

## Standards and Competencies for Automotive/Electrical/Electronics Systems (Course # 5713)

	Begin-End Yr
Standard 1 - Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.	2009 -
1.1 - Lead a team.	2009 -
1.2 - Participate in SkillsUSA as an integral part of classroom instruction	2009 -
1.3 - Assess client complaint and apply problem-solving and decision-making skills to communicate with the client.	2009 -
1.4 - Demonstrate teamwork skills.	2009 -
Standard 2 - Students will demonstrate automotive technology safety practices, including Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) requirements for an automotive repair facility.	2009 -
2.1 - Determine safe and correct procedures for working with electricity in an automotive repair facility	2009 -
2.2 - Use protective clothing, eye protection, and safety equipment.	2009 -
2.3 - Use fire protection equipment.	2009 -
2.4 - Follow OSHA and EPA regulations and manufacturers specifications affecting electrical and electronic automotive systems.	2009 -
2.5 - Respond to safety communications referring to electrical and electronic systems	2009 -
2.6 - Pass with 100 percent accuracy a written examination relating to safety issues	2009 -
2.7 - Pass with 100 percent accuracy a performance examination relating to safety	2009 -
2.8 - Maintain a portfolio record of written safety examinations and equipment examinations for which the student has passed an operational checkout by the instructor.	2009 -
Standard 3 - Students will properly test, diagnose, service, and repair General Electrical System NATEF P-1 Standards 2002 VI-7	2009 -
3.1 - Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. P-1	2009 -
3.2 - Identify and interpret electrical/electronic system concern; determine necessary action. P-1	2009 -
3.3 - Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins. P-1	2009 -
3.4 - Locate and interpret vehicle and major component identification numbers (VIN, vehicle certification labels, and calibration decals). P-1	2009 -
3.5 - Diagnose electrical/electronic integrity for series, parallel and series-parallel circuits using principles of electricity (Ohm's Law). P-1	2009 -
3.6 - Use wiring diagrams during diagnosis of electrical circuit problems. P-1	2009 -
3.7 - Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems. P-1	2009 -
3.8 - Check electrical circuits with a test light; determine necessary action. P-1	2009 -
3.9 - Measure source voltage and perform voltage drop tests in electrical/electronic circuits using a voltmeter; determine necessary action. P-1	2009 -
3.10 - Measure current flow in electrical/electronic circuits and components using an ammeter; determine necessary action. P-1	2009 -
3.11 - Check continuity and measure resistance in electrical/electronic circuits and components using an ohmmeter; determine necessary action. P-1	2009 -
3.12 - Check electrical circuits using fused jumper wires; determine necessary action. P-1	2009 -
3.13 - Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action. P-1	2009 -
3.14 - Measure and diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action. P-1	2009 -
3.15 - Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. P-1	2009 -
3.16 - Inspect and test switches, connectors, relays, solid state devices, and wires of electrical/electronic circuits; perform necessary action. P-1	2009 -
3.17 - Remove and replace terminal end from connector. P-1	2009 -
3.18 - Repair connectors and terminal ends. P-1	2009 -
3.19 - Repair wiring harness (including CAN/BUS systems). P-1	2009 -
3.20 - Perform solder repair of electrical wiring. P-1	2009 -
3.21 - Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures. P-3	2009 -
Standard 4 - Students will properly test, diagnose, service, and repair a Battery System NATEF P-1 Standards 2002 VI-1	2009 -
4.1 - Perform battery state-of-charge test; determine necessary action. P-1	2009 -
4.2 - Perform battery capacity test (or conductance test); confirm proper battery capacity for vehicle application; determine necessary action. P-1	2009 -
4.3 - Maintain or restore electronic memory functions. P-1	2009 -
4.4 - Inspect, clean, fill, and replace battery. P-1	2009 -
4.5 - Perform slow/fast battery charge. P-2	2009 -
4.6 - Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed. P-1	2009 -
4.7 - Start a vehicle using jumper cables and a battery or auxiliary power supply. P-1	2009 -

