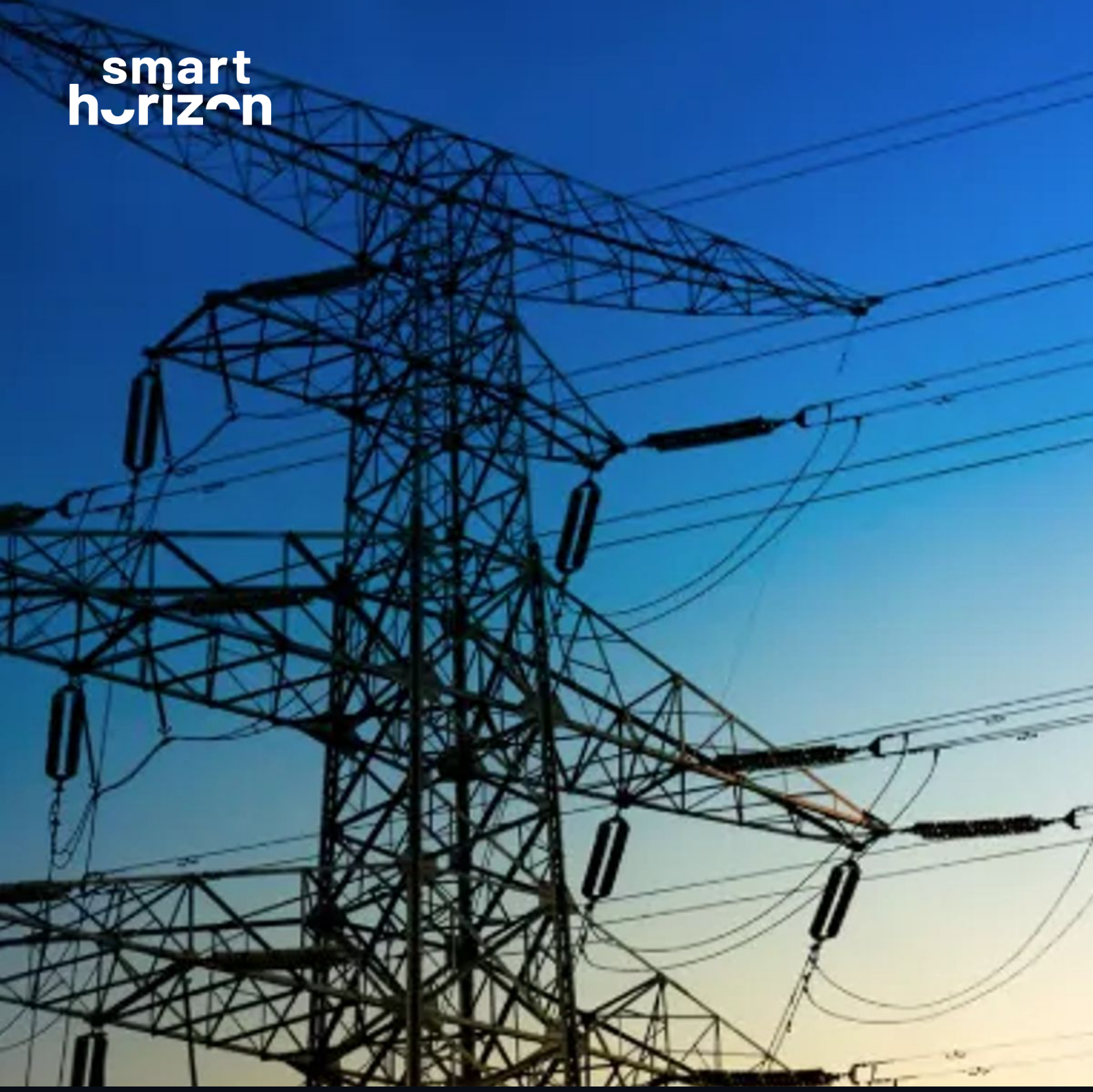


MAINTENANCE AND ENGINEERING | COURSE BROCHURE

Protection of Low Voltage Power Systems

5 days | Classroom training | English

SMART HORIZON

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Course content

Why attend

This course focuses on the protection mechanisms for low voltage power systems, covering design principles, fault analysis, and protective device selection. Participants will gain practical skills to enhance system reliability and safety, ensuring compliance with relevant standards and regulations.

