

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 284T – Level I Inspector Training Emission Control License Assessment Test Out

1.5 hours laboratory, .5 units

Catalog Description

This assessment course includes summative and criterion tests for students to prove knowledge, skills, and abilities to perform emission system inspections in the department laboratory, or by using distance education technologies such as augmented reality or virtual reality. The tests will include recorded and live student demonstrations used for observation and assessment. This course allows students residing at a distance from training centers to complete certification requirements prior to performing warranty service at a dealership. This course is the assessment of AUTO 284 Inspector Level I Emissions lecture, AUTO 284L Level I Inspector Emission Training Lab, and complimented by Work Experience at a Smog Inspection Station.

Prerequisite

None

Recommended Preparation

“C” grade or higher or “Pass” in AUTO 162T Electronics Diagnosis and Repair Assessment Test Out, AUTO 181T Engine Performance I Ignition and Fuel Systems Assessment Test Out, and AUTO 183T Engine Performance II Intake, Exhaust and Emission Systems Assessment Test Out.

Entrance Skills

Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:

- 1) Demonstrate computer input and output tests and activation using a scan tool
- 2) Obtain and describe normal and abnormal waveforms using a lab-scope
- 3) Test thermistor, potentiometer, variable reluctance, pressure, Hall-effect and related sensors
- 4) Graph and interpret system data using PIDS on a scan tool
- 5) Diagnose and repair computer communication networking faults
- 6) Describe types and functions of computer memory including RAM, ROM, and PROM
- 7) Demonstrate proper diagnosis and repair of electronic system concerns
- 8) Describe the operation of various engine performance sensors and actuators of intake and fuel systems
- 9) Use a scan tool to select PIDs and create a map display of normal engine system operation
- 10) Demonstrate knowledge of various ignition systems including waste spark, coil on plug, and driver on plug systems
- 11) Describe various types of fuel systems including throttle body injection, multiport injection, and direct fuel injection
- 12) Diagnose fuel and ignition related concerns using the work shop manual, and by performing systems tests
- 13) Describe various sensor inputs and actuators of ignition and fuel systems
- 14) Use system tests to differentiate between mechanical and engine performance concerns
- 15) Describe the operation of various engine performance sensors and actuators of intake and exhaust related systems
- 16) Use a scan tool to select PIDs and create a map display of engine system related to the operation of air intake and exhaust emissions

- 17) Demonstrate knowledge of various intake systems including variable intake, naturally aspirated, and forced air induction
- 18) Describe various types of exhaust system components including catalytic converters, exhaust manifolds, secondary air, and the sensors used to monitor oxygen and pressure
- 19) Diagnose emission concerns of exhaust gas recirculation, positive crankcase ventilation, intake, air, and evaporative fuel controls
- 20) Use system tests to determine normal and abnormal air and exhaust systems operations
- 21) Identify incomplete and complete system monitors
- 22) Identify freeze frame data

Course Content

- 1) Lecture
 - a. Introduction and safety
 - b. Licensing of test and repair stations and technicians
 - c. Certificates of compliance and noncompliance
 - d. Consumer assistance programs
 - e. Exempted vehicles and fuel conversions
 - f. Referee services for consumers
 - g. Emission control devices and systems
 - h. Technician scores and evaluations
 - i. On Board Diagnostic Systems (OBD)
- 2) Lab assessment
 - a. Perform visual inspections of emission control systems
 - b. Perform emission control tests using various testing equipment prescribed by the B.A.R.
 - c. Demonstrate knowledge of failed test results and passed test results using various test equipment

Course Objectives

Students will be able to:

- 1) Describe and demonstrate personal, shop, equipment, and vehicle safety practices.
- 2) Describe engine theory, design, and operation for both gasoline and diesel.
- 3) Demonstrate their knowledge identifying engines, engine systems, parts and components using manufacturer's service publications.
- 4) Describe emission controls systems theory and operation, and identify system components on various vehicle designs.
- 5) Describe and demonstrate knowledge of federal and state laws and regulations relating to the proper inspections of vehicle emissions.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration, or, where appropriate, the symbol system.

- 1) Quizzes, written exams, and hands-on performance exams that measure students' ability to safely identify necessary action or repair, diagnose and measure engine emissions, and perform necessary tasks related to engine emission repair.
- 2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing, and adjustment of emission related systems and components.
- 3) Skills-based summative assessment that measures students' ability to successfully complete the necessary ASE tasks related to diagnosis, replacement, repair, testing, and adjustment of emission systems and components.

Special Materials Required of Student

- 1) Approved safety glasses
- 2) Access to high speed internet connection and a personal computer device to complete web based training assignments; since this course will be taught as a hybrid training course, minimal computer experience is required
- 3) Students must have an email address
- 4) Computer, tablet, or smart device capable of large screen functions
- 5) Web conferencing with microphone and camera

Minimum Instructional Facilities

- 1) Smart classroom
- 2) Required training materials
- 3) Computer Data Acquisition Device and other equipment prescribed by the B.A.R.
- 4) Lab facility for testing of emission components
- 5) College learning management system

Method of Instruction

- 1) Lecture and discussion
- 2) Demonstration
- 3) Individual assistance
- 4) College learning management system

Out-of-Class Assignments

- 1) **Reading:** assigned course materials, manuals, content on websites, and more.
- 2) **Writing:** assignments where students describe the required tasks related to diagnosis, replacement, repair, testing, and adjustment of emission related systems and components, and more.
- 3) **Other:** web-based training modules (pass online pretests prior to laboratory "Test Out"), portfolio performance projects related to emission related systems and components, and more.

Texts and References

- 1) Required (representative examples):
 - a. Student workbooks – will be provided electronically
 - b. Required: VanGelder, Kirk. Fundamentals of Automotive Technology. Jones and Bartlett Learning, 2023.
 - c. Web Based Training Modules will be provided electronically
 - d. Workshop Manuals will be provided electronically
- 2) Supplemental: None

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Describe how a safe and accurate smog inspection helps to solve pollution problems in California.
- 2) Demonstrate the ability to identify gasoline, diesel, and hybrid emission systems and components.
- 3) Identify and describe engines, engine systems, parts and components using manufacturer's service publications, technical service bulletins, and special service messages.
- 4) Describe all major emission systems and subsystems on gasoline and diesel engines.
- 5) Describe and demonstrate knowledge of federal and state laws and regulations relating to the proper inspections of vehicle emissions.

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Accurately describe and test the compliance of various emission components and systems.

- 2) Identify and test emission systems by navigating multiple sources of industry standard manuals, special service messages, technical service bulletins, and BAR publications and websites for vehicle inspections.
- 3) Communicate effectively and professionally in a diverse setting that includes prospective colleagues, clients, and supervisors.
- 4) Comply with environmental health and safety regulations at the state and federal levels.