

# AUTO TECH: ELECTRICAL AND ELECTRONICS/1 (180 Hours)

Course No.: 79-90-61

## COMPETENCY CHECKLIST

Student Name \_\_\_\_\_

Teacher Name \_\_\_\_\_ School Site \_\_\_\_\_

Start Date \_\_\_\_\_ Completion Date \_\_\_\_\_ Certificate Date \_\_\_\_\_

Teacher Signature \_\_\_\_\_ Student Signature \_\_\_\_\_

(Signature verifies completion of course competencies)

### A. ORIENTATION AND SAFETY (3 hrs)

- \_\_\_\_\_ 1. Scope and purpose of course
- \_\_\_\_\_ 2. Classroom policies and procedures
- \_\_\_\_\_ 3. Class/workplace emergency procedures
- \_\_\_\_\_ 4. Occupations in industry for auto technicians
- \_\_\_\_\_ 5. OSHA workplace requirements for auto techs
- \_\_\_\_\_ 6. EPA legislation for transportation industry
- \_\_\_\_\_ 7. ARB legislation for transportation industry
- \_\_\_\_\_ 8. BAR standards for safety/environment
- \_\_\_\_\_ 9. MSDS in automotive industry
- \_\_\_\_\_ 10. Safety items required by feds/state/local
- \_\_\_\_\_ 11. NATEF in auto technician training
- \_\_\_\_\_ 12. NATEF standard for protective clothing/gloves
- \_\_\_\_\_ 13. NATEF standard for protective respiratory gear
- \_\_\_\_\_ 14. NATEF standard for protective eye gear
- \_\_\_\_\_ 15. NATEF standard for proper ventilation
- \_\_\_\_\_ 16. NATEF standard for chemical/material disposal
- \_\_\_\_\_ 17. Safety test

### B. RESOURCE MANAGEMENT (1 hr)

- \_\_\_\_\_ 1. Resource management principles/techniques
- \_\_\_\_\_ 2. Management of time, materials, personnel
- \_\_\_\_\_ 3. Effective use of time, material, personnel
- \_\_\_\_\_ 4. Benefits of effective resource management
- \_\_\_\_\_ 5. Environmentally responsible management

### C. TRADE MATHEMATICS (5 hrs)

- \_\_\_\_\_ 1. Practical applications of math
- \_\_\_\_\_ 2. Whole number problems
- \_\_\_\_\_ 3. Various fraction problems
- \_\_\_\_\_ 4. Various decimal problems
- \_\_\_\_\_ 5. Fractions to decimals
- \_\_\_\_\_ 6. Decimals to fractions
- \_\_\_\_\_ 7. English system: Measuring length
- \_\_\_\_\_ 8. English system: Measuring weight

- \_\_\_\_\_ 9. English system: Measuring volume/capacity
- \_\_\_\_\_ 10. English system linear units
- \_\_\_\_\_ 11. English system: Units of volume/capacity
- \_\_\_\_\_ 12. English system measuring problems
- \_\_\_\_\_ 13. Measuring techniques of objects
- \_\_\_\_\_ 14. Metric system: Measuring length
- \_\_\_\_\_ 15. Metric system: Measuring weight
- \_\_\_\_\_ 16. Metric system: Measuring volume/capacity
- \_\_\_\_\_ 17. Various metric system linear units
- \_\_\_\_\_ 18. Various metric system units of weight
- \_\_\_\_\_ 19. Various metric system measuring problems
- \_\_\_\_\_ 20. Metric system measuring tools
- \_\_\_\_\_ 21. Geometric problems
- \_\_\_\_\_ 22. Algebraic problems
- \_\_\_\_\_ 23. Problem-solving techniques using percentages
- \_\_\_\_\_ 24. Reading and interpreting graphs
- \_\_\_\_\_ 25. Using a calculator