Low voltage power systems are critical in various industries, and their protection is essential to prevent equipment damage and ensure safety. Professionals often face challenges in identifying appropriate protection strategies and devices, which can lead to costly downtime or safety incidents. Understanding the intricacies of fault analysis, protective device selection, and coordination is vital. This course addresses these challenges by providing participants with the knowledge to implement effective protection schemes, ensuring system reliability and compliance with industry standards. By mastering these concepts, professionals can significantly enhance operational efficiency and reduce risks associated with electrical faults.
This course equips professionals with the necessary skills to analyse and design effective protection schemes. Participants will engage in practical exercises that simulate real-world scenarios, enabling them to make informed decisions regarding protective device selection and system configuration. They will learn to evaluate existing systems, identify weaknesses, and implement improvements. The ability to design tailored protection strategies not only safeguards equipment but also ensures compliance with safety regulations. By the end of the course, participants will be prepared to tackle complex challenges in low voltage power system protection, enhancing their professional capabilities and contributing to safer work environments.

Professional Problems This Course Is Designed to Solve

- Difficulty selecting and coordinating low-voltage protection.
- Unclear fault behaviour and protection settings.
- Gaps in evaluating protection performance and system safety.

Course methodology

The course employs a blend of theoretical instruction and hands-on workshops to build practical capabilities. Participants will engage in case studies to analyse fault scenarios, use simulation software for system modelling, and design protection schemes. Specific exercises will include calculating short-circuit currents, selecting protective devices based on real-world parameters, and developing coordination settings. Outputs will include detailed protection plans, analysis reports, and presentations that demonstrate their understanding of low voltage power system protection. This comprehensive approach ensures that participants not only learn the theory but also apply their knowledge in practical settings, reinforcing their skills and confidence in real-world applications.



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Course objectives

By the end of this course, participants will be able to:
• Analyse fault conditions in low voltage power systems to determine protection requirements.
• Design protection schemes that comply with relevant standards and regulations.
• Select appropriate protective devices based on system characteristics and fault analysis.
• Evaluate the performance of existing protection systems and identify areas for improvement.
• Calculate coordination settings for protective devices to ensure system reliability.
• Construct a comprehensive protection plan for a low voltage power system.
• Justify the selection of specific protective devices based on operational needs and safety considerations.

Target audience

This course is suitable for:
• Electrical engineers working with low voltage systems, responsible for system design and protection.
• Maintenance technicians tasked with troubleshooting and maintaining low voltage power systems.
• Safety officers ensuring compliance with electrical safety standards in low voltage environments.
• Project managers overseeing electrical installations involving low voltage systems.

Target competencies

Participants will develop competencies in:
• Conduct fault analysis for low voltage systems.
• Design and implement protection schemes for electrical installations.
• Evaluate and select protective devices for specific applications.
• Assess compliance with electrical safety standards and regulations.
• Develop coordination settings for protective devices in low voltage systems.
• Create detailed protection plans for low voltage power systems.

Course outline

Day 1: Fundamentals of Low Voltage Power Systems

Applied activity: Participants will analyse a case study of a low voltage power system experiencing frequent outages. They will identify fault types, evaluate existing protection measures, and discuss potential improvements to enhance system reliability and safety.
Output: A fault analysis report outlining identified issues and recommended protective strategies.

09:00–09:54	Overview of low voltage power systems and their components, including transformers and distribution boards.



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09:54–10:48	Key standards and regulations governing low voltage systems, such as IEC and BS standards.
10:48–11:00	Basic principles of electrical protection and safety, including risk assessment.
11:00–11:30	**Coffee break**
11:30–12:12	Basic principles of electrical protection and safety, including risk assessment. (continued)
12:12–13:06	Common fault types and their implications for system operation, including short circuits and overloads.
13:06–14:00	Introduction to protective devices used in low voltage applications, such as fuses and circuit breakers.

Day 2: Fault Analysis and Protection Requirements

Applied activity: Using simulation software, participants will perform short-circuit calculations on a given low voltage system scenario to determine protection requirements. They will assess the implications of their findings on device selection and system configuration, ensuring optimal protection measures are in place.
Output: A detailed report of short-circuit analysis results and recommended protection measures.

09:00–09:54	Methods for analysing faults in low voltage systems, including visual inspections and testing.
09:54–10:48	Impact of faults on system performance and safety, including equipment damage and fire hazards.
10:48–11:00	Determining protection requirements based on fault analysis and load characteristics.
11:00–11:30	**Coffee break**
11:30–12:12	Determining protection requirements based on fault analysis and load characteristics. (continued)
12:12–13:06	Introduction to short-circuit calculations and their importance in system design.
13:06–14:00	Tools and software for fault analysis in low voltage systems, including simulation tools.

Day 3: Protective Device Selection and Coordination

Applied activity: Participants will work in groups to select appropriate protective devices for a fictional low voltage system, considering coordination, operational needs, and safety requirements. They will justify their selections based on analysis and present their findings to the class.
Output: A presentation of selected devices and justification for their choices.

09:00–09:54	Criteria for selecting protective devices in low voltage systems, including current ratings and trip characteristics.
09:54–10:48	Types of protective devices: fuses, circuit breakers, and relays, and their applications.



