description: To add “An introduction to”.

Last updated: 3/99

SAN BERNARDINO VALLEY COLLEGE
COURSE OUTLINE

I. CATALOG DESCRIPTION:
Division: Technical Department: Automotive
Course ID Number: AUTO 088
Course Title: Air-Cooled and Small Engines
Hours: Lecture 3 Hours/Week
Lab 3 Hours/Week
Units: 4
Course Description: An introduction to practical experience in the repair and maintenance of small air-cooled and outboard engines, including engine overhaul, testing, and troubleshooting.
Prerequisite(s)/Corequisite(s): None

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

III. EXPECTED OUTCOMES FOR STUDENTS:
Upon completion of this course, students will be able to:
A. Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals in accordance with local, state, and federal safety and environmental regulations including, but not limited to, the regulatory departments such as the Occupational Safety and Health Act (OSHA), Bureau of Automotive Repair (BAR), South Coast Air Quality Control Board (SCAQCB), Environmental Protection Agency (EPA).
B. Compare the design, operating principles and the component parts of the two and four stroke engine, 50 CC to 2.9 liter engines.
C. Disassemble, inspect, measure, and repair parts which are reusable in a manner consistent with accepted trade practice.
D. Assemble an engine in accordance with manufacturer instructions and specifications.
E. Identify and order new engine parts as needed.
F. Evaluate the design, operation, and component parts of engine fuel systems and perform normal servicing of the fuel system in a manner consistent with accepted industry standards.
G. Recognize the importance of a properly tuned engine, perform all necessary adjustments, demonstrate sequential steps taken in diagnosing tune-up problems, and remove and replace components in a manner consistent with accepted industry standards.
H. Inspect and analyze the cause or failure of defective engine components in a manner consistent with accepted trade practice.

IV. CONTENT:

A. Shop Safety
   1. General shop safety
   2. Automotive Department safety and agreement policy
   3. Technical Division safety statement/agreement
   4. Accepted practices and procedures
   5. Safe use of pneumatic, hydraulic, and electric tools and equipment
   6. Safe use of parts cleaning equipment
   7. Preparation and response to natural disasters in the work place
   8. Recognition, handling, and legal disposal of hazardous materials
   9. Safety tips for using hand tool
   10. Safety tips for technicians
   11. Material Safety Data Sheets (MSDS)
   12. Safety in lifting

B. Orientation/General Information
   1. Certificates (College and NATEF/ASE)
   2. Course Syllabus
   3. Required materials
   4. Grading system
   5. Policies and procedures
   6. Career Opportunities
   7. Salary and benefits
   8. Employer/Employee expectations

C. Basics of Internal Combustion Engines
   1. Four stroke cycle
   2. Two stroke cycle
   3. Engine identification

D. Use of Measuring Tools
   1. Outside micrometer
   2. Inside micrometer
   3. Telescoping gages
   4. Small hole gages

E. Valve Mechanism and Operations
   1. L head valve engines
   2. Overhead valve mechanism
   3. Overhead cam and valve mechanism

F. Valve Problem Diagnosing and Repair
   1. Valve adjustment
   2. Compression check
   3. Air pressure check cylinder

G. Valve Repair
   1. Valve refacing
   2. Valve seat
   3. Valve guide inspection and repair
   4. Valve reassembly procedure

H. Cam Shaft Operation
   1. Camshaft inspection
   2. Cam followers inspection
   3. Inspection of push rod and rocker arm mechanism

I. Cylinder, Piston, and Crankshaft
   1. Removal
   2. Checking wear of engine components
   3. Piston, pin, and connecting rod checks
   4. Piston ring check and installation
   5. Crankshaft inspection and measuring
   6. Oil bearing surfaces

V. METHODS OF INSTRUCTION:
The methods of instruction will include, but are not limited to, classroom lectures, direct demonstration by instructor, guided practice by the learner and presentation by factory video programs.

VI. TYPICAL ASSIGNMENTS:
A. After completion of assigned reading, answer designated review questions.
   Typical Questions:
   1. Name the major components of the two stroke cycle.
   2. List the three most common failures of connecting rods.
B. Students will demonstrate college level writing competency by writing a comprehensive failure analysis report about a selected engine component.
C. Perform typical oil pressure test, write a report of results.
D. Service spark plugs by performing a visual inspection then replacing as needed.
E. Perform a compression test and determine needed repairs.
F. Write a typical shop repair order to Bureau of Auto Repair standards.

VII. EVALUATION:
A. Methods of Evaluation:
   1. Quizzes covering reading assignments
   2. Unit exams
   3. Mid-term exam
   4. Final exam
      Typical Questions:
      a. Explain the procedure for compression testing.
      b. Explain the need for eye safety protection in the lab.
   5. Progress evaluations of lab projects
B. Frequency of Evaluation:
   1. Weekly progress of lab projects
   2. Three quizzes covering reading assignments
   3. Two unit exams
   4. One mid-term exam
   5. One final exam

VIII. TYPICAL TEXT(s):

Title: Small Gas Engines
Author: Alfred C. Roth
Publisher: Goodheart-Wilcox
Date of Publication: 1998

IX. OTHER SUPPLIES REQUIRED OF STUDENTS:
A. Notebook
B. Safety glasses