AUTOMOTIVE MANUAL DRIVETRAIN AND AXLES (NATEF COMPLIANT)
Course Syllabus

Course Number: ATOS-1743  
OHLAP Credit: No
OCAS Code: None
Course Length: 80 Hours
Career Cluster: Transportation, Distribution, and Logistics
Career Pathway: Automotive Service
Career Major(s): Automotive General Service Technician (NATEF Compliant)

Pre-requisite(s):
Course Description:
In this course the student will learn about the components of the manual transmission. The student will learn to check and adjust fluid levels and how to change the manual transmission fluid. The student will learn to identify and interpret transmission concerns, perform shifting tests and determine necessary action. Also covered in this course will be clutches, pressure plates, throw-out bearings, clutch hydraulics, external seals and gaskets, speedometer drive gear and vehicle speed sensors.

The student will also cover power train mounts, extension housing bushings and seals. The student will learn to inspect and test, adjust and replace transmission electrical and electronic components. The student will learn to remove and reinstall transmission and transaxle assemblies. Students will learn to perform inspection, measuring, cleaning, and replacement of all the internal components to perform a complete manual transmission and transaxle overhaul; this will include bearings, synchronizers, gears, main shafts, counter shafts and differentials.

Textbooks:

Course Objectives:
A. General: Drive Train Diagnosis

1. Identify and interpret drive train concerns; determine necessary action. P-1

2. Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. P-1

3. Check fluid condition; check for leaks; determine necessary action. P-1

4. Drain and refill manual transmission/transaxle and final drive unit. P-1

B. Clutch Diagnosis and Repair

1. Diagnose clutch noise, binding, slippage, pulsation, and chatter; determine necessary action. P-1

2. Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action. P-1
3. Inspect and replace clutch pressure plate assembly, clutch disc, release (throw-out) bearing and linkage, and pilot bearing/bushing (as applicable). P-1

4. Bleed clutch hydraulic system. P-1

5. Check and adjust clutch master cylinder fluid level; check for leaks. P-1

6. Inspect flywheel and ring gear for wear and cracks; determine necessary action. P-1

7. Measure flywheel runout and crankshaft end play; determine necessary action. P-2

C. Transmission/Transaxle Diagnosis and Repair

1. Inspect, adjust, and reinstall shift linkages, brackets, bushings, cables, pivots, and levers. P-2

2. Describe the operational characteristics of an electronically-controlled manual transmission/transaxle. P-3

D. Drive Shaft and Half Shaft, Universal and Constant-Velocity (CV) Joint Diagnosis and Repair

1. Diagnose constant-velocity (CV) joint noise and vibration concerns; determine necessary action. P-1

2. Diagnose universal joint noise and vibration concerns; perform necessary action. P-2

3. Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals. P-1

4. Inspect, service, and replace shafts, yokes, boots, and universal/CV joints. P-1

5. Check shaft balance and phasing; measure shaft runout; measure and adjust driveline angles. P-2

E. Drive Axle Diagnosis and Repair

1. Ring and Pinion Gears and Differential Case Assembly

   1. Clean and inspect differential housing; check for leaks; inspect housing vent. P-2

   2. Check and adjust differential housing fluid level. P-1

   3. Drain and refill differential housing. P-1
4. Inspect and replace companion flange and pinion seal; measure companion flange runout. P-2

2. Drive Axles
1. Inspect and replace drive axle wheel studs. P-1
2. Remove and replace drive axle shafts. P-1
3. Inspect and replace drive axle shaft seals, bearings, and retainers. P-2
4. Measure drive axle flange runout and shaft end play; determine necessary action. P-2

F. Four-wheel Drive/All-wheel Drive Component Diagnosis and Repair
1. Inspect, adjust, and repair shifting controls (mechanical, electrical, and vacuum), bushings, mounts, levers, and brackets. P-3
2. Inspect front-wheel bearings and locking hubs; perform necessary action(s). P-3 MD Tasks
3. Check for leaks at drive assembly seals; check vents; check lube level. P-3 P-2
4. Identify concerns related to variations in tire circumference and/or final drive ratios. P-3

1ASE objective
All unmarked objectives are TTC instructor developed.

Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures: 1. Students are graded on theory and shop practice and performance.
2. Each course must be passed with seventy (70%) percent or better.
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.

Description of Classroom, Laboratories, and Equipment: Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.
Available Certifications/College Credit

The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

College Credit Eligibility:
The student must maintain a grade point average of 2.0 or better.