

Automotive Technology I

At-A-Glance - Lamar CISD

Ongoing Skills Imbedded All Year	Professional Standards/Employability Skills/Technical Skills		
		ATI 1(A) The student will demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace such as safety glasses and other personal protective equipment (PPE) and safety data sheets (SDS).	
Grading Period	Unit Name	Estimated Time Frame	TEKS
Grading Period 1 29 Days	Professional Standards/Employability Skills	10 Days	1.A, 1.B, 1.C, 1.D, 1.E, 1.F, 1.G, 1.H, 9.J
	ATI 1(A) The student will demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace such as safety glasses and other personal protective equipment (PPE) and safety data sheets (SDS). ATI 1(B) The student will identify career and employment opportunities, including entrepreneurship opportunities, and internships and industry-recognized certification requirements for the field of automotive technology. ATI 1(C) The student will demonstrate the principles of group participation, team concept, and leadership related to citizenship and career preparation. ATI 1(D) The student will apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the automotive technology industry. ATI 1(E) The student will discuss certification opportunities. ATI 1(F) The student will discuss response plans to emergency situations. ATI 1(G) The student will identify employers' expectations and appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills. ATI 1(H) The student will develop personal goals, objectives, and strategies as part of a plan for future career and educational opportunities. ATI 9(J) The student will inspect, test, and service positive crankcase ventilation (PCV) system and its components such as the filter/breather cap, valve, tubes, orifices, and hoses.		
	Engine Repair	6 Days	3.A, 3.B, 4.A, 4.B, 9.A, 9.B, 9.C, 9.D, 9.E, 9.F, 9.G, 9.H, 9.I, 5.G
	ATI 3(A) The student will locate the manufacturer recommended preventative maintenance schedule. ATI 3(B) The student will perform a preventative maintenance inspection of vehicle systems, including engine, engines, fuel, lubrication, cooling, electrical, and air conditioning systems. ATI 4(A) The student will demonstrate the proper use of hand and power tools and equipment commonly employed in the maintenance and repair of vehicles. ATI 4(B) The student will discuss the proper handling and disposal of environmentally hazardous materials used in servicing vehicles. ATI 9(A) The student will inspect and explain the electrical/electronic components, sensors and circuits on an on board diagnostics (OBD) controlled engine. ATI 9(B) The student will perform engine absolute manifold pressure tests such as vacuum or boost. ATI 9(C) The student will verify engine operating temperature. ATI 9(D) The student will remove and replace spark plugs and inspect secondary ignition components for wear and damage. ATI 9(E) The student will describe the importance of operating all OBD II monitors for repair verification. ATI 9(F) The student will retrieve and record diagnostic trouble codes, OBD II monitor status, and freeze frame data and clear codes when applicable. ATI 9(G) The student will inspect, service, or replace air filters, filter housings, and intake duct work. ATI 9(H) The student will replace fuel filter or filters. ATI 9(I) The student will inspect integrity of the exhaust manifolds, exhaust pipes, mufflers, catalytic converters, resonators, tail pipes, and heat shields. ATI 5(G) The student will service and repair cooling and lubrication systems.		
	NATEF I. Engine Repair A. General	6 Days	NATEF I.A
NATEF I. Engine Repair A. General 1. The student will research vehicle service information, including fluid type, vehicle service history, service precautions, and technical service bulletins. NATEF I. Engine Repair A. General 2. The student will verify operation of the instrument panel engine warning indicators. NATEF I. Engine Repair A. General 3. The student will inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. NATEF I. Engine Repair A. General 4. The student will install engine covers using gaskets, seals, and sealers as required. NATEF I. Engine Repair A. General 5. The student will verify engine mechanical timing. NATEF I. Engine Repair A. General 6. The student will perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. NATEF I. Engine Repair A. General 7. The student will identify service precautions related to service of the internal combustion engine of a hybrid vehicle.			

