

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 181T – Engine Performance I Ignition and Fuel Systems Assessment Test Out

1.5 hours laboratory, .5 unit

Catalog Description

This assessment course includes summative and criterion tests for students to prove knowledge, skills, and abilities to perform diagnosis and repair of engine performance systems on vehicles 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 a student residing at a distance from training centers to complete certification requirements. This course is the assessment for AUTO 181 Engine Performance I Ignition and Fuel Systems lecture, AUTO 181L Engine Performance I Ignition and Fuel Systems Laboratory, and Work Experience courses.

Prerequisite

None

Recommended Preparation

“C” grade or higher or “Pass” in AUTO 162T Electronics Diagnosis and Repair Assessment Test Out.

Entrance Skills

Without the following skills, competencies, and 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

Course Content

- 1) Laboratory Assessment:
 - a. Introduction and safety
 - b. Gasoline engine fundamental tests
 - c. Engine operation parameter measurement and diagnosis
 - d. Ignition system operation, testing and servicing
 - e. gasoline cooling system operation, testing and servicing
 - f. Gasoline fuel system operation and service
 - g. Sensor PID mapping and normal values
 - h. Introduction to solid state electronics sampling
 - i. Voltage and resistance measurements
 - j. Microprocessors, computers, logic systems
 - k. Input devices
 - l. Output devices
 - m. Computer-controlled gasoline fuel injection systems
 - n. Workshop navigation based on codes or symptoms

Course Objectives

Students will be able to:

- 1) Identify and demonstrate the operation of various engine performance sensors and actuators.
- 2) Use a scan tool to select PIDs and display normal system operation.
- 3) Identify and resolve faults and monitor changes in system operation using a scan tool.
- 4) Use PC/ED, wiring diagrams, and workshop manuals to diagnose an engine performance concern.
- 5) Use the SSCC diagnostic process to diagnose an engine performance concern.
- 6) Follow a pinpoint test to perform various tests on engine performance related components.
- 7) Identify the root cause of an electronic engine performance concern.

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, and skills demonstration.

- 1) Skills-based summative assessment that measures students' ability to successfully complete the necessary ASE tasks related to diagnosis, replacement, repair, testing of automotive engine systems.
- 2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing of engine systems.
- 3) Student competencies portfolio used as artifacts.
- 4) Web based training modules.
- 5) Surveys.
- 6) Live and recorded student skills demonstrations used for observation.

Special Materials Required of Student

- 1) Approved safety glasses.
- 2) High-speed internet connection.
- 3) Students will have access to testing tools and equipment while on campus.
- 4) Safe uniform dress code is required.
- 5) Smart device with large screen, camera, and microphone.

Minimum Instructional Facilities

- 1) Auto tech lab (20 service bays)
- 2) Various training vehicles
- 3) Smart classroom
- 4) Diagnostic tools and equipment

Method of Instruction

- 1) Demonstration
- 2) Individual assistance
- 3) Feedback of repair processes regardless of successful or unsuccessful

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, and testing of engine performance systems, and more.
- 3) **Other:** web-based training modules (pass online pretests prior to laboratory "Test Out"), portfolio performance projects related to engine performance systems, 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 who have successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Describe the operation of various engine performance sensors and actuators of intake and fuel systems.
- 2) Use a scan tool to select PIDs and create a map display of normal engine system operation.
- 3) Demonstrate knowledge of various ignition systems including waste spark, coil on plug, and driver on plug systems.
- 4) Describe various types of fuel systems including throttle body injection, multiport injection, and direct fuel injection.
- 5) Diagnose fuel and ignition related concerns using the work shop manual, and by performing systems tests.
- 6) Describe various sensor inputs and actuators of ignition and fuel systems.
- 7) Use system tests to differentiate between mechanical and engine performance concerns.

Student Learning Outcomes

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

- 1) Accurately demonstrate and identify various conditions of engine performance systems.
- 2) Identify and diagnose an engine performance system problem by navigating the workshop manual based on symptoms or codes.
- 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.