

AUTO 172: AUTOMATIC TRANSMISSIONS AND TRANSAXLES

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2021
Credits:	6
Total Contact Hours:	180
Lecture Hours :	72
Lab Hours:	108
Hours Arranged:	0
Outside of Class Hours:	144
Prerequisite:	AUTO 163; AUTO 168 or concurrent enrollment.
Transferable to CSU:	Yes
Transferable to UC:	No
Grading Method:	Standard Letter, Pass/No Pass

Catalog Course Description

Intended for those seeking a career in the automotive service and repair industry, this NATEF certified course is one component of the T-TEN and TEC programs. This course focuses on the service, diagnosis and repair of the automatic automotive drivetrain systems. Appropriate lab activities in automobile drivetrain inspection, service and repair are included. The course prepares students for the ASE Automatic Transmission and Transaxle (A2) certification exam. 72 lecture hours, 108 lab hours.

Course Objectives

- Upon satisfactory completion of the course, students will be able to:
 - complete ninety-five percent (95%) of Priority 1 (P-1), seventy percent (70%) of Priority 2 (P-2) twenty-five percent (25%) of the Priority 3 (P-3) required National Automotive Technician Education Foundation (NATEF) objectives for Automatic Transmission and Transaxle (A2). Please see attached NATEF objectives (pages 50-58) or www.natef.org for the most current objectives.

Major Course Content

- Automatic Transmission/Transaxle Basics
 - Automatic Transmission Model Designation, Theory and Operation
 - Electronic Transmission Controls
 - Basic Hydraulic System Theory and Operation
 - Torque Converter Operation, Lock-up and Control
 - Apply Device, Complex Gear Sets and Hydraulic Shift Controls
- (A-Series) Simpson Based Gear Trains
 - Simpson Based A-Series Gear Trains and Apply Devices
 - Simpson Based A- Series Shift Control and Diagnosis
 - Simpson Based A Series Review Gear Trains , Apply Device and Shift Control
- (U-Series) Tandem Based Gear Trains

- Tandem Based U-Series Gear Trains and Apply Devices
 - Tandem Based U-Series Shift Control and Diagnosis
 - Tandem Based U-Series Review Gear Trains, Apply Device and Shift Control
- (U-series) Ravigneaux\LePelletier Based Gear Trains
 - Ravigneaux\LePelletier (U660E) Based Gear Trains and Apply Devices
 - Ravigneaux\LePelletier (U660E) Based Shift Control and Diagnosis
 - Ravigneaux\LePelletier (U660E) Based Review Gear Trains, Apply Device and Shift Control
 - Compound Based Gear Train Overhaul
 - Compound Gear Train (AB60E) Preview the gear train and apply device. Disassembly and Inspection of Gear Train and Apply Devices
 - Compound Gear Train (AB60E) Shift Control and Diagnosis
 - Compound Gear Train (AB60E) Overhaul and Reassembly
 - Compound Gear Train (AB60E) Review Compound Gear Train (AB60E) Overhaul Highlights

Lab Content

- Automatic Transmission/Transaxle Basics
 - Using generic text and labsheet, identify and describe planetary gear set components, simple planetary gear set power flow, gear ratio characteristics
 - Using generic text and assigned labsheet, identify and describe transmission identification and designations, and transmission units on car and bench
 - Using TIS, basic hand tools and assigned labsheet, R&R Toyota Automatic Transmission/Transaxle
 - Using generic text and assigned labsheet describe the electronic transmission control system and system operation
 - Using generic text and assigned labsheet describe the function and operation of major oil pump components
 - Using generic text and assigned labsheet, describe oil pump pressure regulation and control system operation, and demonstrate diagnosis of mainline pressure fault using Techstream and pressure gauge
 - Using generic text and assigned labsheet, describe torque converter w/lock up clutch operation, and demonstrate diagnosis of component/system fault using various diagnostic tools
 - Using generic text and assigned labsheet, describe apply device operation, and diagnose apply device fault using clutch application chart
- Toyota (A-Series) Simpson Based Gear Trains
 - Using generic text and assigned labsheet, describe Simpson A-series gear train nomenclature, function and operation including power flow in all gear ranges
 - Using generic text and assigned labsheet, identify and describe Simpson A-series apply device orientation, nomenclature function, and operation
 - Using generic text and assigned labsheet, identify and describe Simpson A-series shift control function, operation, diagnosis and testing
- Toyota (U-Series) Tandem Based Gear Trains

- a. Using generic text and assigned lab sheet, describe Tandem based U-series gear train nomenclature, function and operation including power flow in all gear ranges
 - b. Using generic text and assigned lab sheet, identify and describe Tandem based U-series apply device orientation, nomenclature function, and operation
 - c. Using generic text and assigned lab sheet, identify and describe Tandem based U-series shift control function, operation, diagnosis and testing
4. Toyota (U-series) Ravigneaux\LePelletier Based Gear Trains
- a. Using generic text and assigned lab sheet, describe Ravigneaux \LePelletier based U-series gear train nomenclature, function and operation including power flow in all gear ranges
 - b. Using generic text and assigned lab sheet, identify and describe Ravigneaux\LePelletier based U-series apply device orientation, nomenclature function, and operation
 - c. Using generic text and assigned lab sheet, identify and describe Ravigneaux\LePelletier based U-series shift control function, operation, diagnosis and testing
5. Toyota Compound Based Gear Train Overhaul
- a. Using generic text, lab sheet, diagnostic tools and procedures, describe AB60E shift control system function and operation
 - b. Using generic text, lab sheet demonstrate DTC and Symptom based diagnostic procedures of the shift control system
 - c. Using generic text, lab sheet and procedures listed in TIS, perform, inspection disassembly procedures of the AB60E transmission
 - d. Using generic text and lab sheet, perform diagnosis, inspection and overhaul of the AB60E transmission components determine necessary action

Suggested Reading Other Than Required Textbook

Student will complete instructor selected University of Toyota e-learning modules that are related to the subject matter.

Examples of Required Writing Assignments

Students will be assigned industry based technical article evaluation from trade journals.

Examples of Outside Assignments

Student will use electronic service information to complete guided discovery based learning.

Instruction Type(s)

Lecture, Lab, Online Education Lecture