	NATEF I. Engine Repair B. Cylinder Head and Valve Train and Valve Train NATEF I. Engine Repair C. Lubrication and Cooling Systems	7 Days	NATEF I.B, 1.C
	<p>NATEF I. Engine Repair B. Cylinder Head and Valve Train NATEF I. Engine Repair B. Cylinder Head and Valve Train 1. The student will adjust valves (mechanical or hydraulic lifters). NATEF I. Engine Repair B. Cylinder Head and Valve Train 2. The student will identify components of the cylinder head and valve train.</p> <p>NATEF I. Engine Repair C. Lubrication and Cooling Systems NATEF I. Engine Repair C. Lubrication and Cooling Systems 1. The student will perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core, and galley plugs; determine necessary action. NATEF I. Engine Repair C. Lubrication and Cooling Systems 2. The student will inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. NATEF I. Engine Repair C. Lubrication and Cooling Systems 3. The student will remove, inspect, and replace thermostat and gasket/seal. NATEF I. Engine Repair C. Lubrication and Cooling Systems 4. The student will inspect and test coolant; drain and recover coolant; flush and refill cooling system; use proper fluid type per manufacturer specification; bleed air as required. NATEF I. Engine Repair C. Lubrication and Cooling Systems 5. The student will perform engine oil and filter change; use proper fluid type per manufacturer specification; reset maintenance reminder as required. NATEF I. Engine Repair C. Lubrication and Cooling Systems 6. The student will identify components of the lubrication and cooling systems.</p>		
	Brakes Repair C. Drum Brakes and D. Disc Brakes	9 Days	1.A, 5.A, 5.B, 5.C, 5.D, 5.E, 5.F, 5.G, 5.H, 5.I, 5.J, 5.K, 5.L
Grading Period 2 26 Days	<p>ATI 1(D) The student will apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in the automotive technology industry. ATI 5(A) The student will explain Pascal's Theory of Hydraulics as it relates to the brake system. ATI 5(B) The student will inspect brake system components, including master cylinder, brake lines, wheel cylinders, calipers, and flexible hoses and fittings, for external leaks and proper operation. ATI 5(C) The student will inspect, measure, and refinish brake drum diameter to manufacturer specifications. ATI 5(D) The student will remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates. ATI 5(E) The student will lubricate, reassemble, and pre-adjust brake shoes and parking brake. ATI 5(F) The student will remove, inspect for damage or wear, clean, lubricate, and reassemble pads and retaining hardware, caliper assembly, and mounting components such as slides and pins for proper operation. ATI 5(G) The student will refinish a rotor on and off a vehicle and measure final rotor thickness with manufacturer specifications. ATI 5(H) The student will retract and re-adjust caliper piston on an integral parking brake system. ATI 5(I) The student will check brake pedal travel with, and without, engine running to verify proper power booster operation. ATI 5(J) The student will check brake pedal travel with, and without, engine running to verify proper power booster operation. ATI 5(K) The student will check vacuum supply from a manifold or auxiliary pump to vacuum-type brake power booster. ATI 5(L) The student will describe the operation of a regenerative braking system.</p>		
	NATEF V. Brakes C. Drum Brakes	9 Days	NATEF V.C
	<p>NATEF V. Brakes C. Drum Brakes 1. The student will remove, clean, and inspect brake drum; measure brake drum diameter; determine serviceability. NATEF V. Brakes C. Drum Brakes 2. The student will refinish brake drum and measure final drum diameter; compare with specification. NATEF V. Brakes C. Drum Brakes 3. The student will remove, clean, inspect, and/or replace brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. NATEF V. Brakes C. Drum Brakes 4. The student will inspect wheel cylinders for leaks and proper operation; remove and replace as needed. P-2 NATEF V. Brakes C. Drum Brakes 5. The student will pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments.</p>		

