

**CUYAMACA COLLEGE**  
**COURSE OUTLINE OF RECORD**

**AUTOMOTIVE TECHNOLOGY 286T – BAR SMOG CHECK REPAIR TECHNICIAN UPDATE TRAINING**  
**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 diagnosis and repair in the department laboratory, and by using distance education technologies such as augmented reality or virtual reality. This assessment course fulfills BAR licensing update requirements needed every two years for professional development update training. This course allows a student residing distance from training centers to complete certification requirements to update skills, procedures and repairs required at a Smog Test and/or Repair Station. This course compliments industry and college program students by demonstrating the most current diagnosis and repair processes of new systems technologies.

**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, AUTO 182 Engine Performance II Intake, Exhaust and Emission Systems Assessment Test Out and AUTO 284T Inspector Level I Emissions Control License Training 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 s 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.
- 23) Describe how a safe and accurate smog inspection helps to solve pollution problems in California.
- 24) Demonstrate the ability to identify gasoline, diesel, and hybrid emission systems and components.
- 25) Identify and describe engines, engine systems, parts and components using manufacturer's service publications, technical service bulletins, and special service messages.
- 26) Describe all major emission systems and subsystems on gasoline and diesel engines.
- 27) Describe and demonstrate knowledge of federal and state laws and regulations relating to the proper inspections of vehicle emissions.

### **Course Content**

- 1) Lab assessment written exams
  - a. Demonstrate safety and best practices regarding vehicle safety and vehicle pollutants.
  - b. Describe consumer law as prescribed in "Laws and Regulations" of "Repair Dealers" and Technicians.
  - c. Authorization of repairs and services using consumer law "Write it Right"
  - d. How to perform various inspections using various test equipment as prescribed by B.A.R.
- 2) Online Learning Modules
  - a. Students will complete a series of online learning modules.
- 3) Student demonstrations
  - a. Perform functional tests of various emission control systems using test equipment.
  - b. Identify missing, modified, or disconnected emission control devices and systems.
  - c. Identify incorrect engine application and engine changes.
  - d. Perform exhaust gas recirculation tests.
  - e. Perform functional timing tests.
  - f. Use the On Board Diagnostic system to diagnose monitors that are complete and incomplete.

### **Course Objectives**

Students will be able to:

- 1) Describe and demonstrate personal, shop, equipment, and vehicle safety practices.
- 2) Demonstrate and apply laws, regulations, and procedures associated with consumer vehicle diagnosis and repair needs.
- 3) Demonstrate the latest repair processes.

**Method of Evaluation**

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in the 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 measuring the student abilities to safely identify necessary actions or needed repairs, and demonstrates knowledge of consumer rights and responsibilities.
- 2) Practical lab exercises that measure a student' progress toward mastering tasks related to testing and identifying emission related systems and components.
- 3) Skills based summative assessment that measures student' ability to successfully complete the necessary tasks related to testing of emission systems and components.

**Special Materials Required of Student**

- 1) Access to high-speed internet connection and personal computer or access to a personal computer to complete web based training assignments. Since this course is taught as a distance education course, computer experience is necessary.
- 2) Email address
- 3) Safety glasses and protective safe work clothing.
- 4) Smart device, computer or tablet with large screen capability, microphone and camera.

**Minimal Instructional Facilities**

- 1) Smart Classroom
- 2) Required training materials
- 3) College learning management system
- 4) Laboratory with training vehicles
- 5) (D.A.D) vehicle data acquisition devices and other equipment prescribed by B.A.R.

**Method of Instruction**

- 1) Lecture and demonstration of systems related to student learning outcomes
- 2) Individual assistance during laboratory assignments and web-based tutoring using distance learning tools
- 3) Online learning modules with formative learning exercises
- 4) Open laboratories where students perform objective tests and laboratory assignments

**Out of Class Assignments**

- 1) Reading assignments
- 2) Written homework
- 3) Web based learning modules

**Texts and References**

- 1) Required (representative examples):
  - a. Student workbooks – will be provided electronically
  - b. Web Based Training Modules will be provided electronically
  - c. Workshop Manuals will be provided electronically from specialized authors vetted by the BAR. This content changes every two years and is selected by BAR SMEs.
- 2) Supplemental: None

**Student Learning Outcomes**

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

- 1) Accurately demonstrate the compliance and test procedures of specific emission components and systems using new procedures.
- 2) Identify a current emission system update and demonstrate knowledge of compliance, by navigating multiple sources of industry standard manuals, special service messages, technical service bulletins, and BAR publications and websites for vehicle inspections as they apply to changes in government rules and regulations to maintain California BAR professional licensure.
- 3) Communicate effectively and professionally new procedures 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.