COURSE OVERVIEW EE1129
Electrical Troubleshooting & Maintenance

Course Title
Electrical Troubleshooting & Maintenance



Course Date/Venue
November 16-20, 2026/TBA Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
EE1129

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description



This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

This course is designed to provide participants with a detailed and up-to-date overview of Electrical Maintenance and Troubleshooting. It covers the various types of electrical maintenance and basic electrical theory; the types of electrical circuits, electrical components and reading electrical schematics and symbols; the measurement instruments, transformers, motors, generators, switchgear, circuit breakers, and contactors; the electrical safety practices, Lockout/Tagout (LOTO) procedures; and the causes and consequences of arc flash.



During this interactive course, participants will learn the electrical fire hazards and prevention, systematic troubleshooting process and the use of multimeters, clamp meters and insulation testers; the motor and transformer failures, circuit breaker and fuse testing and common electrical faults; the preventive maintenance strategies, predictive maintenance techniques, maintenance scheduling and documentation and electrical panel and cable inspection; the workplace electrical standards, the IEC/NEC/IEEE compliance, local authority regulations, inspection reporting requirements and importance of code-compliant installations; the PLC interface and control panel checks, I/O troubleshooting, basic ladder logic interpretation; and the panel wiring integrity checks.



Course Objectives/Outcomes & Benefits for the Participants

Upon the successful completion of this course, each participant will be able to: -

- Apply and gain an in-depth knowledge on electrical maintenance and troubleshooting
- Discuss the various types of electrical maintenance and basic electrical theory
- Identify types of electrical circuits and electrical components and read electrical schematics and symbols
- Recognize measurement instruments, transformers, motors and generators including switchgear, circuit breakers and contactors
- Carryout electrical safety practices and lockout/tagout (LOTO) procedures and identify the causes and consequences of arc flash
- Apply electrical fire hazards and prevention, systematic troubleshooting process and the use of multimeters, clamp meters and insulation testers
- Diagnose motor and transformer failures, apply circuit breaker and fuse testing and identify common electrical faults
- Employ preventive maintenance strategies, predictive maintenance techniques, maintenance scheduling and documentation and electrical panel and cable inspection
- Review workplace electrical standards covering IEC/NEC/IEEE compliance, local authority regulations, inspection reporting requirements and importance of code-compliant installations
- Apply PLC interface and control panel checks, I/O troubleshooting, basic ladder logic interpretation and panel wiring integrity checks

Exclusive Smart Training Kit - H-STK®



*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of electrical maintenance and troubleshooting for electrical technicians, maintenance electricians, instrumentation technicians, electrical supervisors, maintenance supervisors, electrical engineers (junior to mid-level), plant operators with electrical exposure, facility maintenance staff, utility technicians, shift engineers, HVAC technicians (with electrical duties), technical trainers in electrical field, personnel involved in preventive or corrective maintenance and other technical staff.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Fee

US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Haward's certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. Pan Marave, PE, MSc, BEng, is a **Senior Electrical & Instrumentation Engineer** with over 3**0 years** of extensive experience in **Oil**, **Gas**, **Petrochemical**, **Refinery** & **Power** industries. His expertise includes **Circuit Breakers**, **Switchgears**, **Transformers**, **Electrical Generator & Power Transformers**, **Transformer Oil Sampling Procedures**, **Transformer Oil** Quality Testing Methods, **Transformer Oil Reconditioning & Replacement**, **Electrical Safety**, **Power System Equipment**, **Electrical Drawing**, **Transmission Networks**, **Substation**, **Cable & Over Head Line**, **Substation Automation Systems & Application**, **Distribution Networks**, **Circuit Breaker**, **HV Switchgear Maintenance**, **HV/LV Electrical** Authorisation, Basic **Electricity**, **Electrical & Special Hazards**, **Personnel Protection**, **HV/LV Equipment**, **Motor Controllers**, **Electrical Switching** Practices, Uninterruptible Power Supply (**UPS**), **UPS and Battery System**, Preventive Maintenance of **Battery Charger and UPS System**, **UPS, DC System & Battery Design**, **Operation, Maintenance & Troubleshooting**, **Electrical** Troubleshooting & Maintenance, **Emergency Planning**, **Safety Management**, Safety Instrumented Systems (**SIS**), Safety Integrity Level (**SIL**), Emergency Shutdown (**ESD**); **Electrical Installation**, Maintenance & Troubleshooting, **Electrical Inspection & Testing**, Electrical Measurements, Power Flow Analysis of **Electrical Power Systems**, Electrical Fundamentals, **Basic Electricity** & Electrical Codes, **DCS**, **SCADA** & **PLC**; **Measurement** (**Flow**, **Temperature**, **Pressure**); **Process Analyzers** & **Analytical Instrumentation**; **Process Control**, **Instrumentation** & **Safeguarding**; **Process Controller**, **Control Loop & Valve Tuning**; Industrial **Distribution Systems**; Industrial **Control & Control Systems**, Power Systems **Protection & Relaying**; **Earthing**, **Bonding**, **Grounding**, **Lightning & Surge Protection**; Electric Power **Substation** & **Systems**; Electrical Engineering Principles; **Motor Control Circuit**; **Electrical Fault Analysis**; Electrical Networks & Distribution **Cables**; **Hazardous Areas Classification** and **Detailed Engineering Drawings**, **Codes** & **Standards**. Furthermore, he is also well-versed in Microprocessors Structure, Lead Auditor (**ISO 9000:2000**), **ISO 9002**, Quality Assurance, and Projects & Contracts Management.

