

Automotive Engine Performance

Course Number - 20121

Rationale Statement:

There is a high demand for trained individuals in the automotive service field. The desire for the students to receive industry-based training at the basic level and step up to the higher level of competency in this field is the ultimate goal of this course. Completion of this course will aide students as they continue their education at the post-secondary level or in the workforce and in the preparation for their ASE certification test. (Examples are NATEF tasks that the student may complete for ASE certification)

Suggested Grade Level: 10-12

Topics Covered:

- Safety
- Basic engine electrical
- Computerized engine controls
- Ignition systems
- Fuel, air induction and exhaust systems
- Emission control systems
- Career exploration

Core Technical Standards & Examples

Indicator #1: Demonstrate automotive technology safety practices, including Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) requirements for an automotive repair facility	
Bloom's Taxonomy Level	Standard and Examples
Understand	EP1.1. Demonstrate automotive technology safety practices Examples: <ul style="list-style-type: none">• Summarize the proper use of MSDS (material safety data sheet)• Demonstrate the proper use of hand and power tools• Examine basic shop safety using OSHA (Occupational Safety Health Administration) standards• Use protective clothing and safety equipment according to OSHA and EPA requirements• Maintain a portfolio of successfully completed safety and

Indicator #2: Properly test, diagnose, and service general engine system	
Bloom's Taxonomy Level	Standard and Examples
Analyze	<p>EP2.1. Identify engine performance concerns to determine necessary action. Examples:</p> <ul style="list-style-type: none"> • Perform a visual inspection of the engine • Analyze abnormal engine noises • Analyze abnormal exhaust color and odor
Evaluate	<p>EP2.2. Test basic engine systems Examples:</p> <ul style="list-style-type: none"> • Perform and evaluate a compression test • Perform and evaluate a cylinder leakage test • Perform and evaluate tests using scan tools and/or engine analyzer
Analyze	<p>EP2.3. Research applicable vehicle service information, vehicle history, service precautions, and technical service bulletins. Examples:</p> <ul style="list-style-type: none"> • Locate and record a vehicle's VIN (Vehicle Identification Number) • Read and report on technical service bulletins. • Identify torque specifications, steps, and sequences and apply the necessary formulas for torque extensions • Identify torque yield angles

Indicator #3: Properly test, diagnose, and service computerized engine control system	
Bloom's Taxonomy Level	Standard and Examples
Analyze	<p>EP3.1. Test engine control systems Examples:</p> <ul style="list-style-type: none"> • Retrieve and record any OBD I (On Board Diagnostics), OBD II, and OBD III codes • Obtain and interpret scan tool data • Inspect related systems

	<ul style="list-style-type: none"> • Perform active tests of actuators using scan tool
Apply	EP3.2. Service engine control systems Examples: <ul style="list-style-type: none"> • Access and use service information to perform step-by-step diagnosis, service and repair.
Indicator #4: Properly test, diagnose, and service ignition system	
Bloom's Taxonomy Level	Standard and Examples
Evaluate	EP4.1. Test ignition system Examples: <ul style="list-style-type: none"> • Perform a visual inspection of the ignition system • Inspect and test primary and secondary ignition system wiring • Inspect and test ignition system triggering devices • Inspect and test ignition coil(s)
Apply	EP4.2. Service ignition system Examples: <ul style="list-style-type: none"> • Check and adjust ignition timing (if possible) • Remove and replace spark plugs and wires

Indicator #5: Properly test, diagnose, and service fuel, air induction and exhaust system	
Bloom's Taxonomy Level	Standard and Examples
Evaluate	EP5.1. Test fuel, air induction and exhaust system Examples: <ul style="list-style-type: none"> • Perform a visual inspection of these systems • Perform fuel pressure and fuel volume test • Inspect and test fuel injectors • Utilize time/volume formula to calculate fuel pump efficiency

Evaluate	<p>EP5.2. Service fuel, air induction and exhaust system</p> <p>Examples:</p> <ul style="list-style-type: none"> • Replace fuel filter • Research and graph TPS (throttle position sensor)
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Indicator #6: Properly test, diagnose, and repair emission and evaporative control system

Bloom's Taxonomy Level	Standard and Examples
Evaluate	<p>EP6.1. Test emission and evaporative controls</p> <p>Examples:</p> <ul style="list-style-type: none"> • Perform visual inspection of the emission and evaporative system and components • Perform EGR (exhaust gas recirculation) performance test • Obtain and interpret emissions related trouble codes with scan tool

Indicator #7: Students explore career opportunities in the transportation, distribution, and logistics career cluster and develop leadership skills.

Bloom's Taxonomy Level	Standard and Examples
Understand	<p>EP7.1 Research career opportunities in the transportation, distribution, and logistics fields.</p> <p>Examples:</p> <ul style="list-style-type: none"> • Utilizing the career exploration, software research and write a report on career opportunities in the TD&L field • Utilizing the career exploration software, research educational requirements for a chosen career path • Utilizing career exploration software, update the student's portfolio