



# MLR Automatic Transmission/Transaxle and Suspension/Steering

Career Cluster	Transportation and Logistics
Course Code	20123
Prerequisite(s)	Introduction to Vehicle Systems and Maintenance or Maintenance and Light Repair - Recommended
Credit	1
Program of Study and Sequence	Foundational courses – Introduction to Vehicle Systems and Maintenance or Maintenance and Light Repair – <b>Automotive Transmission/Transaxle and Suspension/Steering</b> – Capstone Experience
Student Organization	SkillsUSA
Coordinating Work-Based Learning	NA
Industry Certifications	ASE
Dual Credit or Dual Enrollment	NA
Teacher Certification	Transportation, Distribution & Logistics Cluster Endorsement; Autobody Technology Pathway Endorsement *Autobody Technology
Resources	

## Course Description:

Students will learn how to inspect, analyze, and service the vehicles automatic transmission/transaxle and suspension/steering systems. They will learn how to evaluate problems and determine the correct solution for the task at hand. Students will comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

## Program of Study Application

MLR (Maintenance Light Repair) Automatic Transmission/Transaxle and Suspension/Steering is an advanced pathway course in the transportation, distribution and logistics career cluster, automotive technology career pathway.

**Course Standards**

**ATSS 1 Students will demonstrate automotive technology safety practices, as identified in Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) requirements for an automotive repair facility.**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Level 1: Recall and Reproduction	<p>ATSS 1.1 Demonstrate automotive technology safety practices</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Identify general shop safety rules and procedures.</li> <li>• Identify and use proper procedures for safe jack and lift operations.</li> <li>• Utilize proper ventilation procedures for working within the lab/shop area.</li> <li>• Identify the location and the types of fire extinguishers and other fire safety equipment.</li> <li>• Identify the location and use of eye wash stations.</li> <li>• Identify the location of posted evacuation routes.</li> <li>• Locate and demonstrate knowledge of Safety Data Sheets (SDS).</li> <li>• Properly dispose chemicals in accordance to state law.</li> </ul>	<ul style="list-style-type: none"> <li>• NATEF tasks that pertain to safety.</li> <li>• OSHA 10</li> <li>• “Right to Know” Federal Law</li> <li>• EPA</li> </ul>

**Notes**

**ATSS 2 Students will demonstrate proper tool selection and usage.**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Level 1: Recall and Reproduction	<p>ATSS 2.1 Demonstrate proper tool selection and usage</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Identify tools and their usage in automotive applications.</li> <li>• Identify standard and metric designation.</li> <li>• Demonstrate safe handling and use of appropriate tools.</li> <li>• Demonstrate proper cleaning, storage, and maintenance of tools and equipment.</li> <li>• Demonstrate proper use of precision measuring tools (e.g. micrometer, dial-indicator, dial-caliper).</li> </ul>	

**Notes**

**ATSS 3 Students will perform diagnostics and repair on the vehicle’s automatic transmission and transaxle.**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Level 2: Skill/ Concept	<p>ATSS 3.1 Inspect and identify drivetrain components</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1</li> <li>• Check fluid level in a transmission or transaxle equipped with a dipstick. P-1</li> <li>• Check fluid level in a transmission or transaxle not equipped with a dipstick. P-1</li> <li>• Check transmission fluid condition; check for leaks. P-2</li> <li>• Identify drive train components and configuration. P-1</li> </ul>	<ul style="list-style-type: none"> <li>• NATEF tasks that apply to sub-indicator.</li> </ul>
Level 2: Skill/ Concept	<p>ATSS 3.2 Perform maintenance on vehicle automatic transmission and transaxle while on the vehicle</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Inspect, adjust, and/or replace external manual valve shift linkage, transmission range sensor/switch, and/or park/neutral position switch. P-2</li> <li>• Inspect for leakage at external seals, gaskets, and bushings. P-1</li> <li>• Inspect, replace and/or align power train mounts. P-2</li> <li>• Drain and replace fluid and filter(s); use proper fluid type per manufacturer specification. P-1</li> </ul>	<ul style="list-style-type: none"> <li>• NATEF tasks that apply to sub-indicator.</li> </ul>
Level 4: Extended Thinking	<p>ATSS 3.3 Analyze the vehicle’s automatic transmission and transaxle while off the vehicle</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Describe the operational characteristics of a continuously variable transmission (CVT). P-3</li> <li>• Describe the operational characteristics of a hybrid vehicle drive train. P-3</li> </ul>	<ul style="list-style-type: none"> <li>• NATEF tasks that apply to sub-indicator.</li> </ul>

