albatts

Alliance for Batteries Technology, Training and Skills

2019-2023

Test and Validation Engineer

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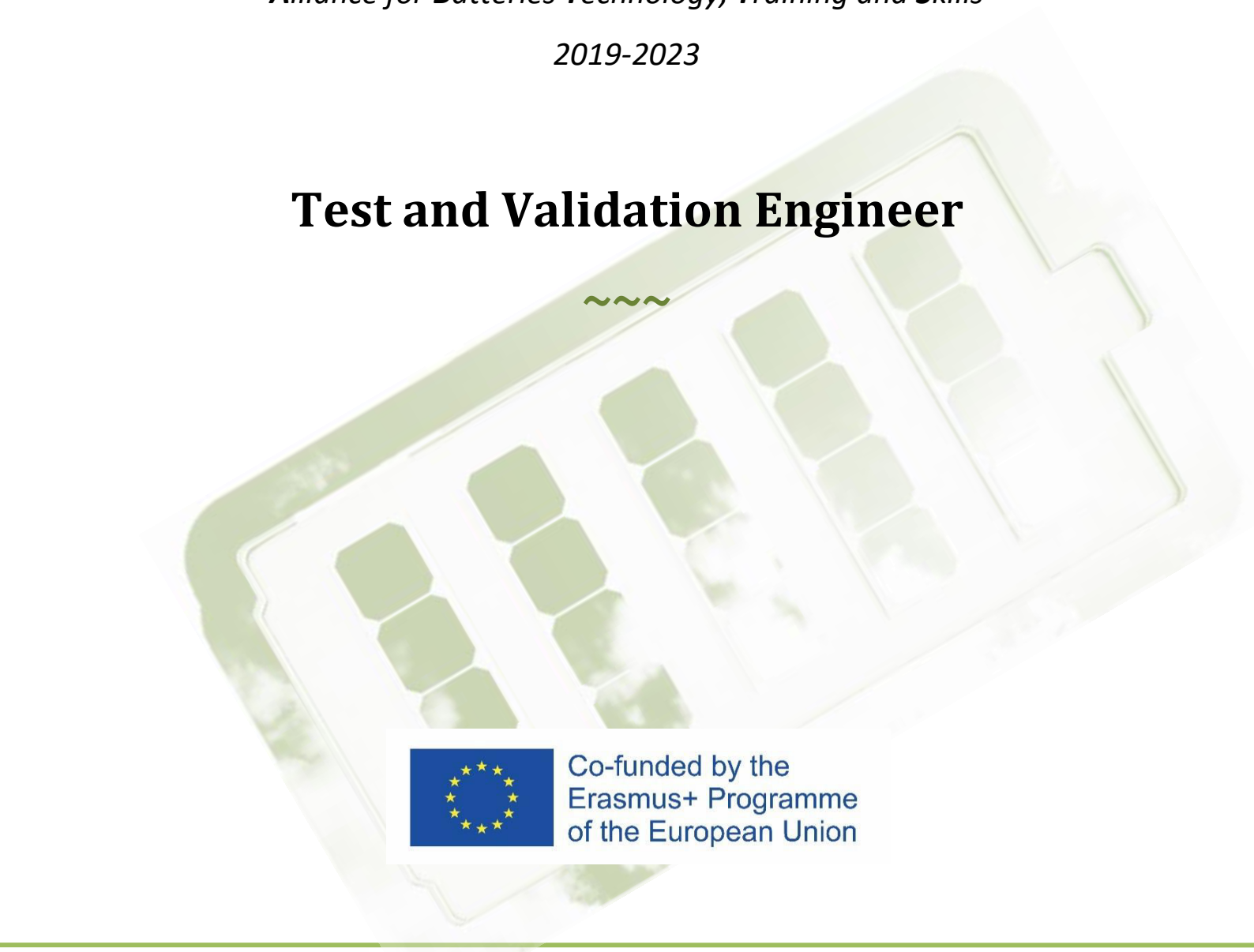

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Test and Validation Engineer

A battery test and validation engineer is responsible for testing and validating the performance, safety, and reliability of batteries and battery systems. They work with a team of engineers and scientists to design and execute test protocols and procedures, and to analyze and interpret the test results. They are responsible for ensuring that the batteries and systems meet the required performance, safety, and quality standards, and for identifying and resolving any issues that arise during the testing phase.

ESCO Occupations - ESCO - Occupations - European Commission (europa.eu)

ID	NAME	Concept URI
7412.1	automotive battery technician	http://data.europa.eu/esco/occupation/06bd6285-13ed-4ea7-90cc-e9638a0600a9
2141.4.2.1	automation engineer	http://data.europa.eu/esco/occupation/bb609566-3ab6-44dd-8f48-cf0b15b96827
2149.16	test engineer	http://data.europa.eu/esco/occupation/c8fa93eb-7c2c-42c3-b135-c2e825a6615e

Context

Minimum EQF	6/7
Value Chain	Raw Materials and Processing Cell and Components Manufacturing Modules and Packs Battery Integration Operation, repair, and maintenance Second Life Recycling
Departments	Production and Maintenance Logistics Quality RnD Intellectual/Legal
Specialisations	Other job roles that are more specialised but based on this Process & Test Engineer - Battery Technology

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	Cell Test Engineer Test Engineer Validation Engineer Test Automation Engineer Test Development Engineer Adhesive & Leak Testing Engineer Battery Test Engineer Product Validation Engineer Test Engineer - Charging Test Engineer - Charging Functions Vehicle Validation Head Battery Module Performance Engineer Performance Simulation Engineer - Powertrain Performance Engineer Senior Battery Electric Vehicle Test Engineer Virtual Design and Verification Engineer - Dynamic System Modelling Electrical Test Engineer HV Battery Test Engineer

Cross-sectoral Specific Competence

Name	Type (S/K)	Description/Context	Level	ESCO
Data Analysis/Science	K	- Systematic analysis and assessment of test data, creation of test reports - Create data analysis programs - Analyze battery cycler and data acquisition system data	Practitioner	gather data; inspect data; process data
Supervising	S	- Perform safe work practices and participate in trainings and safety programs by following safety rules, procedures, regulations, standards and laws. - Report all unsafe acts, unsafe conditions, and injuries - Lead and support a variety of cell testing activities that are central to the development of all current and future products	Expert	supervise staff
Process Improvement	S	- Lead problem solving as well as process and efficiency continuous improvement processes pertaining to the associated technologies	Expert	identify process improvement
Analysis Methods	K	- Manage root cause analysis - Conduct CAD analysis	Expert	analysis methods

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		- Analysis of process and testing of ongoing projects - Systematic analysis and assessment of test data - Create data analysis programs, graphics packages - Analyse requirements specifications and evaluate testability for system integration and qualification test processes		
Analyse Test Data	S	- Systematic analysis and assessment of test data, creation of test reports - Analyse battery cycler and data acquisition system data to determine performance variables of interest - Analysis of errors that occur and development of suggestions for fault rectification and optimization measures - process large data sets and analyse test results - Presenting test results	Expert	analyse test data
(Automated) Product Testing	S	- Lead and support a variety of testing activities that are central to the development of products - Define testing scope, schedule, and requirements for variety of battery products - Experience with testing equipment, oscilloscopes, E-loads, AC source, ideally being controlled by LabView - Experience in software testing or software development (ISO2626-2) - Experience with test simulations - Programming of automatic test systems	Expert	perform product testing
Requirements Engineering	S	- Analyse requirements specifications and evaluate testability for system integration and qualification test processes - System performance against requirements - Define internal requirements for battery cell capabilities - Establish product requirements along with planning and executing validation activities	Expert	conform with production requirements
SW Development / Engineering	K	- Experience with integrating DSM models with control models, to be used for model-based	Expert	software and applications development and analysis

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		software development - Develop dynamic systems models (DSM) - Fluency with programming languages – Matlab, Python, C++, etc - Experience in software testing or software development (ISO2626-2)		
Product Development	S	- Ability to develop dynamic systems models (DSM) - Experience in design or modelling of hybrid or battery electric vehicle systems (e.g. batteries, motors/generators, power electronics, and supporting systems) - Ability to integrate new technologies into products - Comfortable using PTC Creo or other CAD tools - Work in teams to define & develop new procedures as innovation drives new areas of testing - Innovate with new technology & implement autonomy to drive product development - Innovate with new technology & implement autonomy to drive product development	Expert	develop new products
Validation / Verification	S	- Work with test plan development and verification testing of advanced Research & Development projects - Create a test strategy (where to test) for the scope of features being delivered – MiL/SiL (virtual environment), HiL (subsystem simulator), and ViL (on vehicle) - Monitor battery cell tests for successful test execution and quickly identify & troubleshoot issues that arise during testing - Characterize and validate battery models and algorithms - Validate solutions and thermal models for various cooling configurations - Provide guidelines for performing product level integration and battery validation - Responsible for establishing product requirements along with planning and executing validation activities for a variety of battery products	Expert	apply validation engineering

