STRANDS AND STANDARDS
INTRODUCTION TO AUTOMOTIVE

Course Description

This is an entry-level course in Automotive Service. Through demonstrations, lectures, research and practical experiences is designed to introduce the student to a broad experience in the use of: equipment, tools, materials, processes and techniques of automotive service. This is a one-semester course of instruction.

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INTRODUCTION TO AUTOMOTIVE

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.
- Identify the location of and navigate through the MSDS for critical information.
- 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 (NOₓ), and carbon monoxide (CO).
- HC, NOₓ, 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 an approved brake vacuum or brake washer machine.
- Because some exposure might be unavoidable, wear an approved filter mask.

Performance Skill
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.
INTRODUCTION TO AUTOMOTIVE

STRAND 2
Students will be able to understand basic hand tools, fasteners, and shop equipment.

Standard 1
Identify and measure metric and standard fasteners.
- Machine screws, sheet metal screws, bolts, studs, nuts.
- Lock washers, keys, splines, pins, snap rings, setscrews, rivets.
- Head markings, thread series, right-hand and left-hand threads, major and minor diameters, thread pitch (TPI).

Standard 2
Correctly identify and use basic hand tools.
- Screwdrivers, wrench, sockets, drive handles, extensions, pliers, hammer, chisels, punches, files, hacksaw, taps, dies, pullers, vises, drill bits, grinder.
- Describe the use of each of the above tools.

Standard 3
Identify and demonstrate use of basic measuring tools (accurate to 1/32 or 1mm).
- Micrometers, inside and outside calipers, dividers, dial indicator, dial calipers.
- Electrical testers, pressure gauges, feeler gauges.

Standard 4
Complete a repair order including cause, concern, and correction, use reference manuals or information systems to find service procedures and specifications.
- Computer oriented.
- Printed manuals.

Standard 5
Locate proper lift points, raise and support the vehicle using jack stands and a vehicle hoist.
- Use a jack and jack stands to raise and support a vehicle.
- Use a hoist to raise and support a vehicle and properly use safety locks to secure the vehicle.

Performance Skill
Understand basic hand tools, fasteners, and shop equipment.
- Measure metric and standard fasteners.
- Correctly identify and use basic hand tools.
- Demonstrate use of basic measuring tools (accurate to 1/32 or 1mm).
- Complete a repair order including cause, concern, and correction, use reference manuals or information systems to find service procedures and specifications.
- Locate proper lift points, raise and support the vehicle using jack stands and a vehicle hoist.
STRAND 3

Students will be able to understand proper techniques in removal and installation of tires and wheels.

Standard 1
Inspect tires for abnormal wear.
- Proper inflation.
- Mechanical problems (no specific angles).

Standard 2
Dismount, inspect, and remount a tire on a wheel (including TPMS).
- Use the proper equipment.
- Use the correct techniques and safety precautions.

Standard 3
Properly rotate tires and reinstall using proper torque procedures.
- Use either the conventional or directional tire rotation method.
- Lug nuts should be tightened to the proper torque as indicated in the vehicle specifications and in a sequence of cross or star patterns depending on the number of lug nuts.

Standard 4
Use a tire balancer to balance tires of a vehicle using proper procedures.
- Correctly mount wheel to the balancer.
- Correctly balance a wheel and tire assembly.

Standard 5
Locate a leak and identify proper repair procedures.
- Inspect interior and exterior of the tire.
- Determine if the tire can be repaired.
- Repair the tire damage correctly.
- Verify tire repair.

Standard 6
Interpret tire sidewall markings: size, inflation, and load.
- Tire type.
- Section width in millimeters.
- Aspect ratio.
- Speed rating.
- Construction type.
- Rim diameter.
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Performance Skill
Understand proper techniques in removal and installation of tires and wheels.
- Inspect tires for abnormal wear.
- Dismount, inspect, and remount a tire on a wheel (including TPMS).
- Properly rotate tires and reinstall using proper torque procedures.
- Use a tire balancer to balance tires of a vehicle using proper procedures.
- Locate a leak and identify proper repair procedures.
- Interpret tire sidewall markings: size, inflation, and load.

STRAND 4
Students will be able to identify and perform basic services on a vehicle.

