NATEF Crosswalk

The following NATEF Electrical/Electronic Systems tasks (rev. 2001) are covered in this publication. The chart shows where each task is located within the publication. The first column identifies the NATEF task by name and number. The second column identifies the exact location by unit number and assignment sheet or job sheet number.

NATEF Tasks	MAVCC Tasks
VI. Electrical/Electronic Systems	
A. General Electrical Systems Diagnosis	
1. Read, interpret and diagnose electrical/electronic circuits using wiring diagrams.	Unit 2, Assignment Sheet 4 — Using wiring diagrams to locate information about circuits. Unit 3, Assignment Sheet 1 — Identify types of circuits and circuit devices on a circuit.
2. Check continuity in electrical/electronic circuits using appropriate test equipment.	Unit 3, Job Sheet 1 — Calibrate and make functionality tests on electrical diagnostic instruments. Unit 3, Job Sheet 2 — Check electrical/electronic circuits with jumper wires. Unit 3, Job Sheet 3 — Check electrical circuits with a test light. Unit 3, Job Sheet 7 — Check continuity and resistance in electrical/electronic circuits and components with a multimeter.
3. Check applied voltages, circuit voltages, and voltage drops in electrical/electronic circuits using a digital multimeter (DMM).	Unit 3, Assignment Sheet 3 — Prepare to measure current, voltage, resistance, and frequency with a multimeter. Unit 3, Job Sheet 1 — Calibrate and make functionality tests on electrical diagnostic instruments. Unit 3, Job Sheet 4 — Check voltage in electrical/electronic circuits with a multimeter. Unit 3, Job Sheet 5 — Check voltage drops in electrical/electronic circuits with a multimeter.
4. Check current flow in electrical/electronic circuits and components using a digital multimeter (DMM) or clamp-on ammeter.	Unit 3, Assignment Sheet 3 — Prepare to measure current, voltage, resistance, and frequency with a multimeter. Unit 3, Job Sheet 1 — Calibrate and make functionality tests on electrical diagnostic instruments. Unit 3, Job Sheet 6 — Check current flow in electrical/electronic circuits and components with a multimeter.

NATEF Crosswalk

NATEF Tasks	MAVCC Tasks
5. Check resistance in electrical/electronic circuits and components using a digital multimeter (DMM) or clamp-on ammeter.	Unit 3, Assignment Sheet 3 — Prepare to measure current, voltage, resistance, and frequency with a multimeter. Unit 3, Job Sheet 1 — Calibrate and make functionality tests on electrical diagnostic instruments. Unit 3, Job Sheet 7 — Check continuity and resistance in electrical/electronic circuits and components with a multimeter.
6. Find shorts, grounds, and opens in electrical/electronic circuits.	Unit 3, Job Sheet 8 — Find shorts, grounds, opens, and high resistance problems in electrical/electronic circuits.
7. Diagnose parasitic (key-off) battery drain problems.	Unit 5, Job Sheet 7 — Diagnose parasitic (key-off) battery drain problems.
8. Inspect and test fusible links, circuit breakers, relays, solenoids, and fuses; replace as needed.	Unit 2, Assignment Sheet 2 — Determine correct replacement fuses. Unit 3, Job Sheet 11 — Inspect, test, and replace fusible links, circuit breakers, and fuses.
9. Inspect and test spike suppression diodes/resistors; replace as needed.	Unit 2, Job Sheet 1 — Inspect, test, and replace spike suppression diodes/resistors.
B. Battery Diagnosis and Repair	
1. Perform battery load test; determine needed action.	Unit 5, Job Sheet 4 — Make a battery capacity (load) test.
2. Determine battery state-of-charge using an open circuit voltage test.	Unit 5, Job Sheet 3 — Make a battery state-of-charge test. Unit 5, Job Sheet 5 — Determine battery state-of-charge using an open circuit voltage test.
3. Inspect, clean, and service battery; replace as needed.	Unit 5, Job Sheet 2 — Inspect, clean, fill, and replace a battery, battery cables, connectors, clamps, battery box, and hold downs.
4. Inspect and clean battery boxes, mounts, and hold downs; repair or replace as needed.	Unit 5, Job Sheet 2 — Inspect, clean, fill, and replace a battery, battery cables, connectors, clamps, battery box, and hold downs.
5. Charge battery using slow or fast charge method as appropriate.	Unit 5, Job Sheet 6 — Show and fast charge a battery.
6. Inspect, test, and clean battery cables and connectors; repair or replace as needed.	Unit 5, Job Sheet 2 — Inspect, clean, fill, and replace a battery, battery cables, connectors, clamps, battery box, and hold downs.
7. Jump start a vehicle using jumper cables and a booster battery or auxiliary power supply using proper safety procedures.	Unit 5, Job Sheet 9 — Jump start a vehicle.