	NATEF V. Brakes D. Disc Brakes	8 Days	NATEF V.D
Grading Period 3 25 Days	<p>NATEF V. Brakes D. Disc Brakes 1. The student will remove and clean caliper assembly; inspect for leaks and damage/wear; determine necessary action.</p> <p>NATEF V. Brakes D. Disc Brakes 2. The student will inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.</p> <p>NATEF V. Brakes D. Disc Brakes 3. The student will remove, inspect, and/or replace brake pads and retaining hardware; determine necessary action.</p> <p>NATEF V. Brakes D. Disc Brakes 4. The student will lubricate and reinstall caliper, brake pads, and related hardware; seat brake pads and inspect for leaks.</p> <p>NATEF V. Brakes D. Disc Brakes 5. The student will clean and inspect rotor and mounting surface, measure rotor thickness, thickness variation, and lateral runout; determine necessary actions.</p> <p>NATEF V. Brakes D. Disc Brakes 6. The student will remove and reinstall/replace rotor.</p> <p>NATEF V. Brakes D. Disc Brakes 7. The student will refinish rotor on vehicle; measure final rotor thickness and compare with specification.</p> <p>NATEF V. Brakes D. Disc Brakes 8. The student will refinish rotor off vehicle; measure final rotor thickness and compare with specification.</p> <p>NATEF V. Brakes D. Disc Brakes 9. The student will retract and re-adjust caliper piston on an integral parking brake system.</p> <p>NATEF V. Brakes D. Disc Brakes 10. The student will check brake pad wear indicator; determine necessary action.</p> <p>NATEF V. Brakes D. Disc Brakes 11. The student will describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendation.</p>		
	Brakes E. Power-Assist Units – Related Systems (i.e. Wheel Bearings, Parking Brakes, Electrical)	8 Days	2.A, 2.B, 2.C, 3.C, 3.E, 5.F, 8.A, 8.B, 8.C, 8.D, 8.E, 8.F, 8.G, 8.H
	<p>ATI 2(A) The student will demonstrate effective oral communication skills with individuals from varied cultures such as fellow students, coworkers, and customers.</p> <p>ATI 2(B) The student will demonstrate effective written communication skills, including documenting on a repair order the customer concern/complaint, root cause of the failure, and corrective action to complete the repair.</p> <p>ATI 2(C) The student will demonstrate mathematical skills in performing addition, subtraction, multiplication, division, and measurements using decimals and fractions in the metric and U.S. standard systems as appropriate.</p> <p>ATI 3(C) The student will describe the function of the automotive chassis components including braking, steering, transmission, drive train, and suspension systems.</p> <p>ATI 3(E) The student will use published specifications to diagnose component wear and determine necessary repairs.</p> <p>ATI 5(F) The student will inspect, service, and repair chassis and power train components and systems.</p> <p>ATI 8(A) The student will identify the different fluid types used in both an automatic and manual transmission/transaxle.</p> <p>ATI 8(B) The student will identify the fluid types and capacity required by application using service information.</p> <p>ATI 8(C) The student will check fluid level in a transmission or a transaxle equipped with a dipstick.</p> <p>ATI 8(D) The student will check fluid level in a transmission or a transaxle not equipped with a dipstick.</p> <p>ATI 8(E) The student will check fluid condition and inspect for leaks.</p> <p>ATI 8(F) The student will drain and replace fluid and filter or filters in an automatic transmission/transaxle.</p> <p>ATI 8(G) The student will drain and replace fluid in a manual transmission/transaxle.</p> <p>ATI 8(H) The student will inspect power train mounts.</p> <p>NATEF V. Brakes E. Power-Assist Units</p> <p>NATEF V. Brakes E. Power-Assist Units 1. The student will check brake pedal travel with, and without, engine running to verify proper power booster operation.</p> <p>NATEF V. Brakes E. Power-Assist Units 2. The student will identify components of the brake power assist system (vacuum and hydraulic); check vacuum supply (manifold or auxiliary pump) to vacuum type power booster.</p>		
NATEF V. Brakes F. Related Systems (i.e. Wheel Bearings, Parking Brakes, Electrical)	8 Days	NATEF V.F	
<p>NATEF V. Brakes F. Related Systems (i.e. Wheel Bearings, Parking Brakes, Electrical) 1. The student will remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings.</p> <p>NATEF V. Brakes F. Related Systems (i.e. Wheel Bearings, Parking Brakes, Electrical) 2. The student will check parking brake system components for wear, binding, and corrosion; clean, lubricate, adjust and/or replace as needed.</p> <p>NATEF V. Brakes F. Related Systems (i.e. Wheel Bearings, Parking Brakes, Electrical) 3. The student will check parking brake operation and parking brake indicator light system operation; determine necessary action.</p> <p>NATEF V. Brakes F. Related Systems (i.e. Wheel Bearings, Parking Brakes, Electrical) 4. The student will check operation of brake stop light system.</p> <p>NATEF V. Brakes F. Related Systems (i.e. Wheel Bearings, Parking Brakes, Electrical) 5. The student will replace wheel bearing and race.</p> <p>NATEF V. Brakes F. Related Systems (i.e. Wheel Bearings, Parking Brakes, Electrical) 6. The student will inspect and replace wheel studs.</p>			

