

**COURSE OVERVIEW EE0660**

**Earthing, Bonding, Lightning & Surge Protection of Electrical & Electronic Systems and Equipment**

**Course Title**

Earthing, Bonding, Lightning & Surge Protection of Electrical & Electronic Systems and Equipment

**Course Date/Venue**

July 06-10, 2025/Business Meeting, Crowne Plaza Al Khobar, Al Khobar, KSA

**Course Reference**

EE0660

**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 an up-to-date overview of earthing, bonding, lightning and surge protection of electrical and electronic systems & equipment. It covers the recommended design and installation practices for earthing and bonding; the earthing for building electrical systems; the typical rules to be applied for the electrical and electronic systems & equipment; and the earthing and noise control.



During this interactive course, participants will learn how to detect electrical faults on equipment; identify the various applications of earthing and bonding; emphasize the need for a lightning protection system; apply surge and transient protection; and carryout power conditioning.

### Course Objectives

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

- Apply and gain an in-depth knowledge on earthing, bonding, lightning and surge protection of electrical and electronic systems & equipment
- Implement the recommended design and installation practices for earthing and bonding
- Practice earthing for building electrical systems and determine the typical rules to be applied for the electrical and electronic systems & equipment
- Apply earthing and noise control and detect electrical faults on equipment
- Identify the various applications of earthing and bonding and emphasize the need for a lightning protection system
- Discuss surge and transient protection and carryout power conditioning

### 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 earthing, bonding, lightning and surge protection for those who are in charge of electrical and electronic equipment and systems. This includes electrical engineers, instrumentation engineers, control engineers, power protection engineers, designers, planners and other technical staff.

### Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

### 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**

Certificates are accredited by the following international accreditation organizations:


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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.

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council for Independent Further and Higher Education** as an **International Centre**. 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.

**Accommodation**

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

### 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. Grant Stead**, is a **Senior Electromechanical Engineer** with over **35 years** of integrated industrial experience and academic experience as a **University Instructor**. His wide expertise includes **Earthing & Bonding** Equipment, Fundamentals of **Earthing for Building Electrical Systems, Earthing Electrodes, Systems & Conductors, Bonding Enclosures & Equipment, Lightning, Surge & Transient Protection, UPS & Battery** Operation & Maintenance, **UPS**

Classification, Online & Off-line **UPS Operation, UPS Battery** Features, **Battery Charger, UPS System Application, UPS Parallel** Operation & Strategies, **UPS System** Performance Evaluation, **Control Loop Strategies, UPS Converters & Inverters, UPS & Battery Charger** Systems, **Battery Chargers** Construction & Troubleshooting, **Battery** Design & Operation, **Battery Charger & UPS** System Prevention Maintenance, **Circuit Breakers & Switchgears, Electricity & Electrical Codes, Electrical Installations, Electric Motors, Hydraulics & Fluid Mechanics**, Engineering Services, Electrotechnology, **Fitting & Machining, Airconditioning** Repair & Maintenance, Trenching Machines, **Compressors** and **Diesel Engines**. He is also well-versed in Occupational Safety, Coaching & Mentoring, Project Management, Human Resources Management, Procurement Skills, Finance & Infrastructure Maintenance, Health & Safety and Quality Control, Time Management, Leadership and Management Skills, Supervising & Treambuilding Skills, Seven Habits of Highly Effective People, MS Office, Performance Manager, Budgeting & Financial Control and Presentation Skills. Currently, he is the **Operations Manager** of Damelin College wherein he manages the accredited learnership courses as per the required standards by the Sector Education and Training Authority (SETA) ensuring the proper assessment and moderation of all assessments.

During his career life, Mr. Stead worked with several prestigious companies and institutions occupying numerous challenging management and technical positions such as being the **Engineering Manager, Plant Maintenance Engineer, Operations Manager, Maintenance Planner, Maintenance Manager, Reliability Engineer** and **Maintenance Supervisor** for various international companies and institution.

Mr. Stead has a **Bachelor's** degree in **Mechanical Engineering**. Further, he is a **Certified Instructor/Trainer**, a Registered in South African Council for Education (**SACE**) and a **Certified Assessor & Moderator** with the Education Training & Development Practices Sector Education & Training Authority (**ETDP SETA**). He has further delivered numerous trainings, courses, workshops, seminars and conferences internationally.

