**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. |
| **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 |
| **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 |
| **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 |
| **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 |
| **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 |
| **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 |
| **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 |