Lecture Contact Hours: 32-36; Homework Hours: 64-72; Total Student Learning Hours: 96-108

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

AUTOMOTIVE TECHNOLOGY 151 – BRAKE SYSTEM DIAGNOSIS AND REPAIR

2 hour lecture, 2 unit

Catalog Description
This course includes a detailed study of modern automotive braking systems and service procedures. The course will demonstrate drum and disc brake systems inspection, adjustment and repair procedures, including methods of diagnosing and repairing various mechanical and hydraulic brake systems using specified tools and procedures. This course is complemented by AUTO 151L Brake System Laboratory, AUTO 151T Brake System Assessment Test Out, and by Work Experience in the dealership where students will perform specific ASE competencies.

Prerequisite
None

Course Content
1) Lecture:
    a. Introduction and safety
    b. Equipment operation
    c. Basic hydraulic theory
    d. Basic laws of physics as related to automotive braking systems
    e. Drum brake system theory of operation
    f. Disc brake system theory of operation
    g. Theory of operation of electronic and mechanical anti-lock braking systems
    h. Suspension theory and design as it relates to brake performance
    i. Tire and wheel design effect on braking performance
    j. Various brake disc and drum servicing procedures using brake lathes
    k. Brake hydraulic system fluid procedures using pressure and vacuum
    l. Brake component description and operation

Course Objectives
Students will be able to:
1) Successfully navigate manufacturer specific repair information for specific brake system repairs.
2) Demonstrate knowledge of the brake system operation.
3) Create ISO and double flare brake lines.
4) Diagnose various brake pull concerns.
5) Diagnose hard pedal concerns.
6) Perform a master cylinder bench bleed process.
7) Identify various brake system components and inspection.
8) Diagnose low brake pedal concerns.
9) Diagnose brake vibrations.
10) Disassemble, inspect and reassemble rear disc brakes.
11) Disassemble, inspect and reassemble rear drum brakes.

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 using distance education technologies, performance projects where a student is required to submit assigned artifact examples of specific competencies.

1) Quizzes, written exams, and hands-on performance exam that measure students' ability to safely identify necessary action or repair using distance education methodologies.
2) Practical exercises that measure students' progress toward mastering tasks related to diagnosis, replacement, repair, testing, of climate control systems and components.
3) Skills-based summative assessment that measures students' ability to successfully complete the necessary ASE tasks related to diagnosis, replacement, repair, and testing of basic brakes, by completing required specific tasks in the student's portfolio.
4) Students must complete all of the required web based training modules.

Special Materials Required of Student
1) Mechanic's hand tool set
2) Approved safety glasses
3) Must have access to high speed internet
4) Computer or tablet with a large screen.

Minimum Instructional Facilities
1) Auto tech lab (20 bays)
2) Various training vehicles
3) Smart classroom
4) Distance education technologies

Method of Instruction
1) Lecture and demonstration are both synchronous and asynchronous. Students are required to attend all lectures and participate with the instructor and other students during live lectures. Students will have access to recorded lectures.
2) Individual assistance by file sharing, computer sharing, live demonstration of projects based methods for diagnosing and repairing vehicles.
3) Discussion boards will be used to assign weekly reflections and posting of student assignments.
4) Classroom management system (CMI) will be broadcast as group assignments.

Out-of-Class Assignments
1) Reading assignments
2) Writing assignments
3) Web based training modules
4) Quizzes
5) Tests
6) Student portfolio

Texts and References
1) Required (representative examples):
   a. Student workbooks – will be provided electronically.
   b. Required:-CDX Master Automotive Technician Series, 2020, **ISBN:** 9781284170917
   c. Web Based Training Modules will be provided electronically.
   d. Workshop Manuals will be provided electronically.
2) Supplemental: None

Student Learning Outcomes

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

1) Accurately repair various brake system conditions.
2) Identify brake problems by navigating the workshop manual based on symptoms or codes.
3) Communicate effectively and professionally in a diverse setting that includes prospective colleagues, clients, and supervisors.
4) Comply with environmental health and safety regulations at the state and federal levels.