

AUTOMOTIVE TECHNICAL ACADEMY (ATA)

ATA-E100

General Automotive Electrical Technology

Curriculum Framework (Version 1.0)

Programme Status: Proposed for Approval

Programme Information

Programme Code:

ATA-E100

Programme Title:

General Automotive Electrical Technology

Qualification Level:

Professional Diploma

Duration:

48 Weeks

Training Days:

5 Days Per Week

Hours Per Day:

8 Hours

Total Contact Hours:

1,920 Hours

Teaching Philosophy

- **70% Practical = 1,344 Hours**
- **30% Theory = 576 Hours**

The programme follows ATA's competency-based, industry-driven training model, emphasizing practical diagnostics, repair, installation, and preventive maintenance using real vehicles, OEM service information, and professional diagnostic equipment.

Entry Requirement

Successful completion of:

ATA-E000 – Automotive Electrical & Electronics Foundation

or

Recognition of Prior Learning (RPL) in accordance with ATA admission policy.

Programme Goal

To produce highly competent automotive electrical technicians capable of diagnosing, repairing, maintaining, testing, and installing automotive electrical systems in conventional and modern vehicles using industry-standard tools, diagnostic procedures, and OEM best practices.

Graduate Competency Profile

Graduates will be able to:

- Diagnose and repair complete automotive electrical systems.

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- Read, interpret, and create wiring diagrams.
- Perform wiring harness repairs and fabrication.
- Diagnose and repair starting and charging systems.
- Service vehicle lighting and signaling systems.
- Diagnose sensors, actuators, relays, switches, and control circuits.
- Test motors, solenoids, and electrical loads.
- Diagnose CAN Bus, LIN Bus, and basic vehicle communication networks.
- Use multimeters, oscilloscopes, power probes, scan tools, and battery analyzers effectively.
- Perform voltage drop, current draw, continuity, insulation resistance, and parasitic drain tests.
- Carry out OEM-quality electrical repairs and documentation.
- Manage electrical workshop operations safely and professionally.

Programme Structure

Module	Title	Weeks	Hours
E100-01	Electrical Workshop Safety, Professional Practice & Advanced Tools	3	120
E100-02	Automotive Electrical Principles & Circuit Analysis	5	200
E100-03	Wiring Harnesses, Connectors & Electrical Repairs	6	240
E100-04	Batteries, Starting & Charging Systems	6	240
E100-05	Lighting, Signalling, Wipers & Auxiliary Electrical Systems	5	200
E100-06	Sensors, Actuators, Motors, Relays & Control Circuits	6	240
E100-07	Vehicle Communication Networks & Electrical Diagnostics	6	240
E100-08	Workshop Management, Customer Documentation & Quality Assurance	3	120
E100-09	Integrated Automotive Electrical Projects	6	240
E100-10	Industrial Attachment, Capstone Project & Final Assessment	2	80
TOTAL		48 Weeks	1,920 Hours

Module 1

Electrical Workshop Safety, Professional Practice & Advanced Tools

Duration: 3 Weeks

Topics

- Electrical workshop safety
- High-current hazards
- PPE selection

- Lock-out/tag-out awareness
- Battery handling procedures
- Fire safety
- Tool calibration
- Workshop organization
- OEM repair procedures
- Professional ethics

Practical Competencies

Students will:

- Operate electrical workshop equipment safely.
 - Inspect and maintain electrical tools.
 - Apply professional workshop standards.
 - Document electrical service jobs correctly.
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Module 2

Automotive Electrical Principles & Circuit Analysis

Duration: 5 Weeks

Topics

- Advanced Ohm's Law
- Kirchhoff's Laws (practical application)
- Series, parallel, and mixed circuits
- Voltage drop analysis
- Current flow
- Resistance testing
- Power calculations
- Circuit protection
- Electrical symbols
- Wiring diagrams

Practical Competencies

Students will:

- Build and test electrical circuits.
 - Analyze circuit faults.
 - Interpret complex wiring diagrams.
 - Verify electrical performance.
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Module 3

Wiring Harnesses, Connectors & Electrical Repairs

Duration: 6 Weeks

Topics

- Harness construction
- Connector identification
- Terminal repair
- Crimping techniques
- Soldering methods

- Heat-shrink protection
- Shielded wiring
- Grounding systems
- Harness routing
- OEM repair standards

Practical Competencies

Students will:

- Fabricate wiring harnesses.
 - Repair damaged vehicle wiring.
 - Replace terminals and connectors.
 - Perform reliable electrical repairs.
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Module 4

