

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

AUTOMOTIVE TECHNOLOGY 170 – ENGINE OVERHAUL

3 hours lecture, 6 hours laboratory, 5 units

Catalog Description

Diagnosis of engine failures, engine removal and disassembly techniques, engine cleaning and measuring practices, machining principles, and assembly procedures. Emphasis is on practical experience through actual shop training. Students are required to provide an auto engine for overhaul and complete associated tasks in the shop as specified by NATEF (National Automotive Training Educational Foundation). Preparation for ASE A-1 Certification.

Prerequisite

None

Course Content

- 1) Lecture:
 - a. Introduction and safety
 - b. Engine systems
 - c. Engine removal
 - d. Engine disassembly
 - e. Part inspection
 - f. Engine cleaning and machining
 - g. Engine measuring (“mike-up”)
 - h. Cylinder head repair
 - i. Cylinder block preparation
 - j. Pre-assembly checks
 - k. Assembly procedures
 - l. Engine installation
- 2) Lab:
 - a. Introduction and safety
 - b. Laboratory procedures
 - c. Equipment operation
 - d. Engine removal
 - e. Disassembly procedures
 - f. Cleaning operations
 - g. Part inspection and measurements
 - h. Block preparation
 - i. Cylinder head and valve servicing
 - j. Pre-assembly checks
 - k. Assembly procedures
 - l. Engine installation

Course Objectives

Students will be able to:

- 1) Demonstrate standardized safety and hazardous waste handling practices.
- 2) Apply engine operating theory to diagnosis of engine problems.
- 3) Perform engine repairs to prescribed industry standards.

- 4) Utilize required tools and equipment to diagnose engine noise and mechanical problems.
- 5) Demonstrate proper procedures used to remove and install engine.
- 6) Using prescribed industry standards, correctly disassemble and reassemble an automotive engine.
- 7) Utilize proper tools to measure all critical engine components for size and wear.
- 8) Following prescribed industry standards utilize specialized engine machining equipment to repair engine block and cylinder head components.
- 9) Following prescribed industry standards diagnose, inspect and repair lubrication system components.
- 10) Retrieve manufacturers' repair information and technical service bulletins and utilize this information for accurate diagnose and repair.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Quizzes, written exams, and hands-on performance exam that measure students' ability to safely identify necessary action or repair, diagnose and measure engine components, and perform necessary tasks related to engine repair.
- 2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing, and adjustment of engine related systems and components.
- 3) Skills-based summative assessment that measures students' ability to successfully complete the necessary NATEF tasks related relating to diagnosis, replacement, repair, testing, and adjustment of engine systems and components.

Special Materials Required of Student

- 1) Basic hand tool set
- 2) Approved safety glasses

Minimum Instructional Facilities

- 1) Auto tech lab (6 bays)
- 2) Complete engine service equipment center
- 3) Various training models
- 4) Engine machining room
- 5) Engine assembly room (clean room)
- 6) Smart classroom with projection screen

Method of Instruction

- 1) Lecture and demonstration
- 2) Individual and small group assistance

Out-of-Class Assignments

- 1) Reading assignments
- 2) Written homework

Texts and References

- 1) Required (representative example): *Erjavec and Thompson: Mindtap: Automotive Technology: A Systems Approach*. Cengage Unlimited, 2020 ISBN 9780357096772
- 2) Supplemental: None

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Understand nomenclature and operational theory of automotive engines.
- 2) Diagnose engine noise and mechanical problems.
- 3) Remove and install an automotive engine.
- 4) Correctly disassemble and reassemble an automotive engine.
- 5) Measure all critical engine components for size and wear.
- 6) Diagnose and repair cylinder head and valve train components.
- 7) Diagnose, inspect and repair lubrication system components.
- 8) Understand process and procedure for performing various engine machining operations.

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Recognize an unsafe environmental or safety condition by written or verbal description, and provide resolution instructions with 100% accuracy.
- 2) Communicate effectively verbally and in writing the symptom to system to component to cause of various customer concerns regarding engine systems with 100% accuracy.
- 3) Comply with state and federal laws and regulations while performing engine diagnosis in a classroom, laboratory, or work environment evaluation with 80% accuracy.
- 4) Pass a final examination given various engine system and component scenarios using multiple measures with 100% accuracy.