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COURSE BROCHURE

Substation Operation and Control Room Basics Training Course

8 – 12 March 2027
Geneva

Substation Operation and Control Room Basics Training Course

Ref: 3133_118989 **Date:** 8 – 12 March 2027 **Location:** Geneva **Fees:** 7500 GBP

Substation Operation and Control Room Basics is a 1-week training course for substation technicians and junior engineers who carry out switching, monitor plant and support control room duties, producing a substation switching and isolation checklist. Growing grid loads, ageing plant and digital control are raising the cost of a wrong switching step. The course is offered by Jupiter Prime Training.

Why Substation Operation and Control Room Matters Now

Three forces shape substation work today. Networks carry more variable generation, so operators switch more often and under tighter margins. Older breakers sit beside digital relays, so staff must read both. Experienced operators are retiring, leaving newer technicians to take switching decisions sooner. Handled well, supply stays secure and people safe; handled badly, outages and injury follow. The course rests on sound switching discipline, interlocking logic and clear handover between field crews and the control room.

Who Gains Most from Substation Operation and Control Room

- Field staff who carry out switching orders and isolate plant for maintenance
- Control room staff who watch alarms, breaker positions and busbar loading
- Junior engineers who prepare switching sequences and check protection settings
- Maintenance crews who receive plant under a permit and return it to service

A shift crew gains most when its field operators and control room operators attend together and practise the same switching language.

Substation Operation and Control Room Capabilities

The outcomes link the bay with the control screen.

- Identify breakers, disconnectors, earth switches and instrument transformers on a single-line diagram — switching order preparation
- Apply interlocking rules to a proposed switching sequence — safe isolation approval
- Assess alarm and event lists after a trip — restoration decisions by the shift supervisor
- Check relay indications against the expected protection response — fault reports to protection engineers
- Communicate switching steps using repeat-back and confirmation — coordination between field crew and control room
- Specify isolation points, earthing and test-before-touch steps — permit holders and maintenance crews

Key Substation Operation and Control Room Terms

- Circuit breaker — a switching device that makes, carries and interrupts normal load and fault current on command or relay trip.
- Disconnector — an off-load switch that provides a visible isolation gap once the circuit breaker has opened the current.
- Instrument transformer — a current or voltage transformer that scales primary quantities down for meters and relays.
- Busbar — the conductor arrangement that collects and distributes power between incoming and outgoing bays in a substation.
- Interlocking — logic that blocks a switching action unless the plant is in a safe state.
- Switching schedule — the ordered list of operations and checks needed to change the network state safely.

Substation Operation and Control Room Day by Day

Day 1: The Substation and Its Role in the Network

- Single-Line Diagram Reading — Locating Bays, Feeders and Points of Supply
- Busbar Arrangements and Bus Couplers — Choosing Supply Routes During Outages
- Transformer Bays and Tap Changers — Holding Voltage Within Operating Limits
- Substation Layout and Equipment Labelling — Confirming the Right Plant Before Switching
- Shift Logbook and Handover Notes — Passing Network State to the Next Crew

Day 2: Switching Plant and Measurement

- Circuit Breaker Mechanisms and Interrupting Media — Judging Readiness to Operate
- Disconnectors and Earth Switches — Creating Visible Isolation and Earthing Points
- Current and Voltage Transformers — Trusting Readings Used by Relays and Meters
- Breaker Condition Indicators and Operation Counters — Flagging Plant for Maintenance
- Mechanical and Electrical Interlocks — Blocking Unsafe Switching Combinations

Day 3: Protection Relays and Fault Response

- Overcurrent and Earth Fault Relays — Recognising Feeder Fault Trips
- Differential Protection of Transformers and Busbars — Separating Internal From External Faults
- Distance Protection Zones on Lines — Estimating Fault Location After a Trip
- Relay Flags, Event Records and Disturbance Files — Building the Fault Story
- Auto-Reclose and Breaker Failure Schemes — Deciding When to Re-Energise

Day 4: Control Room Monitoring and Automation

- Supervisory Control Screens and Mimic Diagrams — Reading Live Plant Status
- Alarm Priorities and Event Lists — Responding to Critical Alarms First
- Bay Controllers and Station Communication Networks — Tracing Lost Indications
- Remote and Local Control Selection — Assigning Who Operates Each Bay
- Battery and Auxiliary Supply Monitoring — Keeping Protection and Trip Circuits Alive

Day 5: Practising the Substation Switching and Isolation Checklist

- Switching Schedule Drafting From the Single-Line Diagram — Sequencing a Planned Outage
- Repeat-Back Communication Drill — Confirming Each Step Between Field and Control Room
- Trip Restoration Exercise Using Relay Records — Choosing a Safe Re-Energising Order
- Permit-to-Work, Test-Before-Touch and Earthing — Handing Plant Safely to Maintenance
- Substation Switching and Isolation Checklist — Final Version for the Home Site

Applying Substation Operation and Control Room After the Course

- Walk one substation with its single-line diagram and record any labelling or interlock gaps for correction.
- Run a repeat-back switching rehearsal for a planned outage with the field crew and control room shift.

Substation Operation and Control Room Questions FAQ

What is substation operation and control room work, and why does it matter now?

It is the safe switching, monitoring and restoration of substation plant from the bay and the control screen. It matters now because networks switch more often and newer staff decide sooner.

Which roles gain most from substation operation and control room training?

Substation technicians, control room operators and junior engineers gain most. Anyone who writes or carries out switching orders will use the alarm handling and interlocking covered.

How does substation operation and control room training differ from a protection design course?

It focuses on operating plant rather than designing it. A protection design course calculates relay settings and grading, while this one teaches operators to read relay results and switch safely.

What do you bring back from substation operation and control room training?

You bring back a switching and isolation checklist built around your own site. It lists isolation points, earthing steps and repeat-back checks to test on the next outage.

Substation Operation and Control Room: The Way Forward

The substation switching and isolation checklist first informs the next planned outage: which points to isolate, earth and confirm. Field operators, control room staff and permit holders use it together during each switching task. After first use, revisit how alarms and relay records feed restoration choices, where field and control room views most often differ.