	NATEF V. Brakes G. Electronic Brake, Traction Control, and Stability Control Systems	9 Days	NATEF V.G
Grading Period 4 32 Days	Electrical/Electronic Systems	10 Days	1.A, 3.F, 3.G, 3.H, 3.I, 3.J, 3.K, 3.L, NATEF VI.A
	Wiring & Wire Repair	12 Days	
	Circuit Testing	10 Days	
	Electrical/Electronic Systems Wiring & Wire Repair Circuit Testing ATI 1(A) The student will demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace such as safety glasses and other personal protective equipment (PPE) and safety data sheets (SDS). ATI 3(D) The student will locate, read, and interpret service repair information such as schematics, charts, diagrams, graphs, parts catalogs, and technical bulletins. ATI 3(F) The student will identify the appropriate oil viscosity and capacity. ATI 3(G) The student will verify operation of the instrument panel engine warning indicators. ATI 3(H) The student will inspect engine assembly and document findings of fuel, oil, coolant, and other leaks. ATI 3(I) The student will perform common fastener and thread repair, including removing broken bolt, restoring internal and external threads, and repairing internal threads with thread insert. ATI 3(J) The student will inspect, replace, and adjust drive belts, tensioners, and pulleys. ATI 3(K) The student will perform engine oil and filter change. ATI 3(L) The student will explain and perform a "jump-start" of a vehicle using jumper cables and a booster battery. NATEF VI. Electrical/Electronic Systems A. General NATEF VI. Electrical/Electronic Systems A. General 1. The student will research vehicle service information including vehicle service history, service precautions, and technical service bulletins. NATEF VI. Electrical/Electronic Systems A. General 2. The student will demonstrate knowledge of electrical/electronic series, parallel, and series parallel circuits using principles of electricity (Ohm's Law). NATEF VI. Electrical/Electronic Systems A. General 3. The student will use wiring diagrams to trace electrical/electronic circuits. NATEF VI. Electrical/Electronic Systems A. General 4. The student will demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance. NATEF VI. Electrical/Electronic Systems A. General 5. The student will demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. NATEF VI. Electrical/Electronic Systems A. General 6. The student will use a test light to check operation of electrical circuits. NATEF VI. Electrical/Electronic Systems A. General 7. The student will use fused jumper wires to check operation of electrical circuits. NATEF VI. Electrical/Electronic Systems A. General 8. The student will measure key-off battery drain (parasitic draw). NATEF VI. Electrical/Electronic Systems A. General 9. The student will inspect and test fusible links, circuit breakers, and fuses; determine necessary action. NATEF VI. Electrical/Electronic Systems A. General 10. The student will repair and/or replace connectors, terminal ends, and wiring of electrical/electronic systems (including solder repair). NATEF VI. Electrical/Electronic Systems A. General 11. The student will identify electrical/electronic system components and configuration.		
Grading Period 5 32 Days	Electrical/Electronic Systems:	10 Days	5.D, 5.B, 6.A, 6.B, 6.C, 6.D, 6.E, 6.F, 6.G, 6.H, 6.I, 6.J, 6.K, 6.L, 6.M, 6.N, NATEF VI.B
Battery Testing & Service	10 Days		
Charging Systems & Diagnosis	12 Days		

