



MONROE COUNTY
COMMUNITY COLLEGE

Course Outcome Summary

Required Program Core Course

AST105 Engine Theory

Course Information

Division	ASET
Contact Hours	60
Theory	30
Lab Hours	30
Total Credits	3

Prerequisites: RDG090

Course Description

This course focuses on the theory, construction, inspection, and diagnosis of the internal combustion engine. Topics covered include fundamental operating principles, diagnosis, inspection, and adjustment of gasoline engines and their internal components.

This course is a required core course for students pursuing a (n) Certificate *in Automotive Technologies*

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 general engine operation, diagnosis and removal and reinstallation (R & R)

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

- a) Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
- b) Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins.
- c) Verify operation of the instrument panel engine warning indicators.
- d) Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
- e) Install engine covers using gaskets, seals, and sealers as required.
- f) Remove and replace timing belt; verify correct camshaft timing.
- g) Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.
- h) Inspect, remove and replace engine mounts.



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- i) Identify hybrid vehicle internal combustion engine service precautions.
 - j) Remove, inspect, or replace crankshaft vibration damper (harmonic balancer).
- 2. Understand and demonstrate lubrication and cooling system operation, diagnosis and repair**
This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)
- a) Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core and galley plugs; determine necessary action.
 - b) Identify causes of engine overheating.
 - c) Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.
 - d) Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.
 - e) Inspect, remove, and replace water pump.
 - f) Remove and replace radiator.
 - g) Remove, inspect, and replace thermostat and gasket/seal.
 - h) Inspect and test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dams.
 - i) Perform oil pressure tests; determine necessary action.
 - j) Perform engine oil and filter change.
 - k) Inspect auxiliary coolers; determine necessary action.
 - l) Inspect, test, and replace oil temperature and pressure switches and sensors.
 - m) Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive; perform necessary action.
- 3. Understand engine performance operation, diagnosis and repair.**
This outcome is relevant to program outcomes: (A) , (B),(C),(D), (E) and (F)
- a) Identify and interpret engine performance concerns; determine necessary action.
 - b) Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
 - c) Diagnose abnormal engine noises or vibration concerns; determine necessary action.
 - d) Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine necessary action.
 - e) Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.
 - f) Perform cylinder power balance test; determine necessary action.
 - g) Perform cylinder cranking and running compression tests; determine necessary action.
 - h) Perform cylinder leakage test; determine necessary action.
 - i) Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.
 - j) Verify engine operating temperature; determine necessary action.
 - k) Verify correct camshaft timing.