

## COURSE OVERVIEW EE0453

### HV Electrical Authorization Certification for Electrical Team

**Course Title**

HV Electrical Authorization Certification for Electrical Team

**Course Reference**

EE0453

**Course Duration/Credits**

Five days/3.0 CEUs/30 PDHs



**Course Date/Venue**

Session(s)	Date	Venue
1	September 02-06, 2024	Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
2	December 15-19, 2024	Jubail Hall, Signature Al Khobar Hotel, Al Khobar, KSA

**Course Description**



***This practical and highly-interactive course includes various practical sessions where participants will be engaged in HV power switching and other working practices.***



HV electrical systems require special application of maintenance, repair, test, and safety procedures. Personnel must be trained in special precautions to ensure both personnel and workplace safety. OSHA requires training for all qualified employees performing operations or maintenance work, or who have access to electrical power generation, transmission and distribution installations. This course will provide authorization certification to work in HV electrical systems for operation and maintenance team.



The course covers the knowledge and skills needed to safely work with energized HV electric power systems. It covers electrical safety requirements including the principles and procedures for the safe operation and maintenance of such systems. Insulated hand tools, proper grounding procedures, proper protective clothing, and thorough job-planning procedures are covered throughout the course. Properties of electric charge, energy, electric potential, dielectric stress, capacitive and inductive coupling, and material behaviour in electromagnetic fields are discussed.

The effects of electrical energy on humans and various protection concepts are addressed, as are basic first aid practices. Differential protection schemes, insulation materials, Equi-potential grounding, live-line tools, and isolation techniques are covered from both the technical and practical perspectives.

Various OSHA, IEEE, European and NFPA safety procedures are reviewed. Group exercises include the development of safe-work protocols, use of lockout/tagout (LOTO), maintenance task rehearsal, and equipment preparation. Fault current, arc-flash hazards, and proper PPE selection are studied. Other technical topics covered include insulation testing, corona detection by ultrasonic and RF detectors, and signature analysis using an infrared imager.

Successful course participants who attend the course and pass competency exam, will be certified to work on high voltage electrical power systems. Course participants are introduced to the hazards of electrical work and the philosophies of preventing accident and minimizing outage time due to improper safety or work practices. Also included as part of the curriculum are study materials participants may use at their own pace to continue their learning experience. This course addresses OSHA training requirements established in OSHA 29 CFR 1910.269.

### **Course Objectives**

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

- Achieve authorization certification to work in HV electrical systems for operation and maintenance team
- Provide an understanding of industrial high voltage power systems including statutory regulations, safe operation, protection and fault diagnosis on a wide range of power equipment
- Enable operation team to perform HV switching operations on industrial HV networks up to and including 33KV, and to prepare them for HV authorisation
- Apply and gain an in-depth knowledge on HV electrical safety in accordance with the international standards OSHA, NFPA, IEEE and EN
- Discuss basic electricity covering direct current and alternating current
- Identify electrical hazards including electrical shock, electrical arc and blast as well as special hazards and special operating requirements
- Enumerate personnel protection comprising of rubber gloves/blankets, flash suits, eye protection, hard hats and explosion protection
- Carryout protection against the potential danger
- Explain good earthing and bonding installation, confined space and the general instructions for working with high voltage

- Recognize HV equipment including power transformers, switches, isolators and fuses, circuit breakers, instrument transformers, surge arrestors, capacitor banks as well as earth and shunt reactors
- Discuss the characteristics and applications of gas insulated substations (GIS) as well as review metal-enclosed and metal clad switchgears
- Identify motor controllers, protection relays and carryout testing and commissioning
- Recognize portable cables as well as discuss de-energized and energized work
- Apply electrical switching practices for loads, transformers, capacitors and air switches
- Carryout test equipment, emergency planning and safety management

### **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, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.*

### **Who Should Attend**

This course is designed for electrical operation and maintenance team (team leaders, electrical supervisors/senior electrical technicians, electrical technicians and HVAC supervisors/technicians up to 415V system and also electrical engineers, industrial & utility engineers, HSE personnel and electrical team involved in operation and maintenance of HV electrical systems. Supervisors and managers concerned with the safety of electrical workers will find this course especially useful in providing an insight into electrical safety. Course participants are introduced to the hazards of electrical work and the philosophies of preventing accident and minimizing outage time due to improper safety or work practices. Also included as part of the curriculum are study materials participants may use at their own pace to continue their learning experience. This course addresses OSHA training requirements established in OSHA 29 CFR 1910.269.

### **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 Certificate(s)**

(1) Internationally recognized Competency Certificates and Plastic Wallet Cards will be issued to participants who completed a minimum of 80% of the total tuition hours and successfully passed the exam at the end of the course. Successful candidate will be certified to work in HV electrical. Certificates are valid for 5 years.

**Recertification is FOC for a Lifetime.**

**Sample of Certificates**

The following are samples of the certificates that will be awarded to course participants:-



(2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.

