AUTO 163: MANUAL DRIVETRAIN

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2021
Credits:	4.5
Total Contact Hours:	135
Lecture Hours :	54
Lab Hours:	81
Hours Arranged:	0
Outside of Class Hours:	108
Prerequisite:	AUTO 154.
Transferable to CSU:	Yes
Transferable to UC:	No
Grading Method:	Standard Letter, Pass/No Pass

Catalog Course Description

Course covers the theory of operations, diagnosis, and repair of manual transmissions, drive axle and shaft assemblies, transfer cases, clutches, and electrical and electronic systems. Emphasis is placed on rebuilding manual transmissions, rebuilding and set-up of differential, and R & R clutch assemblies. Course prepares students for the ASE A-3, Manual Drivetrain, and Axles. 54 lecture hours, 81 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 Manual Drivetrains and Axles (A3). Please see attached NATEF objectives (pages 50-58) or www.natef.org for the most current objectives.

Major Course Content

1. Manual Clutch
   a. Drivetrain fundamentals
   b. Manual Clutch theory/basics, components and operation
   c. Manual Clutch service, diagnosis and overhaul
2. Manual Transmissions
   a. Manual Transmission theory/basics, components and operation
   b. Manual Transmission inspection and diagnosis
   c. Manual Transmission service and overhaul
   d. Manual Transmission Service Diagnosis and Overhaul Review
3. Manual Transaxles
   a. Manual Transaxle theory/basics, components and operation
   b. Manual Transaxle inspection and diagnosis
   c. Manual Transaxle service and overhaul
4. 4WD/AWD systems
   a. 4WD system theory/basics, components and operation
   b. Advanced 4WD systems and operation
   c. 4WD control system operation and diagnosis
   d. 4WD service and overhaul
5. Driveline and Axle Assemblies
   a. Drive shaft components and operation
   b. Drive shaft/universal joint service, diagnosis and overhaul NVH Theory (Driveline Related)
   c. Axle components/operation, service, diagnosis and overhaul

Lab Content

1. Manual Clutch
   a. Using generic text, 302 text, and job aid packet describe basic component function and operation of the manual clutch system
   b. Using generic text, 302 text, and job aid packet describe hydraulic release mechanism function operation diagnosis and repair
   c. Using generic text, 302 text, and job aid packet describe mechanical release mechanism function operation diagnosis and repair
   d. Using generic text, 302 course text, and worksheet, service diagnose and overhaul clutch system
2. Manual Transmissions
   a. Using the Toyota 302 course text, hand tools and worksheet, demonstrate diagnostic capabilities related to shift and noise complaints
   b. Using the Toyota 302 course text, and labsheet, identify and describe major manual transmission components and operation
   c. Using the Toyota 302 course text, worksheet and hand tools, demonstrate overhaul procedures related to manual transmissions
3. Manual Transaxles
   a. Using the Toyota 302 course text, and labsheet, identify and describe major manual transaxle components and operation
   b. Using the Toyota 302 course text, hand tools and worksheet, demonstrate diagnostic abilities related to electronic shift control for sequential manual gearboxes
   c. Using the Toyota 302 course text, worksheet and hand tools, demonstrate overhaul procedures related to Toyota grouped manual transaxles
4. 4WD/AWD systems
   a. Using the 351 text, and job aid packet describe transfer case theory, components, and system operation.
   b. Using the 351 text, job aid packet and service tools perform diagnostic and service procedures related to 4WD\AWD systems.
   c. Using the 351text, job aid packet and service tools perform overhaul procedures related to 4WD\AWD systems.
5. Driveline and Axle Assemblies
   a. Using generic text and labsheet, describe operation and service procedures related to drive shafts
   b. Using generic text describe the theory of NVH, utilize labsheet, and special service tools diagnose NVH related concerns
   c. Using 351 text and special service tools as part of overhauling perform critical measurements and adjustments related to drive axles

Suggested Reading Other Than Required Textbook

Student will complete instructor selected University of Toyota e-learning

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