Syllabus

AUMT 1410

Automotive Brake Systems

Automotive Technology

BRAZOSPORT COLLEGE

LAKE JACKSON TEXAS

PREPARED BY: Rick Underdahl, INSTRUCTOR — DATE: September 2015

RECOMMENDED BY: _____, DIVISION CHAIRMAN — DATE: _____

APPROVED BY: _____, DEAN — DATE: _____

BRAZOSPORT COLLEGE
500 COLLEGE DRIVE
LAKE JACKSON, TEXAS 77566

AUMT1410

AUTOMOTIVE BRAKE SYSTEMS

COURSE DESCRIPTION

Operation and repair of drum/disc type brake systems. Emphasis on the safe use of modern equipment. Topics include brake theory, diagnosis, and repair of power, manual, anti-lock brake systems, and parking brakes. May be taught manufacturer specific. (2-6)

COURSE FOCUS

Brake systems

TEXT AND REFERENCES

Automotive Technology Curriculum

Author(s): CDX Automotive

- ISBN-13: 9781284027327

Details:

- Online Course pages © 2015
  Access Code Subscription Length: 365
  Days

Required course materials are available at the Brazosport College bookstore, on campus or online at http://www.brazosport.edu/bookstore. A student of this institution is not under any obligation to purchase a textbook from the college bookstore. The same textbook is/may also be available from an independent retailer, including an online retailer.

COURSE GOALS

The following list of course goals will be addressed in the course. These goals are directly related to the performance objectives (Addendum A). (*designates a CRUCIAL goal)

1. Diagnose poor stopping or dragging caused by problems in the master cylinder; determine needed repairs.
2. Diagnose poor stopping, dragging, high/low pedal, or hard pedal caused by problems in a step-bore master cylinder and internal valves (includes volume control devices, quick take-up valve, fast-fill valve, pressure regulating valve) ; determine deeded repairs.
3. Measure and adjust pedal pushrod length.
4. Check master cylinder for internal and external leaks and proper operation; determine needed repairs.
5. Remove, bench bleed, and replace master cylinder.
6. Diagnose poor stopping, pulling, or dragging caused by problems in the brake fluid, lines, and hoses; determine needed repairs.
7. Inspect brake lines and fittings for leaks, dents, kinks, rust, cracks, or wear; tighten loose fittings and supports.
8. Inspect flexible brake hoses for leaks, kinks, cracks bulging, or wear; tighten loose fittings and supports.
9. Replace brake lines (double flare and ISO types), hoses, fittings, and supports.
10. Select, handle, store and install brake fluids (includes silicone fluids).
11. Diagnose poor stopping, pulling, or dragging caused by problems in the hydraulic system valves.
12. Inspect, test, and replace metering (hold-off), proportioning (balance), pressure differential, and combination valve(s).
13. Inspect, test, replace, and adjust load or height sensing-type proportioning valve(s).
14. Inspect, test, and replace brake warning light system switch and wiring.
15. Reset brake pressure differential valve.
16. Bleed (manual, pressure, vacuum, or surge) and/or flush hydraulic system.
17. Check and adjust master cylinder fluid levels.
18. Diagnose poor stopping, pulling, or dragging caused by problems in the drum brake wheel assembly; determine needed repairs.
19. Diagnose poor stopping, noise, pulling, grabbing, dragging, or pedal pulsation caused by problems in the drum brake mechanical assembly; determine needed repairs.
20. Remove, clean (using proper safety procedures), inspect, and measure brake drums.
21. Mount brake drum on lathe and machine braking surface.
22. Remove, clean, and inspect brake shoes/linings, springs, pins, clips, levers, adjusters/self-adjusters, and other related brake hardware; determine needed repairs.

23. Clean and remove loose dirt, rust, or scale on brake backing (support) plates(using proper safety procedures); inspect; remove and reinstall if necessary.
24. Remove and reinstall/ replace wheel cylinders.
25. Disassemble and clean wheel cylinder assemble; inspect parts for wear, rust, scoring, and damage; hone cylinder (if necessary and recommended by manufacturer); replace all cups, boots, and any damaged or worn parts.
26. Lubricate brake shoe support pads on baking (support) plate, adjuster/self adjuster mechanisms, and other hardware.
27. Determine correct brake shoe application.
28. Install brake shoes and related hardware.
29. Adjust brake shoes and reinstall brake drums or drum/hub assemblies and wheel bearings.
30. Reinstall wheel, torque lug nuts, and make final checks and adjustments.
31. Diagnose poor stopping, pulling, or dragging caused by problems in the disc brake caliper assemble; determine needed repairs.
32. Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation caused by problems in the disc brake mechanical assemble; determine needed repairs.
33. Remove caliper assemble from mountings; clean and inspect for leaks and damage to caliper housings.
34. Clean and inspect caliper mountings and slides for wear and damage.
35. Remove, clean and inspect pads and retaining hardware; determine needed repairs, adjustments and replacements.
36. Remove, disassemble, and clean caliper assemble; inspect parts for wear, rust, scoring, and damage; replace all seals, boots, and any damage or worn parts.
37. Reassemble and reinstall caliper.
38. Clean and inspect rotor; measure rotor with dial indicator and micrometer.
39. Remove rotor, mount on lather, and machine (apply non-directional finish where applicable).
40. Determine correct brake pad application.
41. Install pads, calipers, and related attaching hardware.
42. Adjust calipers with integrated parking brakes.
43. Fill master cylinder with recommended fluid and seat pads; inspect caliper for leaks.
44. Reinstall wheel and torque lug nuts, and make final checks and adjustments.
45. Test pedal free travel with and without engine running; check power booster operation.
46. Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster with a vacuum gauge.
47. Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; repair or replace parts as necessary.
48. Inspect and test hydro-boost system and accumulator for leaks and proper operation; repair and replace parts as necessary.
49. Diagnose wheel bearing noises, wheel shimmy and vibration problems; determine needed repairs.

