AUTO G045N: BASIC CLEAN AIR CAR COURSE

Item	Value
Curriculum Committee Approval Date	05/06/2025
Top Code	094800 - Automotive Technology
Units	0 Total Units
Hours	90 Total Hours (Lecture Hours 54; Lab Hours 36)
Total Outside of Class Hours	0
Course Credit Status	Noncredit (N)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	Yes; Repeat Limit 3
Open Entry/Open Exit	No
Grading Policy	P/NP/SP Non-Credit (D)

Course Description

This noncredit course is the first in a series of courses required by the Bureau of Automotive Repair (BAR) to obtain an Advanced Emissions Specialist license. The course will cover rules and regulations, history of the California Smog Check Program, a study of five-gas analysis, oxygen sensors, an overview of all emission control devices offered in California since 1975, and an introduction to second generation onbosard diagnostic system (OBD ll). The theory in this course is reinforced with hands-on skill practice. Students must complete this course before submitting an application to the BAR for an Advanced Emissions Specialist license. Noncredit. NOT DEGREE APPLICABLE. Not Transferable.

Course Level Student Learning Outcome(s)

1. Course Outcomes
2. Analyze automotive engines and related components for correct system operation.
3. Use diagnostic tools and equipment for automotive repair.
4. Analyze five gas exhaust emissions.

Course Objectives

- 1. Describe Bureau of Automotive Repair (BAR) rules and regulations.
- 2. Evaluate oxygen sensor signals and feedback systems.
- 3. Analyze diagnostic trouble codes and freeze frame data and determine root cause of emissions failures.
- 4. Evaluate five-gas exhaust samples and make repairs that reduce harmful emissions.
- 5. Demonstrate checking monitor readiness on vehicles equipped with second generation on-board diagnostics systems (OBDII).

Lecture Content

Rules and Regulations Legal cost of repair estimates Work order signature compliance License renewal Repair procedures for compliance Referrals to other businesses Bureau actions against licensee Multiple shop ownership Records management Smog: Cause and Effect Combustion process Formation and effects of carbon monoxide (CO) Formation and effects of hydrocarbons (HC) Formation and effects of oxides of nitrogen (NOx) Federal and state efforts to control air pollutants from vehicles Electrical Fundamentals Series circuits Parallel circuits Series parallel circuits Gas Analysis Stoichiometric air/fuel ratio Components and operation of a gas analyzer HC emissions and the relationship to engine performance CO emissions and the relationship to engine performance Carbon Dioxide (CO2) emissions and the relationship to engine performance Oxygen (O2) content in the exhaust and the relationship to engine performance NOx emissions and the relationship to engine performance Relationship of four gases to one another and stoichiometric air/fuel ratio Troubleshooting a gas analyzer Program Description Program overview Station definitions Station licensing requirements Equipment requirements Licensed technician requirements Station operation Station audits Repair assistance Cost waivers Customer authorization Inspection scenarios Oxygen Sensors and Air/Fuel Ratio Oxygen sensor operation Zirconia Titania Air/fuel Oxygen sensor heater Diagnosis of oxygen sensor aging System control and condition Verifying zirconia oxygen sensors Rich test Lean rise time Fixed oxygen sensor signal Partial switching Biased sensor signal Misfire Air/fuel sensor analysis and testing Onboard Diagnostics Second Generation (OBDII) Evolution of onboard diagnostics Onboard diagnostics terminology and communication OBD II system monitors Diagnostic troubleshooting routines Performing specific manufacturer's diagnostic routines Component testing

Lab Content

Using available service information, locate emission control systems, and timing specifications for selected vehicles Conduct complete visual inspections on three selected vehicles and record results Perform a functional smog inspection on three vehicles and record results Perform two-speed idle test on three vehicles and record results. Analyze and interpret results Erase diagnostic trouble codes Test an oxygen sensor and feedback system using a digital storage oscilloscope Test a catalytic converter using a pyrometer, propane enrichment, oxygen storage indicators, and other methodology

Method(s) of Instruction

- Enhanced NC Lect (NC1)
- Enhanced NC Lab (NC2)

Reading Assignments

TextWebsitesBAR Student Workbook and websitesSmog Check Inspection Procedures ManualSmog Check Reference Guide ASE L1 composite vehicle type

Writing Assignments

Students prepare for written tests through careful reading of assigned texts. Students use criticalthinking to analyze vehicle emissions systems, evaluate information, determine root cause, andperform repairs to reduce harmful emissions. Students use lab scopes, gas analyzers, serviceinformation, and other equipment to gather critical information to make diagnostic decisions.

Out-of-class Assignments

N/A

Demonstration of Critical Thinking

Students will diagnose emissions related concerns based on information gathered from test equipment, service information, and other sources. Students will demonstrate an ability to determine cause and effect, root

cause, relationships of all data, and make repairs that reduce harmful emissions.

Required Writing, Problem Solving, Skills Demonstration

Students prepare for written tests through careful reading of assigned texts. Students use critical thinking to analyze vehicle emissions systems, evaluate information, determine root cause, and perform repairs to reduce harmful emissions. Students use lab scopes, gas analyzers, service information, and other equipment to gather critical information to make diagnostic decisions.

Eligible Disciplines

Automotive technology: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

Manuals Resources

1. Bureau of Automotive Repair (BAR). Department of Consumer Affairs Bureau of Automotive Repair Smog Check Inspector Smog Check Repair Technician Licensing Examinations, Bureau of Automotive Repair (BAR) , 02-03-2023 2. Department of Consumer Affairs Bureau of Automotive Repair Standards Training Unit. Smog Check Reference Guide, Bureau of Automotive Repair (BAR) (latest) , 05-15-2019 3. Bureau of Automotive Repair (BAR). Write it Right, Bureau of Automotive Repair (BAR) (latest) , 02-01-2019 4. California Department of Consumer Affairs Bureau of Automotive Repair. State of California Laws and Regulations Pertaining to Automotive Repair Dealers, Smog Check Stations and Technicians, Official Lamp and Brake Adjusting Stations and Adjusters, California Department of Consumer Affairs Bureau of Automotive Repair (latest) , 03-14-2019