NATEF Tasks	MAVCC Tasks
C. Starting System Diagnosis and Repair	
1. Perform starter current draw test; determine needed action.	Unit 6, Job Sheet 1 — Make a no-load starter current draw test (off vehicle).
2. Perform starter circuit cranking voltage and votage drop tests; determine needed action.	Unit 6, Job Sheet 2 — Make starter circuit voltage drop tests.
3. Inspect, test, and replace components (key switch, push button, and/or magnetic switch) and wires in the starter control circuit.	Unit 6, Job Sheet 3 — Inspect, test, and repair or replace switches, connectors and wires of start control circuits.
4. Inspect, test, and replace starter relays and solenoids/switches.	Unit 6, Job Sheet 4 — Inspect, test, and replace starter relays and solenoids.
5. Remove and replace starter; inspect flywheel ring gear or flex plate.	Unit 6, Job Sheet 5 — Remove and replace a starter.
D. Charging System Diagnosis and Repair	
1. Diagnose instrument panel mounted volt meters and/or indicator lamps that show a no charge, low charge, or overcharge condition; determine needed action.	Unit 9, Assignment Sheet 1 — Diagnose the cause(s) of faulty gauge readings.
2. Diagnose the cause of a no charge, low charge, or overcharge condition; determine needed action.	Unit 7, Assignment Sheet 1 — Diagnose charging system problems that cause an undercharge, a no-charge, or an overcharge condition.
3. Inspect, adjust, and replace alternator drive belts, pulleys, fans, tensioners, and mounting brackets.	Unit 7, Job Sheet 1 — Inspect, adjust, and replace alternator drive belts, pulleys, and tensioners.
4. Perform charging system voltage and amperage output test; determine needed action.	Unit 7, Job Sheet 2 — Make a charging system output test; determine needed repairs.
5. Perform charging circuit voltage drop tests; determine needed action.	Unit 7, Job Sheet 3 Make a charging system voltage drop test; determine needed repairs.
6. Remove and replace alternator.	Unit 7, Job Sheet 6 — Remove, inspect, and replace an alternator.
7. Inspect, repair, or replace connectors and and wires in the charging styem.	Unit 7, Job Sheet 5 — Inspect, repair or replace connectors and wires of charging circuits.
8. Diagnose AC voltage teakage (failed rectifier) at alternator output; determine needed action.	Unit 7, Job Sheet 2 — Make a charging system output test; determine needed repairs.

