# Brakes I Course No. 40204 Credit: 0.5

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| **Student name:** |  | **Graduation Date:** |  |

Pathways and CIP Codes:Mobile Equipment Maintenance (47.9999) - Technology Strand II

Course Description: A comprehensive, **technical level** course designed to provide students with the basic theories, equipment, and skills needed to inspect and service braking systems.

Directions:The following competencies are required for full approval of this course. Check the appropriate number to indicate the level of competency reached for learner evaluation.

**RATING SCALE:**

4. Exemplary Achievement: Student possesses outstanding knowledge, skills or professional attitude.

3. Proficient Achievement:Student demonstrates good knowledge, skills or professional attitude. Requires limited supervision.

2. Limited Achievement:Student demonstrates fragmented knowledge, skills or professional attitude. Requires close supervision.

1. Inadequate Achievement:Student lacks knowledge, skills or professional attitude.

0. No Instruction/Training:Student has not received instruction or training in this area.

## Benchmark 1: General Brake Systems Diagnosis

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. |  |

## Benchmark 2: Hydraulic System Diagnosis and Repair

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 2.1 | Diagnose pressure concerns in the brake system using hydraulic principles, Pascal’s Law. |  |
| 2.2 | Diagnose poor stopping, pulling, or dragging concerns, caused by malfunctions in the hydraulic system; determine necessary action. |  |
| 2.3 | Inspect brake system for leaks, rust, cracks, and bulging or wear in lines. |  |
| 2.4 | Fill brake fluids to proper level. |  |
| 2.5 | Fabricate and/or install brake lines. |  |
| 2.6 | Describe the purpose of the metering (hold-off) proportioning (balance), pressure differential and combination valves. |  |
| 2.7 | Inspect, test, and/or replace components of brake warning light system. |  |
| 2.8 | Describe the different types of brake fluids and select the correct type for the vehicle to be worked on. |  |
| 2.9 | Identify and describe the master cylinder operation. |  |
| 2.10 | Describe different methods of bleeding brakes and demonstrate at least one method. |  |

## Benchmark 3: Drum Brake Diagnosis and Repair

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 3.1 | Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging, or pedal pulsation concerns; determine necessary action. |  |
| 3.2 | Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self –adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. |  |
| 3.3 | Inspect, measure brake drums, and reassemble. |  |
| 3.4 | Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings. |  |

## Benchmark 4: Disc Brake Diagnosis and Repair

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 4.1 | Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing; determine necessary action. |  |
| 4.2 | Clean and inspect caliper mounting and slides for wear and damage; determine necessary action. |  |
| 4.3 | Remove, clean, and inspect pads and retaining hardware; determine necessary action. |  |
| 4.4 | Clean, inspect and measure rotor with a dial indicator and a micrometer; follow manufacture’s recommendations in determining need to machine or replace. |  |
| 4.5 | Describe or demonstrate caliper piston retraction on an integrated parking brake system. |  |

## Benchmark 5: Power Assist Units Diagnosis and Repair

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 5.1 | Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; determine necessary action. |  |
| 5.2 | Demonstrate an understanding of and the application of a hydraulically assisted power brake system. |  |

## Benchmark 6: Miscellaneous Diagnosis and Repair (Wheel Bearings, Parking Brakes, Electrical, etc.)

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 6.1 | Diagnose wheel bearing noises, wheel shimmy, and vibration concern. |  |
| 6.2 | Replace wheel bearing and grease. |  |
| 6.3 | Remove and reinstall sealed wheel bearing assembly. |  |
| 6.4 | Inspect and replace wheel studs. |  |
| 6.5 | Demonstrate an understanding of and the application of air brake systems. |  |

## Benchmark 7: Antilock Brake and Traction Control System

### Competencies

| **#** | **Description** | **RATING** |
| --- | --- | --- |
| 7.1 | Identify and inspect antilock brake system (ABS components). |  |
| 7.2 | Describe ABS principles of operation and retrieve ABS codes. |  |
| 7.3 | Demonstrate proper removal and reinstallation of the tire and wheel assembly including proper torque of lug nuts. |  |

I certify that the student has received training in the areas indicated.

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

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