

CUYAMACA COLLEGE OFFICIAL COURSE OUTLINE

AUTOMOTIVE TECHNOLOGY 155 – ADVANCED DRIVE TRAIN SYSTEMS

2.5 hours lecture, 4.5 hours laboratory, 4 units

Catalog Description

Advanced course in power drive systems emphasizing advanced diagnosis and repair of drive train systems and components. Designed to develop greater student performance under simulated industry conditions. Students will be required to complete associated tasks in the shop as specified by NATEF (National Automotive Training Educational Foundation). Preparation for ASE A-2 and A-3 Certification.

Prerequisite

AUTO 152

Entrance Skills

Without the following skills, competencies and/or knowledge, any student entering this course will be highly unlikely to succeed:

- 1) Understand operational theory and diagnosis of automatic and manual transmissions
- 2) Understand operational theory and diagnosis of transfer cases and differentials
- 3) Ability to perform pressure tests on automatic transmission
- 4) Ability to diagnose and repair electronic shift components
- 5) Ability to remove and re-install automatic and manual transmissions and transaxles
- 6) Ability to inspect and adjust linkages, cables and range selectors
- 7) Ability to diagnose and inspect drive-train components for oil leaks
- 8) Ability to diagnose, adjust and replace clutch components
- 9) Ability to diagnose and repair differential and drive axle components
- 10) Ability to diagnose and repair four wheel drive and transaxle components

Course Objectives

Students will be able to:

- 1) Acquire safe working habits
- 2) Relate driveline theory to practical application
- 3) Perform manual transmission, clutch, and driveline repair to prescribed industry standards
- 4) Perform automatic transmission diagnosis and repair to prescribed industry standards

Special Materials Required of Student

- 1) Basic hand tool set
- 2) Approved safety glasses
- 3) Notebook, required textbook

Minimum Instructional Facilities

- 1) Auto tech lab (6 bays)
- 2) Complete auto drive train equipment center
- 3) Automotive transparencies, PowerPoint presentations, CD/DVD videos
- 4) VCR/monitor
- 5) SMART classroom

Course Content

- 1) Lecture:
 - a. Introduction and safety
 - b. Purpose of clutch
 - c. Types of clutches
 - d. Pressure plate design
 - e. Standard transmission principles

- f. Gear types
 - g. Synchronizer types
 - h. Gear ratios
 - i. Types of linkages
 - j. Electrical clutches
 - k. Driveline types
 - l. Rear drive differentials
 - m. Front drive units
 - n. Overdrive units
 - o. Four wheel drive units
 - p. Hydraulics theory and fluid flow in typical transmissions
 - q. Torque converter operation including lock-up type
 - r. Operation of: drums, bands, servos, accumulators, clutches, modulators, governors
 - s. Planetary gears: operation and control
 - t. Shift control and valve bodies
 - u. Electronic shift control
 - v. Coolers and fluid types
 - w. Diagnosing automatic transmission problems
- 2) Lab:
- a. Introduction and safety
 - b. Laboratory procedures
 - c. System diagnosis
 - d. Leak testing
 - e. Pressure checks
 - f. Evacuating system
 - g. Compressor repair
 - h. Diagnosis, service and repair of electronic shift control systems and components
 - i. Lock-up converter diagnosis and repair
 - j. Transmission reassembly and installation
 - k. Clutch diagnosis and repair
 - l. Overdrive repairs and shift linkage adjustment
 - m. Driveline service (both front and rear drive cars)
 - n. Oil seal replacement
 - o. Wheel bearing diagnosis and replacement
 - p. Ring and pinion gear replacement
 - q. Differential repair (standard and Posi-Trac types)

Method of Instruction

- 1) Lecture and demonstration
- 2) Individual assistance

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 and written exams
- 2) Observation of student work
- 3) Inspection of work completed
- 4) Hands-on performance exam

Texts and References

- 1) Required: Thiessen/Dales. Automotive Drive Trains Automatic and Manual. 2nd edition. Prentice Hall, 1996.
- 2) Supplemental: None