InnoEnergy Skills Institute

Introduction to Battery Safety

This course introduces essential safety aspects of battery manufacturing, testing, storage, handling, and disposal. It covers administrative and engineering controls, risks and hazards, mitigation, and safety compliance across all phases of the battery lifecycle. Participants will learn to recognize appropriate safety measures, use personal protective equipment (PPE) effectively, and identify key regulations to maintain safety standards and compliance. In addition, emphasis is given to the importance of personal responsibility for safety at all levels of the workplace and throughout the battery lifecycle.

Learning outcomes

Upon completion of the certification, learners will be able to:

- Distinguish between administrative and engineering safety controls.
- Recognize the safety risks in producing, handling, transporting, storing, or recycling battery cells or battery packs.
- Determine appropriate safety measures to ensure safety compliance at any stage of battery cell or battery pack manufacturing and disposal.
- Utilize the appropriate PPE to comply with safety protocols when producing, handling, transporting, storing, or recycling battery cells or battery packs.
- Identify relevant safety regulations to ensure compliance.

Certification structure

This course consists of eight lessons. Each lesson has video instruction and self-check questions.

Lesson	Outcomes
Lesson 1: General Safety: Regulation, Roles, Responsibilities, and Controls	• Explain the role of safety regulations • Identify the function of various safety compliance roles

	• Differentiate between administrative safety controls and engineering safety controls
Lesson 2: Battery Fundamentals	• Explain the relationship between voltage, current, resistance, power, and energy • Identify the various parts of a cell and battery • Differentiate between the functions of a protective circuit module (PCM) and a battery management system (BMS) • Identify the features and inherent risks in the most common cell form factors
Lesson 3: Cell Production Process	• Explain the common hazards involved in the cell production process and which pieces of equipment they are associated with • Identify the types of PPE needed for common hazards of the cell production process
Lesson 4: Battery Pack Production Process	• Identify the main phases of the battery pack production process • Explain how the battery pack production process differs from the cell production process • Explain why a battery pack is more inherently dangerous than a cell • Explain the common hazards involved in the battery pack production process and which pieces of equipment they are associated with • Identify the types of PPE needed for common hazards of the battery pack production process
Lesson 5: Battery and Cell Charging and Testing	• Define the terms C-rate, P-rate, capacity, and voltage window and why they are important for safety • Explain the administrative controls that go into a safe testing plan • Explain the engineering controls that go into a safe testing set-up • Identify four types of tests, their inherent risks, and how to mitigate them

Lesson 6: Handling and Storage of Batteries and Cells	• Explain inherent risks of handling cells and batteries and how to mitigate them • Explain the inherent risks involved in charging a battery and how to mitigate them • Recognize the signs of a damaged cell or battery and the appropriate actions to be taken • Be able to derive safe storage conditions from a cell datasheet • Distinguish between safe vs. unsafe cell or battery storage conditions and locations
Lesson 7: Safe Shipping and Transportation of Batteries	• Explain the significance of UN38.3 • Explain how the International Air Transport Association (IATA) battery guidance classifies batteries • Identify what is needed to safely ship an experimental cell or battery
Lesson 8: Waste Management and Recycling	• Describe what type of battery can be thrown in regular household trash • Explain how to safely dispose of lithium- ion or similar batteries • Explain the hazards involved in battery disposal and recycling • Explain the methods of mitigating those risks

Instructors

Reece Daniel has spent over a decade working in battery research and development at battery labs in both industry and academia and has participated in projects spanning the full spectrum of the battery technology life-cycle--from exploratory, beaker-cell testing to commercial cell and battery pack fabrication and production. In addition, he was a research engineer responsible for the development and testing of novel electrochemical energy storage systems. He has a particular interest in establishing and maintaining procedures, personnel management, and safety protocols.

Mohammed Abdulgadir is an electrical engineer with expertise in HVDC networks, distributed generation systems, and energy efficiency. His expertise has helped energy producers and

manufacturers in Europe and the Middle East optimize the production, efficiency, and safety of electrical production and use.

How will you learn?

This course is 100% online and asynchronous.

Duration: 3 Hours

Is it right for you?

This course is intended for anyone who may interact with batteries in a plant, factory, or other context. The intended skill level of the course is novice. Completion of this course should set the learner up to be compliant with OSHA, or other relevant regulatory bodies.

- Battery cell and pack manufacturing technicians and managers
- Other battery related workers, technicians, and managers

Prerequisites: No prerequisite knowledge is required for success in this course.

Certificates of Achievement

We offer two pathways for issuing of certificates, **InnoEnergy Skills Institute Certificate** and **EDC (European Digital Credentials),** each with its own unique set of benefits, allowing your organization to choose the one that best suits the objectives. **The Achievement recognition will be awarded at a >75% course assessment pass rate.**

InnoEnergy Skills Institute Certificates

What is it?

The InnoEnergy Skills Institute serves as the certificate issuer, verifying learners' progress and achievements with the course material.

What are the benefits?

InnoEnergy Skills Institute certificates are highly adaptable for recognizing various learning

levels and achievements. We offer Participation, Completion, and Achievement certificates for learners who complete online courses through the Skills Institute platform.

What that means for you?

You will receive a digital credential that you can store in your personal digital credential wallet. You can also add and share these credentials on your social media platforms. The authenticity of the credentials can be verified online by anyone seeking credential verification.

European Digital Credentials (europass)

What is it?

European Digital Credentials provide an online record of an individual's personal achievements and qualifications. Recognized by employers across the continent, InnoEnergy Skills Institute can issue European Digital Credentials, which learners can add to their European Digital Credentials wallet. For this type of credentials, we only offer Achievement certificates, awarded at a >75% course assessment pass rate.

What are the benefits?

It allows learners to signal their skills and qualifications using the European Learning Model — a semantic standard that helps the recognition of qualifications and digital credentials across Europe. It also combats fraud, and greatly reduces administrative costs.

What that means for you?

You can be confident in the authenticity of your credentials and showcase your skills in a way that is understood in the context of the European Learning Model. You'll also be able to access everything quickly and easily via your online European Digital Credentials wallet.