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10:48–11:00	Coordination principles for protective devices to ensure system reliability and prevent nuisance tripping.
11:00–11:30	Coffee break
11:30–12:12	Coordination principles for protective devices to ensure system reliability and prevent nuisance tripping. (continued)
12:12–13:06	Calculating settings for protective devices based on system parameters and fault levels.
13:06–14:00	Case studies on protective device failures and lessons learned from real-world incidents.

Day 4: Designing Protection Schemes

Applied activity: Participants will design a complete protection scheme for a fictional low voltage installation, including device selection, coordination settings, and compliance documentation. They will present their design to the group, demonstrating their understanding of the principles covered.
Output: A comprehensive protection scheme document detailing design choices, calculations, and compliance considerations.

09:00–09:54	Steps in designing a protection scheme for low voltage systems, including risk assessment and device placement.
09:54–10:48	Integrating protective devices into system design to ensure optimal performance.
10:48–11:00	Testing and validation of protection schemes through simulations and real-world scenarios.
11:00–11:30	Coffee break
11:30–12:12	Testing and validation of protection schemes through simulations and real-world scenarios. (continued)
12:12–13:06	Common pitfalls in protection scheme design and how to avoid them, including miscoordination.
13:06–14:00	Documentation and reporting requirements for protection schemes, including compliance checks.

Day 5: Integrated Application of Protection Strategies

Applied activity: In teams, participants will tackle a comprehensive case study involving multiple fault scenarios in a low voltage system, applying all learned concepts to develop a robust protection strategy. They will present their findings and recommendations to the class, showcasing their integrated approach.
Output: A group report detailing the integrated protection strategy and justifications for decisions made.

09:00–09:54	Review of key concepts and skills learned throughout the course, reinforcing critical knowledge areas.



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09:54–10:48	Practical application of protection strategies in complex scenarios, including multiple fault types.
10:48–11:00	Collaborative problem-solving for real-world low voltage protection challenges, fostering teamwork.
11:00–11:30	**Coffee break**
11:30–12:12	Collaborative problem-solving for real-world low voltage protection challenges, fostering teamwork. (continued)
12:12–13:06	Assessment of protection scheme effectiveness and performance based on case studies.
13:06–14:00	Future trends in low voltage power system protection, including smart technologies and IoT integration.

The timings provided are estimates and may vary depending on the number of participants and the discussions taking place during the sessions. They are indicative only and do not constitute a binding commitment.

Dates, venues and fees

Current published course plans. Fees are per participant in GBP, excluding unconfirmed taxes.

