

STRANDS AND STANDARDS

ASE BRAKES



Course Description

This course is a follow up course to the ASE Engine and Chassis MLR courses and is in a sequence that prepares individuals to apply technical knowledge and skills to the specialized maintenance and repair of automotive vehicles. Instruction covers training in the following areas: safety and automobile braking systems. Work ethics and productivity are an integral part of the classroom and lab activities of these courses. This course is based on the ASE 2022 Task Lists which can be found at <https://www.aseeducationfoundation.org/resources>.

Intended Grade Level	10-12
Units of Credit	0.5
Core Code	40-09-00-00-022
Concurrent Enrollment Core Code	40-09-00-13-022
Prerequisite	ASE ENGINE-MLR, ASE CHASSIS-MLR
Skill Certification Test Number	Industry
Test Weight	
License Area of Concentration	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Automotive
Endorsement 2	NA
Endorsement 3	NA

STRAND 1

Students will participate in personal and leadership development activities through SkillsUSA or another appropriate career and technical student organization.

Standard 1

Student will use communication skills to effectively communicate with others.

- Understand when it is appropriate to listen and to speak.
- Understand and follow verbal and written instructions for classroom and laboratory activities.

Standard 2

Student will effectively use teamwork to respectfully work with others.

- Identify and understand different roles in working with a team.

Standard 3

Student will use critical thinking and problem-solving skills.

- Analyze the cause of the problem.
- Develop a solution to address the problem.
- Implement the plan.
- Evaluate the effectiveness of the plan.

Standard 4

Student will be dependable, reliable, steady, trustworthy, and consistent in performance and behavior.

- Set and meet goals on attendance and punctuality.
- Prioritize, plan, and manage work to complete assignments and projects on time.

Standard 5

Student will be accountable for results.

- Use an achievement chart for activities and behaviors in class that encourages a personal evaluation of classroom performance.
- File a regular written report on progress toward completion of assignments and projects.

Standard 6

Be familiar with the legal requirements and expectations of the course.

- Be familiar with the course disclosure statement and all requirements for successful completion of the course.
- Demonstrate workplace ethics, e.g. fair, honest, disciplined.

STRAND 2

Students will participate in work-place readiness activities.

Standard 1

Student will demonstrate employability skills.

- Use a career search network to find career choices.
- Write a resume including a list of demonstrated skills.
- Write a letter of application.
- Complete a job application.
- Participate in an actual or simulated job interview.

Standard 2

Student will participate in a work-based learning experience outside the classroom.

- Student will plan and implement a work-based learning experience aligned with their career goal.

STRAND 3

Students will understand and demonstrate general shop safety.

Standard 1

Learn safe working habits and procedures. Pass a safety test with 100 percent.

- Personal safety.
- Tool and equipment safety.
- Workplace safety.
- Personal protective equipment (PPE).

Standard 2

Comply with safety rules for working with automotive chemicals.

- Chemical manufacturers provide a Safety Data Sheets (SDS) for each chemical they produce.
- Identify the location of and navigate through the SDS for critical information.
- Store and dispose of chemicals in properly labeled containers.

Standard 3

Identify the gasses encountered in the automotive field and the hazards they present.

- Water, oxygen, nitrogen, carbon dioxide (CO₂), hydrocarbons (HC), oxides of nitrogen (NO_x), and carbon monoxide (CO).
- HC, NO_x, and CO can pose health and environmental problems if they are not controlled.

Standard 4

Identify the hazards and control of asbestos dust.

- Asbestos is a carcinogen – a substance that causes cancer.
- Never use compressed air to clean brake assemblies.
- Understand approved methods such as a brake vacuum or brake washer machine.
- Because some exposure might be unavoidable, wear an approved filter mask.

Performance Skills

Understand general shop safety.

- Pass a safety test with 100 percent.
- Comply with safety rules for working with automotive chemicals.
- Identify the gasses encountered in the automotive field and the hazards they present.
- Identify the hazards and control of asbestos dust.

STRAND 4

Students will inspect the Base Brake System.

Standard 1

Research vehicle service information such as fluid type, vehicle service history, service precautions, technical service bulletins, and recalls including vehicles equipped with advanced driver assistance systems (ADAS).

Standard 2

Identify brake system components and configurations.

Standard 3

Retrieve and record DTCs, OBD monitor status, and freeze frame data; clear codes and data when directed.

Standard 4

Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS).

Standard 5

Install wheel and torque lug nuts.

Standard 6

Identify and interpret brake system concerns; determine needed action.

Performance Skills

- Research applicable vehicle and service information.
- Identify brake system components and configurations.
- Retrieve and record DTCs, OBD monitor status, and freeze frame data.
- Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS). Verify engine mechanical timing.
- Install wheel and torque lug nuts.

STRAND 5

Students will inspect the Brake Hydraulic System(s).

Standard 1

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

Standard 2

Measure brake pedal height, travel, and free play (as applicable); determine needed action.

Standard 3

Check master cylinder for internal/external leaks and proper operation; determine needed action.

Standard 4

Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, and loose fittings/supports; determine needed action.

Standard 5

Select, handle, store, and fill brake fluids to proper level; use proper fluid type per manufacturer specification.

Standard 6

Identify components of hydraulic brake warning light system.

Standard 7

Bleed and/or replace fluid in the brake system.

Standard 8

Test brake fluid for contamination.

Standard 9

Remove, bench bleed, and reinstall master cylinder.

Standard 10

Diagnose poor stopping, pulling, or dragging concerns caused by malfunctions in the hydraulic system; determine needed action.

Standard 11

Replace brake lines, hoses, fittings, and supports.

Standard 12

Fabricate brake lines using proper material and flaring procedures.

