Sodium-Ion Battery Systems Training Course

Professional Development Training Course Outline

Category	Renewable Energy	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Sodium-Ion Battery Systems Training Course provides a future-focused foundation in next-generation energy storage, sodium-ion cell chemistry, battery energy storage systems (BESS), electric mobility, grid-scale storage, renewable-energy integration, battery management systems (BMS), advanced materials, lifecycle management, and sustainable battery manufacturing. Sodium-ion technology is moving from development toward commercial scale, with growing interest in electric vehicles, stationary storage, industrial applications, and cold-climate operation. The International Energy Agency reports that sodium-ion batteries can offer strong low-temperature performance and reduce exposure to lithium-price volatility, while current limitations include lower energy density and less-developed supply chains.

This professional training course equips participants to understand the technology roadmap, system architecture, performance characteristics, safety considerations, techno-economic drivers, supply-chain opportunities, sustainability, recycling, and market applications of sodium-ion battery systems. Through practical learning and industry case studies, participants explore how sodium-ion technology can complement LFP and other lithium-ion chemistries, particularly in stationary storage, urban mobility, industrial equipment, and applications where cold-temperature performance and supply-chain diversification are important. The course also examines emerging commercialization trends and the strategic role of sodium-ion batteries in the global energy transition and electrification ecosystem.

Programme Curriculum

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5 days

Course Objectives

By the end of the course, participants will be able to:

1. Understand the fundamentals of sodium-ion battery chemistry and electrochemical energy storage.
2. Explain major cell components, materials, architectures, and operating principles.
3. Analyze sodium-ion battery performance, energy density, power capability, efficiency, and lifecycle characteristics.
4. Compare sodium-ion, LFP, NMC, and other emerging battery technologies.
5. Understand Battery Management Systems (BMS) and battery-system monitoring concepts.
6. Evaluate sodium-ion applications in grid-scale energy storage and renewable-energy integration.
7. Examine opportunities in electric vehicles, two-wheelers, three-wheelers, commercial mobility, and industrial equipment.
8. Assess battery safety, risk management, thermal considerations, standards, and responsible system operation.
9. Understand battery manufacturing, quality assurance, testing, validation, and technology scale-up.
10. Analyze battery economics, total cost of ownership, supply-chain resilience, and commercialization pathways.
11. Explore battery recycling, circular economy, sustainability, and end-of-life strategies.
12. Evaluate real-world industry case studies, technology roadmaps, and deployment scenarios.
13. Develop strategic insights for sodium-ion battery adoption, project development, innovation, and energy-transition planning.

Target Audience

1. Battery engineers and energy-storage professionals
2. Electrical, electronics, mechanical, and chemical engineers
3. Renewable-energy and solar-plus-storage professionals
4. Electric vehicle and e-mobility professionals
5. BESS developers, operators, and project managers
6. Energy consultants, researchers, and technology analysts
7. Manufacturing, quality, supply-chain, and sustainability professionals

8. Government, utility, policy, investment, and clean-energy decision-makers

Course Modules

Module 1: Sodium-Ion Battery Fundamentals & Technology Landscape

- Evolution from **lithium-ion to sodium-ion energy storage**
- Electrochemical principles and **ion intercalation**
- Key cell components-cathode, anode, electrolyte, separator, and current collectors
- Major sodium-ion chemistry families and technology pathways
- **Case Study:** Analysis of the commercial transition from laboratory-scale sodium-ion technology toward vehicle and stationary-storage applications

Module 2: Cell Chemistry, Materials & Battery Architecture

- **Cathode materials** and their influence on performance
- **Hard-carbon anodes** and sodium-storage mechanisms
- Electrolytes, separators, current collectors, and interfaces
- Cylindrical, prismatic, pouch, and emerging **cell-to-pack architectures**
- **Case Study:** Comparing sodium-ion cell architecture with LFP battery-pack architecture for stationary storage

Module 3: Battery Performance, Testing & BMS

- Understanding **capacity, voltage, energy density, power density, efficiency, and cycle life**
- Fundamentals of **State of Charge (SoC)** and **State of Health (SoH)**
- Battery Management System functions and system-level monitoring
- Performance testing, validation, diagnostics, and data interpretation
- **Case Study:** BMS-based performance assessment for a sodium-ion stationary battery system

Module 4: Safety, Reliability & Responsible System Design

- Battery-system safety principles and **risk assessment**
- Thermal behavior, environmental conditions, and reliability considerations
- Electrical protection, monitoring, isolation, and fault-management concepts
- Standards, compliance, documentation, and operational governance
- **Case Study:** Developing a high-level safety and reliability framework for a grid-connected sodium-ion BESS

Module 5: Sodium-Ion BESS & Renewable-Energy Integration

- Sodium-ion applications in **utility-scale and behind-the-meter energy storage**
- Solar-plus-storage and wind-plus-storage integration
- Peak management, load shifting, backup power, and grid flexibility
- Microgrids, distributed energy resources, and energy-access applications
- **Case Study:** Evaluating sodium-ion storage for renewable-energy integration in a high-demand electricity network

Module 6: Electric Mobility & Emerging Applications

- Sodium-ion opportunities in **EVs, urban mobility, two-wheelers, and three-wheelers**
- Cold-climate performance and application suitability

- Industrial vehicles, forklifts, commercial fleets, and specialized mobility
- Hybrid battery concepts combining sodium-ion and lithium-ion technologies
- **Case Study:** Assessing sodium-ion technology for an urban electric-mobility fleet where range, cost, and temperature performance must be balanced

Module 7: Manufacturing, Supply Chain & Sustainability

- Sodium-ion **gigafactory scale-up** and manufacturing economics
- Critical materials, supply-chain diversification, and localization
- Quality control, production consistency, and technology readiness
- **Circular economy, recycling, resource efficiency, and lifecycle assessment**
- **Case Study:** Supply-chain resilience assessment comparing sodium-ion and lithium-ion battery ecosystems

Module 8: Techno-Economics, Commercialization & Future Roadmap

- **Levelized cost of storage (LCOS)** and total cost of ownership
- Market segmentation and application-specific technology selection
- Investment considerations, commercialization barriers, and scalability
- Technology roadmaps, competitive positioning, and future innovation
- **Case Study:** Building a strategic business assessment for deploying sodium-ion BESS versus LFP storage

Training Methodology

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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