

Dakota County Technical College

AUTM 2025: Brakes

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 1

Lab Hours/Week: 2

OJT Hours/Week: *.*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course includes basic principles of brakes, hydraulic system basics, disc and drum brakes, parking brakes, anti-lock brakes and power assist units. Emphasis will be placed on operation, diagnosis and repair of various types of braking systems. Prerequisites: AUTM2100

B. COURSE EFFECTIVE DATES: 01/27/2010 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

D. LEARNING OUTCOMES (General)

1. Bleed (manual, pressure, vacuum or surge) brake system
2. Check master cylinder for internal and external leaks and proper operation: determine necessary action
3. Clean and inspect caliper mounting and slides for wear and damage: determine necessary action
4. Clean, inspect, and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace
5. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause and correction
6. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns: determine necessary action
7. Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging, or pedal pulsation concerns: determine necessary action
8. Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system: determine necessary action
9. Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law)
10. Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts
11. Fabricate and/or install brake lines (double flare and ISO types); replace hoses, fittings, and supports as needed
12. Flush hydraulic system
13. Identify and interpret brake system concern: determine necessary action
14. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear, tighten loose fittings and supports: determine necessary action
15. Inspect, test, and/or replace components of brake warning light system
16. Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves
17. Inspect, test, replace and adjust height (load) sensing proportioning valve
18. Install wheel, torque lug nuts, and make final checks and adjustments
19. Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, calibration labels)
20. Measure brake pedal height: determine necessary action
21. Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings
22. Reassemble, lubricate, and reinstall caliper, pads, and related hardware; set pads, and inspect for leaks
23. Refinish brake drum
24. Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing: determine necessary action
25. Remove, bench bleed, and reinstall master cylinder
26. Remove, clean (using proper safety procedures), inspect, and measure brake drums: determine necessary action
27. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble
28. Remove, clean, and inspect pads and retaining hardware: determine necessary action
29. Remove, inspect, and install wheel cylinders
30. Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins
31. Select, handle, store, and fill brake fluids to proper level
32. Adjust calipers with integrated parking brake system

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33. Bleed the anti-lock brake systems (ABS) front and rear hydraulic circuits
34. Check operation of brake stop light system: determine necessary action
35. Check operation of parking brake indicator light system
36. Check parking brake cables and components for wear, rusting, binding, and corrosion; clean, lubricate, and replace as needed
37. Check parking brake operation: determine necessary action
38. Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster
39. Depressurize high-pressure components of the anti-lock brake system (ABS)
40. Diagnose anti-lock brake system (ABS) braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc)
41. Diagnose anti-lock brake system (ABS) electronic control(s) and components using self-diagnosis and/or recommended test equipment: determine necessary action
42. Diagnose poor stopping, wheel lock-up, abnormal pedal feel or pulsation, and noise concerns caused by the anti-lock brake system (ABS): determine necessary action
43. Diagnose wheel bearing noises, wheel shimmy, and vibration concerns: determine necessary action
44. Identify and inspect anti-lock brake system (ABS) components: determine necessary action
45. Identify traction control/vehicle stability control system components
46. Inspect and replace wheel studs
47. Inspect and test hydraulically assisted power brake system for leaks and proper operation: determine necessary action
48. Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation: determine necessary action
49. Install wheel, torque lug nuts, and make final checks and adjustments
50. Measure and adjust master cylinder pushrod length
51. Refinish rotor off vehicle
52. Refinish rotor on vehicle
53. Remove and install anti-lock brake system (ABS) electrical/electronic and hydraulic components
54. Remove and reinstall rotor
55. Remove and reinstall sealed wheel bearing assembly
56. Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust wheel bearings
57. Replace wheel bearing and race
58. Test pedal free travel with and without engine running; check power assist operation
59. Test, diagnose, and service ABS speed sensors, toothed ring (tone wheel), and circuits using a graphing voltmeter (GMM), digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data)

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted