



Automotive Technical Academy (ATA)

Faculty of Automotive Electrical & Electronics



Curriculum with Course Syllabus

Department: ELECTRIC VEHICLES (EVs)

Semester 1-4 | Core Courses + ATA 2040 Electives + SIWES + Capstone with Course Codes (EV 101-EV 404)

EV 101 – Workshop Safety for EV Systems

Credit Hours	2 (1T/1P)
Course Description	High-voltage safety, PPE, EV-specific workshop rules.
Syllabus / Topics	• PPE • HV safety • Lockout-tagout
Practical Activities / Lab Work	• High-voltage glove usage, safety drills
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Apply EV workshop safety practices.
Accreditation Mapping	NBTE NID Safety ASE
AI/Future Module ↘	VR High Voltage Safety Simulator

EV 102 – Fundamentals of Electric Vehicles

Credit Hours	3 (2T/1P)
Course Description	EV types, architecture, and global trends.
Syllabus / Topics	• EV types • EV architecture • EV trends
Practical Activities / Lab Work	• EV teardown analysis
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Explain fundamentals of EV technology.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI EV Architecture Analyzer



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EV 103 – Batteries & Energy Storage I

Credit Hours	2 (1T/1P)
Course Description	Lithium-ion cells, battery packs, SOC/SOH basics.
Syllabus / Topics	• Lithium-ion cells • Battery packs • SOC/SOH
Practical Activities / Lab Work	• Battery pack inspection
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Understand basic EV battery systems.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AI Battery Health Predictor

EV 104 – Electric Motors & Controllers I

Credit Hours	2 (1T/1P)
Course Description	BLDC, PMSM, induction motors and controllers.
Syllabus / Topics	• BLDC motors • PMSM • Controllers
Practical Activities / Lab Work	• Bench test BLDC motor
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Understand EV motors and controllers.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AR Motor Simulator

EV E1 – CAD EV Chassis & Battery Placement (Elective)

Credit Hours	2 (0T/2P)
Course Description	Basics of CAD design for EV chassis and battery placement.
Syllabus / Topics	• CAD basics • EV chassis design • Battery placement
Practical Activities / Lab Work	• Create CAD model of EV chassis [®]
Assessment Methods	Project 100%
Learning Outcomes	Apply CAD to EV battery/chassis design.
Accreditation Mapping	NBTE Elective IMI-UK
AI/Future Module ↘	CAD EV Design Tool

EV 201 – Charging Systems & Infrastructure

Credit Hours	3 (1T/2P)
Course Description	AC/DC chargers, CCS, CHAdeMO, wireless charging.
Syllabus / Topics	• AC chargers • DC fast charging • Wireless charging
Practical Activities / Lab Work	• Install & test Level 2 charger
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Install and maintain EV charging systems.
Accreditation Mapping	NBTE NID ASE



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AI/Future Module ↘

AI Smart Charger Analyzer

EV 202 – Batteries & Energy Storage II

Credit Hours	3 (1T/2P)
Course Description	BMS architecture, thermal management, battery repair.
Syllabus / Topics	• BMS • Thermal management • Battery repair
Practical Activities / Lab Work	• BMS testing
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Diagnose and service advanced EV battery systems.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI BMS Diagnostic Tool

EV 203 – Electric Motors & Controllers II

Credit Hours	2 (1T/1P)
Course Description	Field-oriented control, motor tuning.
Syllabus / Topics	• Motor tuning • Field-oriented control
Practical Activities / Lab Work	• Configure PMSM controller
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Optimize motor and controller operation.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AI Motor Optimizer

EV 204 – Power Electronics & Inverters

Credit Hours	2 (1T/1P)
Course Description	Inverters, DC-DC converters, onboard chargers.
Syllabus / Topics	• Inverters • DC-DC converters • Onboard chargers
Practical Activities / Lab Work	• Test inverter module
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Understand and service EV power electronics.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ↘	AI Power Electronics Analyzer

EV E2 – AR EV Charging Network Simulation (Elective)

Credit Hours	2 (0T/2P)
Course Description	Simulation of EV charging networks using AR.
Syllabus / Topics	• AR simulation • Charging network



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	modeling
Practical Activities / Lab Work	• Simulate EV charging station
Assessment Methods	Project 100%
Learning Outcomes	Apply AR to EV charging system analysis.
Accreditation Mapping	NBTE Elective IMI-UK
AI/Future Module ✗	AR Smart Grid Trainer

EV 301 – SIWES Internship

Credit Hours	6 (0T/6P)
Course Description	Supervised internship in EV service centers or charging companies.
Syllabus / Topics	• EV workshop attachment • Charging installation
Practical Activities / Lab Work	• On-the-job EV diagnostics
Assessment Methods	Supervisor Report 50% Logbook 30% Oral 20%
Learning Outcomes	Apply EV diagnostics and service skills in industry.
Accreditation Mapping	NBTE SIWES ASE
AI/Future Module ✗	IoT Internship Logbook

EV 401 – Capstone Project

Credit Hours	6 (0T/6P)
Course Description	Independent project on EV innovation.
Syllabus / Topics	• Proposal • Execution • Defense
Practical Activities / Lab Work	• AI-based EV prototype
Assessment Methods	Project 50% Report 30% Defense 20%
Learning Outcomes	Execute EV innovation project.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ✗	AI EV Innovation Suite

EV 402 – Advanced EV Diagnostics & Troubleshooting

Credit Hours	3 (1T/2P)
Course Description	Advanced CAN diagnostics, predictive maintenance.
Syllabus / Topics	• CAN diagnostics • Predictive maintenance
Practical Activities / Lab Work	• Diagnose EV via CAN bus
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Apply advanced EV diagnostic methods.
Accreditation Mapping	NBTE NID ASE
AI/Future Module ✗	AI Predictive Maintenance Platform



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EV 403 – EV Thermal Management & HVAC

Credit Hours	2 (1T/1P)
Course Description	Cooling systems for EVs, HVAC integration.
Syllabus / Topics	• EV cooling systems • HVAC integration
Practical Activities / Lab Work	• Inspect EV cooling circuits
Assessment Methods	CA 20% Practical 40% Exam 40%
Learning Outcomes	Service EV thermal and HVAC systems.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AI Thermal Flow Analyzer

EV 404 – Entrepreneurship in EV Services

Credit Hours	2 (1T/1P)
Course Description	EV workshop setup, charging stations, parts business.
Syllabus / Topics	• EV business models • Charging station setup
Practical Activities / Lab Work	• Draft EV business plan
Assessment Methods	CA 20% Business Plan 40% Exam 40%
Learning Outcomes	Develop entrepreneurship skills in EV sector.
Accreditation Mapping	NBTE NID IMI-UK
AI/Future Module ↘	AI Business Planner

EV E3 – Smart Grids & Vehicle-to-Grid (Elective)

Credit Hours	2 (0T/2P)
Course Description	Smart grids and V2G energy exchange.
Syllabus / Topics	• Smart grids • Vehicle-to-grid systems
Practical Activities / Lab Work	• Simulate V2G operation
Assessment Methods	Project 100%
Learning Outcomes	Understand smart grids and V2G applications.
Accreditation Mapping	NBTE Elective IMI-UK
AI/Future Module ↘	AI V2G Energy Manager