

Course Outline for AUTO A5

BRAKES

Effective: Fall 2016

I. CATALOG DESCRIPTION:

AUTO A5 — BRAKES — 4.00 units

Diagnosis, evaluation, inspection, adjustment, and repair of braking, antilock braking systems, traction control and related devices. Class will involve California State law regarding brake and safety inspections. . Includes the material on the California Brake Adjuster’s Licensing Examination. Students are strongly recommended to enroll in Automotive Lab concurrently.

2.00 Units Lecture 2.00 Units Lab

Prerequisite

AUTO INTR - Automotive Service and Introduction
 with a minimum grade of C
 (May be taken concurrently)

Grading Methods:

Letter or P/NP

Discipline:

	<u>MIN</u>
Lecture Hours:	36.00
Lab Hours:	108.00
Total Hours:	144.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. AUTOINTR

1. identify and describe uses of automotive related tools;
2. describe the importance of preventative maintenance and inspection procedures as they relate to the automobile;
3. apply Ohm’s law, read basic schematics, test automotive electrical systems;
4. discuss braking systems, perform a brake inspection, identify parts;
5. differentiate between suspension and steering system types, inspect and qualify components;
6. restraints system identification, know safety concerns of each system and inspection of restraint systems;

IV. MEASURABLE OBJECTIVES:

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

- A. Describe the theory and fundamentals of automotive brake, anti-lock brake electronic traction control, and steering stability systems;
- B. Use basic testing and diagnostic tools and equipment in the inspection, diagnosis and repair of automotive braking systems;
- C. Demonstrate the ability to access the vehicle computer and various sensors relating to brakes and suspension systems;
- D. Demonstrate safe and appropriate handling of hazardous material;
- E. Accurately investigate and catalogue consumer concerns;
- F. Maintain a clean and professional environment.

V. CONTENT:

A. Automotive brakes.

1. Foundation brake systems
 - a. Hydraulic servo, dual-servo, advanced leading trailing and leading trailing
 - b. Caliper and piston front
 - c. Caliper and piston rear
2. Anti-Lock systems and sub-systems
 - a. Wheel speed sensors
 - b. Vehicle speed sensors
 - c. Hydraulic control units
 - d. Electrical control units
3. Traction control systems, and sub-systems.
 - a. Wheel speed sensors

- b. Vehicle speed sensors
 - c. Hydraulic control units
 - d. Electrical control units
 - 4. Steering Stability systems and subsystems
 - a. Wheel speed sensors
 - b. Vehicle speed sensors
 - c. Hydraulic control units
 - d. Electrical control units
 - e. Yaw Sensors
 - f. Pitch Sensors
 - g. Decelerometers
 - h. Steering input sensors
- B. Testing and diagnostic tools and equipment
 - 1. Proper and safe tool use procedures
 - 2. Diagnostic safety precautions
 - 3. Analysis of test results
 - 4. Digital volt, ohm meter reading (DVOM)
 - 5. Digital storage oscilloscope hook-up and reading
- C. Computer access
 - 1. Access vehicle on board computer
 - 2. Retrieve codes and refer to diagnostic service information
 - 3. Evaluate sensor data
- D. Hazardous material handling
 - 1. Demonstrate proper handling of brake system components
 - 2. Perform proper fluid disposal
- E. Consumer concerns
 - 1. Research customer concerns, evaluate steps needed to repair concern
 - 2. Catalogue concern
 - 3. Repair Procedures
- F. Electrical Concerns
 - 1. Base Brakes
- G.
 - 1. ABS
 - 2. Traction Control
 - 3. Collision avoidance
- H. Professional environment
 - 1. Safety glasses (clear lens) worn in all laboratory areas
 - 2. No loose clothing (coveralls strongly recommended)
 - 3. Long Hair secured
 - 4. No open toe shoes (safety shoes recommended)
 - 5. Work areas maintained; clean free of debris and spills

VI. METHODS OF INSTRUCTION:

- A. **Lab** - Student Hands-on laboratory activities and assignments
- B. **Lecture** -

VII. TYPICAL ASSIGNMENTS:

- A. Lecture based assignments
 - 1. Lecture on ABS.
- B. Lab based assignments
 - 1. Test Hall effect WSS

VIII. EVALUATION:

A. **Methods**

- 1. Exams/Tests
- 2. Quizzes
- 3. Class Participation
- 4. Home Work
- 5. Lab Activities

B. **Frequency**

Exams - at least two per semester. Midterm and Final

Quizzes - Weekly

Class participation/Lab Activities - Ongoing, weekly, daily

Homework - Weekly

IX. TYPICAL TEXTS:

- 1. California State Department Consumer Affairs *Brake Inspection Manual.*, -, 2003.
- 2. Duffy, James. *Modern Automotive Technology.* 6 ed., Goodheart-Wilcox, 2014.
- 3. Halderman, James. *Automotive Maintenance and Light Repair.* 6 ed., Pearson, 2014.
- 4. Halderman, James. *Automotive Maintenance and Light Repair.* 6 ed., Pearson, 2014.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Safety Glasses