



COURSE OVERVIEW EE0439

Intensive Overhead Transmission Line (OHTL)

Course Title

Intensive Overhead Transmission Line (OHTL)

Course Date/Venue

November 23-27, 2025/Abu Dhabi Meeting Room, The Tower Plaza Hotel, Dubai, UAE

Course Reference

EE0439

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 intensive overhead transmission line (OHTL). It covers the power transmission networks, components of transmission lines, reliability levels and selection of economic voltage of transmission of power; the OHTL safety procedures; the OHTL towers; the OHTL conductors; the isolator materials; the surge arrestors and the OHTL earthing.



Further, the course will also discuss the function of current transformer including its types, classes, connections, multi-ratio, polarity, burden calculations, saturation, etc.; the OHTL voltage transformers; the OHTL outdoor circuit breakers and reclosers; the OHTL measurements and instrumentation; and the distribution switchgear of oil wells.



During this interactive course, participants will learn to maintain, repair and troubleshoot switchgears and VSD; recognize variable speed drive and electronic components that include diode, thyristor, transistor and IGBT; and identify the design, function and equivalent circuit diagram of motors as well as the design and function of AC converter.



Course Objectives

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

- Apply and gain an in-depth knowledge on intensive overhead transmission line (OHTL)
- Describe power transmission networks, components of transmission lines, reliability levels and selection of economic voltage of transmission of power
- Employ OHTL safety procedures and discuss OHTL towers covering its types, selection of tower structure, tower design, spacing and clearances and clearance for power line crossings
- Recognize OHTL conductors including the types of conductors, selection of conductor size, spacing between conductors, offset of conductors, sag and tension calculations, electrical requirements, vibration dampers, jumpers and corona calculations
- Identify the isolator materials and isolator types, causes of isolator failures, voltage distribution over isolators, arcing horns, string efficiency, methods to improve string efficiency and guard rings
- Describe surge arresters including lightning and flashovers, operation principle of surge arresters, gapless type surge arresters, external gap type surge arresters and surge arresters monitoring
- Explain OHTL earthing including earthwire selection criteria, tower earthing methods and standards, protective angle, back flashover, counterpoise methods and earth resistance measuring methods
- Discuss the function of current transformer as well as its construction types, classes, connections, multi-ratio, polarity, burden calculations, saturation, etc.
- Recognize OHTL voltage transformers and the function of voltage transformers, inductive, capacitive VTs, coupling capacitors, medium voltage outdoor VTs, VTs for GIS, combined transformers, VT standard accuracy classes and burdens
- Analyze OHTL outdoor circuit breakers and reclosers covering the function of a CB, IEEE standards for selection of CBs, requirements of CBs, classification of CBs, oil CBs, vacuum CBs, air blast CBs, etc.
- Carryout OHTL measurements and instrumentation and describe the distribution switchgear of oil wells
- Maintain, repair and troubleshoot switchgears in a professional manner
- Define variable speed drive and discuss electronic components including diode, thyristor, transistor and IGBT
- Explain VSD of oil wells as well as the design, function and equivalent circuit diagram of motors
- Identify the design and function of AC converter covering rectifier, DC link, inverter, pulse width modulation, pulse-edge and space-vector modulation
- Maintain, repair and troubleshoot VSD efficiently

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 overhead transmission line for engineers and other technical staff.

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. 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.

* Howard Technology * CEUs * Howard Technology * CEUs * Howard Technology * CEUs * Howard Technology *

 **Howard Technology Middle East**
Continuing Professional Development (HTME-CPD) CEUs
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CEU Official Transcript of Records

TOR Issuance Date: 28-Apr-17
HTME No. PAR11317
Participant Name: Eissa Al Dossari

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
EE439	Intensive Overhead Transmission Line (OHTL)	April 24-28, 2017	30	3.0

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

TRUE COPY

Maricel De Guzman
Academic Director

Howard Technology has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1750 Old Meadow Road, Suite 600, McLean, VA 22102, USA. In obtaining this approval, Howard 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, Howard Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2013 Standard.

Howard 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.

Howard Technology is accredited by



P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel.: +971 2 3091 714 | Fax: +971 2 3091 716 | E-mail: info@haward.org | Website: www.haward.org

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Certificate Accreditations

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

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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**. 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.
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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.

