Battery Degradation Analysis 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

Battery degradation analysis is a critical discipline in the rapidly evolving fields of electric vehicles (EVs), renewable energy storage, lithium-ion technology, and battery management systems (BMS). As global demand for sustainable energy solutions, fast-charging batteries, and high-performance energy storage systems increases, understanding the mechanisms behind battery aging, capacity fade, thermal instability, and performance degradation has become essential. Battery Degradation Analysis Training Course is designed to equip professionals with advanced analytical tools, predictive modeling techniques, and real-world diagnostic skills to assess and mitigate battery degradation effectively.

This course emphasizes data-driven battery analytics, AI-powered diagnostics, electrochemical modeling, and lifecycle optimization strategies. Participants will gain hands-on experience in failure analysis, state-of-health (SOH) estimation, degradation forecasting, and safety assessment, ensuring they can contribute to cutting-edge innovations in EV battery systems, grid storage solutions, and next-generation energy technologies.

Programme Curriculum

Battery Degradation Analysis Training Course

Introduction

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Course Duration

5 days

Course Objectives

1. Understand battery degradation mechanisms in lithium-ion systems
2. Analyze capacity fade, internal resistance growth, and cycle aging
3. Apply data analytics and machine learning for battery diagnostics
4. Evaluate state-of-health (SOH) and state-of-charge (SOC) estimation
5. Perform thermal runaway and safety risk assessments
6. Develop predictive maintenance strategies using AI models
7. Interpret electrochemical impedance spectroscopy (EIS) data
8. Conduct battery lifecycle and performance optimization studies
9. Identify failure modes in EV and energy storage batteries
10. Utilize digital twin technology for battery simulation
11. Implement fast-charging degradation mitigation techniques
12. Assess sustainability and recycling impact on battery lifespan
13. Integrate battery analytics into smart grid and IoT systems

Target Audience

1. Battery engineers and EV design specialists
2. Energy storage system professionals
3. Data scientists in battery analytics
4. R&D engineers in lithium-ion technology
5. Automotive and EV industry professionals
6. Renewable energy and grid storage experts
7. Quality assurance and reliability engineers
8. Academics and researchers in electrochemistry

Course Modules

Module 1: Fundamentals of Battery Technology

- Battery types and chemistries
- Lithium-ion fundamentals
- Energy density vs power density
- Battery components overview
- **Case Study:** EV battery architecture analysis

Module 2: Degradation Mechanisms

- Chemical and mechanical degradation
- SEI layer formation
- Lithium plating effects
- Electrolyte decomposition

- **Case Study:** Capacity fade in EV batteries

Module 3: Battery Aging Analysis

- Calendar vs cycle aging
- Aging indicators
- Performance degradation curves
- Environmental impact
- **Case Study:** Aging trends in grid storage systems

Module 4: Data-Driven Diagnostics

- Data acquisition systems
- Sensor integration
- Data preprocessing techniques
- Feature extraction
- **Case Study:** Real-time battery monitoring system

Module 5: Machine Learning Applications

- Predictive modeling
- Regression and classification models
- Neural networks for SOH prediction
- AI-based diagnostics
- **Case Study:** AI-driven battery failure prediction

Module 6: State Estimation Techniques

- SOC estimation methods
- SOH estimation models
- Kalman filtering
- Adaptive algorithms
- **Case Study:** SOC estimation in EVs

Module 7: Thermal Management & Safety

- Heat generation mechanisms
- Thermal runaway analysis
- Cooling strategies
- Safety standards
- **Case Study:** Battery fire incident analysis

Module 8: Electrochemical Analysis

- EIS fundamentals
- Voltage and current analysis
- Reaction kinetics
- Modeling techniques
- **Case Study:** EIS-based degradation detection

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

Start Date	End Date	Location	Price
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

Ready to enroll or request a customized program? Book online or contact us:

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