\* Haward Technology \* CEUs \* Haward Technology \* CEUs \* Haward Technology \* CEUs \* Haward Technology \*



**Haward Technology Middle East**

Continuing Professional Development (HTME-CPD)

CEUs

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## CEU Official Transcript of Records

**TOR Issuance Date:** 20-Sep-18

**HTME No.** PAR10475

**Participant Name:** Farhan Al Khatib

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
EE0453	HV Electrical Authorization Certification for Electrical Team	September 16-20, 2018	30.0	3.0

**Total No. of CEU's Earned as of TOR Issuance Date** **3.0**

**TRUE COPY**



Maricel De Guzman  
Academic Director

Haward Technology has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2013 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2013 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 Association 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 is accredited by










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\* Haward Technology \* CEUs \* Haward Technology \* CEUs \* Haward Technology \* CEUs \* Haward Technology \*

### Certificate Accreditations


Certificates are accredited by the following international accreditation organizations:-

- 
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.

### 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.

### 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. William Hardi** is a **Senior Electrical Engineer** with almost **35** years of extensive experience within the **Oil, Gas, Petrochemical, Refinery & Power** industries. His expertise widely covers in the areas of **Power System Analysis, Power System Generation and Distribution, Electric Power System Design, Maintenance, Testing & Troubleshooting, Transformer Protection, Transformer Problem and Failure Investigations, Power System Operation and Control, Fault Analysis in Power Systems, HV/MV Cable Splicing, Cable & Over Head Power Line, HV/MV Switchgear, HV Cable Design, Cable Splicing & Termination, High Voltage Electrical Safety, Medium & High Voltage Equipment, High Voltage Circuit Breaker Inspection & Repair, High Voltage Power System, HV Equipment Inspection & Maintenance, HV Switchgear Operation & Maintenance, Resin / Heat Shrink & Cold Shrink Joints, HV/LV Equipment, LV & HV Electrical System, LV, MV & HV Cable Installations & Properties, ORHVS for Responsible and Authorized Person High Voltage Regulation, Transformers Maintenance, inspections & repairs, Commissioning of LV & HV Equipment, Oil Purification and High Voltage Maintenance, HT Switch Gear -Testing, Safe Operating, Maintenance, Inspection & Repairs on LV & HT Cables - Testing (Pulse & Megger), Line Patrol in Low Voltage & Distribution, Transmission, Operating Principles up to 132KV, Abnormal Conditions & Exceptions, Commissioning & Testing, Transformer Inspections & Repairs, Live Line Work up to 33KV, Basic Power System Protection, High Voltage Operating Preparedness Phasing (110V to 132KV), HV Operating & Fault Finding (up to 132KV), Maintenance & Construction Supervision, Line Construction & Maintenance up to 132KV, VSD/VFD Installations & Testing, Electrical Panel Design, VSD/VFD Installations & Testing, Instrument Installation and wiring, Programmable Logic Controller (PLC), PLC for Process Control & Automation, ABB Drives and other PLC Starters, PLC Starters – Commissioning & fault-finding, , AC/DC Supplies & Change Over Systems, AC & DC Winders and VLF Testing, Soft Starters – VSD's etc.,**

During Mr. Hardi career life, he has gained his practical experience through several significant positions and dedication as the **Branch Manager, Maintenance Manager, Project Manager, Site Superintendent, Construction Supervisor, Shift Supervisor, Maintenance & Production Shift Supervisor, HT Specialist, Electrical & Instrumentation Supervisor, High Voltage Specialist & Commissioning Supervisor, Electrical Supervisor, Principal Technical Official, Winder & Conveyor Technician and Instructor/Trainer** from various companies, like the Armcoil Africa, JR Compressors, ELGER Electrical, Saaiplaas 3 Shaft, ESCOM and Target Mining.

Mr. Hardi is a **Qualified Electrician** certified by the Engineering Trades Training Board. Further, he is a **Certified Instructor/Trainer** and has delivered various trainings, seminars, conferences, workshops and courses globally.

**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**

0730 – 0800	Registration & Coffee
0800– 0815	Welcome & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0845	<b>Basic Electricity</b> Direct Current (Basic Terms, Ohm's Law, Application, Controls, Power Supplies, Batteries, Control & UPS, Testing and Maintenance) • Alternating Current (Basic Terms, Sine Wave, Peak & RMS Voltage, Formulas and Calculation, Frequency)
0845 – 0900	<b>Electrical Hazards</b> Electrical Shock • Electrical Arc • Blast • Accident Discussions
0900 – 0915	Break
0915 – 0930	<b>Special Hazards</b> Unique Designs • Special Operating Requirements
0930 – 0945	<b>Personnel Protection</b> Rubber Gloves/Blankets (Use, Maintenance, Care) • Flash Suits • Eye Protection • Hard Hats • Explosion Protection
0945 – 1015	<b>Protection Against the Potential Danger</b>
1015 – 1030	<b>Good Earthing &amp; Bonding Installation</b>
1030 – 1045	<b>Confined Space</b> Scope and Application • Training Requirements • Duties of Employees
1045 – 1130	<b>General Instructions for Working with High Voltage</b> Electrical Safety • Electrical Work Permit
1130 – 1200	<b>HV Equipment – Power Transformers</b> Types • Connections • Hazards & Testing • Troubleshooting • High Pot Testing • Step Regulators
1200 – 1215	Break
1215 – 1245	<b>HV Equipment – Switches, Isolators &amp; Fuses</b> Characteristics and Functions • Types & Ratings • Testing & Hazards
1245 – 1315	<b>HV Equipment – Circuit Breakers</b> Characteristics and Functions • Types & Ratings • Testing & Hazards
1315 – 1345	<b>HV Equipment – Instrument Transformers</b> Characteristics and Functions • Types & Ratings • Connections • Grounding • Testing
1345 – 1420	<b>HV Equipment – Surge Arrestors</b> Characteristics and Functions • Types & Ratings • Testing & Hazards
1420 – 1430	<b>Recap</b> 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**

