EuroSPI / ASA Certified Automotive Battery Systems Engineer

Goal

For decades batteries in vehicles were just 12 V led batteries to provide power to start the vehicle and to provide power for the electronic control units in the car. Once you start the car an alternator reloads the battery during drive. This electric supply was sufficient for a long time until the drivers of change impacted the entire automotive industry. Nowadays the vehicles have a LV (Low Voltage) and HV (High Voltage) bord net and the HV power supply is used for the electrification of the powertrain in the vehicle. The goal is to reach zero emission vehicles in the future. That led to new skills needs (electric powertrain), new car architectures.
This course addresses Basic Batteries Concepts and Basic Batteries Markets, Battery Management System, High Voltage Relays, Functional Safety Standard, Cybersecurity Standard, and international norms that must be fulfilled according to UNECE regulations when releasing a traction battery to the European market. The training includes practical examples and exercises to learn about:
The automotive The student knows about the History of the battery in automotive.
The student knows about the battery market and its players in general.
The student knows the functions of a Battery Management Systems (BMS)
The student knows the main functions of a high voltage relay
The students knows how a HARA is performed.
The student knows how a Threat and Risk Analysis (TARA) is performed according to ISO 21434.
The student is aware of a typical test strategy for testing lithium-ion battery packs and systems for automotive applications
The student knows about automotive homologation process basics for battery systems in Europe.

Content

The following lectires and exercises are part of the course:

BATTENG.U1.E1	Basic Batteries Concepts
BATTENG.U1.E2	Basic Batteries Markets
BATTENG.U2.E1	Battery Management System
BATTENG.U2.E2	High Voltage Relays
BATTENG.U2.E3	Functional Safety
BATTENG.U2.E4	Cybersecurity
BATTENG.U2.E5	Testing of electrically propelled road vehicles
BATTENG.U3.E1	Battery homologation

Schedule

Unit Identifier		Unit Name	Element Identifier	Element Name	Performance Criterion	PC Description
BATTENG.U1	Day 1	Introduction to battery concepts in automotive	BATTENG.U1.E1	Basic Batteries Concepts	BATTENG.U1.E1.PC1	The student knows about the History of the battery in automotive.
					BATTENG.U1.E1.PC2	The student knows about the battery supply chain in automotive.
					BATTENG.U1.E1.PC3	The student knows some applications of batteries in automotive architectures.
					BATTENG.U1.E1.PC4	Know the principles of an electric battery and battery cells in cars
	Day 1		BATTENG.U1.E2	Basic Batteries Markets	BATTENG.U2.E1.PC1	The student knows about the battery market and its players in general.
					BATTENG.U2.E1.PC2	Know the impact of the battery industry.
BATTENG.U2	Day 1	Battery Systems Engineering	BATTENG.U2.E1	Battery Management System	BATTENG.U2.E1.PC1	The student knows the functions of a Battery Management Systems (BMS)
					BATTENG.U2.E1.PC2	The student knows components, specifics and requirements for a BMS
					BATTENG.U2.E1.PC3	The student knows hardware functions of a BMS
					BATTENG.U2.E1.PC4	The student knows software functions of a BMS
	Day 2	Exercise U2.E1				Functional Specifications Battery Systems
	Day 2		BATTENG.U2.E2	High Voltage Relays	BATTENG.U2.E2.PC1	The student knows the main functions of a high voltage relay
					BATTENG.U2.E2.PC2	The student knows about the control strategy of a power electronic which realises a high voltage relay.
	Day 2		BATTENG.U2.E3	Functional Safety	BATTENG.U2.E3.PC1	The students knows how a HARA is performed.
					BATTENG.U2.E3.PC2	The student knows about ASIL and target FIT and target Diagnostic Coverage.
					BATTENG.U2.E3.PC3	The student knows what an FMEA/FMEDA is.
	Day 3	Exercise U2.E3				Battery System HARA and Safety Goals and Battery Safety Concepts
			BATTENG.U2.E4	Cybersecurity	BATTENG.U2.E4.PC1	The student knows how a TARA (Threat and Risk Analysis) is performed according to ISO 21434.
					BATTENG.U2.E4.PC2	The student knows how to use a TARA for a battery system.
	Day 3	Exercise U2.E4				Battery System TARA and Cybersecurity Goals and Battery Cybersecurity Concepts
BATTENG.U3	Day 3	Battery Homologation	BATTENG.U3.E1	Battery homologation	BATTENG.U3.E1.PC1	The student knows about automotive homologation process basics.
					BATTENG.U3.E1.PC2	The student knows about specific norms to be applied to qualify and release a battery system in automotive.
	Day 4	Exercise U1.E1				Battery System Test Specifications Design Exercise / Test Plans
BATTENG	Day 4	Summary and Exam Preparation			BATTENG.Ux.Ex	Summary of lessons learned and exam prep
EXAM	Day 4	Exam of 1,5 hiurs			BATTENG.Ux.Ex	Exam in the EuroSPI exam portal system

The course is structured by elements which are linked to job role descriptions for battery system engineers at car makers and suppliers in automotive. For each element there is a slide set, student notes and exercises.

Training Materials

The training materials include slides, examples and exercise materials. It also includes linked articles and papers for further reading. The course is held within the infrastructure of the online EuroSPI academy which offers all training materials, exercises, self tests for the exam preparation, and access to exercises.

Target Group and Prerequisites

We address here new job role descriptions in automotive industry. The skill level in car makers is defined as: minimum bachelor level, master level preferred, minimum 5 years experience in design of complex systems. Also car makers search for PhDs with technical universities which are involved in battery design and development.
EQF level 7 and 8, university degree required.

Cancellation

Cancellation is not possible. You may determine a substitute or attend the course at a later date.

Examination and Certification

Exams are organised by the EuroSPI / ASA certification organisation. In case of safety engineers the exam is based on a set of mandatory exercises to be performed in the course under the observation of the trainers. The EuroSPI / ASA system allows to register with a job role, upload the exercises and have an assessor in the system assessing the student performance in the practical exercises. The EuroSPI / ASA system generates a unique certification ID and certificate for the attendee. Every 2 years the certificate will later need to be renewed by attending a short update training of 1 day to learn about the new state of the art developments in battery systems engineering.

The EuroSPI Academy

The training is held in the EuroSPI academy (https://academy.eurospi.net/) in cooperation with ISCN. The moodle based training environment integrates all above mentioned training materials and tools in an effective online training platform.

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