50. Remove, clean, inspect, repair, or replace and pack wheel bearings, replace seals and adjust wheel bearings.
51. Check parking brake system; inspect cables and parts for wear, rusting, binding and corrosion; clean or replace parts as necessary; lubricate assembly.
52. Adjust parking brake assembly; check operation.
53. Test parking brake indicator lights, switches, and wiring.
54. Test, adjust, repair or replace brake stop light switch and wiring.
55. Diagnosis and repair of anti-lock braking systems .

STUDENT CONTRIBUTIONS

Students are expected to attend regularly scheduled classes. They should complete all reading and outside class assignments prior to the scheduled meetings. The student will assist in demonstrations, complete assignments and tests demonstrating appropriate knowledge and skills in the specific areas designated. Students will be asked to complete an Instructor/Course Evaluation at the end of the course.

COURSE EVALUATION

A = 100 - 90
B = 89 - 80
C = 79 - 70
D = 69 - 60
F = 59 and below

COURSE SCHEDULE

The class meets for 2 lecture hours and 6 lab hours per week.

ADDENDUM A

PERFORMANCE OBJECTIVES

1. The student may be allowed references. Content goals 1 - 4 should serve as a study guide. The student will diagnose brake system failures associated with the master cylinder. Performance will be satisfactory if the diagnosis is consistent with the failure.

2. The student will be allowed references. Following a review of content goal 5 the student will remove and replace a master cylinder. Performance will be satisfactory if the cylinder is properly bench bleed and installed within twice the flat rate.

3. The student will be allowed references. Content goals 6 - 9 should serve as a prerequisite. The student will diagnose brake failures caused by fluid, line and hose problems and repair. Performance will be satisfactory if the problem is correctly diagnosed and repaired.

4. The student will be allowed references. Content goals 10, 16 and 17 should serve as a prerequisite. The student will handle and use brake fluids. Performance will be satisfactory if the storage and use complies with the published MSDS and factory established procedures.

5. The student will be allowed references. Content goals 18 - 23 and 26 - 30 should serve as a reference. The student will diagnose and service drum brake systems. Performance will be satisfactory if the service is completed in twice the published flat rate time.

6. The student will be allowed references. Content goals 24 and 25 should serve as a reference. The student will remove service and replace wheel cylinders. Performance will be satisfactory if the cylinder is brought into specifications.

7. The student will be allowed references. Content goals 31 - 37 and 40 - 44 should serve as a reference. The student will diagnose and service brake failures associated with disc brakes. Performance will be satisfactory if the service is completed in twice the published flat rate time.

8. The student will be allowed references. Content goals 38 and 39 should serve as a reference. The student will inspect and turn a brake rotor. Performance will be satisfactory if the rotor is brought into factory specifications.

9. The student will be allowed references. Content goals 45 - 48 should serve as a reference. The student will diagnose and repair a power assisted brake system. Performance will be satisfactory if the service is completed in twice the published flat rate time.

10. The student will be allowed references. Content goals 49 and 50 should serve as a prerequisite. The student will diagnose and repair wheel bearing associated problems. Performance will be satisfactory if the problems are correctly diagnosed and eliminated.

11. The student will be allowed references. Content goals 51 - 53 should serve as a prerequisite. The student will check and service parking brake systems. Performance will be satisfactory if the parking brake functions within factory specifications.

12. The student will be allowed references. Content goal 54 should serve as a reference. The student will test and a repair brake stop light switch and wiring system. Performance will be satisfactory if the stop light works correctly.

13. The student will not be allowed references. Content goals 1 - 54 should be reviewed. The student will take instructor administered tests. Performance will be satisfactory if the student maintains a minimum score of 60.

14. The student will be allowed references. Content goal 55 should serve as a reference. The student will diagnose and repair anti-lock braking systems. Performance will be satisfactory if system is repaired..

STUDENTS WITH DISABILITIES

Brazosport College is committed to providing equal education opportunities to every student. Brazosport College offers services for individuals with special needs and capabilities including counseling, tutoring, equipment, and software to assist students with special needs. Please contact the Special Populations Counselor, 979.230.3236, for further information.

ACADEMIC HONESTY

Brazosport College assumes that students eligible to perform on the college level are familiar with the ordinary rules governing proper conduct including academic honesty. The principle of academic honesty is that all work presented by you is yours alone. Academic dishonesty including, but not limited to, cheating, plagiarism, and collusion shall be treated appropriately. Please refer to the Brazosport College Student Guide for more information. This is available online at http://www.brazosport.edu. Click on the CATALOGS AND SCHEDULES link under STUDENTS.

Academic dishonesty violates both the policies of this course and the Student Code of Conduct. In this class, any occurrence of academic dishonesty will be referred to the Dean of Student Services for prompt adjudication, and will, at a minimum, result in an automatic zero for the assignment. Sanctions may be imposed beyond your grade in this course by the Dean of Student Services.

Developed/Revised: January 29, 2015