



South Central College

AST 1712 Basic Tune Up

Course Outcome Summary

Course Information

Description	This course covers the theory and principles of operation of automotive gasoline engines, fuel systems, ignition systems, and emission systems. Prior knowledge gained by the successful completion of AST1212 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 explain various engine systems

Learning Objectives

Explain four cycle internal combustion engine operation
Describe engine management system operation - mechanical, cooling, exhaust, fuel, ignition and emission systems
Identify hybrid vehicle internal combustion engine service precautions.

3. Demonstrate inspection and testing procedures

Learning Objectives

Inspect engine for fuel, oil, coolant or other leaks - determine necessary action
Check coolant condition and perform a cooling system pressure test - determine necessary action
Verify engine operating temperature, inspect and test the thermostat, radiator, cap, hoses, bypass, and recovery tank- determine necessary action
Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.
Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action.
Perform an exhaust system backpressure test - determine necessary action
Perform an engine absolute (vacuum/boost) intake manifold pressure test, perform engine cranking vacuum test, test the operation of turbocharger/supercharger systems.
Conduct a cylinder power balance test - determine necessary action
Perform an engine cranking and running compression test, perform a cylinder leakage test - determine necessary action
Verify camshaft timing - determine necessary action
Inspect and test the primary ignition circuit, wiring, crankshaft and camshaft position sensor(s), ignition module and other solid state ignition components
Inspect and test the distributor, coil, ignition secondary wiring and components - determine necessary action
Inspect and test the PCV, EGR, EFE and the secondary air injection systems - determine necessary action
Inspect the fuel tank, cap, lines, fittings and hoses - determine necessary action

4. Diagnose engine performance complaints

Learning Objectives

Interpret and verify customer complaint - determine necessary action
Locate and interpret vehicle and major component identification numbers (VIN, certification and calibration labels)
Diagnose no start, drivability and emission concerns on engines with distributor ignition, DIS and COP ignition
Diagnose the cause of unusual engine noise or vibration - determine necessary action
Diagnose engine support system problems with an oscilloscope, engine analyzer and a digital multimeter
Diagnose unusual exhaust color, odor, and sound - determine necessary action

5. Demonstrate engine repair and maintenance

Learning Objectives

Replace spark plugs, fuel filter and air filter
Check and adjust ignition timing and timing advance
Check and adjust idle speed and mixture when applicable
Adjust valves on engines with mechanical or hydraulic lifters when required
Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.
Perform engine oil and filter change.

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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