

STRANDS AND STANDARDS

ASE CHASSIS MLR



Course Description

This is an advanced-level course in Automotive Service that deals with the overall chassis of a vehicle. Through demonstrations, lectures, research and practical experiences dealing with chassis, this course is designed to assist students in broadening their experience, through the use of equipment, tools, materials, processes and techniques in inspecting, diagnosing, and servicing of automobiles. The most current information can be found at the MLR Task List at the following address: <https://www.asealliance.org/natef-accreditation/program-standards>.

Intended Grade Level	11-12
Units of Credit	Minimum 0.5
Core Code	40.09.00.00.021
Concurrent Enrollment Core Code	40.09.00.13.021
Prerequisite	Introduction to Automotive
Skill Certification Test Number	N/A
Test Weight	N/A
License Type	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Automotive Service
Endorsement 2	N/A
Endorsement 3	N/A



STRAND 1

Students will be able to understand 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 Material Safety Data Sheets (MSDS) for each chemical they produce.
- Store 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.
- Use a vacuum source or flush with water.

Performance Skill

Understand general shop safety.

- Learn safe working habits and procedures. 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 2

Students will be able to understand, inspect, diagnose, and service the basics of automatic transmissions and transaxles.

Standard 1

In-vehicle transmission and transaxle.

- Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch.
- Inspect for leakage at external seals, gaskets, and bushings.
- Inspect, replace, and align, power train mounts.
- Drain and replace fluid and filter(s).

Standard 2

Off-vehicle transmission and transaxle.

- Describe the operational characteristics of a continuously variable transmission (CVT).
- Describe the operational characteristics of a hybrid vehicle drive train.

Performance Skill

Understand, inspect, diagnose, and service the basics of automatic transmissions and transaxles.

- In-vehicle transmission and transaxle.
- Off-vehicle transmission and transaxle.

STRAND 3

Students will be able to understand, inspect, diagnose, and service the basics of a manual drive train and axels.

Standard 1

Drain and refill manual transmission/transaxle and final drive unit.

Standard 2

Check for system leaks around the clutch.

Standard 3

Describe the operational characteristics of an electronically-controlled manual transmission/transaxle.

Standard 4

Drive shaft, half shafts, universal and constant-velocity (CV) joints.

- Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals.
- Inspect, service, and replace shafts, yokes, boots, and universal/CV joints.

Standard 5

Differential case assembly.

- Drain and refill differential housing.
- Inspect and replace drive axle wheel studs.

Standard 6

Inspect four-wheel drive/all-wheel drive front-wheel bearings and locking hubs.

Performance Skill

Understand, inspect, diagnose, and service the basics of a manual drive train and axels.

- Drain and refill manual transmission/transaxle and final drive unit.
- Check for system leaks around the clutch.
- Describe the operational characteristics of an electronically-controlled manual transmission/transaxle.
- Drive shaft, half shafts, universal and constant-velocity (CV) joints
- Inspect four-wheel drive/all-wheel drive front-wheel bearings and locking hubs.

STRAND 4

Students will be able to understand, inspect, diagnose, and service basic suspension and steering systems.

Standard 1

Disable and enable supplemental restraint system (SRS).

Standard 2

Related suspension and steering service.

- Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.
- Flush, fill, and bleed power steering system.
- Inspect for power steering fluid leakage; determine necessary action.
- Remove, inspect, replace, and adjust power steering pump drive belt.
- Inspect and replace power steering hoses and fittings.
- Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.
- Inspect tie rod ends (sockets), tie rod sleeves, and clamps.
- Inspect and replace rebound and jounce bumpers.
- Inspect track bar, strut rods/radius arms, and related mounts and bushings.
- Inspect upper and lower ball joints (with or without wear indicators).
- Inspect suspension system coil springs and spring insulators (silencers).
- Inspect suspension system torsion bars and mounts.
- Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links.
- Inspect strut cartridge or assembly.
- Inspect front strut bearing and mount.
- Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts.
- Inspect, remove, and replace shock absorbers; inspect mounts and bushings.

- Inspect electric power-assisted steering.
- Inspect hybrid vehicle power steering system electrical circuits and safety precautions.
- Describe the function of the power steering pressure switch.

Standard 3

For wheel alignment, perform pre-alignment inspection and measure vehicle ride height; determine necessary action.

Standard 4

Wheels and tires.

- Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.
- Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps.
- Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.

Performance Skill

Understand, inspect, diagnose, and service basic suspension and steering systems.

- Disable and enable supplemental restraint system (SRS).
- Related suspension and steering service
- For wheel alignment, perform pre-alignment inspection and measure vehicle ride height; determine necessary action.
- Wheels and tires.

STRAND 5

Students will be able to understand, inspect, diagnose, and service basic brake systems.

Standard 1

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

Standard 2

Hydraulic system.

- Identify components of brake warning light system.
- Bleed and/or flush brake system.
- Test brake fluid for contamination.

Standard 3

Drum brakes.

- Remove, clean, inspect, and measure brake drum diameter; determine necessary action.
- Refinish brake drum and measure final drum diameter; compare with specifications.

- Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
- Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.
- Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments.

Standard 4

Disc brakes.

- Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.
- Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.
- Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks.
- Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral runout; determine necessary action.
- Remove and reinstall rotor.
- Refinish rotor on vehicle; measure final rotor thickness and compare with specifications.
- Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.
- Retract and re-adjust caliper piston on an integral parking brake system.
- Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations.

Standard 5

Power-assist units.

- Check brake pedal travel with, and without, engine running to verify proper power booster operation.
- Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster.

Standard 6

Miscellaneous (wheel bearings, parking brakes, electrical, etc.).

- Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings.
- Replace wheel bearing and race.
- Inspect and replace wheel studs.

Standard 7

Electronic brakes traction and stability control systems.

- Identify traction control/vehicle stability control system components.
- Describe the operation of a regenerative braking system.

Performance Skill

Understand, inspect, diagnose, and service basic brake systems.

- Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS).
- Hydraulic system.
- Drum brakes.
- Disc brakes.
- Power-assist units.
- Miscellaneous (wheel bearings, parking brakes, electrical, etc.).
- Electronic brakes traction and stability control systems.

STRAND 6

Students will understand the importance of career readiness skills as it relates to the workplace and outlined in the SkillsUSA Framework – Level 2.

Standard 1

Understand and demonstrate reliability.

- Determine individual time management skills.
- Explore what's ethical in the workplace or school.
- Demonstrate awareness of government.
- Demonstrate awareness of professional organizations and trade unions.

Standard 2

Understand and demonstrate responsiveness.

- Define the customer.
- Recognize benefits of doing a community service project.
- Demonstrate social etiquette.
- Identify customer expectations.

Standard 3

Understand resiliency.

- Discover self-motivation techniques and establish short-term goals.
- Select characters of a positive image.
- Identify a mentor.

Standard 4

Understand and demonstrate workplace habits.

- Participate in a shadowing activity.
- Explore workplace ethics: codes of conduct.
- Recognize safety issues.
- Perform a skill demonstration.
- Exercise your right to know.

Standard 5

Understand and develop initiative.

- Develop personal financial skills.
- Develop a business plan.
- Investigate entrepreneurship opportunities.

Standard 6

Understand and demonstrate continuous improvement.

- Conduct a worker interview.
- Demonstrate evaluation skills.
- Examine ethics and values in the workplace.
- Develop a working relationship with a mentor.
- Construct a job search network.

STRAND 7

Students will understand the importance of career readiness skills as it relates to the workplace and outlined in the SkillsUSA Framework – Level 3.

Standard 1

Understand and develop collaboration skills.

- Develop a working relationship with a mentor.
- Apply supervisory skills.
- Manage a project and evaluate others.

Standard 2

Understand and demonstrate change management skills.

- Evaluate your career and training goals.
- Identify and apply conflict resolution skills.
- Illustrate an organizational structure.
- Plan and implement a leadership project.

Standard 3

Understand how customer service applies to the workplace.

- Serve as a volunteer in the community.
- Examine workplace ethics: the role of values in making decisions.
- Understand the cost of customer service.
- Develop customer service skills.
- Maximize customer service skills.

Standard 4

Understand and demonstrate career readiness.

- Market your career choice.
- Research resume writing.
- Demonstrate interviewing skills.

- Predict employment trends.
- Re-evaluate career goals and establish long-term goals.
- Construct a job search network.
- Evaluate professional competencies.
- Analyze your entry-level job skills.
- Design and present a lesson plan on an aspect of your career choice.
- Write an article for a professional journal in your career area.
- Refine your employment portfolio.