0730 – 0745	<b>HV Equipment – Capacitor Banks</b> Theory of Operation • Application & Hazards
0745 - 0815	<b>HV Equipment – Earth &amp; Shunt Reactors</b> Characteristics and Functions • Types



0810 - 0830	<b>Gas Insulated Substations (GIS)</b> Characteristics • Applications
0915 - 0930	<b>Metal-Enclosed &amp; Metal Clad Switchgears</b> Characteristics • Cubicles and Equipments
0930 - 0945	Break
0945 - 1015	<b>Motor Controllers</b>
1015 - 1045	<b>Protection Relays</b>
1045 - 1100	<b>Testing &amp; Commissioning</b>
1100 - 1115	<b>Portable Cables</b> Application • Hazards
1115 - 1200	<b>Energized Work</b> Policies and Procedures • Recognition (Voltage Classification, Energized Equipment) • Work Zones (Controlled Areas) • Work Clearances • Proper Tools
1200 - 1215	Break
1215 - 1245	<b>De-Energized Work</b> Policies and Procedures • Voltage Detection Equipment • Lock and Tag Out • Grounds/Grounding • Personal Protective Grounds
1245 - 1300	<b>Electrical Switching Practices</b> Loads (Pickup & Dropout, Sequence) • Transformers • Paralleling • Split Buss • Capacitors • Air Switches (Gloves & Grounds)
1300 - 1330	<b>Test Equipment</b> Ammeters, Ohmmeters, Voltmeters • Phase Angle Meters • Phasing Sticks/Devices • Oscilloscopes • Voltage Testers-Wiggy, etc. • Thumpers • Relay & Meter Test Equipment • Insulation Testers (Meggers, Power Factor/Dissipation)
1330 - 1400	<b>Emergency Planning</b> Communications • Electrical Fires • Phone Numbers • Panic Button • Tools/Equipment
1400 - 1420	<b>Safety Management</b> Audits • Policies • Costs
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Two

**Day 3**

0730 - 0930	<b>Practical Sessions</b> Switching Programs
0930 - 0945	Break
0945 - 1100	<b>Practical Sessions (cont'd)</b> Isolation Certificates
1100 - 1230	<b>Practical Sessions (cont'd)</b> Isolation Certificates (cont'd)
1230 - 1245	Break
1245 - 1420	<b>Practical Sessions (cont'd)</b> Electrical Permit to Work
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4**

0730 - 0930	<b>Practical Sessions (cont'd)</b> Danger Notices & Pre-Cautions
0930 - 0945	Break

0945 – 1100	<b>Practical Sessions (cont'd)</b> <i>Sanction for Test</i>
1100 – 1230	<b>Practical Sessions (cont'd)</b> <i>Sanction for Test (cont'd)</i>
1230 – 1245	<i>Break</i>
1245 – 1420	<b>Practical Sessions (cont'd)</b> <i>Log-Out &amp; Tag-Out</i>
1420 – 1430	<b>Recap</b>
1430	<i>Lunch &amp; End of Day Four</i>

**Day 5**

0730 – 0930	<b>Practical Sessions (cont'd)</b> <i>Safe Key Systems</i>
0930 – 0945	<i>Break</i>
0945 – 1100	<b>Practical Sessions (cont'd)</b> <i>Electrical Safety Systems- Interlocks-Earthing-Isolation &amp; Access Control</i>
1100 – 1200	<b>Practical Sessions (cont'd)</b> <i>Electrical Safety Systems- Interlocks-Earthing-Isolation &amp; Access Control (cont'd)</i>
1200 – 1215	<i>Break</i>
1215 – 1245	<b>Practical Sessions (cont'd)</b> <i>Fault Reports</i>
1245 – 1300	<b>Course Conclusion</b> <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1300 – 1400	<b>COMPETENCY EXAM</b>
1400 – 1415	<i>Evaluation of Competency Exam</i>
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch &amp; End of Course</i>

## Practical Sessions

This practical and highly-interactive course includes the following practical sessions:-



- |                                   |  |
|-----------------------------------|--|
| (1) Switching Programs            | (6) Log-Out & Tag-Out  |
| (2) Isolation Certificates        | (7) Safe Key Systems   |
| (3) Electrical Permit to Work     | (8) Electrical Safety Systems-Interlocks-<br>Earthing-Isolation & Access Control |
| (4) Danger Notices & Pre-Cautions | (9) Fault Reports  |
| (5) Sanction for Test             |  |

## Course Coordinator

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