	4.8 - Identify high voltage circuits of electric or hybrid electric vehicles and related safety precautions. P-1	2009 -
	4.9 - Identify electronic modules, security systems and/or radios that require reinitialization or code entry following battery disconnect. P-2	2009 -
	4.10 - Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. P-1	2009 -
Standard 5 - Students will properly test, diagnose, service, and repair Starting System NATEF P-1 Standards 2002 VI-C		2009 -
	5.1 - Perform starter current draw tests; determine necessary action. P-1	2009 -
	5.2 - Perform starter circuit voltage drop tests; determine necessary action. P-1	2009 -
	5.3 - Inspect and test starter relays and solenoids; determine necessary action. P-2	2009 -
	5.4 - Remove and install starter in a vehicle. P-1	2009 -
	5.5 - Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action. P-2	2009 -
	5.6 - Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition. P-2	2009 -
Standard 6 - Students will properly test, diagnose, service, and repair Charging System NATEF P-1 Standards 2002 VI-E		2009 -
	6.1 - Perform charging system output test; determine necessary action. P-1	2009 -
	6.2 - Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions. P-1	2009 -
	6.3 - Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment. P-1	2009 -
	6.4 - Remove, inspect, and install generator (alternator). P-1	2009 -
	6.5 - Perform charging circuit voltage drop tests; determine necessary action. P-1	2009 -
Standard 7 - Students will properly test, diagnose, service, and repair Lighting Systems NATEF P-1 Standards 2002 VI-F		2009 -
	7.1 - Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action. P-1	2009 -
	7.2 - Inspect, replace, and aim headlights and bulbs. P-2	2009 -
	7.3 - Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action P-2	2009 -
	7.4 - Identify system voltage and safety precautions associated with high intensity discharge headlights. P-1	2009 -
Standard 8 - Students will properly test, diagnose, service, and repair Gauges, Warning Devices, and Driver Information Systems NATEF P-1 Standards 2002 VI-F		2009 -
	8.1 - Inspect and test gauges and gauge sending units for cause of intermittent, high, low, or no gauge readings; determine necessary action. P-1	2009 -
	8.2 - Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action. P-3	2009 -
	8.3 - Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action. P-1	2009 -
	8.4 - Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action. P-3	2009 -
Standard 9 - Students will properly test, diagnose, service and repair Horn and Wiper/Washer systems. NATEF P-1 Standards 2002 VI-G-1 thru 3		2009 -
	9.1 - Diagnose incorrect horn operation; perform necessary action. P-2	2009 -
	9.2 - Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action. P-2	2009 -
	9.3 - Diagnose incorrect washer operation; perform necessary action. P-2	2009 -
Standard 10 - Students will properly test, diagnose, service, and repair Accessories NATEF P-1 Standards 2002 VI-H		2009 -
	10.1 - Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action. P-2	2009 -
	10.2 - Diagnose incorrect heated glass, mirror or seat operation; determine necessary action. P-1	2009 -
	10.3 - Diagnose incorrect electric lock operation; determine necessary action. P-2	2009 -
	10.4 - Diagnose incorrect operation of cruise control systems; determine necessary action. P-1	2009 -
	10.5 - Diagnose supplemental restraint system (SRS) concerns; determine necessary action. (Note: Follow manufacturer's safety procedures to prevent accidental deployment.) P-2	2009 -
	10.6 - Disarm and enable the airbag system for vehicle service. P-1	2009 -
	10.7 - Diagnose radio static and weak, intermittent, or no radio reception; determine necessary action. P-1	2009 -
	10.8 - Remove and reinstall door panel. P-1	2009 -
	10.9 - Diagnose body electronic system circuits using a scan tool; determine necessary action. P-2	2009 -
	10.10 - Check for module communication (including CAN/BUS systems) errors using a scan tool. P-1	2009 -
	10.11 - Diagnose the cause of false, intermittent, or no operation of anti-theft system. P-2	2009 -
Standard 11 - Students will demonstrate communication skills required in the automotive service industry		2009 -
	11.1 - Communicate and comprehend oral and written information pertaining to electrical and electronic systems.	2009 -
	11.2 - Solve electrical problems and make decisions using a logical process	2009 -
	11.3 - Use teamwork skills to solve problems relating to electrical and electronic system issues	2009 -
Standard 12 - Students will demonstrate interpersonal and employability skills required in the automotive service industry		2009 -
	12.1 - Infer relationships between honesty, integrity, and organization and personal job success	2009 -
	12.2 - Demonstrate attitudes conducive to workplace success.	2009 -
	12.3 - Maintain electrical and electronic equipment in a neat and orderly work area	2009 -
	12.4 - Assess implications of cultural and religious diversity for classroom and workplace relationships	2009 -
	12.5 - Develop individual and team time management and work sequencing skills to increase productivity in electrical and electronic systems diagnostics and repair.	2009 -