Advanced Power System Protection and Reliability Training Course

4 – 8 July 2027
Johannesburg

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Ref: 934_169847 **Date:** 4 – 8 July 2027 **Location:** Johannesburg **Fees:** 6000 Euro

Overview

Advanced Power System Protection and Reliability Training Course is a 1-week course for protection engineers, relay specialists, commissioning teams, reliability personnel, and technical managers who need a Protection Coordination and Reliability Assurance Dossier. Participants connect fault studies, relay settings, scheme redundancy, selectivity, sensitivity, dependability, and security with test and misoperation evidence. The course converts protection data into prioritized reliability actions. Agile Leaders Training Center provides this power-system protection and reliability course.

Who Should Attend

- Professionals responsible for protection philosophy, relay settings, and coordination studies.
- Teams responsible for commissioning, secondary injection, and end-to-end test evidence.
- Personnel responsible for substation reliability, disturbance review, and corrective actions.
- Engineers responsible for bus, transformer, feeder, and transmission-line protection schemes.
- Technical managers responsible for protection risk, maintenance priorities, and assurance decisions.

The course assumes participants already interpret single-line diagrams, fault-study results, and relay records, and leaves out introductory circuit protection.

Departments and Industries

The course supports protection reliability decisions across utility, industrial, infrastructure, and critical-power environments.

- Protection, control, and substation engineering departments
- Power generation, transmission, and distribution operations
- Industrial electrical systems in process and manufacturing facilities
- Transport, data-center, and infrastructure power teams
- Commissioning, asset management, and reliability functions

Learning Objectives

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

- Analyze fault-study inputs and protection-zone boundaries.
- Apply selectivity, sensitivity, dependability, and security criteria.
- Build coordinated relay-setting and grading evidence.
- Diagnose scheme misoperations and hidden failure paths.
- Evaluate testing, redundancy, and maintenance evidence.
- Prioritize protection reliability improvement actions.

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Course Agenda

Day 1: Protection Architecture and Reliability Criteria

- Protection-Zone Boundary and Overlap Mapping Method
- Selectivity, Sensitivity, Dependability, and Security Criteria Matrix
- Primary and Backup Protection Responsibility Diagram
- Current-Transformer and Voltage-Transformer Measurement Chain Review
- IEC 60255-1 Relay Requirement and Test Evidence Checklist

Day 2: Fault Studies and Relay Coordination

- Short-Circuit Study Input and Scenario Validation Sheet
- Overcurrent Time-Current Coordination and Grading-Interval Plot
- IEC 60255-151 Overcurrent Function Characteristic Review
- Distance-Protection Zone Reach and Time-Grading Matrix
- Directional and Earth-Fault Element Coordination Method

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Day 3: Scheme Application and Redundancy

- IEEE C37.234 Bus-Protection Application Decision Map
- Transformer Differential Restraint and Inrush-Security Assessment
- Breaker-Failure Initiation and Isolation Logic Diagram
- Communication-Assisted Line Protection Dependability Review
- Redundant Scheme Common-Mode Failure Analysis

Day 4: Testing, Misoperation, and Reliability Improvement

- Secondary-Injection and End-to-End Test Evidence Plan
- COMTRADE Disturbance Record and Sequence-of-Events Analysis Method
- Protection Misoperation Cause-and-Consequence Register
- Relay Setting Change-Control and Independent-Review Checklist
- Protection Maintenance and Reliability Action Prioritization Matrix

Day 5: Protection Reliability Decision Practice

- Suggested Exercise: Protection-Zone and Backup Coverage Verification
- Suggested Exercise: Overcurrent and Distance Coordination Review
- Suggested Exercise: Bus and Breaker-Failure Scheme Risk Diagnosis
- Suggested Exercise: Misoperation Evidence and Corrective-Action Review
- Capstone Exercise: Protection Coordination and Reliability Assurance Dossier

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Practical Exercises

The course uses suggested activities to turn relay records and fault-study evidence into traceable decisions.

- Suggested activity: verify protection zones and backup coverage for an industrial substation.
- Suggested activity: evaluate a feeder coordination plot against fault-current scenarios.
- Suggested activity: diagnose a misoperation using disturbance records and event sequences.
- Suggested activity: rank reliability actions by risk, evidence, and verification needs.

FAQs

Who suits Power System Protection and Reliability Training and what does it assume?

Practicing protection, relay, commissioning, substation, and reliability personnel suit the course. It assumes experience with single-line diagrams, fault studies, and relay records while excluding introductory electrical protection theory.

How does Power System Protection and Reliability Training differ from a basic protective relaying course?

Power System Protection and Reliability Training integrates coordination studies, scheme redundancy, misoperation evidence, testing, and reliability decisions rather than concentrating on introductory relay functions.

How do selectivity and dependability affect power-system protection reliability?

Selectivity limits isolation to the required zone, while dependability supports operation when faults occur. Teams balance both with sensitivity and security criteria across primary and backup schemes.

Which evidence supports a protection coordination review?

A protection coordination review uses validated fault scenarios, equipment duties, relay characteristics, grading plots, setting files, protection-zone diagrams, and independent review records.

How should teams investigate protection-system misoperations?

Teams investigate misoperations by aligning disturbance records, event sequences, relay targets, settings, logic, communication status, breaker response, and maintenance history in a cause-and-consequence register.

Conclusion

Participants take back a Protection Coordination and Reliability Assurance Dossier linking fault studies, settings, tests, scheme risks, and improvement priorities. The dossier strengthens traceability for setting approval, maintenance, and corrective-action decisions. It also identifies assumptions, evidence gaps, and verification tasks for engineering review.