

**CUYAMACA COLLEGE**  
COURSE OUTLINE OF RECORD

**AUTOMOTIVE TECHNOLOGY 111L – ENGINE DIAGNOSIS AND REPAIR LABORATORY**

3 hours laboratory, 1 unit

**Catalog Description**

This laboratory course allows a student to practice proper operation, disassembly, assembly, repair, and diagnostic techniques for gasoline and diesel engines including the proper timing procedures. Students will record and demonstrate critical clearance measurements. This course is the lab for students taking AUTO 111 Engine Diagnosis and Repair lecture, and or for students taking work experience and need additional instruction and practice completing required NATEF competencies and tasks.

**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) Safety policies and procedures
- 2) Laboratory exercises using distance education technologies
- 3) Laboratory practice using virtual reality or mobile technologies
- 4) Assistance of repair techniques using web conferencing and remote access computer sharing
- 5) Access to department laboratory condition where a student can practice on campus
- 6) Gasoline and diesel mechanical engine combustion theory and operation

- 7) Engine timing systems
- 8) Engine condition tests
- 9) Ignition spark
- 10) Fuel injection
- 11) Exhaust gas recirculation theory
- 12) Engine component measurements
- 13) Oil systems
- 14) Engine temperature controls
- 15) Engine vacuum
- 16) Engine related parameter identification data

### **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. Grades determined by demonstrated proficiency in the subject matter using multiple measurements, one of which is a written description of the components to the cause of failure using the diagnostic process and skills demonstrations.

- 1) Skills-based summative assessment that measures students' ability to complete the required NATEF tasks related to diagnosis, replacement, repair, and 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 is required to showcase student skills.
- 4) Web based training modules.
- 5) Performance projects used to evaluate student ability to accurately perform repair procedures.

### **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 assignments
- 2) Writing assignments
- 3) Web-based training

**Texts and References**

- 1) Required (representative examples):
  - a. Student workbooks – will be provided electronically
  - b. Required:-CDX Master Automotive Technician Series, 2020, ISBN: 9781284109955
  - c. Web Based Training Modules
  - 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 diagnose engine system conditions.
- 2) Correctly 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.