Energy Storage Systems Course: BESS & Battery Technologies

10 – 14 May 2027
Barcelona (Spain)



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Introduction

As global power systems shift toward renewable energy and decentralized generation, energy storage systems have become a critical component of modern electricity infrastructure. They play a central role in grid stability, frequency regulation, peak shaving, load leveling, and renewable energy integration. Among these technologies, battery energy storage systems BESS stand out as one of the most flexible and scalable solutions for both utility-scale and distributed applications.

This intensive 1-week course provides a comprehensive and practical understanding of energy storage systems, with a strong focus on battery energy storage systems BESS. Participants will explore storage technologies including mechanical storage systems, thermal storage systems, and electromagnetic storage technologies, while gaining in-depth knowledge of BESS components, battery chemistries, battery management systems, and power conversion systems. The program also addresses system design, economic analysis, safety standards, regulatory frameworks, and real-world implementation strategies.

Course Objectives

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

- Understand the principles and technologies of various energy storage systems
- Develop in-depth knowledge of battery energy storage systems BESS fundamentals
- Analyze BESS components, architecture, and battery management systems
- Integrate energy storage systems into modern power systems and renewable energy projects
- Evaluate grid stability applications such as frequency regulation, peak shaving, and load leveling
- Conduct economic analysis and assess business models for energy storage implementation
- Apply safety considerations and relevant standards in system design
- Assess emerging technologies including advanced battery technologies and hybrid energy storage systems

Course Outlines

Day 1: Introduction to Energy Storage Systems

- Overview of energy storage technologies
- Importance of energy storage systems in modern power systems
- Mechanical storage systems and thermal storage systems
- Electromagnetic storage technologies



Day 2: Battery Energy Storage Systems BESS Fundamentals

- Battery technologies and chemistries
- BESS components and system architecture
- Battery management systems and monitoring
- Power conversion systems for BESS

Day 3: BESS Applications and Grid Integration

- Grid stability and frequency regulation
- Peak shaving and load leveling strategies
- Renewable energy integration with storage solutions
- Microgrids and islanding operations

Day 4: Energy Storage System Design and Implementation

- Sizing and selection of energy storage systems
- Technical evaluation and performance optimization
- Economic analysis and business models
- Safety considerations and international standards
- Case studies of successful BESS implementation

Day 5: Future Trends and Emerging Technologies

- Advanced battery technologies and innovation
- Hybrid energy storage systems
- Energy storage in electric vehicles
- Policy and regulatory landscape shaping energy storage deployment

Why Attend This Course: Wins & Losses!

- Ability to assess and select appropriate energy storage technologies for specific applications
- Practical skills to design and size battery energy storage systems BESS
- Strong understanding of grid integration and renewable energy integration strategies
- Capability to conduct economic analysis and evaluate project feasibility
- Awareness of safety standards, regulatory requirements, and risk considerations
- Insight into future trends including hybrid systems and electric vehicle integration

Conclusion

Energy storage systems, particularly battery energy storage systems BESS, are transforming modern power systems and accelerating the transition toward renewable energy. This course equips participants with the technical, economic, and strategic knowledge required to design, evaluate, and implement energy storage solutions effectively.



By mastering system fundamentals, grid integration principles, economic considerations, and emerging technologies, participants will be prepared to contribute confidently to the future of sustainable energy infrastructure.