### D. TOOLS AND EQUIPMENT (10 hrs)

- \_\_\_\_\_ 1. Use/Storage techniques: General hand tools
- \_\_\_\_\_ 2. Use/Storage techniques: Shop equipment
- \_\_\_\_\_ 3. Use/Storage: Specialty tools & equipment

### E. SERVICE MANUAL/COMPUTER-BASED INFO SYSTEM (2 hrs)

- \_\_\_\_\_ 1. Types of service manuals
- \_\_\_\_\_ 2. Information that can be found in service manuals
- \_\_\_\_\_ 3. Use of service manuals
- \_\_\_\_\_ 4. CD & web search to find auto tech info
- \_\_\_\_\_ 5. Advantages: CD & web over service manuals

### F. BASIC AUTOMOTIVE ELECTRICITY (5 hrs)

- \_\_\_\_\_ 1. Definition of terms
- \_\_\_\_\_ 2. Devices used in measuring electrical activity
- \_\_\_\_\_ 3. Compare AC to DC
- \_\_\_\_\_ 4. Electrical circuits and their components

- \_\_\_\_\_ 5. Operation of charging systems
- \_\_\_\_\_ 6. Electricity can be generated
- \_\_\_\_\_ 7. Electrical systems found in cars
- \_\_\_\_\_ 8. Features/Functions: Automotive storage battery
- \_\_\_\_\_ 9. Test: Automotive storage battery
- \_\_\_\_\_ 10. Function: Fuses
- \_\_\_\_\_ 11. Different types: Electrical accessories
- \_\_\_\_\_ 12. Functions: Electrical accessories
- \_\_\_\_\_ 13. Test: Charging system

**G. GENERAL MOTORS FUEL/IGNITION CONTROL (5 hrs)**

- \_\_\_\_\_ 1. GM electronic engine control systems
- \_\_\_\_\_ 2. Measure mixture control dwell
- \_\_\_\_\_ 3. Electronic spark timing sensor input
- \_\_\_\_\_ 4. General Motors electronic fuel injection systems
- \_\_\_\_\_ 5. Activate: General Motors self-diagnostic system
- \_\_\_\_\_ 6. Measure samples: GM sensor readings
- \_\_\_\_\_ 7. General Motors system trouble codes

**H. FORD ELECTRICAL FUEL/IGNITION CONTROL (5 hrs)**

- \_\_\_\_\_ 1. Ford electronic engine control systems
- \_\_\_\_\_ 2. Measure mixture control dwell
- \_\_\_\_\_ 3. Electronic spark timing sensor input
- \_\_\_\_\_ 4. Ford electronic fuel injection systems
- \_\_\_\_\_ 5. Ford self-diagnostic system
- \_\_\_\_\_ 6. Various Ford sensor readings
- \_\_\_\_\_ 7. Ford system trouble codes

**I. CHRYSLER FUEL AND IGNITION CONTROL (5 hrs)**

- \_\_\_\_\_ 1. Chrysler electronic engine control systems
- \_\_\_\_\_ 2. Measure mixture control dwell
- \_\_\_\_\_ 3. Electronic spark timing sensor input
- \_\_\_\_\_ 4. Chrysler electronic fuel injection systems
- \_\_\_\_\_ 5. Activate: Chrysler self-diagnostic system
- \_\_\_\_\_ 6. Measure various Chrysler sensor readings
- \_\_\_\_\_ 7. Chrysler system trouble codes

**J. IMPORT ELECTRICAL FUEL/IGNITION CONTROL (5 hrs)**

- \_\_\_\_\_ 1. Import electronic engine control systems
- \_\_\_\_\_ 2. Electronic spark timing: Different types
- \_\_\_\_\_ 3. Import electronic fuel injection systems
- \_\_\_\_\_ 4. Operation of CIS and CIS-E injection systems
- \_\_\_\_\_ 5. Activate: Import self-diagnosis systems
- \_\_\_\_\_ 6. Measure: Import sensor readings
- \_\_\_\_\_ 7. Trouble codes

