

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Automotive Technology 151T – Brake System Diagnosis and Repair Assessment Test Out

1.5 hours laboratory, .5 unit

Catalog Description

This portfolio assessment course includes summative and criterion tests using vehicles with brake system concerns for diagnosis and repair. This course allows a student to demonstrate knowledge of proper diagnostic techniques for various brake component concerns in the department laboratory or by using distance education technologies, live demonstrations, and recordings of work. This course allows a student residing at a distance from training centers to complete ASE certification requirements. This course compliments AUTO 151L Brake Systems Laboratory, AUTO 151 Brake Systems Lecture, and Work Experience classes.

Prerequisite

None

Recommended Preparation

“C” grade or higher or “Pass” in AUTO 162T Electronics Diagnosis and Repair Assessment Test Out or equivalent.

Entrance Skills

Without the following skills, competencies, and knowledge, students entering this course will be highly unlikely to succeed:

- 1) Demonstrate computer input and output tests and activation using a scan tool
- 2) Obtain and describe normal and abnormal waveforms using a lab-scope
- 3) Test thermistor, potentiometer, variable reluctance, pressure, Hall-effect and related sensors
- 4) Graph and interpret system data using PIDS on a scan tool
- 5) Diagnose and repair computer communication networking faults
- 6) Describe types and functions of computer memory including RAM, ROM, and PROM
- 7) Demonstrate proper diagnosis and repair of electronic system concerns

Course Content

- 1) Assessment 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 and describe standardized safety and hazardous waste handling practices.
- 2) Successfully navigate manufacturer specific repair information for specific brake system repairs.
- 3) Demonstrate and describe 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 by 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, and skills demonstration.

- 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) High speed internet connection and access
- 3) A computer or tablet with a large screen size
- 4) Safety dress code is required

Minimum Instructional Facilities

- 1) Auto tech lab (20 service bays)
- 2) Various training vehicles
- 3) Smart classroom
- 4) Diagnostic tools and equipment

Method of Instruction

- 1) Demonstration
- 2) Individual assistance
- 3) Feedback of repair processes regardless of successful or unsuccessful

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 (pass online pretests prior to laboratory "Test Out"), 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

Exit Skills

Students having successfully completed this course exit with the following skills, competencies, and/or knowledge:

- 1) Perform brake mechanical and hydraulic repair adhering to manufacturers guidelines.
- 2) Demonstrate and describe disc and drum brake system operation.
- 3) Repair brake lines using specialized repair tools.
- 4) Diagnose various brake system concerns including pull, pedal feel, vibrations, and noise related concerns.
- 5) Perform various hydraulic related tests and procedures.
- 6) Disassemble, inspect, and reassemble rear disc brakes.
- 7) Disassemble, inspect, and reassemble rear drum brakes.
- 8) Diagnose and repair parking brake systems.
- 9) Perform critical brake measurements.
- 10) Machine brake drums and rotors using on vehicle and off vehicle brake lathes.

Student Learning Outcomes

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

- 1) Accurately repair various brake system conditions.
- 2) Identify and repair 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.