COURSE INFORMATION FORM

DISCIPLINE: Automotive Technology
COURSE TITLE: Automotive Engine Repair

CR.HR: 6  LECT HR: 3  LAB HR: 6  CLIN/INTERN HR: 0  CLOCK HR: 0

CATALOG DESCRIPTION

This course covers the history, theory of operation, diagnosis and repair of automotive gasoline and light-duty diesel engines. The student will receive instruction on engine maintenance and repair including methods, tools and procedures required to properly recondition engine assemblies. Reconditioning of engine assemblies and components include cylinder head and valve service, piston and ring service, block and bearing service. This course emphasizes precision measuring and engine mechanical systems diagnosis.

PREREQUISITES

Concurrent enrollment in or completion of AUTO 100.

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)

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

1. Demonstrate the cognitive and manipulative skills necessary to complete assigned tasks.
2. Describe and employ safe work habits, observing both personal safety and a concern for the safety of others.
3. Analyze, diagnose and determine necessary actions to solve general engine mechanical problems.
4. Apply procedures needed to successfully perform service operations.
5. Employ effective behaviors necessary to successfully work with others.

GENERAL EDUCATION OUTCOMES (ESO)

Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

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<th>Outcomes</th>
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**PROGRAM-LEVEL OUTCOMES**

**CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES**
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

1. Students will demonstrate the knowledge necessary to obtain industry recognized certifications.
2. Students will demonstrate or apply knowledge of basic sciences to the practices of automotive technology.
3. Students will demonstrate the knowledge and application of safety rules and regulations.
4. Students will exhibit professional behavior.
5. Students will be able to use mathematics as it pertains to the automotive technicians.

**CLASS-LEVEL ASSESSMENT MEASURES**
Student accomplishment of expected student outcomes may be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

One or more of the following will be used:

1. Written evaluation (1-4)
2. Oral evaluation (1-5)
3. Performance Exam (1-4)
4. Written Laboratory Assignments (1-5)
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. Engine operation
   A. Simple engine
   B. Four stroke engine operation
   C. Cylinder arrangement
   D. Valve train
   E. Cylinder block
   F. Front wheel drive
   G. Engine classifications
   H. Combustion chamber designs
   I. Direction of Crankshaft rotation
   J. Firing order
   K. Engine cooling
   L. Spark and compression ignition

II. Engine shop safety, tools and equipment
   A. Shop safety
   B. Tools of the industry
   C. Pullers
   D. Air tools
   E. Shop equipment
   F. Electric machinery
   G. Hydraulic equipment

III. Preliminary diagnosis before repair
   A. Diagnosing problems before an overhaul
   B. Oil consumption & fuel mixture problems
   C. Compression loss
   D. Engine noises
   E. Oil pressure problems
   F. Cooling system problems
   G. Electronic failures/engine damage

IV. Cleaning the engine
   A. General shop health and safety
   B. Cleaning methods
C. Cleaning the outside of the engine
D. Cleaning the inside of the engine

V. Engine removal, disassembly, inspection, and in-car repairs
   A. Service information and shop manuals
   B. Engine removal
   C. Engine disassembly
   D. Ordering parts
   E. Major engine repair-engine in the vehicle

VI. Measuring
   A. Metric system
   B. Measuring tools
   C. Precision measuring tools

VII. Engine hardware: fasteners, thread repair, and gaskets
   A. Characteristics of fasteners
   B. Bolt stretch
   C. Torque and friction
   D. Drill bits
   E. Taps, threads, and dies
   F. Repairing broken fasteners
   G. Flared lines
   H. Gaskets, gasket sealers, and seals

VIII. Cylinder Block – inspection and service
   A. Cleaning the block
   B. Oil and water plugs
   C. Main bearing caps and main bearing
   D. Decking the block
   E. Inspecting cylinder bores
   F. Deglazing cylinders and reboring cylinders
   G. Honing cylinders to size
   H. Chamfering the cylinder
   I. Cylinder sleeves and lifter bores
   J. Final block preparation

IX. Crankshaft, bearings, and engine balancing
   A. Crankshaft design
   B. Crank end thrust
   C. Checking crank condition
   D. Bearings
   E. Engine balancing

X. Pistons, rings, and connecting rods
   A. Pistons
   B. Pistons rings
C. Wrist pins
D. Connecting rods

XI. Lubrication and cooling system
   A. Oil
   B. Oil pumps
   C. Priming the system
   D. Oil filters
   E. Crankcase ventilation
   F. Cooling system circulation and belts
   G. Thermostat and thermostat bypass
   H. Radiators

XII. Cylinder head: Parts and service
   A. Head disassembly
   B. Carbon removal
   C. Crack inspection and repair
   D. Valve guide inspection
   F. Valve guide seals

XIII. Cylinder head: springs, valves, and valve seats
   A. Valve springs
   B. Pushrods and rocker arms
   C. Valves and valve service
   D. Valve seats and service
   E. Reassembling the head

XIV. Engine breathing and power: cam, manifolds, and turbochargers
   A. Camshaft and cam thrust
   B. Valve lash and valve lifters
   C. Valve timing and cam drives
   D. Manifolds
   E. Turbochargers and superchargers

XV. Reassembly and starting
   A. Warranty
   B. Reassembly
   C. Completion of assembly
   D. Engine installation
   E. Engine starting and initial bread-in of the camshaft
   F. Final inspection and cleaning