



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

**BRAKES I
AMS3149 3 Credit Hours**

Student Level:

This course is open to students on the college level in either the freshman or sophomore year and to area high school vocational students.

Catalog Description:

AMS 3149 - BRAKES I (3 hrs)

This course will enable the student to gain basic understanding and hands on experience utilizing industry standard procedures in the diagnosing and repair of braking systems. Topics presented throughout the course cover hydraulic systems, drum and disc brakes, power brakes, miscellaneous and related braking systems such as wheel bearings, parking brakes, electrical, etc., and anti-lock brake systems.

Prerequisites:

None

Controlling Purpose:

This course is designed to help the student increase their knowledge concerning entry-level skills contained in the sequenced competencies, for success, after graduation from the Automotive Technology Program.

Learner Outcomes:

Upon completion of this course, the student will be able to identify the principles and procedures of braking systems.

The learning outcomes and competencies detailed in this course outline or syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups project for this course as approved by the Kansas Board of Regents.

Units Outcomes and Criterion Based Evaluation Key for Core Content:

The following defines the minimum core content not including the final examination period. Instructors may add other content as time allows.

Evaluation Key:

A = All major and minor goals have been achieved and the achievement level is considerably

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DISCLAIMER: THIS INFORMATION IS SUBJECT TO CHANGE. FOR THE OFFICIAL COURSE PROCEDURE CONTACT ACADEMIC AFFAIRS.

- above the minimum required for doing more advanced work in the same field.
- B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.
- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.
- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.
- F = Failing, will be computed in GPA and hours attempted.
- N = No instruction or training in this area.

UNIT 1: General Brake Systems Diagnosis

Outcomes: The student will gain a global understanding of the brake system and brake-related diagnosis.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Identify and interpret brake system concern; determine necessary action.
						Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins.
						Locate and interpret vehicle and major component identification numbers (VIN, vehicle cert. labels, calibration decals).

UNIT 2: Hydraulic System Diagnosis and Repair

Outcomes: The student will demonstrate and understanding and ability to repair hydraulic brake systems.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Diagnose pressure concerns in the brake system using hydraulic principles (Paschal's Law).
						Measure brake pedal height; determine necessary action.
						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 malfunctions in the hydraulic system; determine necessary action
						Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.
						Fabricate and/or install brake lines (double flare and ISO types); replace hoses, fittings, and supports as needed.
						Select, handle, store and fill brake fluids to proper level.
						Inspect, test, and/or replace metering (hold-off), proportioning (balance), pressure differential, and combination valves.
						Inspect, test, and/or replace components of brake warning light system.
						Bleed (manual, pressure, vacuum or surge) brake system
						Flush hydraulic system.

UNIT 3: Drum Brake Diagnosis and Repair

Outcomes: The student will demonstrate an understanding of the brake drum along with diagnosis and repair.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.
						Remove, clean (using proper safety procedures), inspect, and measure brake drums; determine necessary action.
						Refinish brake drum.
						Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
						Remove, inspect, and install wheel cylinders.
						Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings.
						Install wheel, torque lug nuts, and make final checks and adjustments.

UNIT 4: Disc Brake Diagnosis and Repair

Outcomes: The student will demonstrate an understanding of the disc brake along with diagnosis and repair.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Diagnose poor stopping, noise, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.
						Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing; determine necessary action.
						Clean and inspect caliper mounting and slides for wear and damage; determine necessary action.
						Remove, clean, and inspect pads and retaining hardware; determine necessary action.
						Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts.
						Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.
						Clean, inspect and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace.
						Remove and reinstall rotor.
						Refinish rotor according to manufacturer's recommendations.
						Adjust calipers equipped with an integrated parking brake system.
						Install wheel, torque lug nuts, and make final checks and adjustments.

UNIT 5: Power Assist Units Diagnosis and Repair

Outcomes: The student will gain an understanding of the braking power assist unit along with diagnosis and repair.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						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 valve check for proper operation; determine necessary action.
						Inspect and test the hydro-boost system and accumulator for leaks and proper operation; determine necessary action.

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

Outcomes: The student will gain an understanding of the various ancillary systems and parts associated with the braking system, to include diagnosis, repair, and maintenance.

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						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 parking brake cables and components for wear, rusting, binding, and corrosion; clean, lubricate, or replace as needed.
						Check parking brake operation; determine necessary action.
						Check operation of parking brake indicator light system.
						Check operation of brake stop light system; determine necessary action.
						Replace wheel bearing and race.
						Inspect and replace wheel studs.
						Remove and reinstall sealed wheel bearing assembly.

Projects Required:

As assigned.

Textbook:

Contact Bookstore for current textbook.

Materials/Equipment Required:

Students are required to furnish their own Personal Protection Equipment ie Safety Glasses.

Attendance Policy:

Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:

The grading policy will be outlined by the instructor in the course syllabus.

Maximum class size:

Based on classroom occupancy

Course Timeframe:

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability, which may impact work in this class which requires accommodations, contact the Disability Services Coordinator.