

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 121 – Automatic Transmission Theory and Operation

2 hours lecture, 2 units

This lecture course contains information about the theory and operation of automatic transmissions. The course topics include mechanical, hydraulic, and electronic controls of torque distribution. Current computerized control system operation and diagnosis of the drivetrain system will be emphasized. This course is complimented by AUTO 121L Automatic Transmission Theory and Operation Laboratory and AUTO 121T Automatic Transmission Theory and Operation Assessment Test Out.

Prerequisite

None

Course Content

- 1) Lecture:
 - a. Safety policies and procedures
 - b. Purposes of clutches
 - c. Driveshaft's and their relationship to torque
 - d. Gear types
 - e. Gear ratios
 - f. Overdrive
 - g. Hydraulics and electronic transmission controls
 - h. Servicing procedures
 - i. Precision measurements
 - j. Hydraulic theory
 - k. Coolers and fluid types
 - l. Torque converter operation including lock-up type
 - m. Planetary gears operation and control
 - n. Operation of drums, bands, servos, accumulators, clutches, modulators, governors
 - o. Mechanical shift control and valve bodies
 - p. Electronic shift control and solenoid bodies
 - q. Diagnosing mechanical and electronic transmission problems

Course Objectives

Students will be able to:

- 1) Describe standardized safety and hazardous waste handling practices.
- 2) Apply transmission system theory principles in order to describe repair subsystems and related problems.
- 3) Describe various types of automatic transmissions.
- 4) Describe electronic and hydraulic computer-controlled automatic transmission systems.
- 5) Describe power flow.
- 6) Describe power take off.
- 7) Utilize manufacturer's repair information and technical service bulletins for accurate diagnosis and repair of automatic transmissions.
- 8) Identify transmission components, measurements and repairs.
- 9) Describe the planetary gearset components and operation.

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.

- 1) Quizzes, written exams, and hands-on performance exam that measure students' ability to safely identify necessary action or repair using distance education methodologies.
- 2) Practical exercises that measure students' progress toward mastering tasks related to automatic transmission system's operation and components.
- 3) Students must complete all of the required web based training modules.

Special Materials Required of Student

- 1) Approved safety glasses
- 2) Must have access to high speed internet, 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 bays)
- 2) Various training vehicles
- 3) Smart classroom
- 4) Distance education technologies

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, 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

Student Learning Outcomes

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

- 1) Accurately describe automatic transmission system conditions.
- 2) Correctly identify system solutions for automatic transmission 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.