**K. GENERAL ELECTRICAL SYSTEM DIAGNOSIS (40 hrs)**

- \_\_\_\_\_ 1. Complete work order
- \_\_\_\_\_ 2. Identify/interpret system concerns
- \_\_\_\_\_ 3. Research applicable vehicle & service information
- \_\_\_\_\_ 4. Locate/interpret vehicle & major component
- \_\_\_\_\_ 5. Diagnose electrical/ circuit integrity
- \_\_\_\_\_ 6. Use wiring diagrams during diagnosis

- \_\_\_\_\_ 7. Use of a DMM during diagnosis of problems
- \_\_\_\_\_ 8. Check electrical circuits with a test light
- \_\_\_\_\_ 9. Check electrical/electronic circuit waveforms
- \_\_\_\_\_ 10. Check electrical circuits using fused jumper wires
- \_\_\_\_\_ 11. Shorts/problems in electrical/electronic circuits
- \_\_\_\_\_ 12. Causes of excessive parasitic draw
- \_\_\_\_\_ 13. Inspect and test the electrical devices
- \_\_\_\_\_ 14. Inspect/test switches, connectors, relays, etc
- \_\_\_\_\_ 15. Remove & replace terminal end from connector
- \_\_\_\_\_ 16. Repair wiring harness (including CAN/BUS systems)
- \_\_\_\_\_ 17. Solder repair: Electrical wiring
- \_\_\_\_\_ 18. Hybrid hi voltage circuit/safety precautions

**L. BATTERY DIAGNOSIS AND SERVICE (30 hrs)**

- \_\_\_\_\_ 1. Battery state-of-charge test
- \_\_\_\_\_ 2. Battery capacity test; confirm for vehicle
- \_\_\_\_\_ 3. Maintain /restore electronic memory functions
- \_\_\_\_\_ 4. Inspect, clean, fill, &/or replace battery/cables
- \_\_\_\_\_ 5. Perform battery charge
- \_\_\_\_\_ 6. Using jumper cables or auxiliary power supply
- \_\_\_\_\_ 7. Circuits of electric/hybrid vehicle; safety
- \_\_\_\_\_ 8. Accessories that require re-initialization code
- \_\_\_\_\_ 9. Hybrid auxiliary battery service/repair/test

**M. STARTING SYSTEM DIAGNOSIS & REPAIR (30 hrs)**

- \_\_\_\_\_ 1. Perform starter current draw tests
- \_\_\_\_\_ 2. Perform starter circuit voltage drop tests
- \_\_\_\_\_ 3. Inspect and test starter relays and solenoids
- \_\_\_\_\_ 4. Remove and install starter in a vehicle
- \_\_\_\_\_ 5. Inspect and test: Starter control circuits
- \_\_\_\_\_ 6. Electrical & engine problems: slow no-crank

**N. CHARGING SYSTEM DIAGNOSIS & REPAIR (30 hrs)**

- \_\_\_\_\_ 1. Perform charging system output test
- \_\_\_\_\_ 2. Diagnose under-, no-, & overcharge
- \_\_\_\_\_ 3. Inspect, adjust, or replace components
- \_\_\_\_\_ 4. Remove/inspect/install generator (alternator)
- \_\_\_\_\_ 5. Perform charging circuit voltage drop tests

**O. EMPLOYABILITY SKILLS (4 hrs)**

- \_\_\_\_\_ 1. Employer requirements in an employee
- \_\_\_\_\_ 2. Identify potential employers thru job search
- \_\_\_\_\_ 3. Sample résumé/cover letters
- \_\_\_\_\_ 4. Accurate, legible application
- \_\_\_\_\_ 5. Common mistakes made on job application
- \_\_\_\_\_ 6. Sample job applications
- \_\_\_\_\_ 7. Enthusiasm on the job
- \_\_\_\_\_ 8. Appropriate appearance on a job
- \_\_\_\_\_ 9. Upgrading of skills on a job
- \_\_\_\_\_ 10. Customer service to build relationships