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**Course Name**

# Power System Reliability & Failure Prevention

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**Sector Name**

Electrical Engineering

**Document Type**

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## Power System Reliability & Failure Prevention

### Course Introduction

Electrical failures rarely begin now equipment trips or power are interrupted. Weak connections, overloaded components, ageing equipment, protection issues, operating conditions, poor redundancy, recurring disturbances, and unresolved warning signs can gradually reduce system reliability long before a visible failure occurs. The challenge of engineering is to recognize these vulnerabilities early and understand how a local problem could affect the wider power system.

**Boost Consulting & Training** has designed this course to help electrical engineers approach reliability proactively rather than treating failures as isolated events. Participants will learn how to identify reliability-critical components, analyze failure mechanisms and system dependencies, investigate recurring failures, evaluate redundancy and contingency arrangements, recognize early indicators of deteriorating reliability, and prioritize preventive actions according to their potential impact on power availability.

**The main concept of this course** is to understand where and how an electrical power system can fail, then use engineering evidence to strengthen vulnerable points and prevent failures from becoming significant interruptions.

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## Power System Reliability & Failure Prevention

### Target Audience

- ✓ Electrical and power systems engineers
- ✓ Electrical maintenance and reliability engineers
- ✓ Plant and facility electrical engineers
- ✓ Engineering and technical operations professionals

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## Power System Reliability & Failure Prevention

### Learning Objectives

- ✓ Explain the factors that influence electrical power system reliability and availability.
- ✓ Identify critical components and vulnerable points within electrical power systems.
- ✓ Analyze common equipment and system-level failure mechanisms.
- ✓ Trace how individual electrical failures can develop into wider system interruptions.
- ✓ Investigate recurring failures using structured engineering analysis.
- ✓ Evaluate redundancy, backup arrangements, and system configuration for reliability.
- ✓ Prioritize preventive actions according to failure likelihood and operational consequence.
- ✓ Develop practical reliability improvement measures for electrical power systems.

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## Power System Reliability & Failure Prevention

### Course Outline

#### ✓ DAY 01

##### **Understanding Electrical System Reliability**

##### **Reliability in Real Power Systems**

- ✓ Connecting reliability, availability, maintainability, and continuity of electrical supply
- ✓ Understanding how equipment condition, system design, loading, operation, and maintenance influence reliability
- ✓ Distinguishing isolated equipment problems from vulnerabilities affecting overall system performance

##### **Finding Reliability-Critical Points**

- ✓ Mapping sources, transformers, switch gear, feeders, protection, distribution paths, and critical loads
- ✓ Identifying single points of failure and components with disproportionate operational impact
- ✓ Developing a Power System Reliability Map for a realistic electrical network

## Power System Reliability & Failure Prevention

### Course Outline

#### ✓ DAY 02

##### **Understanding How Electrical Failures Develop**

##### **Equipment Failure Mechanisms**

- ✓ Examining thermal, electrical, mechanical, insulation, connection, and environmental deterioration
- ✓ Relating operating stress and abnormal conditions to developing equipment failure
- ✓ Recognizing recurring patterns associated with transformers, switchgear, cables, and distribution equipment

##### **Tracing Failure Through the System**

- ✓ Understanding how a local equipment failure can affect upstream and downstream components
- ✓ Identifying dependencies that can amplify the consequences of an initial fault
- ✓ Completing an Electrical Failure Path Analysis from initiating problem to system interruption

## Power System Reliability & Failure Prevention

### Course Outline

#### ✓ DAY 03

##### **Investigating Failures & Warning Signs**

##### **Learning from Electrical Failure Events**

- ✓ Building an evidence timeline from alarms, trips, measurements, operating records, and field observations
- ✓ Separating immediate failure symptoms from underlying technical causes
- ✓ Applying structured root-cause reasoning to recurring and complex electrical events

##### **Detecting Reliability Deterioration Early**

- ✓ Recognizing abnormal temperature, loading, insulation, connection, vibration, and operating trends
- ✓ Using recurring alarms, nuisance trips, defects, and maintenance findings as reliability indicators
- ✓ Conducting an Early Failure Warning Exercise using mixed electrical evidence

## Power System Reliability & Failure Prevention

### Course Outline

#### ✓ DAY 04

##### **Strengthening the Power System Against Failure**

##### **Reducing Vulnerability Through System Configuration**

- ✓ Evaluating redundancy, alternative supply paths, sectionalization, and backup arrangements
- ✓ Assessing the reliability implications of normal and abnormal system configurations
- ✓ Identifying situations where apparent redundancy does not provide effective protection against interruption

##### **Testing System Response to Failure**

- ✓ Examining contingency conditions involving loss of supply, feeder, transformer, or major electrical equipment
- ✓ Identifying overloaded or vulnerable components following a system contingency
- ✓ Running a Power System Failure Scenario to test system response and available alternatives

## Power System Reliability & Failure Prevention

### Course Outline

#### ✓ DAY 05

##### **Preventing Recurring & High-Impact Failures**

##### **Prioritizing Reliability Improvements**

- ✓ Ranking vulnerabilities according to failure potential, consequence, criticality, and available controls
- ✓ Comparing maintenance, equipment improvement, configuration change, monitoring, and replacement options
- ✓ Directing resources toward interventions that provide meaningful reliability improvement

##### **From Failure History to Prevention**

- ✓ Converting recurring failures and reliability weaknesses into targeted preventive actions
- ✓ Establishing practical indicators for tracking whether reliability is improving
- ✓ Developing a Power System Failure Prevention Plan for a realistic electrical system

## Power System Reliability & Failure Prevention

### Confirmed Sessions

| FROM          | TO            | DURATION | FEES       | LOCATION        |
|---------------|---------------|----------|------------|-----------------|
| Dec. 21, 2026 | Dec. 25, 2026 | 5 days   | 4250.00 \$ | UAE , Abu Dhabi |

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