

Automotive Technology II

LEARNING GOALS

***Based upon the Maryland State Department of Education Framework and NATEF Guidelines*

Electronic and Electrical Systems and Engine Performance Diagnosis and Repair

- Students will conduct an interest assessment and identify career goals to assure successful preparation in automotive service technology.
(LG-01)
- Students will identify specific automotive equipment and safety standards to provide a safe and orderly environment (LG-02)
- Students will use proper repair procedures, and troubleshooting techniques in order to perform required engine service according to (NATEF) standards (LG-03)
- Students will perform required electrical/electronic service to comply with NATEF standards. (LG-04)
- Students will perform required engine performance service to comply with NATEF standards (LG-07)
- Using proper procedures and techniques, students will utilize CD ROMS and other training information resources in order to access automotive data (LG-08)

Technical Programs Indicators

STUDENTS WILL BE ABLE TO:

1. Identify career opportunities in automotive service technology to emphasize the importance of Automotive Service Excellence (ASE) certification (LG-01-01)
2. Articulate the importance of personal safety, including eyewear, shoes, and uniforms to comply with MOSHA (Maryland Occupational Safety and Health Administration, and OSHA (Occupational Safety and Health Administration) standards (LG-02-01)
3. Identify and use hand tools, power tools and other National Automotive Technicians Education Foundation (NATEF) approved equipment in order to promote proper use (LG-02-02)
4. Provide an overview of shop operation and layout in order to conform to NATEF, MOSHA and OSHA standards (LG-02-03)
5. Describe career opportunities in engine repair in order to emphasize the importance of Mathematics, Science and communication skills (LG-03-01)
6. Utilize various media in order to research information in the performance of engine repairs (LG-03-02)
7. Describe automotive engines and select the necessary tools and specialized equipment to perform engine repairs (LG-03-04)
8. Perform specific engine repair tasks: disassembly, cleaning, inspecting, measuring, and reassembly in order to meet industry standards established by ASE/NATEF (LG-03-05)
9. Describe the career opportunities in electrical system service in order to emphasize the importance of related math, science and communications skills (LG-04-01)
10. Select the necessary tools and specialized equipment required in order to perform electrical/electronic systems service, tests, and repairs. (LG-04-02)
11. Perform specific electrical/electronic systems repair tasks in order to meet industry standards established by ASE/NATEF (LG-04-03)
12. Describe career opportunities in engine performance to emphasize the importance of mathematics, science and communication skills (LG-07-01)
13. Utilize various media to facilitate engine performance repairs (LG-07-02)
14. Identify CD ROMS and other computer components to become familiar with automotive application (LG-08-01)
15. Explain input sensors and out put device classification as well as operation of automotive computers to use the computer control modules and training interface components properly (LG-08-02)

16. Perform on-board diagnostics using scanners and other devices to determine the status of the automotive electronic systems (LG-08-03)

17. Perform computer system tests and services to diagnose automotive problems (LG-08-04)

Indicators and Objectives

1. Identify career opportunities in automotive service technology to emphasize the importance of ASE certification. (LG-01-01)

Identify common facilities and dealerships where automotive technicians are employed to become familiar with operations (LG-01-01-01)

Review various videos, magazine articles and newspaper articles to gain an understanding of the overwhelming demand for automotive technicians (LG-01-01-02)

Refer to various colleges and or other learning institutions in order to learn of other areas where a working knowledge of automotive technology would be Helpful or necessary (LG-01-01-03)

Become familiar with various Industry-School partnerships, internships and articulations in order to successfully matriculate towards certification and or AA degree (LG-01-01-04)

Participate in VICA, Ford AAA and other organizations and competitions To become familiar with current automotive developments (LG-01-01-05)

2. Articulate the importance of personal safety, including eyewear, shoes and uniforms to comply with MOSHA, OSHA and NATEF standards.

List the importance of a governing safety body in order to promote a safe workplace (LG-02-02-01)

Identify types of fires and their origin, along with proper extinguishers and their locations in order to be prepared for laboratory emergencies (LG-02-02-02)

Utilize review and test materials on career and technology safety offered by MSDE (LG-02-02-03)

Explain distributed copy of Safety First Practices as outlined in Instructors Resource Binder Volume I. Automotive Excellence in order to establish consistency and Assessment. (LG-02-02-04)

Formulate a copy of MSDS to perform properly in case of materials mishandling. (LG-02-02-05)

Solicit student participation in the formulation of copies of MSDS to familiarize students with factory standards. (LG-02-02-06)

