

# Lassen Community College Course Outline

## AT-74 Engine Repair and Machining-Cylinder Heads

3.0 Units

### I. Catalog Description

This course is designed to prepare the student with basic, through increasingly advanced, skills in overhaul procedures for the owner or rebuilder. Safety, basic hand tools, cylinder head removal and replacement, cleaning techniques, disassembly and assembly of cylinder head components, measuring, diagnosis of oil consumption and poor performance with corrective measures will be covered. Emphasis will be on cylinder head overhaul as it relates to home, small farm shop, and commercial shop. This course conforms to ASE Education Foundation standards. This course has been approved for hybrid delivery.

**Recommended Preparation:** English 105 or equivalent multiple measures placement

17 Hours Lecture, 102 Hours Lab, 34 outside-of-class hours, 153 total student learning hours

Scheduled: Fall even

### II. Coding Information

Repeatability: Not Repeatable. Take 1 Time

Grading Option: Graded or Pass/No Pass

Credit Type: Credit - Degree Applicable

TOP Code: 094800

### III. Course Objectives

#### A. Course Student Learning Outcomes

Upon completion of this course the student will be able to:

1. Diagnose, disassemble, initiate corrective measures, and reassemble an automotive engine cylinder head to manufactures' specifications at a beginner level.
2. Perform common cylinder head machining operations at a beginner level.

### IV. Course Content

#### A. Safety exam

1. Shop safety and routine
2. Vehicle identifying information, customer concern, related service history, cause and correction.
3. 3. Identify and interpret cylinder head concern; determine necessary action.

#### B. Cylinder head designs and theory of operation

1. O.H.V. and overhead cam designs
2. Valve train operation
3. Combustion chamber designs
4. Cylinder head nomenclature

#### C. Cylinder head removal and installation

1. Parts organization
2. Cam timing precautions
3. Cleaning techniques

4. Head bolt torque and tightening order
- D. Disassembly, cleaning and inspection
  1. Valve removal
  2. Chemical and mechanical cleaning
  3. Crack detection, ferrous and nonferrous
  4. Checking for straightness
- E. Machining
  1. Angle relationship to block/manifold
  2. Surface texture cast iron, aluminum
  3. Intake/exhaust valve reconditioning
  4. Stud removal/replacement
  5. Guide reconditioning
  6. Seat boring and replacement
  7. Valve spring inspection and testing
- F. Grinding and seating valves according to manufacturer's specifications
  1. Machine set-up
  2. Valve specifications
  3. Stem/seat clearances
  4. Seat grinding
- G. Final cleaning and assembly
  1. Guide cleaning
  2. Valve seal installation
  3. Valve installation

## **V. Assignments**

### **A. Appropriate Readings**

1. Industry materials as furnished by the instructor
2. Manufacturers bulletins
3. Current professional manuals

### **B. Writing Assignments**

Typical writing assignments may include:

1. Providing written answers to assigned questions
2. Performing mathematical calculations as assigned
3. Maintaining a notebook of class assignments/activities
4. Maintain a record of completed assignments/activities

### **C. Expected Outside Assignments**

Appropriate outside assignments may include:

1. Researching appropriate readings
2. Preparing written assignments
3. Studying as needed for successful classroom performance

### **D. Specific Assignments that Demonstrate Critical Thinking**

Students will perform analysis and evaluation of readings and/or classroom materials and utilize this analysis in classroom discussion, writing assignments, and in performing laboratory activities. Students must select and use appropriate methods and materials needed to complete laboratory assignments.

## **VI. Methods of Evaluation**

### **Traditional Classroom Instruction**

Term paper (topic choice, thesis statement, outline, bibliography, rough draft, final draft), homework, classroom discussion, essay, journals, lab demonstrations and activities, multiple choice quizzes, and participation.

### **Hybrid Evaluation**

All quizzes and exams will be administered during the in person class time. Students will be expected to complete online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation and to maintain effective communication between instructor and students.

## **VII. Methods of Delivery**

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

**Traditional Classroom Delivery**  Correspondence Delivery

Online Delivery

Hybrid Delivery

### **Traditional Classroom Delivery:**

The appropriate method of instruction will be determined by the instructor and may include:

1. Lecture with or without various audio/visual aids.
2. Group problem solving, discussion, debate, and/or critique.
3. Demonstration
4. Computer-assisted/other self-paced instruction.
5. Field trips or field assignments.
6. Laboratory assignments utilizing planned activities or "live" work.

### **Hybrid Delivery**

Hybrid modality may involve face to face instruction mixed with online instruction. A minimum of 1/3 of instruction, including 100% labs, will be provided face to face. The remaining hours will be taught online through a technology platform as adopted by the district.

## **VIII. Representative Texts and Supplies**

Goodnight and VanGelder; *Master Automotive Technician Series Automotive Engine Repair*, 2017, ISBN 9781284101980

Industry materials as furnished by the instructor

Current professional manuals

Appropriate shop clothing, proper footwear, and safety glasses.

## **IX. Discipline/s Assignment**

Automotive Technology

## **X. Course Status**

Current Status: Active

Original Approval Date: 6/1/1990

Board Approval: 03/12/2013

Chancellors' Approval: 05/01/2013

Revised By: Chad Lewis

Curriculum/Academic Standards Committee Revision Date: 02/15/2022