NATEF Tasks	MAVCC Tasks
E. Lighting Systems Diagnosis and Repair	
1. Headlights, Daytime Running Lights, Parking, Clearance, Tail, Cab, and Instrument Panel Lights	
1. Diagnose the cause of brighter than normal, intermittent, dim, or no headlight and daytime running light (DRL) operation.	Unit 8, Assignment Sheet 1 — Diagnose the cause of headlights and daytime running lights problems.
2. Test, aim, and replace headlights.	Unit 8, Job Sheet 1 — Inspect, replace, and aim headlights/bulbs.
3. Test headlight and dimmer circuit switches, relays, wires, terminals, connectors, sockets, and control components; repair or replace as needed.	Unit 8, Job Sheet 2 — Inspect, test, and replace light bulbs and test sockets. Unit 8, Job Sheet 3 — Inspect, test, and replace the components of a headlights and daytime running lights circuit.
4. Inspect and test switches, bulbs/LEDs, sockets, connectors, terminals, relays, and wires of parking, clearance, and taillight circuits; repair or replace as needed.	Unit 8, Assignment Sheet 2 — Diagnose the cause of parking lights, clearance lights, and taillights problems. Unit 8, Job Sheet 4 — Inspect, test, repair, and replace the components of a parking light, clearance light, and taillight circuit.
5. Inspect and test instrument panel light circuit switches, relays, bulbs, sockets, connectors, terminals, wires, and printed circuit/control modules; repair or replace as needed.	Unit 8, Assignment Sheet 6 — Diagnose the cause of instrument lighting problems. Unit 8, Job Sheet 8 — Inspect, test, repair, and replace the components of an instrument lighting circuit.
6. Inspect and test interor cab light circuit switches, bulbs, sockets, connectors, terminals, and wires; repair or replace as needed.	Unit 8, Assignment Sheet 7 — Diagnose the cause of courtesy lights problems. Unit 8, Job Sheet 9 — Inspect, test, repair, and replace the components of a courtesy lights circuit.
7. Inspect and test tractor-to trailer multi-wire connector(s); repair or replace as needed.	Unit 8, Job Sheet 10 — Inspect, test, repair, and replace the components of tractor-to-trailer lights circuit.
2. Stoplights, Turn Signals, Hazard Lamps, and Back-up Lights	
1. Inspect, test, and adjust stoplight circuit switches; bulbs/LEDs, sockets, connectors, terminals, and wires; repair or replace as needed.	Unit 8, Assignment Sheet 1 — Diagnose the cause of stoplight (brake light) problems. Unit 8, Job Sheet 5 — Inspect, test, adjust, repair, and replace the components of a stoplight (brake light) circuit.
2. Inspect and test turn signal and hazard circuit flasher(s), switches, relays, bulbs/LEDs, sockets, connectors, terminals, and wires; repair or replace as needed.	Unit 8, Assignment Sheet 4 — Diagnose the cause of turn signals and hazard lights problems. Unit 8, Job Sheet 6 — Inspect, test, repair, and replace the components of a turn sign and hazard lights circuit.

NATEF Tasks	MAVCC Tasks
3. Inspect, test, and adjust back-up lights and warning device circuit switches, bulbs/LEDs, sockets, horns, buzzers, connectors, terminals, and wires; repair or replace as needed.	Unit 8, Assignment Sheet 5 — Diagnose the cause of back-up lights problems. Unit 9, Assignment Sheet 3 — Diagnose the cause(s) of the faulty operation of audible warning devcies. Unit 8, Job Sheet 7 — Inspect, test, repair, and replace the components of a back-up lights circuit. Unit 9, Job Sheet 3 — Inspect, test, repair, and replace components of audible warning device circuits.
F. Gauges and Warning Devices Diagnosis and repair	
1. Interface with vehicle's on-board computer; perform diagnostic procedure using recommended electronic diagnostic equipment and tools (to include PC base software, and/or data scan tools); determine needed action.	Unit 4, Assignment Sheet 2 — Interpret SAE fault codes. Unit 4 Job Sheet 2 — Access vehicle fault codes using the vehicle's computerized diagnostic system; determine needed repairs.
2. Diagnose the cause of intermittent, high, low, or no gauge readings; determine needed action.	Unit 9, Assignment Sheet 1 — Diagnose the cause(s) of faulty gauge readings.
3. Diagnose the cause of data bus-driven gauge malfunctions; determine needed action.	Unit 9, Assignment Sheet 1 — Diagnose the cause(s) of faulty gauge readings. Unit 9, Job Sheet 2 — Inspect, test, repair, and replace the components of an electronic instrument cluster, warning light, indicator light, and driver information circuit.
4. Inspect and test gauge circuit sending units, gauges, connectors, terminals, and wires; repair or replace as needed.	Unit 3, Job Sheet 10 — Inspect, test, repair, and replace switches, connectors, terminals, and wires of electrical/electronic circuits. Unit 9, Job Sheet 1 — Inspect, test, repair, and replace the components of a gauge circuit.
5. Inspect and test warning devices (lights and audible) circuit sending units, bulbs/LEDs, sockets, connectors, wires, and printed circuits/ control modules; repair or replace as needed.	Unit 4, Job Sheet 1 — Use a DVOM to measure reference voltage output from the electronic control module. Unit 9, Job Sheet 3 — Inspect, test, repair, and replace components of audible warning device circuits.
6. Inspect, test, replace, and calibrate (if applicable) electronic speedometer, odometer, and tachometer systems.	Unit 9, Assignment Sheet 2 — Diagnose the cause(s) of the faulty operation of an electronic instrument cluster, warning light, indicator light, and driver information light.
G. Related Electrical Components	
1. Diagnose the cause of constant, intermittent, or no horn operation; determine needed action.	Unit 10, Assignment Sheet 1 — Diagnose the cause of horn problems.

