Electrical and Instrumentation Design Fundamentals Course

7 – 11 March 2027
Johannesburg

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Training Center

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Ref: 978_174480 **Date:** 7 – 11 March 2027 **Location:** Johannesburg **Fees:** 6000 Euro

Overview

Electrical and Instrumentation Design Fundamentals Course is a one-week foundation course for professionals who need to coordinate electrical power, instrumentation, and control design deliverables. Participants connect design inputs, load and instrument data, single-line diagrams, P&IDs, equipment selection, cabling, earthing, loop documentation, control interfaces, and design reviews. The course resolves gaps between discipline documents through a coordinated Electrical and Instrumentation Design Basis and Drawing Register. Agile Leaders Training Center delivers this electrical and instrumentation design course.

Who Should Attend

- Graduate and junior electrical engineers entering project design work
- Junior instrumentation engineers developing control documentation
- Design technicians who prepare drawings, schedules, and registers
- Project engineers coordinating electrical and instrumentation interfaces
- Multidisciplinary team members who review design deliverables

The course assumes basic engineering knowledge and familiarity with technical drawings, while detailed power-system studies, safety-instrumented-system design, and certification preparation remain outside scope.

Departments and Industries

The course supports coordinated design work across projects that combine electrical supply, measurement, control, and field installation.

- Engineering and project teams in industrial plants and process facilities
- Design offices serving utilities, infrastructure, and buildings
- Construction and commissioning teams coordinating field packages
- Facilities engineering in healthcare, transport, and data centers
- Owner engineering and technical assurance functions

Learning Objectives

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

- Define electrical and instrumentation design inputs and boundaries
- Prepare core electrical drawings, schedules, and selection records
- Build instrument indexes, I/O lists, and loop documentation
- Coordinate power, signal, control, cabling, and earthing interfaces
- Apply document checking and interdisciplinary review controls
- Assemble a coordinated design basis and drawing register

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Course Agenda

Day 1: Design Basis and Interfaces

- Project Design Input and Requirement Register
- Electrical and Instrumentation Scope Boundary Matrix
- Equipment Area, Service, and Environmental Data Sheet
- Design Standard, Assumption, and Deviation Log
- Interdisciplinary Interface and Responsibility Map

Day 2: Electrical Design Deliverables

- Electrical Load List and Demand Summary Method
- Single-Line Diagram Structure and Review Checklist
- Equipment Selection and Rating Data Sheet
- Cable Schedule, Routing, and Segregation Register
- Earthing and Bonding Design Coordination Plan

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Day 3: Instrumentation Design Deliverables

- P&ID Instrument Symbol and Tag Review Using ISA-5.1
- Instrument Index and Specification Data Register
- Input and Output List Development Method
- Instrument Loop Diagram and Connection Record
- Hook-Up Drawing and Installation Detail Checklist

Day 4: Control and Installation Coordination

- Control Narrative and Cause-and-Effect Interface Map
- Power Supply, Panel, and Marshaling Coordination Sheet
- Signal Type, Shielding, and Cable Interface Matrix
- Junction Box, Termination, and Field Location Register
- Design Review, Comment, and Revision-Control Workflow

Day 5: Design Review Practice and Capstone

- Exercise on Design Inputs and Discipline Boundaries
- Exercise on Electrical Drawing and Schedule Consistency
- Exercise on Instrument Index and Loop Documentation
- Exercise on Cable, Earthing, and Control Interfaces
- Capstone Exercise: Electrical and Instrumentation Design Basis and Drawing Register

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Practical Exercises

The course uses suggested activities that turn project inputs into coordinated electrical and instrumentation design records.

- Suggested activity: reconcile a load list, single-line diagram, and equipment schedule
- Suggested activity: build an instrument index and I/O list from a P&ID
- Suggested activity: trace power, signal, cable, and earthing interfaces across disciplines
- Suggested activity: close design-review comments and update a controlled drawing register

FAQs

Who suits electrical and instrumentation design fundamentals, and what does it assume?

Graduate engineers, junior designers, technicians, and project coordinators suit the course. It assumes basic engineering knowledge and familiarity with technical drawings, while advanced studies and certification preparation remain outside scope.

How does electrical and instrumentation design differ from electrical installation training?

Electrical and instrumentation design defines requirements, selects equipment, develops drawings, and coordinates interfaces before field work. Electrical installation training focuses more on constructing, connecting, inspecting, and maintaining equipment in accordance with approved design documents.

Why must electrical and instrumentation documents be coordinated?

Coordination keeps loads, power supplies, signal types, cables, earthing, panels, tags, and field locations consistent across documents. It prevents one discipline from changing an interface without the related drawings, schedules, and registers being reviewed.

What documents form the foundation of instrumentation design?

Instrumentation design commonly uses P&IDs, instrument indexes, specifications, I/O lists, loop diagrams, hook-up drawings, cable schedules, control narratives, and cause-and-effect records. Each document serves a different design and verification purpose.

How are electrical and instrumentation design changes controlled?

Design changes are controlled through an approved baseline, numbered comments, documented assumptions, discipline checks, interface reviews, revision records, and issue status. The drawing register shows which deliverables changed and what related documents require review.

Conclusion

Participants take back an Electrical and Instrumentation Design Basis and Drawing Register containing inputs, boundaries, drawings, schedules, indexes, interfaces, checks, and revision controls. The file changes disconnected discipline documents into a coordinated design trail. Teams can update it as project information develops and use it to govern reviews and field-package readiness.