

**CUYAMACA COLLEGE**  
**COURSE OUTLINE OF RECORD**

**Automotive Technology 151L – Brake System Diagnosis and Repair Laboratory**

3 hours laboratory, 1 unit

**Catalog Description**

This laboratory course describes and demonstrates proper inspection and diagnostic techniques for various brake symptoms and conditions. This course is the lab for students taking courses AUTO 151 Brake Diagnosis and Repair Lecture, AUTO 151T Brake Assessment Test Out, and/or for students taking Work Experience who need additional instruction and practice completing required ASE competencies and tasks.

**Prerequisite**

None

**Course Content**

- 1) Laboratory:
  - 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) Demonstrate standardized safety and hazardous waste handling practices.
- 2) Successfully navigate manufacturer specific repair information for specific brake system repairs.
- 3) Demonstrate knowledge of the brake system operation.
- 4) Create ISO and double flare brake lines.
- 5) Diagnose various brake pull concerns.
- 6) Diagnose hard pedal concerns.
- 7) Perform a master cylinder bench bleed process.
- 8) Identify various brake system components and inspection.
- 9) Diagnose low brake pedal concerns.
- 10) Diagnose brake vibrations.
- 11) Disassemble, inspect and reassemble rear disc brakes.
- 12) 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 ASE competencies using a student portfolio.

- 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 brake systems and components.
- 3) Required skills-based summative assessment that measures students' ability to successfully complete the necessary ASE tasks related to diagnosis, replacement, repair, and testing of brake systems by sharing recorded or live demonstrations.
- 4) Students must complete all of the required web based training modules.

### **Special Materials Required of Student**

- 1) Approved safety glasses
- 2) Must have access to high-speed internet.
- 3) A signed Ford dealership sponsoring agreement form.
- 4) A computer or tablet with a large screen size.
- 5) Safe clothing - uniform as required by dealership.

### **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 project 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:** assigned course materials, manuals, content on websites, and more.
- 2) **Writing:** assignments where students describe the required tasks related to diagnosis, replacement, repair, and testing of brake systems, components, and controls, and more.
- 3) **Other:** web-based training modules, portfolio performance projects related to brake systems, components, and controls, and more.

### **Texts and References**

- 1) Required (representative examples):
  - a. Student workbooks – will be provided electronically.
  - b. Required: VanGelder, Kirk. Fundamentals of Automotive Technology. Jones and Bartlett Learning, 2023.
  - 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.