ATL 130 Course Outline as of Fall 2024

CATALOG INFORMATION

Dept and Nbr: ATL 130 Title: MANUAL TRANSMISSION
Full Title: Automotive Manual Transmissions and Drive Train Systems
Last Reviewed: 1/22/2024

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
Students will learn theory and operation, diagnosis, service, and repair of automotive manual transmissions and drive trains. Course prepares student for Automotive Service Excellence (ASE) A3 Manual Drive Train & Axles certification test.

Prerequisites/Corequisites:
Course Completion of ATL 101 and ATL 161

Recommended Preparation:
Eligibility for ENGL 1A or equivalent and MATH 25 or equivalent

Limits on Enrollment:

Schedule of Classes Information:
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Transfer Credit:
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ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	Inactive:
IGETC:	**Transfer Area**	Effective:	Inactive:

CSU Transfer:	Effective:	Inactive:
UC Transfer:	Effective:	Inactive:

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Demonstrate shop safety regarding working procedures and hazardous materials and waste handling.
2. Research and identify correct procedures and specifications for maintenance and repair of manual transmission and drive train systems.
3. Perform diagnosis, service, and maintenance procedures in a timely manner to industry standards.

Objectives:
At the conclusion of this course, the student should be able to:
1. Diagnose fluid usage, level, leakage, and condition concerns, drain and fill manual transmission/transaxle and final drive unit.
2. Diagnose clutch noise, binding, slippage, pulsation, and chatter, and determine necessary action.
3. Inspect, clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs and perform necessary action.
4. Inspect and replace hydraulic clutch slave and master cylinders, lines, hoses, and release bearing, lever and pivot; and perform necessary action.
5. Inspect and replace pilot bearing or bushing, release bearing, clutch pressure plate assembly and clutch disc.
6. Inspect flywheel and ring gear for wear and cracks, measure runout; and determine necessary action.
7. Diagnose noise, hard shifting, jumping out of gear, and fluid leakage concerns and determine necessary action.
8. Disassemble, clean, inspect and reassemble transmission/transaxle components.
9. Measure endplay or preload (shim or spacer selection procedure) on transmission/transaxle shafts and perform necessary action.
10. Diagnose constant velocity (CV), and universal joint noise and vibration concerns, and determine necessary action.

11. Inspect, service, and replace shafts, yokes, boots, and CV joints.
12. Diagnose final drive noise and vibration concerns and determine necessary action.
13. Inspect and replace companion flange, pinion seal, and measure companion flange runout.
14. Inspect ring gear, measure runout, and determine necessary action.
15. Remove, inspect, reinstall, and adjust drive pinion, seals, ring gear, spacers, sleeves, and bearings.
16. Measure and adjust drive pinion depth, and pinion bearing preload.
17. Check ring and pinion tooth contact patterns, gear backlash, and perform necessary action.
18. Inspect and flush differential housing, and refill with correct lubricant.
19. Inspect and replace drive axle shaft seals, bearings, and retainers.
20. Remove and replace drive axle shafts.
21. Disassemble, inspect, and reassemble transfer case and components.

Topics and Scope:

Lecture-Related Topics and Scope:
I. Automotive Safety and Shop Practice
II. Proper Care and Manipulation of Basic Hand Tools
III. Fundamentals, Operating and Servicing Principles of Manual Transmissions/Transaxles
- A. Design features
- B. Power flows- four and five speed transmissions/transaxles
- C. Synchronizers
- D. Shift mechanisms
- E. Lubrication
- F. Problem diagnosis
- G. Service procedures
- H. Electronically controlled transmissions

IV. Fundamentals, Operating and Servicing Principles of Drivelines and Couplings
- A. Universal and constant velocity joints
- B. Front Wheel Drive (FWD)/Rear Wheel Drive (RWD) driveshafts
- C. Service procedures

V. Fundamentals, Operating and Servicing Principles of Clutches
- A. Components – clutch discs, pressure plate assemblies, pilot, and release bearings
- B. Clutch linkage
- C. Problem diagnosis
- D. Service procedures

VI. Fundamentals, Operating and Servicing Principles of Final Drives, and Drive Axle Assemblies
- A. Components – ring and pinion gears, differential, axle shafts
- B. Lubrication
- C. Problem diagnosis
- D. Service procedures

VII. Fundamentals, Operating and Servicing Principles of Four-Wheel Drive and All Wheel Drive Assemblies
- A. Transfer cases
- B. Front drive axles
- C. Lubrication
- D. Problem diagnosis
- E. Service procedures

VIII. Hazardous Waste Handling
IX. Hybrid, Electric, and Alternative Fuel Safety
X. Hybrid, Electric, and Alternative Fuel Applicable Systems Awareness

Lab-Related Topics and Scope:
I. Demonstrate Proper Shop Safety and Working Practices, Including Tools and Equipment, and Hazardous Waste Handling
II. Repair/Service Clutch System
III. Disassemble, Inspect, Repair, and Reassemble Manual Transmission
IV. Diagnose and Service a Transaxle
V. Diagnose and Service a Differential
VI. Diagnose and Service a Transfer Case

Assignment:

Lecture-Related Assignments:
1. Weekly reading (20-30 pages)
2. Homework problems
3. Weekly objective quizzes covering inspection, evaluation, and repair of drive train components
4. Midterm and final exam

Lab-Related Assignments:
1. Performance exams, such as:
   A. Dissemble listed components
   B. Inspect listed components
   C. Reassemble listed components
2. Lab worksheets

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework problems; lab worksheets	Problem solving 5 - 20%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Performance exams	Skill Demonstrations 35 - 50%

Exams: All forms of formal testing, other than skill performance exams.

Weekly objective quizzes; midterm and final exam	Exams 35 - 50%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Automotive Drivetrain and Manual Transmissions. Santini, Keith and VanGelder, Kirk. CDX. 2019 (classic)
Instructor prepared materials