Venue	Start date	End date	Fee (GBP)
Dubai Confirmed dates	9 Nov 2026	13 Nov 2026	**£6,300.-**
Online Confirmed dates	9 Nov 2026	13 Nov 2026	**£1,250.-**
Frankfurt Confirmed dates	23 Nov 2026	27 Nov 2026	**£5,300.-**
Online Confirmed dates	23 Nov 2026	27 Nov 2026	**£1,250.-**
Kuala Lumpur Confirmed dates	7 Dec 2026	11 Dec 2026	**£2,900.-**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (GBP)
Online Confirmed dates	7 Dec 2026	11 Dec 2026	**£1,250.–**
Paris Confirmed dates	14 Dec 2026	18 Dec 2026	**£5,720.–**
Online Confirmed dates	14 Dec 2026	18 Dec 2026	**£1,250.–**
Istanbul Confirmed dates	11 Jan 2027	15 Jan 2027	**£5,300.–**
Online Confirmed dates	11 Jan 2027	15 Jan 2027	**£1,250.–**
Amsterdam Confirmed dates	25 Jan 2027	29 Jan 2027	**£5,080.–**
Online Confirmed dates	25 Jan 2027	29 Jan 2027	**£1,250.–**
Barcelona Confirmed dates	1 Feb 2027	5 Feb 2027	**£5,680.–**
Online Confirmed dates	1 Feb 2027	5 Feb 2027	**£1,250.–**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (GBP)
Singapore Confirmed dates	8 Feb 2027	12 Feb 2027	**£5,640.-**
Online Confirmed dates	8 Feb 2027	12 Feb 2027	**£1,250.-**
London Confirmed dates	22 Feb 2027	26 Feb 2027	**£4,900.-**
Online Confirmed dates	22 Feb 2027	26 Feb 2027	**£1,250.-**
Dubai Confirmed dates	8 Mar 2027	12 Mar 2027	**£6,300.-**
Online Confirmed dates	8 Mar 2027	12 Mar 2027	**£1,250.-**
Frankfurt Confirmed dates	22 Mar 2027	26 Mar 2027	**£5,300.-**
Online Confirmed dates	22 Mar 2027	26 Mar 2027	**£1,250.-**
Vienna Confirmed dates	29 Mar 2027	2 Apr 2027	**£5,880.-**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (GBP)
Online Confirmed dates	29 Mar 2027	2 Apr 2027	**£1,250.–**
Kuala Lumpur Confirmed dates	12 Apr 2027	16 Apr 2027	**£2,900.–**
Online Confirmed dates	12 Apr 2027	16 Apr 2027	**£1,250.–**
Paris Confirmed dates	26 Apr 2027	30 Apr 2027	**£5,720.–**
Online Confirmed dates	26 Apr 2027	30 Apr 2027	**£1,250.–**
Istanbul Confirmed dates	10 May 2027	14 May 2027	**£5,300.–**
Online Confirmed dates	10 May 2027	14 May 2027	**£1,250.–**
Amsterdam Confirmed dates	24 May 2027	28 May 2027	**£5,080.–**
Online Confirmed dates	24 May 2027	28 May 2027	**£1,250.–**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (GBP)
Rome Confirmed dates	31 May 2027	4 Jun 2027	**£4,900.-**
Online Confirmed dates	31 May 2027	4 Jun 2027	**£1,250.-**
Singapore Confirmed dates	14 Jun 2027	18 Jun 2027	**£5,640.-**
Online Confirmed dates	14 Jun 2027	18 Jun 2027	**£1,250.-**
London Confirmed dates	21 Jun 2027	25 Jun 2027	**£4,900.-**
Online Confirmed dates	21 Jun 2027	25 Jun 2027	**£1,250.-**
Dubai Confirmed dates	12 Jul 2027	16 Jul 2027	**£6,300.-**
Online Confirmed dates	12 Jul 2027	16 Jul 2027	**£1,250.-**
Frankfurt Confirmed dates	26 Jul 2027	30 Jul 2027	**£5,300.-**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (GBP)
Online Confirmed dates	26 Jul 2027	30 Jul 2027	**£1,250.-**
Cape Town Confirmed dates	2 Aug 2027	6 Aug 2027	**£3,780.-**
Online Confirmed dates	2 Aug 2027	6 Aug 2027	**£1,250.-**
Kuala Lumpur Confirmed dates	9 Aug 2027	13 Aug 2027	**£2,900.-**
Online Confirmed dates	9 Aug 2027	13 Aug 2027	**£1,250.-**
Paris Confirmed dates	23 Aug 2027	27 Aug 2027	**£5,720.-**
Online Confirmed dates	23 Aug 2027	27 Aug 2027	**£1,250.-**
Istanbul Confirmed dates	13 Sept 2027	17 Sept 2027	**£5,300.-**
Online Confirmed dates	13 Sept 2027	17 Sept 2027	**£1,250.-**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (GBP)
Amsterdam Confirmed dates	20 Sept 2027	24 Sept 2027	**£5,080.-**
Online Confirmed dates	20 Sept 2027	24 Sept 2027	**£1,250.-**
Rome Confirmed dates	27 Sept 2027	1 Oct 2027	**£4,900.-**
Online Confirmed dates	27 Sept 2027	1 Oct 2027	**£1,250.-**
Singapore Confirmed dates	11 Oct 2027	15 Oct 2027	**£5,640.-**
Online Confirmed dates	11 Oct 2027	15 Oct 2027	**£1,250.-**
London Confirmed dates	25 Oct 2027	29 Oct 2027	**£4,900.-**
Online Confirmed dates	25 Oct 2027	29 Oct 2027	**£1,250.-**
Dubai Confirmed dates	8 Nov 2027	12 Nov 2027	**£6,300.-**



Course content

Dates, venues and fees (continued)

Venue	Start date	End date	Fee (GBP)
Online Confirmed dates	8 Nov 2027	12 Nov 2027	**£1,250.–**
Frankfurt Confirmed dates	22 Nov 2027	26 Nov 2027	**£5,300.–**
Online Confirmed dates	22 Nov 2027	26 Nov 2027	**£1,250.–**
Cape Town Confirmed dates	29 Nov 2027	3 Dec 2027	**£3,780.–**
Online Confirmed dates	29 Nov 2027	3 Dec 2027	**£1,250.–**
Kuala Lumpur Confirmed dates	6 Dec 2027	10 Dec 2027	**£2,900.–**
Online Confirmed dates	6 Dec 2027	10 Dec 2027	**£1,250.–**
Paris Confirmed dates	13 Dec 2027	17 Dec 2027	**£5,720.–**
Online Confirmed dates	13 Dec 2027	17 Dec 2027	**£1,250.–**



Course content

Plan your next step

Dates, availability, exact venue, taxes, inclusions and payment terms require written confirmation. This brochure is not a quotation, registration, booking confirmation or visa invitation. Participants receive a Smart Horizon UK certificate of attendance; programmes are not externally accredited and do not award a professional qualification or designation. Confirm arrangements before booking travel.

For group or in-house training, contact our learning team to discuss your objectives and delivery arrangements.

Contact Smart Horizon

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View the latest course details online