### **Course Program**

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

#### **Day 1: Sunday, 06<sup>th</sup> of July 2025**

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Introduction &amp; Basics</b> Fundamentals of Earthing • Bonding • Lightning • Surge Protection • Shielding
0930 – 0945	Break
0945 – 1100	<b>Recommended Design &amp; Installation Practices</b> Wiring and Earthing for Safety and Performance
1100 – 1230	<b>Recommended Design &amp; Installation Practices (cont'd)</b> Wiring and Distribution Systems
1230 – 1245	Break
1245 – 1420	<b>Recommended Design &amp; Installation Practices (cont'd)</b> Dedicated and Derived Neutral Systems • Earthing and Bonding Equipment
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day One

#### **Day 2: Monday, 07<sup>th</sup> of July 2025**

0730 – 0930	<b>Fundamentals of Earthing for Building Electrical Systems</b> Earthing of Building Systems • Which Electrical Systems Can be Operated Ungrounded • Proper Methods of Earthing Building Electrical Systems
0930 – 0945	Break
0945 – 1100	<b>Fundamentals of Earthing for Building Electrical Systems (cont'd)</b> Location of the Service Earthing Connection • Proper Sizing of Grounded (Neutral) Conductors
1100 – 1230	<b>Typical Rules to be Applied</b> Rules for Multiple Services to One Building • Rules for Low Impedance and High Impedance Systems • Rules for Bonding Requirements at Building Service Equipment • Earthing Electrodes, Systems and Conductors • Bonding Enclosures and Equipment
1230 – 1245	Break
1245 – 1420	<b>Typical Rules to be Applied (cont'd)</b> Equipment Earthing Conductor Types • Enclosure and Equipment Earthing • Earthing of Separately Derived Systems • Earthing at More than One Building • Disconnecting Means for Separate Buildings
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Two

#### **Day 3: Tuesday, 08<sup>th</sup> of July 2025**

0730 – 0900	<b>Earthing &amp; Noise Control</b> Misconceptions of Performance Earthing • Single Point versus Multi Point Techniques
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0900 – 0915	Break
0915 – 1100	<b>Earthing &amp; Noise Control (cont'd)</b> Noise and Zero Signal Reference Grid
1100 – 1200	<b>Earthing &amp; Noise Control (cont'd)</b> Avoiding Non-Recommended Practices • Shielding
1200 – 1215	Break
1215 – 1420	<b>Electrical Faults</b> Ground Fault Circuit Interrupters • Equipment Ground Fault Protection Systems
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4: Wednesday, 09<sup>th</sup> of July 2025**

0730 – 0900	<b>Applications of Earthing &amp; Bonding</b> Earthing and Bonding in Hazardous (Classified) Locations • Earthing and Bonding for Health Care • Earthing and Bonding for Swimming Pools, Hot Tubs and Spas • Static and Electricity: Earthing and Bonding Requirements
0900 – 0915	Break
0915 – 1100	<b>Applications of Earthing &amp; Bonding (cont'd)</b> Common Violations • Building Electrical Inspection Procedures • How to Recognise Hazards
1100 – 1200	<b>Lightning</b> Need for a Lightning Protection System • Which Protection Systems Work and which Don't • Best Location for IT Equipment • Optimum Earthing for Building
1200 – 1215	Break
1215 – 1420	<b>Lightning (cont'd)</b> Pitfalls of Isolated Earthing • Shielding and Bonding of Electronics and Communications • Optimum Location of Surge Protection Devices
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Four

**Day 5: Thursday, 10<sup>th</sup> of July 2025**

0730 – 0930	<b>Surge &amp; Transient Protection</b> Lightning Phenomena • Protection of Power Supply
0930 – 0945	Break
0945 – 1100	<b>Surge &amp; Transient Protection (cont'd)</b> Protection of Electric Communications Circuits • Power System Faults and Switching Surges
1100 – 1200	<b>Surge &amp; Transient Protection (cont'd)</b> Mitigation Techniques • Case Studies
1200 – 1215	Break
1215 – 1345	<b>Power Conditioning</b> Power Conditioners • Uninterruptible Power Systems • Power Quality Alternative Sources
1345 – 1400	<b>Summary, Course Conclusion, Open Forum &amp; Closing</b>
1400 – 1415	<b>POST-TEST</b>
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**

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