Lecture Contact Hours: 80-90; Homework Hours: 160-180; Total Student Learning Hours: 240-270
Laboratory Contact Hours: 96-108; Homework Hours: 0; Total Student Learning Hours: 96-108

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

AUTOMOTIVE TECHNOLOGY 202 – ASEP–BRAKES AND ALIGNMENT

5 hours lecture, 6 hours laboratory, 7 units

Catalog Description
General Motors ASEP course to include a detailed study of modern automotive braking systems and service procedures including two and four wheel electronic anti-lock brake system operation and repair. Laboratory experience will cover drum and disc brake system inspection, adjustment and repair procedures. Also covers modern suspension and steering systems including electronic ride control, steering, and four wheel alignment principles as applied to checking and correcting alignment settings. Repair and replacement of suspension components. Additional training in wheel balancing. Emphasis on practical experience on "live" automobiles. Preparation for ASE and GM certification.

Prerequisite
None

Course Content
1) Lecture:
    a. Introduction and safety
    b. Equipment operation
    c. Laboratory procedures
    d. Basic hydraulic theory
    e. Basic laws of physics as related to automotive braking systems
    f. Drum brake system theory of operation
    g. Disc brake system theory of operation
    h. Theory of operation of electronic anti-lock braking systems
    i. Suspension theory and design
    j. Alignment procedures
    k. Suspension component repair and replacement
    l. Manual steering control systems
    m. Power steering control systems
    n. Electronic power steering systems
    o. Electronic ride control systems
    p. Tire and wheel design
    q. Tire balancing principles
    r. Four wheel steering systems
2) Lab:
    a. Introduction and safety
    b. Laboratory procedures
    c. Equipment operation
    d. Diagnosing and repairing drum brake systems
    e. Diagnosing and repairing various power assist systems
    f. Diagnosing and repairing electronic anti-lock systems
    g. Pre-alignment checks
    h. Tire balancing
    i. Alignment procedures
    j. Suspension component diagnosis, repair and replacement

k. Manual steering system repair and adjustment
l. Power steering system repair and adjustment
m. Electronic power steering diagnosis and repair
n. Electronic ride control diagnosis and repair
o. Tire and wheel care
p. Four wheel alignment

Course Objectives

Students will be able to:

1) Demonstrate standardized safety and hazardous waste handling practices.
2) Apply brake system theory principles in order to diagnose brake system and related problems.
3) Perform various brake repairs to prescribed industry standards.
4) Use prescribed industry standards to measure thickness variation, runout, maximum and minimum diameter of various braking components utilizing industry recognized measuring tools.
5) Apply suspension and steering theory in order to identify steering and suspension concerns and determine necessary action.
6) Use prescribed industry standards to diagnose and repair/replace power steering system components.
7) Demonstrate proper procedures to test and diagnose electronically controlled steering systems.
8) Follow prescribed industry standards to diagnose and repair/replace front and rear suspension systems and components.
9) Adjust and replace front and rear wheel bearings to prescribed industry standards.
10) Diagnose and adjust vehicle alignment settings to prescribed industry standards.
11) Use proper procedures and tools to diagnose and adjust or replace wheel and tire components to prescribed industry standards.
12) Utilize manufacturer's repair information and technical service bulletins for accurate diagnosis and repair.

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 brake, steering, and suspension system components, and perform necessary tasks related to brake, steering, and suspension system repair.
2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing, and adjustment of brake, steering, suspension and related 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 brake, steering, and suspension systems and components.

Special Materials Required of Student

1) Mechanic's hand tool set
2) Approved safety glasses
3) Specialized brake and alignment tools

Minimum Instructional Facilities

1) Auto tech lab (6 bays)
2) Smart classroom
3) Complete brake servicing equipment center
4) Various brake system training models
5) Complete four wheel alignment center

6) Computer and strobe tire balance equipment

Method of Instruction
1) Lecture and demonstration
2) Individual assistance

Out-of-Class Assignments
1) Reading assignments
2) Writing assignments

Texts and References
1) Required: To be supplied by GM ASEP Curriculum Committee
2) Supplemental: None

Student Learning Outcomes
Upon successful completion of this course, students will be able to:
1) Demonstrate standardized safety and hazardous waste handling practices using assigned lab sheets and hands-on testing.
2) Apply brake system theory principles in order to diagnose and repair brake system and related problems using assigned lab sheets and hands-on testing.