# Brakes I Course No. 40204 Credit: 0.5

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

Pathways and CIP Codes:Vehicle Maintenance & Repair (47.0600)

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

### Competencies

| **#** | **DESCRIPTION** | **RATING** |
| --- | --- | --- |
| 1.1 | Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. |  |
| 1.2 | Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. |  |
| 1.3 | Demonstrate proper removal and reinstallation of the tire and wheel assembly including proper torque of lug nuts |  |

## 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 | Fabricate and/or install brake lines. |  |
| 2.5 | Describe the purpose of the metering (hold-off) proportioning (balance), pressure differential and combination valves. |  |
| 2.6 | Identify, inspect, test, and/or replace components of brake warning light system. |  |
| 2.7 | Describe the different types of brake fluids and select the correct type for the vehicle to be worked on and fill vehicle to proper level. |  |
| 2.8 | Identify and describe the master cylinder operation. |  |
| 2.9 | Describe different methods of bleeding brakes and demonstrate at least one method. |  |
| 2.10 | Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action. |  |

## 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. |  |
| 4.6 | Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer’s recommendations. |  |

## 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 | Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings |  |
| 6.3 | Replace wheel bearing and race. |  |
| 6.4 | Remove and reinstall sealed wheel bearing assembly. |  |
| 6.5 | Inspect and replace wheel studs. |  |
| 6.6 | Check parking brake operation and parking brake indicator light system operation; determine necessary action. |  |
| 6.7 | Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed. |  |

## 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 | Describe the operation of a regenerative braking system. |  |

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

Instructor Signature:

For more information, contact:

CTE Pathways Help Desk

(785) 296-4908

[pathwayshelpdesk@ksde.org](mailto:pathwayshelpdesk@ksde.org)



900 S.W. Jackson Street, Suite 102

Topeka, Kansas 66612-1212

[https://www.ksde.org](https://www.ksde.org/)

The Kansas State Department of Education does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities and provides equal access to any group officially affiliated with the Boy Scouts of America and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: KSDE General Counsel, Office of General Counsel, KSDE, Landon State Office Building, 900 S.W. Jackson, Suite 102, Topeka, KS 66612, (785) 296-3201.