COURSE INFORMATION FORM

DISCIPLINE
Automotive Technology

COURSE TITLE
Manual Drivetrain and Axles

CR.HR 4 LECT HR 2 LAB HR 4 CLIN/INTERN HR _______ CLOCK HR _______

CATALOG DESCRIPTION

This course incorporates the theory of operation and service procedures of manual drive trains and axles including drivelines, constant velocity (CV) joints, manual transmissions and transaxles, differentials and clutches. Noise, vibration, and harshness (NVH) will be covered in this course.

PREREQUISITES

Concurrent enrollment in or completion of AUTO 100.

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)

Upon completion of this course, the student will be able to:

1. Demonstrate the cognitive and manipulative skills necessary to complete assigned tasks.
2. Describe and employ safe work habits, observing both personal safety and a concern for the safety of others.
3. Analyze, diagnose and determine necessary actions to solve geartrain and axle concerns.
4. Apply procedures needed to successfully perform service operations.
5. Employ effective behaviors necessary to successfully work with others.

GENERAL EDUCATION OUTCOMES (ESO)

Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.
PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

1. Students will demonstrate or apply knowledge of basic sciences to the practices of automotive technology.
2. Students will demonstrate or apply knowledge of basic sciences to the practices of automotive technology.
3. Students will demonstrate the knowledge and application of safety rules and regulations.
4. Students will exhibit professional behavior.
5. Students will be able to use mathematics as it pertains to the automotive technicians.

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes may be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

1. Written evaluation (1-4)
2. Oral evaluation (1-5)
3. Performance exams (1-4)
4. Written Laboratory assignments (1-5)
Individual instructors may order this outline as fits the needs of their individual courses. In addition, they may place more emphasis on some areas than on others. What is assured is that this particular list is covered in the course. Other topics may be added to a course as the instructor sees fit, and as time and interest allow. An *asterisk can be used to mark an item as optional.

I. Introduction
   A. Safety review
   B. Service information review
   C. Special tools related to manual drive train and axles

II. Manual drive train theory
   A. Identifying major components
   B. Gear selection – increasing torque and RPM
   C. Differences between a transmission and transaxle

III. Clutches
   A. Identification of clutch parts
   B. Types of clutches
   C. Designs and different types of linkages

IV. Manual transmissions
   A. Basic designs
   B. Disassembly and service

V. Manual transaxles
   A. Basic designs
   B. Disassembly and service

VI. Front drive axles
   A. CV joint types
   B. Identification of different types of CV joints
   C. CV joint service

VII. Drive shafts
   A. Service and repair
   B. U-joint types and service of each
   C. Checking drive shaft angles and alignment

VIII. Differential function
   A. Service
   B. Noise diagnosis
   C. Ring and pinion replacement
   D. Blacklash and preload
E. Service on limited-slip type differentials

IX. Four-wheel drive systems
   A. Difference between four-wheel drive and all-wheel drive
   B. Service and diagnosis of four-wheel drive systems
   C. Transfer cases
   D. Servicing four-wheel drive systems
   E. Viscous couplings and their use
   F. Four-wheel drive bearings

IX. Noise, vibration, and harshness (NVH)
   A. NVH theory
   B. Diagnosing NVH concerns