

AUTOMOTIVE BRAKES **FUNDAMENTALS (II)**

Course Syllabus

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Course Number: BR102 Instructor: Ron Rader

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Course Length: 60 hours Email: rrader@nwtech.edu

Career Cluster: Transportation Campus: Alva, OK

Career Pathway: Automotive Service **Program:** Automotive Service Technology

Career Major: Automotive Service Technician, Automotive Chassis Technician, Automotive Maintenance Light

Repair Technician

Pre-requisite: Automotive Introduction, Automotive Brakes Introduction

Course Description: In this course the student will learn to diagnose and repair drum and disc brake systems.

> Also covered will be diagnosing and repairing the entire hydraulic brake system, which will include, the master cylinder, lines and proportioning valves and stop light operation. Students will learn to diagnose and repair power assist units. Finally this course will cover diagnosis and service of wheel bearings, to include how to replace bearings and

races, as well as clean, repack and adjust wheel bearing.

Instructional Philosophy:

To provide a training program that is of merit both educationally and ethically while effectively providing the individual learner the opportunities, knowledge and skills

necessary to succeed in the workplace as well as life.

Course Goals: Upon successful completion of this course, the student will be able to:

Competencies:

Hydraulic System Diagnosis and Repair

Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's

Measure and adjust pedal height.

Check master cylinder for internal and external leaks and proper operation; determine

necessary action.

Remove, bench bleed, and reinstall master cylinder.

Diagnose poor stopping, pulling or dragging concerns caused by problems in the

hydraulic system; determine necessary action.

Fabricate and install brake lines (double flare and ISO types); replace hoses, fittings, and

supports as needed.

Inspect, test, and replace metering (hold-off), proportioning (balance), pressure

differential, and combination valves.

Inspect, test, replace, and adjust height (load) sensing proportioning valve.

Inspect, test, and replace components of brake warning light system.

Drum Brake Diagnosis and Repair

Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns;

determine necessary action.

Mount brake drum on lathe; machine braking surface.

Remove, inspect, and install wheel cylinders.

Install wheel, torque lug nuts, and make final checks and adjustments.

Disc Brake Diagnosis and Repair

Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns;

Course Syllabus Page 1 determine necessary action.

Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.

Remove and install rotor

Refinish rotor on vehicle.

Refinish rotor off vehicle

Adjust calipers with integrated parking brake system.

Install wheel, torque lug nuts, and make final checks and adjustments.

Power Assist Units Diagnosis and Repair

Test pedal free travel with and without engine running; check power assist operation. Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster. Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; determine necessary action.

Inspect and test hydraulically assisted power brake system for leaks and proper operation; determine necessary action.

Measure and adjust master cylinder pushrod length.

Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.) Diagnosis and Repair

Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.

Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust wheel bearings.

Check operation of brake stop light system; adjust and service as needed.

Replace wheel bearing and race.

Major Course Projects:

Students will perform tasks relating to the Automotive Service Industry as per standards identified by the National Automotive Technicians Education Foundation (NATEF). Students will complete repair orders each day and will document completion of competencies on competency profiles tracking individual progress and accomplishment. Projects will include performing tasks on mock ups, shop vehicles, and live work as student skills progress. These projects will reinforce classroom theory instruction and will require the student to consult industry service information during the course of task performance.

Project Outline:

Instructional Delivery Plan:

The instruction for this course will be comprised of multiple methods designed to promote and accommodate different learning styles including classroom lecture, classroom demonstrations, shop demonstrations, hands on learning activities, classroom discussion, interactive media, textbook, computer based learning activities, research projects, guest speakers, student presentations, and interactive learning with CPS (Classroom Performance System). Students will be required to practice the skills associated with the instructional content and will be required to work independently and also in teams. Assignments will require students to use academic skills in math, science, and language arts.

Assessment Plan:

Students will be assessed according to three basic kinds of learning. Knowledge: Does the student possess the required knowledge to perform a specific competency? Skills: Does the student possess the necessary coordination to perform the task/competency? Attitude: Will the student perform the task/competency on the job after learning to do

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it? Students will also be assessed according to the basic work skills of attendance and promptness. Soft skills will be assessed in the Academic Career Center.

Daily work- Performance of technical skills on job, work habits,

safety, clean-up, participation

Written assignment- Repair orders, textbook assignments, etc.

Grading Scale:

A 90-100 Exceeds expectations

B 80-89 Meets industry standards and expectations

C 70-79 Passing grade, but does not meet some standards D 60-69 Passing, but only meets the minimum standards

F Below 60 Failing, does not meet minimum standards

Alliance Credit

Offered:

OSU Okmulgee

Industry Alignments: ASE Certification, ODCTE Certification,

End of Instruction

Industry Assessment:

ASE Certification, ODCTE Certification,

Resources: Automotive Excellence Vol. 1 and Vol. 2

Modern Automotive Technology

Introduction to Automotive Service: Fundamental Concepts

CDX Global Interactive Training

Snap On Shop Key

Alldata

Attachments: See Automotive Service Technology Task List Competency Handbook

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