

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 121T – Automatic Transmission Theory and Operation 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 transmission system repairs, including critical measurements of automatic transmission components using vehicles in the department laboratory; or by using distance education technologies such as augmented reality, virtual reality or mobile technologies. The tests will include drivetrain control systems such as hydraulics, friction clutches, electronic and mechanical transmission control systems, inputs, actuations, or other auxiliary systems. This course allows a student residing at a distance from training centers to complete certification requirements. This course is complemented by AUTO 121 Automatic Transmission Theory and Operation lecture and AUTO 121L Automatic Transmission Theory and Operation laboratory courses.

Prerequisite

None

Recommended Preparation

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

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) 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 automatic transmission theory and operation through actual repairs.
- 3) Demonstrate knowledge of various automatic transmission components and repair methods.
- 4) Show the use of precision measurement tools for critical measurement.
- 5) Use actual tools for mechanical automatic transmission performance tests of accurate failure analysis.
- 6) Perform mechanical tests using Scan tool technology as prescribed by the manufacturer.

- 7) Document failure analysis on automatic transmission systems for warranty and customer pay services.
- 8) Display competent knowledge of automatic transmissions assembly and R&R process.
- 9) Competently resolve automatic transmission mechanical concerns for appropriate repairs.
- 10) Show correct disassembly of both FWD and RWD automatic transmissions and their subassemblies.

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 powertrain systems.
- 2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing of powertrain systems.
- 3) A student portfolio will be used to show student skill mastery of powertrain competencies.
- 4) Web based training modules.
- 5) Performance projects used to evaluate student ability to navigate repair procedures.
- 6) Live student demonstrations and/or actual diagnosis and repairs.

Special Materials Required of Student

- 1) Approved safety glasses.
- 2) High speed internet connection and access to a large screen computer, laptop, or tablet.
- 3) Students will have access to testing tools and equipment while on campus and by simulations.
- 4) Safety 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 automotive powertrain systems, and more.
- 3) **Other:** web-based training modules (pass online pretests prior to laboratory "Test Out"), portfolio performance projects related to automatic transmission system's operation and components, 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 having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Describe various types of gear reduction and multiplication of a planetary gear-set.
- 2) Describe the purpose and operation of a torque converter.
- 3) Identify power flow through an automatic transmission and transaxle using the workshop manual.
- 4) Describe normally open, normally closed, and variable electronically controlled solenoids and their effect on transmission operation.
- 5) Describe mechanical, electrical, and hydraulic transmission systems and their interrelationships.
- 6) Accurately disassemble and reassemble transmission and transaxle main assemblies and sub-assemblies.
- 7) Monitor and record transmission related parameter identification data (PIDS) related to correct operating conditions.

Student Learning Outcomes

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

- 1) Accurately diagnose mechanical automatic transmission systems.
- 2) Correctly display automatic transmission components and operation.
- 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.