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COURSE BROCHURE

# Power Line and Cable Electrical Design Training Course

30 August – 3 September 2027
London

# Power Line and Cable Electrical Design Training Course

**Ref:** 3018_114434 **Date:** 30 August – 3 September 2027 **Location:** London **Fees:** 5900 GBP

Power line and cable electrical design is a 1-week training course for utility engineers who select conductors, size cables and check voltage performance on transmission and distribution circuits, ending with a line and cable design calculation pack. As networks absorb new generation, larger industrial loads and longer underground routes, each conductor choice now fixes losses, voltage headroom and outage exposure for decades. Jupiter Prime Training presents power line and cable electrical design here.

## Why Power Line and Cable Electrical Design Matters Now

Three pressures shape circuit design today. Solar and wind connections arrive where conductors were never rated for variable flows, urban growth pushes circuits underground where soil governs rating, and customers expect fewer interruptions and less energy lost as heat. Sound sizing avoids early reconductoring and voltage complaints; copied designs inherit hidden losses, overheated joints and clearance infringements that surface only under peak summer load. The course rests on established electrical engineering practice for line constants, thermal rating and sag, described in general terms.

## Who Gains Most from Power Line and Cable Electrical Design

- Network planners who decide routes, voltage levels and conductor sizes
- Line designers who prepare sag and clearance calculations
- Cable engineers who select insulation, screens and laying methods
- Distribution engineers responsible for feeder voltage and losses
- Consultant engineers who check design submissions

Utility planning sections gain most when planners, line designers and cable engineers attend together.

## Power Line and Cable Electrical Design Capabilities

Participants turn conductor catalogues into checkable calculations.

- Calculate impedance and capacitance of lines and cables — load flow and protection settings
- Specify conductor sizes against thermal, voltage and fault limits — procurement approval
- Assess voltage regulation along feeders and select regulating devices — customer supply quality
- Weigh conductor loss reduction against capital cost over asset life — investment committee
- Apply sag and tension calculations to confirm ground and crossing clearances — public safety and wayleave owners
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Build a planning study comparing circuit options for a new connection — network planning decision

## Key Power Line and Cable Electrical Design Terms

- Ampacity — the continuous current a conductor or cable carries without exceeding its permitted temperature.
- Surge impedance loading — the power level at which a line's reactive generation and absorption balance.
- Voltage regulation — the change in receiving-end voltage between no load and full load.
- Sag — the vertical distance between a conductor's lowest point and the straight line joining its two supports.
- Ruling span — an equivalent span length used to calculate tension for a section of unequal spans.
- Cable sheath bonding — the method of connecting cable metallic screens to earth to limit circulating currents.

## Power Line and Cable Electrical Design Day by Day

### Day 1: Circuit Role and Conductor Choices

- Network Voltage Levels and Circuit Duty — Choosing Transmission or Distribution Ratings
- Aluminium, Steel-Reinforced and High-Temperature Conductors — Strength Versus Conductivity
- Overhead Line Versus Underground Cable Routes — Cost, Consent and Outage Exposure
- Cable Insulation and Screen Types — Voltage Class and Installation Conditions
- Route Survey Inputs — Terrain, Crossings and Environmental Constraints

### Day 2: Line and Cable Parameters

- Series Resistance and Inductance Calculation — Conductor Geometry and Phase Spacing
- Shunt Capacitance and Charging Current — Long Lines and Cable Circuits
- Short, Medium and Long Line Models — Accuracy for Planning Studies
- Sequence Impedances and Mutual Coupling — Earth Fault Calculations
- Cable Sheath Bonding Arrangements — Circulating Currents and Sheath Voltages

### Day 3: Voltage Regulation and Losses

- Voltage Drop Calculation Along Radial Feeders — Customer Supply Limits
- Reactive Compensation and Line Regulators — Feeder Voltage Profile Correction
- Surge Impedance Loading and Receiving-End Voltage Rise — Light Load Voltage Control
- Technical Loss Estimation by Load Factor — Annual Energy Lost as Heat
- Economic Conductor Sizing Over Asset Life — Capital Versus Loss Cost

## Day 4: Thermal Rating, Sag and Clearance

- Conductor Thermal Rating Heat Balance — Ambient, Wind and Solar Inputs
- Cable Current Rating in Ground and Ducts — Soil Resistivity and Grouping
- Sag and Tension Calculation Using Ruling Span — Stringing Tables
- Ground and Crossing Clearance Checks — Roads, Buildings and Other Circuits
- Short-Circuit Withstand of Conductors and Screens — Fault Duration Limits

## Day 5: Practising the Line and Cable Design Calculation Pack

- Load Flow Study of Circuit Options for a New Connection — Network Planning Choice
- Conductor Selection for an Industrial Feeder Case — Applying Day 1 and Day 3 Methods
- Parameter and Voltage Profile Check for a Cable Route — Applying Day 2 Calculations
- Rating and Clearance Verification for an Overhead Section — Applying Day 4 Results
- Line and Cable Design Calculation Pack — Assumptions, Results and Recommendations

## Applying Power Line and Cable Electrical Design After the Course

- Lead a recalculation of voltage drop and technical losses on one heavily loaded feeder and propose a conductor or compensation change
- Audit the thermal rating assumptions used for an existing cable route against measured soil resistivity and grouping

## Power Line and Cable Electrical Design Questions FAQ

### What is power line and cable electrical design, and why does it matter now?

Power line and cable electrical design is the calculation of conductor size, line constants, voltage regulation, losses, rating and sag for transmission and distribution circuits. It matters now because new generation and loss targets make conductor choices costlier to reverse.

### Which roles gain most from power line and cable electrical design?

Network planners, overhead line designers, cable engineers and distribution engineers in utilities gain most, along with consultants who check submissions.

### How does power line and cable electrical design differ from an overhead line maintenance course?

Power line and cable electrical design works before construction, fixing conductor size, rating and clearance by calculation. A maintenance course handles patrols and repairs on built circuits.

### What do you bring back from power line and cable electrical design training?

You bring back a worked calculation set for a case connection covering circuit options, conductor selection, parameters, voltage profile, thermal rating and clearance, with assumptions colleagues can check.

## Power Line and Cable Electrical Design: The Way Forward

The line and cable design calculation pack first informs the choice between overhead and underground options for a new connection. Planners use it to defend the conductor choice, line designers to set stringing tables, and cable engineers to confirm ratings. After first use, revisit load growth and ambient assumptions, which drive losses and thermal margin.