**Notes:** P-1, P-2, P-3 refers to levels of difficulty under NATEF tasks (p-1 lowest)

**ATSS 4 Students will perform maintenance on vehicle suspension and steering systems.**

<i>Webb Level</i>	<i>Sub-indicator</i>	<i>Integrated Content</i>
Level 4: Extended Thinking	<p>ATSS 4.1 Analyze and evaluate the suspension and steering system components</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Research vehicle service information including fluid type, vehicle service history, service precautions, and technical service bulletins. P-1</li> <li>• Disable and enable supplemental restraint system (SRS); verify indicator lamp operation. P-1</li> <li>• Identify suspension and steering system components and configurations. P-1</li> </ul>	<ul style="list-style-type: none"> <li>• NATEF tasks that apply to sub-indicator.</li> </ul>
Level 3: Strategic Thinking	<p>ATSS 4.2 Inspect and assess the suspension and steering system</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots. P-1</li> <li>• Inspect power steering fluid level and condition. P-1</li> <li>• Flush, fill, and bleed power steering system; use proper fluid type per manufacturer specification. P-2</li> <li>• Inspect for power steering fluid leakage. P-1</li> <li>• Remove, inspect, replace, and/or adjust power steering pump drive belt. P-1</li> <li>• Inspect and replace power steering hoses and fittings. P-2</li> <li>• Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm, mountings, and steering linkage damper. P-1</li> <li>• Inspect tie rod ends (sockets), tie rod sleeves, and clamps. P-1</li> <li>• Inspect upper and lower control arms, bushings, and shafts. P-1</li> <li>• Inspect and replace rebound bumpers. P-1</li> <li>• Inspect track bar, strut rods/radius arms, and related mounts and bushings. P-1</li> <li>• Inspect upper and lower ball joints (with or without wear indicators). P-1</li> <li>• Inspect suspension system coil springs and spring insulators (silencers). P-1</li> <li>• Inspect suspension system torsion bars and mounts. P-1</li> </ul>	<ul style="list-style-type: none"> <li>• NATEF tasks that apply to sub-indicator.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Inspect and/or replace front/rear stabilizer bar (sway bar) bushings, brackets, and links. P-1</li> <li>• Inspect, remove, and/or replace strut cartridge or assembly; inspect mounts and bushings. P-2</li> <li>• Inspect front strut bearing and mount. P-1</li> <li>• Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms. P-1</li> <li>• Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts. P-1</li> <li>• Inspect, remove, and/or replace shock absorbers; inspect mounts and bushings. P-1</li> <li>• Inspect electric power steering assist system. P-2</li> <li>• Identify hybrid vehicle power steering system electrical circuits and safety precautions. P-2</li> <li>• Describe the function of suspension and steering control systems and components, (i.e. active suspension, and stability control). P-3</li> </ul>	
<p>Level 2: Skill/ Concept</p>	<p>ATSS 4.3 Inspect and measure vehicle wheel alignment Examples:</p> <ul style="list-style-type: none"> <li>• Perform pre-alignment inspection; measure vehicle ride height. P-1</li> <li>• Describe alignment angles (camber, caster and toe) P-1</li> </ul>	<ul style="list-style-type: none"> <li>• NATEF tasks that apply to sub-indicator</li> </ul>
<p>Level 2: Skill/ Concept</p>	<p>ATSS 4.4 Inspect, Identify, and repair wheels and tires Examples:</p> <ul style="list-style-type: none"> <li>• Inspect tire condition; identify tire wear patterns; check for correct tire size, application (load and speed ratings), and air pressure as listed on the tire information placard/label. P-1</li> <li>• Rotate tires according to manufacturer's recommendations including vehicles equipped with tire pressure monitoring systems (TPMS). P-1</li> <li>• Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly. P-1</li> <li>• Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. P-1</li> <li>• Inspect tire and wheel assembly for air loss; determine necessary action. P-1</li> </ul>	<ul style="list-style-type: none"> <li>• NATEF tasks that apply to sub-indicator.</li> </ul>

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	<ul style="list-style-type: none"><li>• Repair tire following vehicle manufacturer approved procedure. P-1</li><li>• Identify indirect and direct tire pressure monitoring systems (TPMS); calibrate system; verify operation of instrument panel lamps. P-1</li><li>• Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system (TPMS) including relearn procedure.P-1</li></ul>	
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