

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

AUTOMOTIVE TECHNOLOGY 192 – ASSET–DRIVE TRAIN

5.5 hours lecture, 7.5 hours laboratory, 8 units

Catalog Description

Ford ASSET course encompassing the study of modern drive train systems. Includes theory of operation, diagnosis, repair and overhaul of manual transmissions, clutches, drivelines and differentials including four wheel drive and front wheel drive. The course also includes the theory of operation, diagnosis, repair and overhaul of automatic transmissions and transaxles. Current computerized control system operation and diagnosis of the drive train will be emphasized. Includes Ford Motor Company certification and preparation for ASE Certification. Complemented by work experience in the dealership.

Prerequisite

None

Course Content

1) Lecture:

- a. Purpose of clutch
- b. Types of clutches
- c. Pressure plate design
- d. Driveshafts
- e. Standard transmission principles
- f. Gear types
- g. Synchronizer types
- h. Gear ratios
- i. Overdrive
- j. Driveline types
- k. Rear drive axles
- l. Front drive axles
- m. Differentials
- n. Four wheel drive transfer cases
- o. Manual locking hubs
- p. Automatic locking hubs
- q. Electronic automatic all-wheel drive
- r. Hydraulic theory
- s. Coolers and fluid types
- t. Torque converter operation including lock-up type
- u. Planetary gears operation and control
- v. Operation of drums, bands, servos, accumulators, clutches, modulators, governors
- w. Mechanical shift control and valve bodies
- x. Electronic shift control and solenoid bodies
- y. Diagnosing mechanical and electronic transmission problems

2) Lab:

- a. Introduction and safety
- b. Universal joint repair
- c. Final drive overhaul (standard and traction-loc types)

- d. Transfer case overhaul
- e. Wheel bearing replacement
- f. Locking hub overhaul
- g. Automatic all wheel drive system computerized control diagnosis and testing
- h. Manual transmission and transaxle disassembly
- i. Manual transmission and transaxle power flow
- j. Manual transmission and transaxle gauging
- k. Manual transmission and transaxle reassembly
- l. Automatic transmission and transaxle disassembly
- m. Automatic transmission and transaxle gauging
- n. Valve body service
- o. Automatic transmission and transaxle assembly and testing
- p. Automatic transmission and transaxle computerized control diagnosis and testing

Course Objectives

Students will be able to:

- 1) Demonstrate standardized safety and hazardous waste handling practices.
- 2) Utilize manufacturer's repair data and specifications for accurate diagnosis and repair.
- 3) Diagnose manual and automatic transmission mechanical and electrical faults following manufacturer's procedures.
- 4) Utilize industry standards to perform maintenance and adjustment on automatic and manual transmissions.
- 5) Remove and replace drive train components and major assemblies according to published repair data.
- 6) Inspect, measure and replace torque converters and fluid couplings utilizing accepted industry practice.
- 7) Inspect, measure, repair and adjust drive train components and major assemblies following manufacturer's procedures.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Quizzes, written exams, and hands-on performance exam that measure students' ability to safely identify necessary action or repair, diagnose and measure drive train components, and perform necessary tasks related to drive train repair.
- 2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing and adjustment of drive train systems and components.
- 3) Skills-based summative assessment that measures students' ability to successfully complete the necessary NATEF tasks related to diagnosis, replacement, repair, testing and adjustment of drive train systems and components.

Special Materials Required of Student

- 1) Mechanic's hand tool set
- 2) Approved safety glasses

Minimum Instructional Facilities

- 1) Auto tech lab (6 bays)
- 2) Complete selection of special tools for Ford Motor Co. transmissions
- 3) Various training models
- 4) Training vehicles
- 5) Front and rear axle assemblies
- 6) Four wheel drive transfer case assemblies

- 7) Manual transmissions and transaxles
- 8) Automatic transmissions and transaxles

Method of Instruction

- 1) Lecture and demonstration
- 2) Group work
- 3) Internet multimedia coursework as required by Ford Motor Company
- 4) Intensive hands-on training utilizing late model drive train components and tools
- 5) Various late model vehicles for repair practice

Out-of-Class Assignments

- 1) Reading assignments
- 2) Writing assignments

Texts and References

- 1) Required (representative example): Various Ford Motor Company training publications
- 2) Supplemental: Online training courses and service publications supplied by Ford Motor Company

Exit Skills

Students having successfully completed this course exit with the following skills, competencies and/or knowledge:

- 1) Clutch diagnosis and repair.
- 2) Manual transmission/transaxle diagnosis and repair.
- 3) Drive shaft and axle shaft diagnosis and repair.
- 4) Drive axle diagnosis and repair.
- 5) Four wheel drive/all wheel drive diagnosis and repair.
- 6) Automatic transmission/transaxle diagnosis and repair.
- 7) Automatic transmission/transaxle maintenance and adjustment.

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Demonstrate standardized safety and hazardous waste handling practices.
- 2) Utilize manufacturer's repair data and specifications for accurate diagnosis and repair using assigned lab sheets and hands-on testing.
- 3) Diagnose manual and automatic transmission mechanical and electrical faults following manufacturer's procedures using assigned lab sheets and hands-on testing.