



### AST 205 Automotive Engine Repair

#### Course Information

Division	ASET
Contact Hours	120
Theory	30
Lab Hours	90
Total Credits	5

Pre requisites – AST 101, AST 105

#### Course Description

This course will focus on the repair procedures utilized in repairing and rebuilding internal combustion engines. Disassembly, assembly, part inspection, use of manuals and repair/replacement procedures will be applied to both upper and lower engine components

This course will be an elective course taken by students who chose to take this as their elective in the AAS in Automotive Service Technology program.

#### Program Outcomes Addressed by this Course:

Upon successful completion of this course, students should be able to meet the program outcomes listed below:

- A. Demonstrate the correct method of utilizing automotive service tools and equipment
- B. Identify all related system diagnostic/repair information within automotive service information
- C. Employ safe and professional work habits while conducting typical automotive service procedures.
- D. Explain how the various systems of an automobile work
- E. Demonstrate correct service procedures in the various automotive systems
- F. Test and diagnose the proper operation of the various automotive systems

#### Course Outcomes

In order to evidence success in this course, the students will be able to:

##### 1. Understand and demonstrate engine block assembly diagnosis and repair

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Remove, inspect, or replace crankshaft vibration damper (harmonic balancer).
- b) Disassemble engine block; clean and prepare components for inspection and reassembly.
- c) Inspect engine block for visible cracks, passage condition, core and gallery plug condition, and surface warpage; determine necessary action.
- d) Inspect and measure cylinder walls/sleeves for damage, wear, and ridges; determine necessary action.
- e) Deglaze and clean cylinder walls.
- f) Inspect and measure camshaft bearings for wear, damage, out-of-round, and alignment; determine necessary action.
- g) Inspect crankshaft for straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage



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condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable); determine necessary action.

- h) Inspect main and connecting rod bearings for damage and wear; determine necessary action.
- i) Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems; determine necessary action.
- j) Inspect and measure piston skirts and ring lands; determine necessary action.
- k) Determine piston-to-bore clearance.
- l) Inspect, measure, and install piston rings.
- m) Inspect auxiliary shaft(s) (balance, intermediate, idler, counterbalance or silencer); inspect shaft(s) and support bearings for damage and wear; determine necessary action; reinstall and time.
- n) Assemble engine block.

### 2. Understand and demonstrate cylinder head and valve train operation diagnosis and repair

This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)

- a) Remove cylinder head; inspect gasket condition; install cylinder head and gasket; tighten according to manufacturer's specifications and procedures.
- b) Clean and visually inspect a cylinder head for cracks; check gasket surface areas for warpage and surface finish; check passage condition.
- c) Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages (orifices); determine necessary action.
- d) Adjust valves (mechanical or hydraulic lifters).
- e) Inspect and replace camshaft and drive belt/chain; includes checking drive gear wear and backlash, end play, sprocket and chain wear, overhead cam drive sprocket(s), drive belt(s), belt tension, tensioners, camshaft reluctor ring/tone-wheel, and valve timing components; verify correct camshaft timing.
- f) Establish camshaft position sensor indexing.
- g) Inspect valve springs for squareness and free height comparison; determine necessary action.
- h) Replace valve stem seals on an assembled engine; inspect valve spring retainers, locks/keepers, and valve lock/keeper grooves; determine necessary action.
- i) Inspect valve guides for wear; check valve stem-to-guide clearance; determine necessary action.
- j) Inspect valves and valve seats; determine necessary action.
- k) Check valve spring assembled height and valve stem height; determine necessary action.
- l) Inspect valve lifters; determine necessary action.



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# Course Outcome Summary

Required Program Core Course

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- m) Inspect and/or measure camshaft for runout, journal wear and lobe wear.
- n) Inspect camshaft bearing surface for wear, damage, out-of-round, and alignment; determine necessary action.

Date Updated: 3/31/15, 8/12/15, 9/3/15  
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