**Industrial Engineering Technology**

**Automotive Technology I Standards**

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| **Comments-** |  | * Procedures and terminology used should be consistent with industry practice, expectations.
* Maintain HIOSH, OSHA, and other pertinent guidelines for Automotive Tech I.
* When possible use mock ups, practice vehicles, and/or simulations.
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| **Standard** | **Concept** | **Benchmark/Performance Indicator** |
| **AMT 1.0****Apply the proper safety practices prescribed by OSHA/HIOSH when working in the Automotive Lab.** | **Safety** | **AMT 1.1 Select and use the proper Personal Protection Equipment (PPE)*** Identify the proper PPE to use in different situations when working in the Automotive Lab.
* Demonstrate the proper use of PPE

**AMT 1.2 Apply fire safety guidelines in the Automotive lab*** Identify the different classes of fire as described by OSHA
* Demonstrate the proper fire safety procedures, including evacuation
* Interpret Hazard Communication Safety Data Sheets (OSHA) for chemicals, formerly know as MSDS
* Explain the Global Harmonization System (GHS)

**AMT 1.3 Apply pertinent guidelines and proper safety procedures when using tools, equipment, mock- ups, and vehicles in the Automotive Lab*** Explain the proper safety procedures before using tools, equipment, mock-ups, and vehicles.
* Demonstrate the proper use of tools and equipment
* Demonstrate the proper procedures when working with mock-ups and vehicles

**AMT 1.4 Employ proper emergency procedures in the Automotive Lab*** Explain why following OSHA/HIOSH procedures are important for safety in the automotive lab
* Explain the procedure if an accident happens in the shop
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| **AMT 2.0** **Differentiate between different tools and between different equipment and choose the appropriate for any given situation.** | **Tools and Equipment** | **AMT 2.1 Identify and explain the use of tools and equipment in the automotive shop*** Use the correct names of tools and equipment
* Explain the proper use of tools and equipment
* Choose the proper tool to use in any given situation
* Demonstrate the proper use of the tools and equipment, including safety
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| **AMT 3.0****Apply precision measurements to engine and drivetrain components** **in order to interpret what service options to be used.** | **Measurement** | **AMT 3.1 Recognize the difference between units of measurement*** Identify the United States Customary (USC) vs. System of International Units (SI)
* Name the different units of measurement used for length, weight, volume, temperature, and pressure in both USC and SI units
* Explain how to convert measurements from fractions to decimal and convert measurements from USC to SI and SI to USC

**AMT 3.2 Demonstrate the proper measuring techniques on engine and drivetrain components to get accurate data*** Correctly identify measuring tools by giving their proper name
* Apply the proper technique when using a measuring tool to get an accurate reading: i.e. a ruler, outside micrometer, inside micrometer, vernier caliper, dial indicator, feeler gauge, telescoping gauge, tire pressure gauge, compression tester, vacuum gauge
* Interpret the data from measurements taken and choose the proper service needed
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| **AMT 4.0****Identify and explain engines and their parts used in automobiles in order to perform basic engine repair.** | **Engines**  | **AMT 4.1 Recognize and explain the differences of engine configurations and types*** Identify the different engine configurations (inline, v-type, horizontally opposed), sizes (liters, cubic inches, cubic centimeters), and types (gas, rotary, diesel, hybrid, electric)
* Explain the advantages and disadvantages of each engine configuration and type

**AMT 4.2 Explain the 4 stroke cycle in automotive terminology and in basic language*** Name and identify the engine parts needed to produce the 4-stroke cycle (i.e. intake manifold, exhaust manifold, fuel pump, camshaft etc.)
* Explain the complete process of the 4-stroke cycle (piston movement, valve positioning, camshaft and crankshaft positioning, spark and fuel delivery).

**AMT 4.3 Demonstrate Cylinder Head inspection and service*** Identify cylinder head parts by name
* Inspect cylinder head for cracks, and warping (straight edge) and recommend a course of action
* Inspect valve train for damage and wear and recommend a course of action

**AMT 4.4 Demonstrate Short block inspection and service*** Identify short block parts by name
* Measure bearing clearances, crankshaft end play, cylinder taper and out of round
* Analyze measurements and recommend a course of action
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| **AMT 5.0****Perform basic vehicle preparation before servicing** | **Vehicle Maintenance** | **AMT 5.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins**.* Locate vehicle identification number (VIN)
* Describe vehicle make, model, engine size
* Locate vehicle diagnostic port
* Interpret vehicle service intervals and follow

**AMT 5.2 Demonstrate pre vehicle maintenance inspections*** Verify operation of the instrument panel engine warning indicators
* Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action *i.e. refill if necessary*
* Inspect drivetrain for any leaks, wear, or damage and determine necessary action *i.e. refill if necessary*
* Inspect accessory fluids and refill if necessary

**AMT 5.3 Demonstrate Battery System service*** Identify vehicle battery, cables, and connections
* Perform battery voltage check, load test, and cable check and determine any necessary action
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| **AMT 6.0****Perform basic servicing on systems of the automobile** | **Systems** | **AMT 6.1 Demonstrate Steering and Suspension System service*** Identify steering and suspension system parts and explain their function
* Perform an inspection of the steering and suspension system and determine any necessary action

**AMT 6.2 Demonstrate Lubrication System service*** Identify lubrication system parts and explain their function
* Perform oil and filter change

**AMT 6.3 Demonstrate Cooling System service*** Identify cooling system parts and explain their function
* Perform a cooling system pressure check including radiator cap and determine any necessary action

**AMT 6.4 Demonstrate External Lighting System service*** Identify vehicle external lights and sequence of operation
* Perform external light inspection and determine any necessary action

**AMT 6.5 Demonstrate Ignition System service*** Identify ignition system parts and explain their function
* Perform spark plug replacement

**AMT 6.6 Demonstrate Exhaust System service*** Identify exhaust system parts and explain their function
* Perform an exhaust system check for leaks and integrity of the system and determine any necessary action
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| **AMT 7.0****Perform basic servicing on automobile drivetrain systems**  | **Drivetrain** | **AMT 7.1 Demonstrate Wheels and Tires service*** Identify wheel and tire size
* Inspect tires for wear and air pressure then determine proper action
* Rotate tires and torque wheel lug nuts to specifications

**AMT 7.2 Demonstrate Automatic Transmission service*** Identify dip stick, shifter linkage, park/neutral switch and/or TCM connector
* Identify and explain what a torque converter does
* Perform fluid check and fill

**AMT 7.3 Demonstrate Manual Transmission service*** Identify clutch pedal and linkage and shifter linkage
* Identify and explain what the flywheel, pressure plate, clutch disc, and release bearing perform
* Differentiate between a hydraulic, cable, and mechanical linkage for the clutch
* Perform fluid check and fill

**AMT 7.4 Demonstrate Differential service** * Identify if there is a separate differential or combined with the transaxle
* Explain gear ratios of the ring and pinion gears
* Perform fluid check and fill if necessary (if applicable)

**AMT 7.5 Demonstrate Brake System service*** Identify disc brake parts
* Identify drum brake parts
* Inspect master cylinder for leakage, refill if necessary
* Perform a brake inspection for friction material wear and hydraulic leakage, determine any necessary action
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