



South Central College

AST 1332 Upper Engine

Course Outcome Summary

Course Information

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| Description | This course covers testing and rebuilding the cylinder head. The student will analyze cylinder compression and leakage to determine if valve and valve seat service is necessary. Hands-on experience consists of valve refacing, valve guide service, valve seat reconditioning, valve spring testing, shim selection, and proper assembly and installation. Prior knowledge gained by the successful completion of AST1311 is required for student success in this course. (1 lecture credit, 1 lab credit) |
| Total Credits | 2 |
| Total Hours | 48 |

Types of Instruction

| Instruction Type | Credits/Hours |
|------------------|---------------|
| Lecture | |
| Lab | |

Pre/Corequisites

Admission into the Automotive Service program

Institutional Core Competencies

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Exhibit professionalism and demonstrate proper shop safety procedures

Learning Objectives

Demonstrate professional conduct, act responsibly and accept responsibility for the successful and timely completion of assignments
Identify and follow all shop safety procedures

2. Identify and describe cylinder head components

Learning Objectives

Explain engine and cylinder head operation
Identify cylinder head components and explain the purpose of each component
Identify cylinder head design

3. Disassemble, inspect and measure cylinder head components - determine necessary action

Learning Objectives

Mark, remove and disassemble the cylinder head(s), inspect head gasket condition - keep components in order
Clean cylinder heads, clean passages, and prepare the cylinder head components for inspection and measuring
Check the cylinder heads for cracks, warpage, surface finish or damage
Inspect pushrods, rocker arms, shafts, and pivots for wear, bending, cracks, looseness and blocked passages, inspect valve lifters
Inspect valve springs for squareness, breakage, measure pressure and free height; inspect spring retainers, locks and valve grooves
Inspect valve stem, valve face, valve seat and valve guides for wear, pitting, burning, out of round and damage
Measure valve stem to guide clearance

4. Analyze component failure; repair or replace cylinder head components

Learning Objectives

Evaluate the cause of a component failure
Explain and demonstrate valve guide repair and machine valve seal surface area
Explain and demonstrate valve face and valve seat grinding
Check valve face to seat contact and seat concentricity
Inspect and measure the camshaft for wear or damage, measure cam bearings, camshaft bore alignment; inspect valve lifters and lifter bore - replace component if necessary
Replace valve stem seals on an assembled engine
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 variable valve timing components).

5. Reassemble cylinder head assembly

Learning Objectives

Replace all seals and gaskets and any components that did not pass inspection or meet specifications
Install valves, seals, springs, and shims; measure valve stem height, valve spring installed height
Install the cylinder head gasket(s) and cylinder head(s) on the engine; torque to specifications
Install the camshaft and lifters if applicable
Install the timing sprockets, belt, tensioner, idler pulley and other valve train components - verify correct valve timing, belt tension and establish camshaft position sensor indexing.
Adjust valves (mechanical or hydraulic lifters), install all covers with new gaskets and seals

SCC Accessibility Statement

South Central College strives to make all learning experiences as accessible as possible. If you have a disability and need accommodations for access to this class, contact the Academic Support Center to request and discuss accommodations. North Mankato: Room B-132, (507) 389-7222; Faribault: Room A-116, (507) 332-7222.

Additional information and forms can be found at: www.southcentral.edu/disability

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