NATEF Crosswalk

NATEF Tasks	MAVCC Tasks
2. Inspect and test horn circuit relays, horns, switches, connectors, and wires; repair or replace as needed.	Unit 3, Job Sheet 10 — Inspect, test, repair, and replace switches, connectors, terminals and wires of electrical/electronic circuits. Unit 10, Job Sheet 1 — Inspect, test, repair, and replace the components of a horn circuit.
3. Diagnose the cause of constant, intermittent, or no wiper operation; diagnose the cause of wiper speed control and/or park problems; determine needed action.	Unit 10, Assignment Sheet 2 — Diagnose the cause of wiper problems.
4. Inspect and test wiper motor, resistors, park switch, relays, switches, connectors, and wires; repair or replace as needed.	Unit 3, Job Sheet 10 — Inspect, test, repair, and replace switches, connectors, terminals, and wires of electrical/electronic circuits. Unit 10, Job Sheet 2 — Inspect, test, and replace the components of wiper circuits. Unit 10, Job Sheet 3 — Inspect, test, repair, and replace intermittent (pulsing) wiper controls.
5. Inspect wiper motor transmission linkage, arms, and blades; adjust or replace as needed.	Unit 10, Job Sheet 2 — Inspect, test, and replace the components of wiper circuits.
6. Inspect and test windshield washer motor or pump/relay assembly, switches, connectors, terminals, and wires; repair or replace as needed.	Unit 3, Job Sheet 10 — Inspect, test, repair, and replace switches, connectors, terminals, and wires of electrical/electronic circuits. Unit 10, Assignment Sheet 3 — Diagnose the cause of windshield washer problems. Unit 10, Job Sheet 4 — Inspect, test, repair, and replace the components of a windshield washer circuit.
7. Inspect and test side-view mirror motors, heater circuit grids, relays, switches, connectors, terminals, and wires, repair or replace as needed.	Unit 3, Job Sheet 10 — Inspect, test, repair, and replace switches, connectors, terminals, and wires of electrical/electronic circuits. Unit 11, Assignment Sheet 2 — Diagnose the cause of heated, lighted, and electrically operated mirror problems. Unit 11, Job Sheet 2 — Inspect, test, repair, and replace the parts of a heated, lighted, and electrically operated mirror.
8. Inspect and test heater and A/C electrical components including: A/C clutches, motors, resistors, relays, switches, connectors, terminals, and wires; repair or replace as needed.	Unit 3, Job Sheet 10 — Inspect, test, repair, and replace switches, connectors, terminals, and wires of electrical/electronic circuits. Unit 10, Assignment Sheet 4 — Diagnose the cause of heater problems. Unit 10, Assignment Sheet 5 — Diagnose the cause of air conditioning problems. Unit 10, Job Sheet 5 — Inspect, test, repair, and replace the components of a heater circuit. Unit 10, Job Sheet 6 — Inspect, test, repair, and replace the components of an air-conditoning circuit.

NATEF Tasks	MAVCC Tasks
9. Inspect and test auxiliary power outlet, integral fuse, connectors, terminals, and wires; repair or replace as needed.	Unit 3, Job Sheet 10 — Inspect, test, repair, and replace switches, connectors, terminals, and wires of electrical/electronic circuits. Unit 11 Job Sheet 8 — Inspect, test, repair, and replace the parts of a cigar lighter/auxiliary power outlet.
10. Diagnose the cause of slow, intermittent, or no power side window operation; determine needed action.	Unit 11, Assignment Sheet 1 — Diagnose the cause of power window problems.
11. Inspect and test motors, switches, relays, connectors, terminals, and wires of power side window circuits; repair or replace as needed.	Unit 3, Job Sheet 10 — Inspect, test, repair, and replace swtiches, connectors, terminals, and wires of electrical/electronic circuits. Unit 11, Job Sheet 1 — Inspect, test, repair, and replace the parts of a power window.
12. Inspect block heaters; determine needed repairs.	Unit 10, Job Sheet 7 — Inspect, test, repair, and replace the components of an engine block heater.
13. Inspect and test cruise control electrical components; repair or replace as needed.	not covered
14. Inspect and test engine cooling fan electrical control components; repair or replace as needed.	not covered