

Automotive Technology IV

Course Title: Automotive Technology IV

Course Description: Course emphasis is on the relationship between 4 stroke engine operation and fuel, ignition, and emissions systems. Theory of operation of each system is covered in detail, and advanced diagnostic routines and methods are explored.

Equivalent CCNS Courses:

ASE 130 General Engine Diagnosis

ASE 134 Automotive Fuel and Emissions Systems I

Automotive Technology Enduring Understandings:

- Inquiry guides problem solving
- Parts impact whole
- Analysis of evidence influences performance

World Class Outcomes for Automotive Technology I:

- Investigate underlying academic principles and their applications across multiple disciplines
- Explore the applications of numerous technologies
- Collect and evaluate data to accurately analyze systems
- Apply appropriate technology to perform tasks accurately
- Perform tasks independently in a set time period, with minimal instruction.
- Perform tasks with 100% accuracy recognizing that no acceptable margin of error exists.
- Develop analysis driven concern resolutions
- Clearly communicate procedures both verbally and with written documentation.

General Engine Diagnosis, CCNS and NATEF Tasks

1. Complete work order to include customer information, vehicle identifying information, customer concern, related customer service history, cause, and correction. FEMP.01.02.j, FEMP.01.02.k, FEMP.01.02.l, RWC10-GR.12-S.2-GLE.2-EO.b

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2. Research applicable vehicle and service information, such as internal engine operation, vehicle service history, service precautions, and technical service bulletins. FEMP.01.02.j, FEMP.01.02.k, FEMP.01.02.l, RWC10-GR.12-S.2-GLE.2-EO.b
3. Verify operation of instrument panel engine warning indicators. FEMP.01.02.d , FEMP.01.02.e
4. Inspect engine assembly for fuel, oil, coolant, and other leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action. FEMP.01.02.d , FEMP.01.02.e
5. Identify causes of engine overheating. FEMP.01.02.d , FEMP.01.02.e
6. Perform oil pressure tests, determine necessary action. FEMP.01.02.d, FEMP.01.02.e
7. Diagnose abnormal exhaust color, odor, and sound; determine necessary action. FEMP.01.02.d, FEMP.01.02.e
8. Perform engine vacuum/ boost manifold pressure tests; determine necessary action. FEMP.01.02.d FEMP.01.02.e FEMP.01.02.h MA10-GR.HS-S.1-GLE.2-EO.a.iii
9. Perform engine cranking and running compression tests; determine necessary action. FEMP.01.02.d FEMP.01.02.e FEMP.01.02.h MA10-GR.HS-S.1-GLE.2-EO.a.iii
10. Perform cylinder leakage tests; determine necessary action. FEMP.01.02.d, FEMP.01.02.e MA10-GR.HS-S.1-GLE.2-EO.a.iii
11. Verify engine operating temperature; determine necessary action. FEMP.01.02.d, FEMP.01.02.e
12. Verify correct camshaft timing. FEMP.01.02.d, FEMP.01.02.e
13. Diagnose abnormal engine noises or vibration concerns; determine necessary action. FEMP.01.02.d, FEMP.01.02.e FEMP.01.02.h
14. Identify hybrid vehicle internal combustion engine service precautions. FEMP.01.02.d, FEMP.01.02.e

ASE 134 Automotive Fuel and Emissions Systems I CCNS and NATEF Tasks

1. Remove and replace spark plugs; inspect secondary ignition components for wear and damage. FEMP.01.02.d, FEMP.01.02.e
2. Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices and hoses; perform necessary action. FEMP.01.02.d, FEMP.01.02.e
3. Retrieve and record diagnostic trouble codes, OBD monitor status and freeze frame data; clear codes when applicable. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.k, FEMP.01.02.l

4. Describe the importance of running all OBD#II monitors for repair verification. FEMP.01.02.d, FEMP.01.02.e FEMP.01.02.k FEMP.01.02.l
 5. Replace fuel filter(s). FEMP.01.02.d, FEMP.01.02.
 6. Inspect, service or replace air filters, filter housings and intake duct work. FEMP.01.02.d, FEMP.01.02.e
 7. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s) and heat shields; perform necessary action. FEMP.01.02.d, FEMP.01.02.e
 8. Inspect condition of exhaust system hangers, brackets, clamps and heat shields; repair or replace as needed. FEMP.01.02.d, FEMP.01.02.e
 9. Check and refill diesel exhaust fluid (DEF). FEMP.01.02.d, FEMP.01.02.e
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NATEF, National Automotive Technicians Education Foundation

CDE Standards Descriptors

FEMP.01.02.c Execute repair plans for facilities and mobile equipment.

FEMP.01.02.d Understand the value and necessity of practicing personal and occupational safety and protecting the environment by using materials and processes in accordance with manufacturer and industry standards.

FEMP.01.02.e Understand the safe and appropriate use of tools, equipment and work process.

FEMP.01.02.f Understand scientific principles in relation to chemical, mechanical and physical functions for various engine and vehicle systems.

FEMP.01.02.g Perform and document maintenance procedures in accordance with the recommendations of the manufacturer.

FEMP.01.02.h Understand the application, operation, maintenance, and diagnosis of engines, including but not limited to two- and four-stroke and supporting subsystems.

FEMP.01.02.j Perform and document repair procedures in accordance with manufacturer recommendations and industry standards.

FEMP.01.02.k Demonstrate the effective use of computer based equipment to control electromechanical devices commonly used in diagnostic analysis.

FEMP.01.02.l Use technical vocabulary, technical reports and manuals, electronic systems and related technical data resources to determine repairs and estimates.

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MA10-GR.HS-S.2-GLE.4-EO.a Create equations that describe numbers or relationships. (CCSS: A-CED)

MA10-GR.HS-S.1-GLE.2-EO.a.iii Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (CCSS: N-Q.3)

MA10-GR.HS-S.2-GLE.1-EO.b Interpret functions that arise in applications in terms of the context. (CCSS: F-IF)

RWC10-GR.12-S.2-GLE.2-EO.b Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem. (CCSS: RI.11-12.7)

SC09-GR.HS-S.1-GLE.2-EO.a Develop, communicate, and justify an evidence-based scientific explanation supporting the current model of an atom

SC09-GR.HS-S.1-GLE.2-EO.b Gather, analyze and interpret data on chemical and physical properties of elements such as density, melting point, boiling point, and conductivity

SC09-GR.HS-S.1-GLE.3-EO.d Examine, evaluate, question, and ethically use information from a variety of sources and media to investigate the conservation of mass and energy

SC09-GR.HS-S.1-GLE.5-EO.c Use direct and indirect evidence to develop predictions of the types of energy associated with objects