	<p>ATI 5(D) The student will service and repair electrical and electronic systems. ATI 5(B) The student will remove, repair, and replace engine components. ATI 6(A) The student will demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity as defined by Ohm's Law. ATI 6(B) The student will demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop, current flow, resistance, and ground circuits. ATI 6(C) The student will use wiring diagrams to trace electrical/electronic circuits. ATI 6(D) The student will demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. ATI 6(E) The student will confirm proper battery capacity for vehicle application and perform battery capacity test. ATI 6(F) The student will perform battery state-of-charge test. ATI 6(G) The student will inspect and clean the battery, fill battery cells, and check battery cables, connectors, clamps, and hold-downs. ATI 6(H) The student will perform starter current draw test. ATI 6(I) The student will inspect and test fusible links, circuit breakers, fuses, and relays. ATI 6(J) The student will perform charging system output test. ATI 6(K) The student will inspect, adjust, or replace generator/alternator drive belts and check pulleys and tensioners for wear and belt alignment. ATI 6(L) The student will verify operation of instrument panel gauges and warning/indicator lights, and reset maintenance indicators. ATI 6(M) The student will inspect interior and exterior lamps and sockets, including headlights and auxiliary light such as fog and driving lights and replace as needed. ATI 6(N) The student will verify windshield wiper and washer operation and replace wiper blades as needed.</p> <p>NATEF VI. Electrical/Electronic Systems B. Battery Service NATEF VI. Electrical/Electronic Systems B. Battery Service 1. The student will perform battery state-of-charge test; determine necessary action. NATEF VI. Electrical/Electronic Systems B. Battery Service 2. The student will confirm proper battery capacity for vehicle application; perform battery capacity and load test; determine necessary action. NATEF VI. Electrical/Electronic Systems B. Battery Service 3. The student will maintain or restore electronic memory functions. NATEF VI. Electrical/Electronic Systems B. Battery Service 4. The student will inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. NATEF VI. Electrical/Electronic Systems B. Battery Service 5. The student will perform slow/fast battery charge according to manufacturer's recommendations.</p>		
<p>Grading Period 6 29 Days</p>	<p>Heating/Air Components & Operation</p>	<p>10 Days</p>	<p>1.A, 1.B, 5.H, 5.E, 7.A,</p>
	<p>Automatic Air System Operation</p>	<p>9 Days</p>	<p>7.B, 7.C, 7.D, 7.E,</p>
	<p>Heating/Air System Diagnosis</p>	<p>10 Days</p>	<p>NATEF VII.A, VII.B, VII.C, VII.D</p>
	<p>ATI 1(A) The student will demonstrate knowledge of the technical knowledge and skills related to health and safety in the workplace such as safety glasses and other personal protective equipment (PPE) and safety data sheets (SDS). ATI 1(B) The student will identify career and employment opportunities, including entrepreneurship opportunities, and internships and industry-recognized certification requirements for the field of automotive technology. ATI 5(H) The student will perform regular audits and inspections to maintain compliance with safety, health, and environmental regulations. ATI 5(E) The student will service and repair air-conditioning, heating, and accessory systems. ATI 7(A) The student will identify refrigerant type and the safety and environmental concerns related to handling and storage. ATI 7(B) The student will inspect engine cooling and heater systems hoses. ATI 7(C) The student will inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets. ATI 7(D) The student will inspect A/C condenser for airflow restrictions. ATI 7(E) The student will identify hybrid vehicle A/C system electrical circuits and the service/safety precautions.</p> <p>NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) A. General NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) A. General 1. The student will research vehicle service information, including refrigerant/oil type, vehicle service history, service precautions, and technical service bulletins. NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) A. General 2. The student will identify heating, ventilation and air conditioning components and configuration.</p> <p>NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) B. Refrigeration System Components NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) B. Refrigeration System Components 1. The student will inspect and replace A/C compressor drive belts, pulleys, and tensioners; visually inspect A/C components for signs of leaks; determine necessary action. NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) B. Refrigeration System Components 2. The student will identify hybrid vehicle A/C system electrical circuits and the service/safety precautions. NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) B. Refrigeration System Components 3. The student will inspect A/C condenser for airflow restrictions; determine necessary action.</p>		

NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) C. Heating, Ventilation, and Engine Cooling Systems

NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) C. Heating, Ventilation, and Engine Cooling Systems 1. The student will inspect engine cooling and heater systems hoses and pipes; determine necessary action.

NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) D. Operating Systems and Related Controls

NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) D. Operating Systems and Related Controls 1. The student will inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; determine necessary action.

NATEF VII. Heating, Ventilation, and Air Conditioning (HVAC) D. Operating Systems and Related Controls 2. The student will identify the source of A/C system odors.