

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 194 – Diesel Engine Performance and Diagnosis

2 hours lecture, 2 units

Catalog Description

This lecture training course describes and demonstrates diesel engine performance concerns and diagnosis, which includes the use of service publications, diagnostic tests and procedures, as well as special tools and equipment. The information and exercises presented in this course are focused on the common rail diesel engines with electronic fuel injection. This is the lecture course for 194L Diesel Engine Performance and Diagnosis Laboratory and 194T Diesel Engine Performance and Diagnosis Assessment Test Out courses.

Prerequisite

None

Course Content

- 1) Introduction and safety
- 2) Diesel engine general diagnosis
- 3) Diesel cylinder head and valve train
- 4) Diesel engine block
- 5) Diesel lubrication system
- 6) Diesel cooling system
- 7) Diesel air induction
- 8) Diesel exhaust and after treatment systems
- 9) Diesel fuel system

Course Objectives

Students will be able to:

- 1) Demonstrate standardized safety and hazardous waste handling practices.
- 2) Successfully navigate manufacture specific repair information for appropriate repairs of diesel engines.
- 3) Proficiently describe the fundamentals of diesel engine theory and operations.
- 4) Proficiently identify various diesel engine components and apply the appropriate repairs.
- 5) Demonstrate the ability to perform mechanical diesel engine performance tests.
- 6) Demonstrate the ability to perform engine performance tests using Scan tools.
- 7) Proficiently document failure analysis for warranty and customer pay services.
- 8) Demonstrate actions to repair diesel engine performance systems.
- 9) Demonstrate the ability to diagnose and repair diesel fuel management systems.
- 10) Demonstrate the ability to diagnose and repair exhaust and intake air systems.
- 11) Demonstrate the ability to use codes and symptoms to follow pinpoint tests to diagnose related DTC's
- 12) Test high pressure oil system tests and understand operation of various common rail engines and designs.

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 diesel engine systems.
- 2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing of diesel engine systems.
- 3) Student portfolio of competencies record book will contain student artifacts.
- 4) Web based training modules.
- 5) Performance projects.

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 and by remote assistance software
- 4) Safe uniform dress code is required while in the lab on campus.

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 diesel engine systems, and more.
- 3) **Other:** web-based training modules (pass online pretests prior to laboratory "Test Out"), portfolio performance projects related to diesel engine systems, and more.

Texts and References

- 1) Required (representative examples):
 - a. Student workbooks – will be provided electronically.
 - b. Required: CDX Light Vehicle Diesel Engines, 2019 (classic), **ISBN: 9781284196696**
 - c. Web Based Training Modules will be provided electronically.
 - d. Workshop Manuals will be provided electronically.
- 2) Supplemental: None

Student Learning Outcomes

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

- 1) Accurately describe various conditions of diesel engine performance fuel and exhaust systems.
- 2) Identify diesel engine performance fuel system problems 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.