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		- Define testing scope, schedule, and requirements; coordinate with Test engineering to develop test protocols/scripts and test fixtures; execute validation by coordinating with internal and external test facilities; process large data sets and analyse test results; generate reports; diagnose any test related issues; support definition of product requirements that needs to be validated; and support design and process root cause analysis activities - Design and execute verification plans		
Diagnostics (Performance Prediction/Validation)	K	- Help validate the design's performance	Practitioner	performance diagnosis

Sector Specific Competence

Name	Type (S/K)	Description/Context	Level	ESCO
BMS	K	- Develop test cases/procedures that effectively verify BMS functionalities and performance against internal system requirements - Designing, analysing and validating Battery Modules & BMS HW in a team across a range of battery systems for a variety of applications - Understanding of battery systems and their application	Expert	BMS

Soft Competence

Name	Type (S/K)	Description/Context	Level	ESCO
Communication	K	- Active and close cooperation with internal/external colleagues - Ongoing expert discussion - Localization and establishing contacts with potential service providers - Work and collaborate with other operators	Expert	communication
Problem Solving/Troubleshooting	S	- Diagnose, troubleshoot, and repair issues. Enlist Subject Matter Experts (SMEs) to aid in identifying root-cause and corrective action - Lead problem solving and rack issues found during trials	Expert	problem solving & troubleshoot

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		- troubleshooting, reporting and maintaining quality regarding the production process - Troubleshoot Test Equipment - Monitor battery cell tests for successful test execution and quickly identify & troubleshoot issues that arise during testing - Perform analyses on machine test data to develop understanding of system operation, solve problems and improve performance		
Teamwork	K	- Work in specialized teams with planning and executing activities for a variety of battery products - Work in different groups along the value chain to define requirements and validate battery models and algorithms etc. - Active and close cooperation with internal/external colleagues and other stakeholders	Expert	teamwork principles

General Transversal Competence

Name	Type (S/K)	Description/Context	Level	ESCO
Reporting	S	- Create data analysis programs and report analysis results in a professional manner - Report issues and test status - Develop various battery cell test experiments and document procedures - Generate test reports including key information requested - Generate reports and present to internal and external stakeholders	Expert	follow reporting procedures
Computer Literacy / Office	S	- Essential to be able to navigate and operate in an online environment using the appropriate tools defined by tasks	Expert	have computer literacy
Customers/Stakeholders	S	Generate reports and present to internal and external stakeholders - Support customer system integration effort and reproduce field issues - Active and close cooperation with internal/external colleagues and other stakeholders - Ongoing expert discussion with worldwide CoE development colleagues	Practitioner	communicate with customers

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Documentation	S	- Generate documentation of test results and technical designs - Develop various battery cell test experiments and document procedures	Practitioner	use technical documentation; observe documents

Academic Competence (can be taken from University programme)

Name	Type (S/K)	Description/Context	Level	ESCO
Engineering	K	- execute feature and algorithm development testing on engineering build software - coordinate with Test engineering to develop test protocols/scripts and test fixtures	Expert	engineering principles
Computer Science / IT Management	K	- Understanding and ability to use necessary applications and programs. - Ability to design and develop theoretical and practical applications - software and hardware development	Expert	computer science
Electrical Engineering (systems)	K	- Write testing programs of varying complexity, for a variety of electrical testing equipment - Conduct electrical testing - Development of new ideas on measurement technology and methodology for electrical, geometric and thermal test methods - Create test concepts and backup plans for the charging system - Experience with modelling of Mechanical/electrical systems (Engine/battery, transmission/motors, converters and thermal) using software like Matlab/Simulink and Dynasty (or equivalent commercial software like GT Suite and AMESim, ANSYS/twin builder etc.)	Expert	electrical engineering

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