

**Common Course Outline**  
**AUTO 156**  
**Repairing Automotive Manual Transmissions**  
**5 Credits**  
**Community College of Baltimore County**

**Description**

**AUTO 156 – Repairing Automotive Manual Transmissions** introduces diagnosis and repair of automotive manual transmissions transaxles and differentials; includes diagnosis, inspection, disassembly and repair of manual transmissions, manual transaxles, differentials, and drive axles.

**5 credits:** 3 lecture hours; 14 laboratory hours

**Prerequisite:** AUTO 100 or written permission from program coordinator required

**Corequisite:** ACLT 052 or ACLT 053 or (ESOL 052 and ESOL 054) and MATH 081

**Overall Course Objectives**

Upon completion of this course students will be able to:

1. diagnose transmission noise, hard shifting, jumping out of gear, fluid leakage problems, and determine needed repairs;
2. remove and replace transaxle final drive;
3. disassemble and clean transaxle final drive;
4. inspect, adjust and reinstall transaxle shift cover, forks, levers, grommets, shafts, sleeves, detent mechanism, interlocks and springs;
5. inspect and reinstall output shaft, gears, thrust washers, bearings, and retainers;
6. measure endplay or preload (shim or spacer selection procedure) on transaxle shafts and adjust as needed;
7. inspect and reinstall synchronizer hub, sleeve, keys (inserts), springs, and blocking rings;
8. inspect and reinstall reverse idler gear, shaft, bearing, thrust washers, and retainers;
9. inspect, service, and replace shafts, yokes, boots, and universal/CV joints;
10. remove and inspect drive pinions gear, spacers, sleeves, and bearings;
11. measure and adjust drive pinion depth;
12. measure and adjust pinion bearing preload;
13. measure and adjust side bearing preload, ring and pinion gear total backlash, and backlash variation on a differential carrier assembly (threaded cup and shim types);
14. inspect ring and pinion tooth contact patterns and adjust as needed; and
1. perform all other up-to-date NATEF (National Automotive Technicians Education Foundation) tasks from the master course list.

**Major Topics**

- I. Repair of manual transmission and transaxle

- II. Repair of transfer case and electronic 4 (Wheel Drive) WD actuators
- III. Repair of differentials
- IV. Measurement and set up of differential gears

## **Course Requirements**

### **Grading/Exams:**

Grading procedures will be determined by the individual faculty member but will include the following:

- A minimum of 4 quizzes
- A minimum of 8 lab projects
- A minimum of 1 written paper
- A minimum of 4 homework assignments
- One mid-term exam
- Class participation
- Comprehensive final skills assessment (required)

### **Written Paper**

1. Topic of the paper will be selected by the student and should relate to the subject material of the course.
2. The paper should be 6 to 8 pages in length, typewritten, and double-spaced. It should include in addition to the 6 to 8 pages of text, an author and title page and bibliography utilizing a minimum of three reference resources excluding classroom materials.
3. All papers are due when 80% of the class sessions are completed. Papers submitted late will be deducted one letter grade.

Written Assignments: Students are required to utilize appropriate academic resources.

### **Other Course Information**

AUTO 156 approaches repairing automotive manual transmissions as a learning process that incorporates theory with laboratory experience. To complete the course successfully, practical ability as well as knowledge of theory must be demonstrated.

This is an Automotive Technology core course and is taught in an 8-week format.