

# Automotive Technology I Standards

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**Course Title:** Automotive Technology I

**Course Description:** Consists of three primary elements; Shop and personal safety training provides students with shop and vehicle safety instruction and vehicle system fundamentals. Automotive engine service introduces general engine theory, repair, and maintenance. Basic automotive electricity introduces electrical system fundamentals, circuit diagrams, and repair techniques which are applied in the diagnosis of various vehicle safety systems.

**Equivalent CCNS Courses:**

ASE 162 Automotive Engine Service  
ASE 120 Basic Automotive Electricity  
ASE 122 Automotive Electrical Safety Systems

**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.

**Shop and Personal Safety, CCNS and NATEF Tasks**

1. Identify general shop safety rules and procedures. FEMP.01.02.d , FEMP.01.02.e
2. Utilize safe procedures for handling of tools and equipment. FEMP.01.02.d , FEMP.01.02.e
3. Identify and use proper placement of floor jacks and jack stands. FEMP.01.02.d , FEMP.01.02.e
4. Identify and use proper procedures for safe lift operation. FEMP.01.02.d , FEMP.01.02.e
5. Utilize proper ventilation procedures for working within the lab/shop area. FEMP.01.02.d , FEMP.01.02.e
6. Identify marked safety areas. FEMP.01.02.d

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7. Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment. FEMP.01.02.d , FEMP.01.02.e
8. Identify the location and use of eye wash stations. FEMP.01.02.d
9. Identify the location of the posted evacuation routes. FEMP.01.02.d
10. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. FEMP.01.02.d
11. Identify and wear appropriate clothing for lab/shop activities. FEMP.01.02.d
12. Secure hair and jewelry for lab/shop activities. FEMP.01.02.d
13. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. FEMP.01.02.d , FEMP.01.02.e
14. Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.). FEMP.01.02.d , FEMP.01.02.e
15. Locate and demonstrate knowledge of material safety data sheets (MSDS). FEMP.01.02.d , FEMP.01.02.e
16. Identify tools and their usage in automotive applications. FEMP.01.02.e
17. Identify standard and metric designation.
18. Demonstrate safe handling and use of appropriate tools. FEMP.01.02.d , FEMP.01.02.e
19. Demonstrate proper cleaning, storage, and maintenance of tools and equipment. FEMP.01.02.c, FEMP.01.02.d, FEMP.01.02.e
20. Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper). FEMP.01.02.d, MA10-GR.HS-S.1-GLE.2-EO.a.iii
21. Identify information needed and the service requested on a repair order. FEMP.01.02.g, FEMP.01.02.j, FEMP.01.02.l, RWC10-GR.12-S.2-GLE.2-EO.b
22. Identify purpose and demonstrate proper use of fender covers, mats. FEMP.01.02.d
23. Demonstrate use of the three C's (concern, cause, and correction). FEMP.01.02.g, FEMP.01.02.j, FEMP.01.02.l, RWC10-GR.12-S.2-GLE.2-EO.b
24. Review vehicle service history. FEMP.01.02.g, FEMP.01.02.j, FEMP.01.02.l
25. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. FEMP.01.02.g, FEMP.01.02.j, FEMP.01.02.l, RWC10-GR.12-S.2-GLE.2-EO.b

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26. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

### **Automotive Engine Service CCNS and NATEF Tasks**

1. Install engine covers using gaskets, seals, and proper sealants as required. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.h, FEMP.01.02.i
2. Perform common fastener and thread repair to include: remove broken bolts, restore internal and external threads, and repair internal threads with thread inserts. FEMP.01.02.d, FEMP.01.02.e
3. Inspect, replace, and adjust drive belts, tensioner's, and pulleys; check pulley and belt alignment. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.g, FEMP.01.02.h
4. Inspect and test coolant; drain and recover coolant, flush and refill cooling system with recommended coolant, bleed as required. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.g, FEMP.01.02.h, SC09-GR.HS-S.1-GLE.2-EO.b
5. Remove and replace radiator. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.h
6. Inspect engine cooling and heater system hoses, perform necessary action. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.h
7. Remove, inspect and replace thermostat and gasket/ seal. FEMP.01.02.d, FEMP.01.02.h
8. Perform engine oil and filter change. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.g, FEMP.01.02.h, SC09-GR.HS-S.1-GLE.2-EO.b
9. Remove and replace timing belt, verify correct camshaft timing. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.f, FEMP.01.02.g, FEMP.01.02.h, FEMP.01.02.i

### **Basic Automotive Electricity CCNS and NATEF Tasks**

1. Research applicable vehicle and service information, 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
2. Demonstrate knowledge of electrical/electronic series, parallel and series-parallel circuits using principles of electricity; Ohms Law. SC09-GR.HS-S.1-GLE.2-EO.b, MA10-GR.HS-S.2-GLE.4-EO.a, SC09-GR.HS-S.1-GLE.2-EO.a
3. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop, including grounds, current flow and resistance. FEMP.01.02.d, FEMP.01.02.e, MA10-GR.HS-S.1-GLE.2-EO.a.iii

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4. Check operation of electrical circuits with a test light. FEMP.01.02.d, FEMP.01.02.e
5. Check operation of electrical circuits with fused jumper wires. FEMP.01.02.d, FEMP.01.02.e
6. Use wiring diagrams during the diagnosis (troubleshooting) of electrical electronic circuit problems. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.1
7. Inspect and test fusible links, circuit breakers and fuses; determine necessary action. FEMP.01.02.e
8. Replace electrical connectors and terminal ends. FEMP.01.02.e
9. Perform solder repair of electric wiring. FEMP.01.02.e
10. Measure key-off battery drain (parasitic draw). FEMP.01.02.e
11. Perform battery state-of-charge test; perform necessary action.
12. Inspect and clean battery; fill battery cells, check battery cables, connectors, clamps and hold-downs. FEMP.01.02.d, FEMP.01.02.e, SC09-GR.HS-S.1-GLE.2-EO.b
13. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. FEMP.01.02.e

### **Automotive Electrical Safety Systems CCNS and NATEF Tasks**

1. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights or drive lights); replace as needed. FEMP.01.02.e
  2. Aim headlights. FEMP.01.02.e
  3. Identify system voltage and safety precautions associated with high-intensity discharge headlights. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.1
  4. Disable and enable an air bag/SIR system for vehicle service; verify indicator lamp operation. FEMP.01.02.d, FEMP.01.02.e, FEMP.01.02.1
  5. Remove and re-install door panel. FEMP.01.02.e
  6. Describe the operation of keyless entry or remote-start systems. FEMP.01.02.1
  7. Verify operation of instrument panel gauges and warning or indicator lights; reset maintenance indicators. FEMP.01.02.e
  8. Verify windshield wiper and washer operation; replace wiper blades. 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.

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

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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