Presently, Mr. Marave is the **Technical Advisor** of **Chamber of Industry & Commerce** in Greece. Prior to this, he gained his thorough practical experience through several positions as the **Technical Instructor**, **Engineering Manager**, **Electronics & Instruments Head**, **Electrical**, **Electronics & Instruments Maintenance Superintendent**, **Assistant General Technical Manager** and **Engineering Supervisor** of various international companies such as the **Alumil** Mylonas, **Athens Papermill**, **Astropol** and the **Science Technical Education**.

Mr. Marave is a **Registered Professional Engineer** and has **Master's** and **Bachelor's** degree in **Electrical Engineering** from the **Polytechnic Institute of New York** and **Pratt Institute of New York** (**USA**) respectively. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and an active member of the **Technical Chamber** and the Institute of Electrical and Electronics Engineer (**IEEE**) in Greece. He has presented and delivered **numerous international** courses, conferences, trainings and workshops worldwide.

Training Methodology

Our courses employ an interactive, learner-centred methodology that integrates theoretical knowledge with practical application. The training is delivered through a suitable combination of some or all of the following methods, selected according to the course content and learning objectives:

- Instructor-led presentations and facilitated discussions
- Practical workshops and participant presentations
- Hands-on exercises and real-world case studies
- Equipment demonstrations and technical drawings
- Hardware- and software-based simulations
- Gamification & Role Play in soft-skills courses only
- Virtual Reality (VR) and Augmented Reality (AR)
- Instructional videos and other relevant training resources

This blended approach encourages active participation, strengthens practical skills and supports the effective application of acquired knowledge in the workplace.

Learning Design & Customization

This course can be customized to the exact requirements of clients. Haward Technology is so proud of our huge capabilities in tailoring our courses to the training needs of our valued clients.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Monday, 16th of November 2026***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Electrical Maintenance*** *Purpose & Scope of Maintenance • Types: Corrective, Preventive, Predictive • Maintenance Challenges in Industrial Settings • Key Competencies for Electrical Technicians*
0930 – 0945	*Break*
0945 – 1030	***Basic Electrical Theory*** *Ohm's Law & Its Applications • Power & Energy Equations • Voltage, Current, Resistance Relationship • Real versus Reactive Power in AC Circuits*
1030 – 1130	***Types of Electrical Circuits – AC/DC*** *Characteristics of AC versus DC Systems • Series & Parallel Circuits • Single-Phase versus Three-Phase Supply • Frequency, RMS & Peak Values*
1130 – 1215	***Electrical Components – Resistors, Capacitors, Inductors*** *Identification & Function of Basic Components • Behavior in AC & DC Circuits • Series & Parallel Configurations • Practical Applications in Electrical Systems*
1215 – 1230	*Break*
1230 – 1330	***Reading Electrical Schematics & Symbols*** *Standard Electrical Symbols (IEC/ANSI) • Interpreting Wiring Diagrams • Schematic versus Layout Drawings • Hands-On Practice with Sample Diagrams*

1330 – 1420	***Measurement Instruments Overview*** *Introduction to Multimeters & Clamp Meters • Voltage & Current Measurement Techniques • Continuity & Resistance Testing • Instrument Safety & Best Practices*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2: ***Tuesday, 17th of November 2026***