3. Identify and use hand tools, power tools, and other NATEF approved equipment in order to promote proper use ((LG-02-01)

Check student copy of Tools and Equipment inventory list to see what tools are required for a NATEF certified program (LG-02-03-01)

Review Tool and Locator binder in order to determine which tools are required for each specific task (LG-02-03-02)

List components and fasteners in order to apply specific tools to specific tasks to comply with ASE/NATEF standards. (LG-02-03-03)

Formulate compressor maintenance journal to assure proper air source for power tools (LG-02-03-04)

4. Provide and overview of shop operation and layout to conform to NATEF, MOSHA, and OSHA safety standards (LG-02-04)

Locate and identify all types of fire extinguishers in order to maintain maximum safety during operations (LG-02-04-01)

Locate all safety glasses, shields, and other safety equipment specified by NATEF to promote safe laboratory operations (LG-02-04-02)

Review all texts and references referring to MSDS and other chemicals to comply with NATEF standards. (LG-02-04-03)

Comply with all signs and safety boarders outlined in the laboratory to adhere to safe practices. (LG-02-04-04)

Comply with dress code for techs including fitted shirts, pants, shoes and or laboratory coats to promote safe laboratory practices (LG-02-04-05)

5. Describe career opportunities in engine repair to emphasize the importance of math, science and communication skills. (LG-03-01)

Review texts and periodicals in order to establish the importance of science, mathematics and communication skills in the execution of specific automotive tasks as outlined by NATEF. (LG-03-01-01).

Contact various successful establishments and interview management as to the importance of mathematics, science and various communication skills (LG-03-01-02)

Review ASE practice tests in order to be exposed to the importance of mathematics, Science and various communications skills (LG-03-01-03)

6. Utilize various sources in order to research information in the performance of engine repairs. (LG-03-02)

Identify various engine components in order to receive a general understanding of engine anatomy (LG-03-02-01)

Review texts and laboratory manuals in order to become familiar with the workings of automotive engines (LG-03-02-02)

Review supplemental text, videos, and illustrations in order to gain cognitive knowledge of automotive engines (LG-03-02-03)

7. Describe automotive engines and select the necessary tools and specialized equipment in order to perform engines repairs (LG-03-03)

Identify specific function of engine components in order to determine importance of design in an internal combustion, 4-stroke, multi-cylinder, reciprocating engine (LG-03-03-01)

Disassemble engines (training aids) in order to gain expertise in tool utilization as well as component removal (LG-03-03-02)

Reassemble engines under supervision in order to determine ability to perform needed repairs and fundamental diagnosis (LG-03-03-03)

Differentiate various engine configurations in order to initiate and perform repairs as outlined by NATEF standards (LG-03-03-04)

8. Perform specific engine repair tasks; disassembly, cleaning, inspection, measuring, and reassembly in order to meet industry standards established by ASE/NATEF (LG-03-04):

Review and practice the operation of various measuring devices micrometers, dial indicators and vernier calipers in order to perform assigned tasks on engine blocks and components (LG-03-04-01)

Utilize straight edges and other devices in order to determine wear, and longevity factors (LG-03-04-02)

Utilize torque wrenches and piston ring compressors in order to assure correct engine reassembly (LG-03-04-03)

Practice engine removal and installation in order to assure proper component and bracket alignment (LG-03-04-04)

Determine through various diagnostic procedures if engine exhibits symptoms as outlined in text. i.e.: compression, combustion, lubrication etc. (LG-03-04-05).

9. Describe the career opportunities in electrical system services to emphasize the importance of related mathematics, science and communications skills. (LG-04-01)

Identify common facilities and dealerships where automotive technicians are employed to become familiar with operations (LG-04-01-01)

Review various videos, magazine and newspaper articles to gain an understanding of the overwhelming demand for specialized automotive technicians (LG-04-01-02)

Refer to various colleges and other learning institutions to learn of related areas where a working knowledge of automotive electronics would be helpful or necessary (LG-04-01-03)

Become familiar with various Industry-School partnerships, internships, and articulations to successfully matriculation towards certification and or degree in a specific area (LG-04-01-04)

Participate in VICA, Ford AAA and other competitions to test automotive electrical and electronic skills (LG-04-01-05)

10. Select the necessary tools and specialized equipment required to properly perform electrical/electronic systems service test and repairs (LG-04-02)

Review basic electrical theory and formulas with knowledge of how it relates to automotive concepts in order to identify fundamental components (LG-04-02-01)

Identify basic electrical terms and become familiar with electrical vocabulary in order to label and catalogue fundamental automotive electrical systems.
(LG-04-02-02)

