Battery Management Systems (BMS) 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 Management Systems (BMS) are at the heart of modern energy storage solutions, powering innovations across electric vehicles (EVs), renewable energy systems, and smart grid technologies. With the rapid global shift toward clean energy, electrification, and sustainability, the demand for advanced BMS expertise has surged. Battery Management Systems (BMS) Training Course is designed to equip learners with cutting-edge knowledge in battery analytics, real-time monitoring, state-of-charge (SOC) estimation, thermal management, and predictive maintenance, ensuring optimal battery performance, safety, and longevity. Participants will gain hands-on exposure to AI-driven battery diagnostics, IoT-enabled battery monitoring, and high-performance energy storage systems, preparing them for industry-ready roles.

The course integrates industry-relevant case studies, practical simulations, and real-world applications to provide a comprehensive understanding of BMS architecture, algorithms, and design principles. Emphasizing lithium-ion battery technology, EV battery systems, renewable integration, and advanced safety protocols, this program bridges the gap between theoretical concepts and practical implementation. Learners will develop expertise in data-driven battery optimization, fault detection, and energy efficiency strategies, enabling them to contribute effectively to the rapidly evolving energy ecosystem.

Programme Curriculum

Battery Management Systems (BMS) Training Course

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5 days

Course Objectives

1. Understand advanced Battery Management System architecture and components
2. Analyze lithium-ion battery chemistry and performance optimization
3. Implement State of Charge (SOC) and State of Health (SOH) estimation algorithms
4. Explore thermal management and battery safety systems
5. Develop real-time battery monitoring using IoT and embedded systems
6. Apply AI and machine learning for predictive battery maintenance
7. Design cell balancing techniques for high-efficiency energy storage
8. Evaluate battery degradation and lifecycle management strategies
9. Integrate BMS with electric vehicles (EVs) and renewable energy systems
10. Understand battery fault diagnostics and failure analysis
11. Work with CAN communication protocols and embedded controllers
12. Optimize energy efficiency and smart grid integration
13. Gain expertise in industry-standard BMS software tools and simulations

Target Audience

1. Electrical and Electronics Engineering Students
2. EV and Automotive Engineers
3. Renewable Energy Professionals
4. Embedded Systems Developers
5. IoT and Data Analytics Engineers
6. Research Scholars in Energy Storage
7. Battery Manufacturing Professionals
8. Industry Professionals transitioning to **clean energy technologies**

Course Modules

Module 1: Fundamentals of Battery Technology

- Types of batteries-Lithium-ion, Lead-acid, Solid-state
- Electrochemical principles and reactions
- Battery performance parameters
- Charging and discharging cycles

- Case Study: Evolution of EV battery technologies

Module 2: BMS Architecture and Design

- BMS components and block diagram
- Hardware and software integration
- Centralized vs distributed BMS
- Safety mechanisms
- Case Study: Tesla BMS architecture

Module 3: Battery Modeling Techniques

- Equivalent circuit models
- Mathematical modeling
- Simulation tools
- Parameter estimation
- Case Study: MATLAB battery modeling

Module 4: State Estimation Techniques

- SOC estimation methods
- SOH prediction models
- Kalman filtering
- Data-driven estimation
- Case Study: AI-based SOC estimation

Module 5: Thermal Management Systems

- Heat generation in batteries
- Cooling techniques
- Thermal runaway prevention
- Design considerations
- Case Study: EV battery cooling systems

Module 6: Cell Balancing Techniques

- Passive vs active balancing
- Efficiency optimization
- Circuit design
- Performance analysis
- Case Study: Battery pack balancing in EVs

Module 7: Battery Safety and Protection

- Over-voltage and under-voltage protection
- Short circuit protection
- Fault detection
- Safety standards
- Case Study: Battery failure incidents

Module 8: Communication Protocols

- CAN bus fundamentals

- Data acquisition systems
- Communication interfaces
- Real-time monitoring
- Case Study: Automotive CAN networks

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

Start Date	End Date	Location	Price
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

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

Register Online Now

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