

# POWER SYSTEM BLACKOUTS, RESTORATION & TROUBLESHOOTING OPTIMIZATION



## OUR ACCREDITATION & PARTNERS



# POWER SYSTEM BLACKOUTS, RESTORATION & TROUBLESHOOTING OPTIMIZATION



## OVERALL DESCRIPTION:

This is an intensive, practical course designed to equip professionals with comprehensive knowledge and hands-on skills required to prevent, manage, and recover from power system blackouts. Through a combination of expert-led instruction and real-world scenarios, you'll master the strategies to enhance system resilience and operational integrity.

## Course Objectives:

Upon completion of this course, participants will have the knowledge and skills to:

- **Analyze and identify** the root causes and cascading effects of major power system blackouts.
- **Formulate and implement** comprehensive preventive measures and operational guidelines to enhance system resilience.
- **Master the principles and procedures of system restoration**, including the critical "blackstart" process.
- **Apply diagnostic and troubleshooting methodologies** to rapidly identify and resolve system faults.
- **Develop and validate** your own emergency response plans through practical simulations and case-based learning.

## Course Outline:

### Fundamentals of System Stability and Blackouts

- Review of power system stability principles: voltage, frequency, and rotor angle stability.
- Defining blackout events: causes, types (partial vs. total), and their cascading effects.
- Analysis of historical blackout events and their lessons learned.



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## Course Outline:

### Preventive Measures and System Protection

- Designing and implementing protective relaying schemes for effective fault isolation.
- Strategic application of load shedding and other defense mechanisms to prevent collapse.
- Operational best practices and grid codes for maintaining system security.

### System Restoration Principles and Procedures

- Core concepts of a dead system and the role of blackstart resources.
- Detailed, step-by-step procedures for grid restoration, from initial power-island formation to full system synchronization.
- Protocols for coordinating with multiple entities during a restoration event.

### Troubleshooting and Diagnostics

- Utilizing Supervisory Control and Data Acquisition (SCADA) systems for real-time monitoring and fault analysis.
- Techniques for pinpointing faults in a complex system under pressure.
- Post-mortem analysis of system failures to improve future performance.

### Simulation and Emergency Planning

- Hands-on simulation exercises to practice blackout and restoration scenarios.
- Developing and validating a comprehensive emergency response and restoration plan for your specific grid.
- Tools and best practices for conducting effective drills and training.

## WHO SHOULD ATTEND?

This course is designed for professionals who are responsible for the reliability and performance of physical assets. The target audience includes Maintenance Managers, Maintenance Engineers, Operations and Plant Supervisors, Reliability Engineers, and Senior Maintenance Technicians. This course is specifically designed for a wide range of professionals responsible for the reliability and operation of power systems. It is ideal for:

- Power System Engineers and Technicians
- Transmission and Distribution System Operators
- Maintenance and Protection Engineers
- Grid Planners and Managers
- Utility and Industrial Facility Managers
- Anyone involved in the design, operation, or maintenance of large-scale electrical grids.

## Course Methodology:

We utilize a variety of proven adult learning techniques to ensure maximum understanding, comprehension and retention of the information presented. This training course will be conducted as a highly interactive workshop session. A variety of training methodologies will be used Before and during the course whenever applicable. Some of these methods are gamification, online pre-post test, role plays, self-assessment instruments, group exercises & case studies.

