Lecture Contact Hours: 48-54; Homework Hours: 96-108; Total Student Learning Hours: 144-162
Laboratory Contact Hours: 96-108; Homework Hours: 0; Total Student Learning Hours: 96-108

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

AUTOMOTIVE TECHNOLOGY 175 – ADVANCED ENGINE OVERHAUL

3 hours lecture, 6 hours laboratory, 5 units

Catalog Description
Advanced course in engine overhaul designed to develop greater student performance under simulated industry conditions. Students will be required to complete associated tasks in the shop as specified by NATEF (National Automotive Training Educational Foundation). Preparation for ASE A-1 Certification.

Prerequisite
"C" grade or higher or "Pass" in AUTO 170 or equivalent

Entrance Skills
Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:
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.

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 block preparation
    i. Pre-assembly checks
    j. Assembly procedures
    k. Engine installation
2) Lab:
    a. Introduction and safety
    b. Laboratory procedures
    c. Equipment procedures
    d. Equipment operation
    e. Engine removal
    f. Disassembly procedures
    g. Cleaning operations
    h. Part inspection and measurements

i. Block preparation
j. Cylinder head and valve servicing
k. Pre-assembly checks
l. Assembly procedures
m. 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) Independently perform engine repairs to prescribed industry standards.
4) Utilize required tools and equipment to diagnose engine noise and mechanical problems.
5) Using prescribed industry standards, correctly disassemble and reassemble an automotive engine.
6) Independently utilize proper tools to measure all critical engine components for size and wear.
7) Following prescribed industry standards utilize specialized engine machining equipment to repair engine block and cylinder head components.
8) Utilize manufacturers' repair information and technical service bulletins 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 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 assistance

Out-of-Class Assignments
1) Reading assignments
2) Written homework

Texts and References

1) Required (representative example): *Erjacev 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) Independently perform all engine disassembly, wear diagnosis, precision measurement, and engine reassembly.
2) Perform all required cylinder head machining/repair procedures.

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 mechanical system in vehicle diagnosis and repairs with 100% accuracy.
3) Comply with state and federal laws and regulations while performing engine mechanical diagnosis in a classroom, laboratory, or work environment evaluation and repair with 80% accuracy.
4) Pass a final examination given various in-vehicle engine system and component scenarios using multiple measures with 100% accuracy.