Practice the use of DVOM, ammeters, test lights and other electrical diagnostic devices in order to perform needed tasks (LG-04-02-03)

Review the operation of alternators, batteries, relays, inducers and other electrical components in order to interpret automotive electrical symptoms (LG-04-02-04)

Complete all NATEF specific tasks in order to promote successful scores of ASE examinations (LG-04-02-05)

11. Perform specific electrical/electronic systems tasks to meet industry standards established by ASE/NATEF (LG-04-03)

Perform basic diagnostic tests and systems evaluation using VAT 40, Motis refractometer, scanners and other equipment in order to meet NATEF standards (LG-04-03-01)

Make use of simulators and PC=s in order to better understand symptoms which may not readily occur on vehicles (LG-04-03-02)

Perform various tasks on training vehicles in order to successfully comply with ASE/NATEF standards (LG-04-03-03)

Register and take ASE test in order to assess progress in electrical/electronic area at prescribed intervals offered at the school (LG-04-03-04)

12. Describe career opportunities in engine performance in order to emphasize the importance of math, science and communications skills (LG-07-01)

Identify common facilities and dealerships where automotive technicians are employed in order to become familiar with operations (LG-07-01-01)

Contact various successful establishments and interview management as to the importance of mathematics, science and various communication skills in order to gain knowledge of these skills in engine performance (LG-07-01-02)

Refer to various colleges and or other learning institutions in order to learn of other areas where a working knowledge of automotive technology would be helpful or necessary (LG-07-01-03)

Become familiar with various industry-school partnerships, internships, and articulations in order to successfully matriculate towards certification and or AA degree (LG-07-01-04)

Participate in VICA, Ford AAA and other organizations and competitions in order to become familiar with current automotive developments in engine performance (LG-07-01-05)

13. Utilize various media in order to facilitate engine performance repairs (LG-07-02)

Identify various engines in order to receive a general comprehension of how they may have electronically monitored components (LG-07-02-01)

Review texts and laboratory manuals in order to become familiar with the workings of relays, potentiometers, resistors, transistors, and other electronic devices used in electronic monitors (LG-07-02-02)

Review supplemental texts, videos, and illustrations in order to gain cognitive knowledge of the inner workings of on board electronic modules (LG-07-02-03) practice with various simulators and computer programs to develop skills in executing engine performance repairs (LG-07-02-04)

14. Identify CD ROMS and other computer components in order to become familiar with Automotive Technological application (LG-08-01)

List computer components in order to identify those, which are common to automotive use (LG-08-01-01)

Examine automotive computers and other components in order to recognize how and where they fit in the automotive scheme (LG-08-01-02)

Disassemble automotive computers in order to determine appearance of their contents and layout (LG-08-01-03)

Compare different automotive systems in order to become familiar with CD ROM common components (LG-08-01-04)

15. Explain input sensors and out put device classification as well as operation of automotive computers in order to use the computer control modules and training interface components properly (LG-08-02)

Identify all input sensors for layout and location in order to determine pre set electrical values. (LG-08-02-01)

Identify reference as well as feed back voltage in order to check condition of component sensor (LG-08-02-02)

Simulate problematic situations on models in order to become familiar with automotive problems (LG-8-02-03)

Differentiate automotive generated problems from computer-generated problems in order to successfully interpret symptoms (LG-08-02-04)

15. Perform on-board diagnostics using scanners and other devices in order to determine the status of the automotive electronic systems (LG-08-03)

Identify scanners, monitor 400s, Grafix programs and other devices in order to apply them to diagnostics procedures (LG-08-03-01)

Utilize reference materials, textbooks, laboratory manuals and videos in order to learn the operation of on board computers (LG-03-03-02)

Practice interfacing diagnostic devices to on board computers in order to extract necessary information to perform needed repairs (LG-08-03-03)

Compete in VICA, Ford AAA and other organized competitions in order to access progress in automotive diagnostics LG-08-03-04)

17. Perform computer system tests and services in order to diagnose automotive problems (LG-08-04)

Successfully catalogue automotive symptoms in order to decide which diagnostic device is appropriate for the problem (LG-08-04-01)

Review automotive journals and manuals in order to determine recalls and product defects, which are electronically, or computer generated ((LG-08-04-02)

Utilize computers and state of the art electronics in order to solve anticipated problems in automotive design (LG-08-04-03)

View automotive computer problems on laptops as well as desk top personal computers in order to electronically store as well as transport information (LG-08-04-04)

Successfully complete ASE engine performance examination in order to receive automotive computer certification (LG-08-04-05)