Batteries, Starting & Charging Systems

Duration: 6 Weeks

Topics

- Battery technologies (lead-acid, AGM, EFB)
- Battery testing
- Starter motors
- Solenoids
- Alternators
- Voltage regulators
- Charging diagnostics
- Current draw testing
- Battery registration awareness
- Preventive maintenance

Practical Competencies

Students will:

- Diagnose no-start conditions.
 - Test batteries under load.
 - Service charging systems.
 - Repair starting circuits.
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Module 5

Lighting, Signalling, Wipers & Auxiliary Electrical Systems

Duration: 5 Weeks

Topics

- Exterior lighting
- Interior lighting
- LED systems
- Headlamp aiming
- Turn signals
- Hazard systems
- Horn circuits

- Wiper and washer systems
- Power sockets
- Auxiliary electrical accessories

Practical Competencies

Students will:

- Diagnose lighting faults.
 - Install auxiliary circuits.
 - Repair wiper systems.
 - Verify signaling systems.
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Module 6

Sensors, Actuators, Motors, Relays & Control Circuits

Duration: 6 Weeks

Topics

- Temperature sensors
- Pressure sensors
- Position sensors
- Speed sensors
- Electric motors
- Solenoids
- Relays
- Switching circuits
- PWM fundamentals
- Electrical outputs

Practical Competencies

Students will:

- Test sensors accurately.
 - Diagnose actuator faults.
 - Service relay circuits.
 - Verify motor performance.
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Module 7

Vehicle Communication Networks & Electrical Diagnostics

Duration: 6 Weeks

Topics

- CAN Bus fundamentals
- LIN Bus fundamentals
- Network topology
- Scan tool operation
- Oscilloscope introduction
- Voltage drop testing
- Current clamp testing
- Parasitic drain diagnosis
- Wiring fault isolation

- Diagnostic workflow

Practical Competencies

Students will:

- Diagnose communication faults.
 - Capture and interpret basic CAN signals.
 - Perform parasitic drain tests.
 - Apply systematic diagnostic procedures.
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Module 8

Workshop Management, Customer Documentation & Quality Assurance

Duration: 3 Weeks

Topics

- Job estimation
- Labour calculation
- Parts documentation
- Service records
- Customer communication
- Warranty procedures
- Quality inspection
- Workshop scheduling
- Professional ethics

Practical Competencies

Students will:

- Prepare professional quotations.
 - Complete electrical repair reports.
 - Conduct quality inspections.
 - Manage workshop documentation.
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Module 9

Integrated Automotive Electrical Projects

Duration: 6 Weeks

Students complete comprehensive real-world projects including:

- Complete wiring harness fabrication and repair
 - Battery, starter, and alternator diagnostics
 - Lighting and auxiliary system restoration
 - Sensor and actuator testing
 - CAN Bus fault diagnosis
 - Electrical accessory installation
 - End-to-end electrical troubleshooting
 - Final customer-ready quality inspection
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Module 10

Industrial Attachment, Capstone Project & Final Assessment

Duration: 2 Weeks

Students complete:

- Supervised industrial attachment
- Comprehensive electrical diagnosis and repair project
- Practical trade test
- Written examination
- Technical presentation
- Portfolio submission
- Exit competency assessment

Required Laboratories & Workshops

- Automotive Electrical Workshop
- Wiring Harness Fabrication Laboratory
- Battery & Charging Systems Laboratory
- Starter & Alternator Testing Laboratory
- Lighting & Auxiliary Systems Laboratory
- Electrical Diagnostics & Network Laboratory
- Quality Inspection & Assessment Bay

Essential Training Equipment

Students should train with:

- Professional digital multimeters
- Automotive oscilloscopes
- Current clamp meters
- Power probes
- Battery analyzers
- Battery chargers
- Starter/alternator bench testers
- Regulated DC power supplies
- Automotive scan tools
- CAN Bus training boards
- Wiring harness training panels
- Soldering and rework stations
- Terminal crimping tools
- Heat-shrink equipment
- OEM wiring diagram software and service information
- Professional PPE

Assessment Structure

Assessment	Weight
Continuous Practical Assessment	35%
Practical Trade Tests	30%
Written Examination	15%

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Assessment	Weight
Capstone Electrical Project	15%
Professional Conduct & Industrial Attachment	5%
TOTAL	100%

Career Opportunities

Graduates may work as:

- Automotive Electrical Technician
- Automotive Diagnostic Technician (Electrical)
- Vehicle Wiring Harness Specialist
- Battery & Charging System Technician
- Starter & Alternator Technician
- Automotive Service Centre Electrical Technician
- Fleet Electrical Maintenance Technician
- OEM Dealership Electrical Technician
- Technical Instructor
- Independent Automotive Electrical Workshop Owner