

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 111T – Engine Diagnosis and Repair 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 systems including diesel engines in the department laboratory; or by using distance education technologies such as augmented reality, virtual reality, or mobile technologies. The tests will include engine component systems such as pistons, bearings, camshafts, electronic and mechanical engine control systems, inputs, actuations, or other auxiliary systems. This course allows a student residing distance from training centers to complete certification requirements. This course is complemented by work experience AUTO 111 lecture, and AUTO 111L lab.

Prerequisite

None

Recommended Preparation

“C” grade or higher or “Pass” in Automotive Technology 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) Describe and test computer inputs
- 2) Describe and test actuator outputs
- 3) Describe normal and abnormal sensor waveforms
- 4) Demonstrate thermistors
- 5) Test potentiometers
- 6) Test variable resistors
- 7) Test various Hall Effect sensors
- 8) Pressure sensors
- 9) Test Mass Air Flow
- 10) Heater elements
- 11) Capture waveforms using a lab scope
- 12) Describe computer communication
- 13) Use scan tool to compare PID values to test values of sensors
- 14) Create scan tool maps
- 15) Scan tool component and systems test and activations
- 16) Describe types and functions of computer memory
- 17) Clear codes, clear adaptive memory
- 18) Describe network communication data

Course Content

- 1) Department Safety Test
- 2) Written examination
- 3) Tests using distance education technologies
- 4) Tests using virtual reality or mobile technologies

Course Objectives

Students will be able to:

- 1) Demonstrate navigation of manufacturer specific repair information for repair
- 2) Demonstrate knowledge of engine theory and operation through actual repairs
- 3) Demonstrate knowledge of various engine components and repair methods
- 4) Show the use of precision measurement tools for critical measurement
- 5) Use actual tools for mechanical engine performance tests of accurate failure analysis
- 6) Perform mechanical tests using Scan tool technology as prescribed by the manufacturer
- 7) Document failure analysis on engine mechanical systems for warranty and customer pay services
- 8) Display a competent knowledge of engine assembly and R&R process
- 9) Competently resolve engine mechanical concerns for appropriate repairs
- 10) Show correct timing of a rotating assembly including variable timing

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 required 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) A student portfolio will be used to show student skill mastery of engine competencies.
- 4) Web based training modules.
- 5) Performance projects used to evaluate student ability to navigate repair procedures.
- 6) Live student demonstrations or actual diagnosis and repairs.

Special Materials Required of Student

- 1) Approved safety glasses.
- 2) High speed internet connection and access to large screen computer, laptop, or tablet.
- 3) Students will have access to testing tools and equipment while on campus and by simulations.
- 4) Uniform dress code is required.

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 systems, and more
- 3) **Other:** web-based training modules, portfolio artifacts of skill demonstrations, performance projects, 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

Student Learning Outcomes

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

- 1) Show accurate diagnose engine system conditions.
- 2) Correctly display and repair engine system problems.
- 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.