

Automotive Mechatronics Specialist

The Automotive Mechatronics Specialist performs advanced diagnostics on modern vehicle systems, combining mechanical, electrical, and software expertise. Their main activities include analysing communication protocols, using oscilloscopes and diagnostic tools, interpreting wiring diagrams, and conducting system coding, adaptation, and calibration. They are responsible for identifying and resolving complex multi-domain faults across ICE, EV, and hybrid systems, ensuring both performance and compliance with safety and environmental standards.

Key responsibilities involve troubleshooting networked control units, maintaining ADAS systems, ensuring emission compliance, and mentoring colleagues through technical knowledge transfer. Essential competences include green competences (efficiency and emissions diagnostics), digital competences (network and signal diagnostics), soft competences (analytical thinking, mentoring), transversal competences (interdisciplinary collaboration, mechanical insight), and sector-specific competences (ECU and ADAS diagnostics, sensor evaluation).

ESCO Mapping

<https://esco.ec.europa.eu/select-language?destination=/node/1>

ID	NAME	Concept URI
7231.10	Vehicle technician	http://data.europa.eu/esco/occupation/4ad4024e-d1d3-4dea-b6d1-2c7948111dce

Context

EQF Level	4/5
Departments	Production and Maintenance

Green Competences

ID	Name	Type	Description	Level	ESCO
C040	Perform efficiency analysis of vehicle systems	Skill	Evaluate performance/energy use to identify inefficiencies. ▪ Acquire electrical/mechanical measurements safely ▪ Trend energy use vs duty cycles and ambient conditions ▪ Isolate parasitic loads and abnormal consumers ▪ Recommend calibration/tuning changes to reduce losses	3	
C041	Ensure system integrity during diagnostics	Skill	Protect safety/environmental parameters while testing. ▪ Plan tests to avoid component damage ▪ Use bypass/loop tools safely and temporarily ▪ Maintain ESD and contamination controls ▪ Restore configurations after tests and verify	2	
C042	Perform emission diagnostics via exhaust analysis	Skill	Diagnose condition using exhaust gas readings and OBD data. ▪ Set up gas analysers and leak-free sampling ▪ Execute specified drive cycles ▪ Interpret O₂/NO_x/HC/CO data vs limits ▪ Recommend targeted repairs and re-test	3	

Digital Competences

ID	Name	Type	Description	Level	ESCO
C101	Use oscilloscopes for signal diagnostics	Skill	Operate oscilloscopes/trace tools to analyse waveforms. ▪ Configure channels, probes, triggers and sampling ▪ Probe sensors/actuators without disturbing circuits ▪ Compare waveforms against specs and references ▪ Capture/annotate traces for root-cause analysis	3	Link

ID	Name	Type	Description	Level	ESCO
C10 2	Analyse vehicle network communication	Skill	Diagnose CAN/LIN/FlexRay faults and perform coding/adaptation. ▪ Decode frames and analyse bus loads/errors ▪ Identify arbitration, short-to-x and termination issues ▪ Execute coding/parameterisation with OEM tools ▪ Validate function after programming and document	3	Link

Soft Skills

ID	Name	Type	Description	Level	ESCO
C13 7	Apply analytical thinking	Skill	Break down complex faults into testable hypotheses. ▪ Formulate hypotheses from symptoms and data ▪ Design discriminatory tests to isolate faults ▪ Evaluate evidence and decide next actions ▪ Record root cause and corrective actions clearly	3	Link
C15 4	Mentor colleagues technically	Skill	Transfer know-how through documentation and coaching. ▪ Create job aids/checklists for common faults ▪ Lead post-mortem/fault review sessions ▪ Demonstrate diagnostic techniques hands-on ▪ Provide constructive feedback on repairs	2	Link

Transversal Competences

ID	Name	Type	Description	Level	ESCO
C19 4	Mechanical systems	Knowledge	Apply mechanical principles within diagnostic reasoning.	3	Link

ID	Name	Type	Description	Level	ESCO
	knowledge for diagnostics		▪ Explain thermodynamics/fluids basics relevant to faults ▪ Interpret load paths/torque transmission effects ▪ Relate mechanical wear to observed signals ▪ Select suitable mechanical tests (compression, leak-down)		
C195	Collaborate across disciplines	Skill	Coordinate with software, electrical and mechanical teams. ▪ Share findings in structured reports ▪ Align on repair plans and test criteria ▪ Coordinate vehicle availability and safety ▪ Escalate to OEM engineering when needed	2	Link

Sector Specific

ID	Name	Type	Description	Level	ESCO
C271	Evaluate sensor signals	Skill	Diagnose faults using signal shape/amplitude/frequency vs expected behaviour. ▪ Verify supply/reference voltages and grounds ▪ Identify noise/interference and shielding issues ▪ Determine sensor failure modes vs harness faults ▪ Validate system after component replacement	3	Link
C272	Interpret embedded control units	Knowledge	Understand ECU control strategies and related documentation. ▪ Describe feedback loops, maps and protection strategies ▪ Read wiring diagrams, pinouts and network topology ▪ Explain flashing/coding risks and preconditions ▪ Evaluate software/hardware version compatibility	3	Link

ID	Name	Type	Description	Level	ESCO
C27 3	Diagnose and calibrate ADAS systems	Skill	Perform fault diagnosis and static/dynamic calibrations. ▪ Use targets, alignment tools and level surfaces ▪ Verify camera/radar/lidar mounting and angles ▪ Execute OEM calibration procedures ▪ Road-test and confirm performance	3	Link

Other

ID	Name	Type	Description	Level	ESCO
C32 0	Configure advanced measurement chains	Skill	Configure probes, clamps and interface modules for complex captures. ▪ Select probe/clamp types and ranges ▪ Set sample rates/filters and avoid aliasing ▪ Synchronise multi-channel acquisitions ▪ Ensure calibration/traceability of instruments	3	Link