Standard 13

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

Performance Skills

- Diagnose pressure concerns in the brake system using hydraulic principles.
- Measure brake pedal height, travel, and free play.
- Check master cylinder for internal/external leaks and proper operation.
- Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, and loose fittings/supports; Inspect and replace camshaft and drive belt/chain.
- Select, handle, store, and fill brake fluids to proper level.
- Identify components of hydraulic brake warning light system.
- Bleed and/or replace fluid in the brake system.
- Test brake fluid for contamination.
- Remove, bench bleed, and reinstall master cylinder.
- Diagnose poor stopping, pulling, or dragging concerns caused by malfunctions in the hydraulic system.
- Replace brake lines, hoses, fittings, and supports.
- Fabricate brake lines using proper material and flaring procedures.
- Inspect, test, and/or replace components of brake warning light system.

STRAND 6

Students will inspect the Drum Brake System.

Standard 1

Remove, clean, and inspect brake drum; measure brake drum diameter; determine serviceability.

Standard 2

Refinish brake drum and measure final drum diameter; compare with specification.

Standard 3

Remove, clean, inspect, and/or replace brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.

Standard 4

Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.

Standard 5

Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments.

Standard 6

Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging, or pedal pulsation concerns; determine needed action.

Performance Skills

- Remove, clean, and inspect brake drum; measure brake drum diameter.
- Refinish brake drum and measure final drum.
- Remove, clean, inspect, and/or replace brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates.
- Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; perform final checks and adjustments.
- Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging, or pedal pulsation concerns.

STRAND 7

Students will inspect Disc Brake Systems.

Standard 1

Remove and clean caliper assembly; inspect for leaks, damage, and wear; determine needed action.

Standard 2

Inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine needed action.

Standard 3

Remove, inspect, and/or replace brake pads and retaining hardware; determine needed action.

Standard 4

Lubricate and reinstall caliper, brake pads, and related hardware; seat brake pads against rotor; inspect for leaks.

Standard 5

Clean and inspect rotor and mounting surface; measure rotor thickness, thickness variation, and lateral runout; determine needed action.

Standard 6

Remove and reinstall/replace rotor.

Standard 7

Refinish rotor on vehicle; measure final rotor thickness and compare with specification.

Standard 8

Refinish rotor off vehicle; measure final rotor thickness and compare with specification.

Standard 9

Retract and re-adjust caliper piston on an integrated parking brake system.

Standard 10

Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendation.

Standard 11

Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging, or pulsation concerns; determine needed action.

Performance Skills

- Remove and clean caliper assembly; inspect for leaks, damage, and wear.
- Inspect caliper mounting and slides/pins for proper operation, wear, and damage.
- Remove, inspect, and/or replace brake pads and retaining hardware.
- Lubricate and reinstall caliper, brake pads, and related hardware; seat brake pads against rotor; inspect for leaks.
- Clean and inspect rotor and mounting surface; measure rotor thickness, thickness variation, and lateral runout.
- Remove and reinstall/replace rotor.
- Refinish rotor on vehicle; measure final rotor.
- Refinish rotor off vehicle; measure final rotor thickness.
- Retract and re-adjust caliper piston on an integrated parking brake system.
- Describe importance of operating vehicle to burnish/break-in replacement brake pads.
- Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging, or pulsation concerns.

STRAND 8

Students will inspect Brake Power-Assist System(s).

Standard 1

Check brake pedal travel with and without engine running to verify proper power booster operation.

Standard 2

Identify components of the brake power assist system (vacuum/ hydraulic/electric).

Standard 3

Inspect vacuum-type power booster unit for leaks; inspect the check-valve for proper operation; check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster; determine needed action.

Standard 4

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

Performance Skills

- Check brake pedal travel with and without engine running.
- Identify components of the brake power assist system (vacuum/ hydraulic/electric).
- Inspect vacuum-type power booster unit for leaks; inspect the check-valve for proper operation.
- Inspect and test hydraulically assisted power brake system for leaks and proper operation.

STRAND 9

Students will inspect Brake Related System(s).

Standard 1

Remove, clean, inspect, repack/replace, and install wheel bearings; remove and install bearing races; replace seals; install hub and adjust bearings.

Standard 2

Check parking brake system components for wear, binding, and corrosion; clean, lubricate, adjust and/or replace as needed.

Standard 3

Check parking brake operation (including electric parking brakes); check parking brake indicator light system operation; determine needed action.

Standard 4

Check operation of brake stop light system.

Standard 5

Inspect and replace wheel studs.

Standard 6

Remove, reinstall, and/or replace sealed wheel bearing assembly.

Standard 7

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

Performance Skills

- Remove, clean, inspect, repack/replace, and install wheel bearings; remove and install bearing races; replace seals; install hub and adjust bearings.
- Check parking brake system components for wear, binding, and corrosion.
- Check parking brake operation (including electric parking brakes); check parking brake indicator light system operation.
- Check operation of brake stop light system.
- Inspect and replace wheel studs.
- Remove, reinstall, and/or replace sealed wheel bearing assembly.
- Diagnose wheel bearing noises, wheel shimmy, and vibration concerns.

STRAND 10

Students will inspect Electronic Brake Control System(s).

Standard 1

Identify and inspect electronic brake control system components and describe function (ABS, TCS, ESC); determine needed action.

Standard 2

Describe the operation of a regenerative braking system.

Standard 3

Bleed the electronic brake control system hydraulic circuits.

Performance Skills

- Identify and inspect electronic brake control system components and describe function (ABS, TCS, ESC).
- Describe the operation of a regenerative braking system.
- Bleed the electronic brake control system hydraulic circuits.