South Central College

AST 1323 Lower Engine Service

Course Outcome Summary

Course Information

Description This course covers the theory of engine operation and construction, parts identification, measurements, and engine wear locations. Determining the service procedures an engine will require and the reconditioning of all lower engine components are included in this course. Prior knowledge gained by the successful completion of AST1311 is required for student success in this course.
(1.5 lecture credits, 1.5 lab credits)

Total Credits 3

Total Hours 72

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 engine components and explain component operation

Learning Objectives
Identify all lower engine components

Explain engine component operation and purpose
Explain various engine cylinder arrangements

3. Disassemble the engine

Learning Objectives

Mark, remove and inspect the intake and exhaust manifolds, cylinder heads, oil pan, valve covers, harmonic balancer, timing cover, and oil pump
Measure crankshaft end play and connecting rod side clearance
Mark and remove valve lifters, pushrods, valve timing components, connecting rod caps, main bearing caps, crankshaft, camshaft and cam bearings
Remove cylinder wall ridge, mark and remove the pistons and connecting rods
Clean and prepare components for inspection and reassembly

4. Inspect and measure engine components and determine necessary action

Learning Objectives

Inspect the engine block for cracks, surface warpage, restricted passages, core and gallery plug condition or any other defects
Inspect and measure cylinder wall/sleeves for damage, wear and ridges
Inspect main and connecting rod bearings for damage, wear and measure bearing clearance
Identify piston and bearing wear patterns that indicate a connecting rod alignment or main bearing bore problem
Inspect and measure main bearing bores and bore alignment
Inspect crankshaft for, straightness, journal damage, keyway damage, thrust flange and sealing surface condition, and visual surface cracks; check oil passage condition; measure end play and journal wear; check crankshaft position sensor reluctor ring (where applicable).
Inspect and measure camshaft bearings for damage, wear, out of round, and camshaft bore alignment
Inspect and measure the camshaft for damage and wear
Inspect the connecting rods, connecting rod alignment and bearing bore condition
Inspect the pistons and rings for wear or damage, measure piston skirts and ring lands, piston to cylinder clearance and piston pin clearance
Inspect auxiliary shafts and bearings for damage and wear
Inspect the oil pump gears or rotor, housing, pressure relief device and pump drive
Inspect valve timing components for wear or damage
Inspect all pans, covers, sealing surfaces, flywheel, harmonic balancer, pilot bearing, belts, hoses, tensioners, pulleys, fan and radiator for damage

5. Replace or repair engine components

Learning Objectives

Inspect and repair all damaged internal and external threads
Deglaze,hone and clean cylinder walls
Clean the engine block and all fluid passages, replace oil gallery and expansion plugs
Replace pistons and piston pins if required, replace piston rings and all engine bearings and bushings,
Replace the camshaft and valve lifters
Replaced the thermostat, water pump, oil pump and pick up tube, all gaskets and seals
Test and replace if needed the oil pressure and temperature sensors
Inspect and replace if needed the auxiliary cooler, cooling fans, fan clutches, fan shroud and air dam
Change engine oil, oil filter, coolant and flush the cooling system

6. Reassemble lower engine components

Learning Objectives

Install camshaft bearings and camshaft
Install main bearings and crankshaft, measure crankshaft end play and bearing oil clearance using plasticgauge
Install piston rings, measure end gap and side clearance
Install pistons/connecting rods, measure bearing oil clearance and connecting rod side clearance
Install valve timing components, balance shaft, gears/sprockets, chain/belt, etc.- index timing components in the correct position
Install oil pump and pick up tube - prime the oil pump
Prime and install valve lifters if applicable
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.

Install all seals, covers, oil pan, flywheel, harmonic balancer

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

This material can be made available in alternative formats by contacting the Academic Support Center at 507-389-7222.