Standard 1
Identify basic automotive parts and functions.
- Identify engine parts.
  - Block, crankshaft, camshaft, piston, cylinder head, connecting rod, valve train, timing components.
  - Fuel systems: injector, filter, lines, pump, tank.
  - Ignition systems: spark plugs, coil(s).
  - Cooling systems: radiator, pump, thermostat.
- Identify drive train parts.
  - Manual transmission.
  - Automatic transmission.
  - Drivelines.
  - Drive axles.
- Identify brake parts.
  - Master cylinder, lines, caliper, rotor, drum, wheel cylinder, pads, shoes.
- Identify steering and suspension parts.
  - Steering gear.
  - Tie-rod.
  - Shocks/struts.
  - Springs: leaf, coil, torsion bar, air.
- Identify electrical parts.
  - Battery
  - Alternator
  - Starter
  - Circuit protection: fuse, breaker

Standard 2
Based on the manufacture’s specifications, perform under hood checks.
- Inspect and adjust available fluid levels.
- Check belt tension and condition.
- Check condition of hoses.
Standard 3
At the correct interval, perform lube, oil, and filter service. Use proper disposal methods for waste oil and filters.
- Change engine oil and filter using recommended oil viscosity and filter.
- Check for and lubricate available fittings.
- Check air filter.

Standard 4
Inspect and service battery.
- Check battery voltage with the engine off.
- Check battery voltage with engine running.
- Properly jumpstart a vehicle.
- Inspect and clean battery and cables.

Standard 5
Check shocks or struts.
- Visual inspection.
- Check for proper operation.

Standard 6
Understand the four stroke cycle.
- Intake
- Compression
- Power
- Exhaust

Standard 7
Check brakes.
- Lining thickness.
- Fluid leaks.
- Park brake function.

Standard 8
Check lights.
- Visually inspect bulbs.
- Replace light bulbs as needed.

Performance Skill
Perform basic services on a vehicle.
- Identify basic automotive parts and functions.
- Based on the manufacture’s specifications, perform under hood checks.
- At the correct interval, perform lube, oil, and filter service. Use proper disposal methods for waste oil and filters.
• Inspect and service battery.
• Check shocks or struts.
• Understand the four stroke cycle.
• Check brakes.

STRAND 5
Students will be able to identify basic emission components. (Optional)

Standard 1
Identify common emission components.
• PCV system or equivalent
• EVAP system
• Catalytic converter

Standard 2
Run an emission test on a vehicle.
• Hydro carbons
• Carbon monoxide
• Oxides of Nitrogen (NOx)

Performance Skill
Identify basic emission components.
• Identify common emission components.
• Run an emission test on a vehicle.

STRAND 6
Students will be able to solve basic mathematical equations related to automotive.

Standard 1
Solve whole number problems with two- and three-digits.
• Addition
• Subtraction
• Multiplication
• Division

Standard 2
Solve fraction problems.
• Addition
• Subtraction
• Multiplication
• Division
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Standard 3
Solve decimal problems with two- and three-digits.
  • Addition
  • Subtraction
  • Multiplication
  • Division

Standard 4
Solve conversion problems.
  • Fraction-to-decimal
  • Decimal-to-fraction
  • Decimal-to-percent
  • Percent-to-decimal

Standard 5
Solve basic ration-to-proportion problems.

Standard 6
Solve basic linear-measurement problems.
  • Measure using the Imperial system
  • Measure using the Metric system

Performance Skill
Solve basic mathematical equations related to automotive.
  • Solve whole number problems with two- and three-digits.
  • Solve fraction problems.
  • Solve decimal problems with two- and three-digits.
  • Solve conversion problems.
  • Solve basic ration-to-proportion problems.
  • Solve basic linear-measurement problems.

STRAND 7

STRAND 8
Students will be able to understand the importance of employability and work habits.

Standard 1
Integrity
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Standard 2
Punctuality

Standard 3
Staying on task

Standard 4
Productive team work

Standard 5
Leadership

STRAND 9
Students will understand the importance of career readiness skills as it relates to the workplace and outlined in the SkillsUSA Framework – Level 1.

Standard 1
Understand and demonstrate the attitude of cooperation.

- Develop awareness of cultural diversity and equality issues.
- Demonstrate effective communication with others.
- Apply team skills to a group project.
- Identify and apply conflict resolution skills.

Standard 2
Understand and demonstrate the ability of being resourceful and innovative.

- Discover self-motivation techniques and establish short-term goals.
- Measure/modify short-term goals.
- Review a professional journal and develop a three- to five-minute presentation.

Standard 3
Plan for your future career.

- Complete a self-assessment and identify individual learning styles.
- Define future occupations.
- Identify the components of an employment portfolio.
- List proficiency in program competencies.
- Complete a survey for employment opportunities.
- Create a job application.
- Assemble your employment portfolio.
- Employability skills: evaluate program comprehension.
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Standard 4
Understand and demonstrate the ability to manage a project.
• Apply team skills to a group project.
• Observe and critique a meeting.
• Demonstrate business meeting skills.
• Explore supervisory and management roles in an organization.
• Identify and apply conflict resolution skills.
• Demonstrate evaluation skills.
• Manage a project and evaluate others.

Skill Certificate Test Points by Strand

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