UPS and Battery Systems Management for Critical Power Training Course



16 - 20 Nov 2026

Düsseldorf

5900 € (Per Person)

Ref: #ERE6540_96275

Course Introduction / Overview:

In an era where digital infrastructure is the backbone of the global economy, ensuring a continuous and clean power supply is not just a technical requirement but a strategic imperative. This course provides a comprehensive exploration of Uninterruptible Power Supply (UPS) and battery systems, the critical guardians of power continuity for mission-critical facilities. We delve into the core principles that govern power system reliability, moving from fundamental concepts to advanced management techniques. Drawing on foundational knowledge from experts like Alexander Kusko and Marc T. Thompson in their seminal work, "Power Quality in Electrical Systems," this program bridges theoretical understanding with practical application. Participants will gain an in-depth understanding of various UPS topologies, battery chemistries, and the intricate science of battery lifecycle management. BIG BEN Training Center has designed this course to empower professionals with the skills to design, operate, and maintain robust backup power solutions, thereby preventing costly downtime, protecting sensitive equipment, and ensuring operational resilience in any environment. This training is an essential investment for anyone responsible for the integrity of critical power infrastructure.

Target Audience / This training course is suitable for:

- Electrical Engineers and Technicians.
- Data Center Operators and Managers.
- Facilities Management Professionals.
- IT Infrastructure Managers.
- Maintenance and Operations Supervisors.
- Project Managers overseeing critical power projects.
- Consulting Engineers specializing in power systems.
- Critical Systems Technicians.

Target Sectors and Industries:

- Information Technology and Data Centers.
- Healthcare and Medical Facilities.
- Telecommunications and Broadcasting.
- Banking, Finance, and Insurance.
- Industrial Manufacturing and Process Control.
- Government, Defense, and Public Sector Agencies.
- Transportation and Logistics.
- Pharmaceutical and Research Laboratories.

Target Organizations Departments:

- Facilities Management and Maintenance.
- Engineering and Technical Services.
- Information Technology (IT) Operations.
- Data Center Management.
- Health, Safety, and Environment (HSE).
- Capital Projects and Planning.
- Risk Management and Business Continuity.
- Operations and Production.

Course Offerings:

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

- Analyze various UPS topologies to select the optimal solution for specific applications.
- Perform accurate load calculations and capacity planning for critical power systems.
- Differentiate between VRLA and Lithium-Ion battery technologies and their management requirements.
- Implement standardized battery testing and inspection procedures according to IEEE standards.
- Develop and execute comprehensive preventative maintenance plans for UPS and battery systems.
- Troubleshoot common UPS alarms, faults, and battery-related issues effectively.
- Apply electrical safety principles, including NFPA 70E, to all maintenance activities.
- Evaluate the performance and health of a UPS system using monitoring data and logs.
- Manage the full lifecycle of batteries from procurement to responsible disposal.

Course Methodology:

The training methodology at BIG BEN Training Center is centered on immersive and practical learning to ensure participants can apply their knowledge directly in the workplace. This course moves beyond traditional lectures by incorporating a blend of interactive learning techniques. We utilize detailed case studies of real-world UPS failures and power outage scenarios to analyze root causes and develop effective mitigation strategies. Group discussions and collaborative problem-solving sessions will encourage participants to share experiences and tackle complex troubleshooting challenges together. The training will feature guided simulations of maintenance procedures and alarm response protocols, reinforcing best practices in a controlled environment. Our expert instructors facilitate a dynamic learning atmosphere, providing continuous feedback and encouraging active participation. The curriculum is designed to build skills progressively, ensuring that foundational concepts are firmly established before advancing to more complex topics, ultimately equipping participants with the confidence and competence to manage critical power systems effectively.

Course Agenda (Course Units):

Unit One Fundamentals of Uninterruptible Power Systems

- Introduction to critical power and the cost of downtime.
- The role and importance of a UPS in power protection.
- Understanding power problems like sags, surges, and outages.
- Exploring UPS topologies: Standby, Line-Interactive, and Double-Conversion.
- Key components of a UPS: Rectifier, Inverter, Batteries, and Static Switch.
- Introduction to battery technologies: VRLA and Lithium-Ion.
- Basic concepts of power, voltage, and current in AC and DC systems.

Unit Two UPS System Design, Sizing, and Selection

- Conducting a thorough site and load analysis.
- Calculating total power requirements (kVA and kW).
- Principles of UPS sizing and capacity planning.
- Understanding redundancy concepts (N, N+1, 2N).
- Evaluating key UPS specifications and performance metrics.
- Environmental considerations for UPS and battery rooms.
- Comparing single-phase and three-phase UPS systems.

Unit Three Deep Dive into Battery Technology and Management

- Detailed examination of Valve-Regulated Lead-Acid (VRLA) batteries.
- Exploring the advantages and challenges of Lithium-Ion batteries in UPS applications.
- Battery charging fundamentals: Float, equalize, and boost charging.
- Battery testing methods: Impedance, conductance, and discharge testing.
- Interpreting battery test data to predict failure.
- Implementing effective Battery Monitoring Systems (BMS).
- Strategies for battery replacement and extending service life.

Unit Four UPS Operations, Maintenance, and Troubleshooting

- Best practices for UPS and battery installation and commissioning.
- Developing a comprehensive preventative maintenance schedule.
- Performing routine visual and mechanical inspections.
- Understanding and interpreting UPS alarms, alerts, and data logs.
- A systematic approach to troubleshooting common UPS faults.
- Diagnosing and resolving battery-related problems.
- Procedures for safe UPS shutdown and startup (bypass operations).

Unit Five Safety, Compliance, and Advanced Power Topics

- Adherence to electrical safety standards including NFPA 70E.
- Understanding arc flash hazards in UPS environments.
- Overview of key IEEE standards for batteries (IEEE 450, 1188, 1679).
- The function of Static Transfer Switches (STS) and Power Distribution Units (PDUs).
- Harmonic distortion and power factor correction.
- Coordinating UPS systems with generators and other power sources.
- Future trends in energy storage and critical power technology.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

Considering the rise of renewable energy sources and microgrids, how might the traditional role of a centralized UPS evolve to support more distributed and dynamic power architectures?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself by offering a holistic, lifecycle-based approach to critical power management, rather than focusing on isolated operational tasks. We move beyond basic theory to instill a deep understanding of the interplay between design choices, maintenance strategies, and overall system reliability. While other courses may concentrate on a single vendor or technology, this program provides a broad, vendor-neutral perspective, empowering participants to evaluate and manage diverse systems effectively. A significant emphasis is placed on proactive risk mitigation and failure analysis, using real-world case studies to teach not just how to fix a problem, but how to prevent it. The curriculum integrates crucial safety and compliance standards, such as NFPA 70E and IEEE guidelines, ensuring that participants learn to operate safely and responsibly. Furthermore, the course is forward-looking, addressing emerging trends like Lithium-Ion battery technology and its impact on total cost of ownership, preparing professionals for the future of critical power infrastructure, not just its present state.