Las Positas College
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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:

	MIN
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. Collison 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