0730 – 0830	***Transformers, Motors & Generators Overview*** *Types & Working Principles • Common Issues & Symptoms of Failure • Efficiency & Maintenance Needs • Inspection Checklists*
0830 – 0930	***Switchgear, Circuit Breakers & Contactors*** *LV/MV Switchgear Components • Operating Principles & Classifications • Fault Detection & Isolation • Inspection & Maintenance Guidelines*
0930 – 0945	*Break*
0945 – 1100	***Electrical Safety Practices & PPE*** *Key Safety Standards (NFPA 70E, OSHA) • Personal Protective Equipment (PPE) Types • Safe Work Practices & Hazard Identification • Grounding & Bonding Principles*
1100 – 1215	***Lockout/Tagout (LOTO) Procedures*** *Purpose & Regulatory Requirements • Steps in LOTO Application • Tags, Locks & Verification • Group Lockout Scenarios*
1215 – 1230	*Break*
1230 – 1330	***Basics of Arc Flash Hazards*** *Causes & Consequences of Arc Flash • Incident Energy & Boundary Calculations • Arc-Rated PPE Selection • Arc Flash Labeling & Risk Reduction*
1330 – 1420	***Electrical Fire Hazards & Prevention*** *Common Causes of Electrical Fires • Fire Detection & Suppression Systems • NFPA Compliance Overview • Response Strategies for Electrical Fires*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3: ***Wednesday, 18th of November 2026***

0730 – 0830	***Systematic Troubleshooting Process*** *Problem Identification & Isolation • Fault Trees & Logic Flowcharts • Documentation of Faults • Decision-Making Under Pressure*
0830 – 0930	***Use of Multimeters, Clamp Meters & Insulation Testers*** *Functions & Limitations of Each Tool • Measuring Continuity, Resistance & Insulation Resistance • Interpreting Test Results • Safety Measures During Testing*
0930 – 0945	*Break*

0945 – 1100	***Diagnosing Motor & Transformer Failures*** *Overheating & Insulation Breakdown • Bearing & Winding Failures • Vibration & Noise Diagnostics • Megger & Winding Resistance Tests*
1100 – 1215	***Circuit Breaker & Fuse Testing*** *Visual & Functional Inspection • Testing Tripping Mechanisms • Replacing Faulty Breakers/Fuses • Preventive Maintenance Best Practices*
1215 – 1230	*Break*
1230 – 1330	***Common Electrical Faults & Case Studies*** *Short Circuits, Ground Faults, Overloads • Voltage Drop & Harmonics Issues • Hands-On Case Analysis • Root Cause Determination Techniques*
1330 – 1420	***Hands-On Troubleshooting Exercises*** *Simulated Equipment Faults • Guided Troubleshooting Process • Fault Logging & Reporting • Peer Learning & Review*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4: Thursday, 19th of November 2026

0730 – 0830	***Preventive Maintenance Strategies*** *Developing PM Checklists • Component-Based Maintenance Schedules • Importance of Visual Inspections • Lubrication & Tightening Tasks*
0830 – 0930	***Predictive Maintenance Techniques*** *Infrared Thermography Overview • Vibration Monitoring Basics • Ultrasonic Detection & Oil Analysis • Integrating Predictive Tools with CMMS*
0930 – 0945	*Break*
0945 – 1100	***Maintenance Scheduling & Documentation*** *Planning & Prioritizing Tasks • Maintenance Logs & Tracking • Software for Scheduling & Reporting • KPI Monitoring & Reporting*
1100 – 1215	***Electrical Panel & Cable Inspection*** *Panel Layout & Heat Buildup Issues • Cable Gland & Insulation Checks • Identifying Signs of Wear or Damage • Corrective Actions & Tagging*
1215 – 1230	*Break*
1230 – 1420	***Hands-On Lab: Simulated Maintenance Tasks*** *Panel Inspection Simulation • Thermography Tool Demo • Cable Testing with Megger • Documentation of Findings*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

Day 5: Friday, 20th of November 2026

0730 – 0930	***Workplace Electrical Standards*** *IEC/NEC/IEEE Compliance Introduction • Local Authority Regulations • Inspection Reporting Requirements • Importance of Code-Compliant Installations*
0930 – 0945	*Break*

0945 – 1100	***Hands-On Troubleshooting with Fault Simulators*** *Practical Faults on Simulated Panels • Step-By-Step Fault Diagnosis • Safe Isolation & Repair Procedures • Real-Time Feedback on Performance*
1100 - 1230	***PLC Interface & Control Panel Checks (Basic Intro)*** *Introduction to PLC Hardware • I/O Troubleshooting • Basic Ladder Logic Interpretation • Panel Wiring Integrity Checks*
1230 – 1245	*Break*
1245 – 1345	***Group-Based Case Study & Problem Solving*** *Industrial Electrical Failure Scenario • Root Cause Analysis in Teams • Solution Planning & Presentation • Lessons Learned & Peer Review*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org