

COCONINO COMMUNITY COLLEGE

COURSE OUTLINE

Prepared by: Joseph M. Costion
Status: Permanent

Date: Sept. 2, 2004

A. Identification:

1. Subject Area: Automotive Technology
2. Course Number: AUT 120
3. Course Title: Automotive Brake Systems
4. Credit Hrs: 3
5. Catalog Description:

A study of braking systems used on light and medium duty vehicles with an overview of heavy duty brakes (air) which will include theory, operation, construction, maintenance, testing, diagnosis and repair of drum and disc brakes.
Pre or Co-requisite: AUT 100. One lecture. Three lab. May be taken for S/U credit.

B. Course Goals:

To introduce students to the theory, design and service of automotive and light truck brakes. Topics will include: General Brake System Diagnosis, Hydraulic System Diagnosis and Repair, Drum Brake Diagnosis and Repair, and Disc Brake Diagnosis and Repair.

C. Course Outcomes:

Students will:

1. Identify and interpret brake system concern; determine necessary action.
2. Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.
3. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals).
4. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).
5. Measure brake pedal height; determine necessary action.
6. Check master cylinder for internal and external leaks and proper operation; determine necessary action.
7. Remove, bench bleed, and reinstall master cylinder.
8. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action.
9. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
10. Fabricate and/or install brake lines (double flare and ISO types); replace hoses, fittings, and supports as needed.

11. Select, handle, store, and fill brake fluids to proper level.
12. Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.
13. Inspect, test, and adjust height (load) sensing proportioning valve.
14. Inspect, test, and/or replace components of brake warning light system.
15. Bleed (manual, pressure, vacuum or surge) brake system.
16. Flush hydraulic system.
17. Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.
18. Remove, clean (using proper safety procedures), inspect, and measure brake drums; determine necessary action.
19. Refinish brake drum.
20. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
21. Remove, inspect, and install wheel cylinders.
22. Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings.
23. Install wheel, torque lug nuts, and make final checks and adjustments.
24. Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.
25. Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing; determine necessary action.
26. Clean and inspect caliper mounting and slides for wear and damage; determine necessary action.
27. Remove, clean, and inspect pads and retaining hardware; determine necessary action.
28. Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.
29. Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.
30. Clean, inspect, and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace.
31. Remove and reinstall rotor.
32. Refinish rotor according to manufacturer's recommendations.
33. Adjust calipers equipped with an integrated parking brake system.
34. Install wheel, torque lug nuts, and make final checks and adjustments.

D. Course Content:

Will include:

1. General Brake System Diagnosis
2. Hydraulic System Diagnosis and Repair
3. Drum Brake Diagnosis and Repair
4. Disc Brake Diagnosis and Repair