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 instructors. However, we have the right to change the course instructor prior to the course date and inform participants accordingly:



Mr. Pan Marave, PE, MSc, BEng, is a **Senior Electrical & Instrumentation Engineer** with over **30 years** of extensive experience in **Oil, Gas, Petrochemical, Refinery & Power** industries. His expertise includes Safety Instrumented Systems (**SIS**), Safety Integrity Level (**SIL**), Emergency Shutdown (**ESD**); **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**; **Circuit Breakers, Switchgears, Transformers, 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** degrees 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

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 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, 23rd of November 2025

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Introduction to OHTLs Power Transmission Networks • Components of Transmission Lines • Reliability Levels • Selection of Economic Voltage of Transmission of Power
0930 – 0945	Break
0945 – 1100	OHTL Safety Procedures Main Causes Lead to an Accident • Electrical Fire Hazards • Hazard Identification • Injury Prevention Techniques • OSHA's and ANSI's Preventive Measures • Risk Assessment Checklist • Emergency Procedures Following Contact with Overhead Power Lines
1100 – 1230	OHTL Towers Types of Towers • Selection of Tower Structure • Tower Design • Spacing and Clearances • Clearance for Power Line Crossings
1230 – 1245	Break
1245 – 1420	OHTL Conductors Types of Conductors • Selection of Conductor Size • Spacing Between Conductors • Offset of Conductors • Sag and Tension Calculations • Electrical Requirements • Vibration Dampers • Jumpers • Corona Calculations
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: Monday, 24th of November 2025

0730 – 0930	OHTL Isolators Isolator Materials • Isolator Types • Causes of Isolator Failures • Voltage Distribution Over Isolators • Arcing Horns • String Efficiency • Methods To Improve String Efficiency • Guard Rings • String Efficiency Calculation Examples
0930 – 0945	Break
0945 – 1100	OHTL Surge Arrestors Lightning Hits and Flashovers • Operation Principle of Surge Arresters • Gapless Type Surge Arresters • External Gap Type Surge Arresters • Monitors for Surge Arrestors
1100 – 1230	OHTL Earthing Reasons for Earthing OHTLs • Earthwire Selection Criteria • Tower Earthing Methods • Tower Earthing Standards • Protective Angle • Back Flashover • Counterpoise Methods • Earth Resistance Measuring Methods
1230 – 1245	Break



1245 – 1420	OHTL Current Transformers What is the Function of CT? • Construction Types of CTs • CT Classes • CT Connections • Multi-ratio CTs • CT Polarity • CT Burden Calculations • CT Saturation • CT Calculations • CT Standards • Power Transformers' CT Connections • Substation Circuit Breakers' CT's • Generators' CT Connections • Optical CTs
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: Tuesday, 25th of November 2025

0730 – 0930	OHTL Voltage Transformers What is the Function of VT? • Inductive VTs • Capacitive VTs • Coupling Capacitors • Medium Voltage Outdoor VTs • VTs for GIS • Combined Transformers • VT Standard Accuracy Classes and Burdens
0930 – 0945	Break
0945 – 1100	OHTL Outdoor Circuit Breakers & Reclosers What is the Function of a CB? • IEEE Standards for Selection of CBs • Requirements of CBs • Classification of CBs • Oil CBs • Vacuum CBs • Air Blast CBs • SF6 CBs • Controls of CBs • Automatic Reclosing • Reclosure Selection • IEEE Standards for Recloser Selection
1100 – 1230	OHTL Measurements & Instrumentation Phase Continuity Test • Measurement of Overhead Conductor Sag • Insulation Resistance Test • Earth Current Injection Test • Structure Earth Resistance Test
1230 - 1245	Break
1245 – 1420	Distribution Switchgear of Oil Wells General Construction, Operation & Safety • Metal Clad Switchgear Construction & Safety Features • Commissioning Switchgear • Breaker Construction & Safety Features • Capacitors • Current Transformers • Instrument Transformers, Test Switches, Metering and Relaying Devices • NETA Recommended Acceptance Test
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: Wednesday, 26th of November 2025

0730 - 0930	Maintenance, Repair & Troubleshooting of Switchgears Metal Clad Switchgear Maintenance Details • Discussions • Maintenance & Repair Fundamentals • Maintenance & Repair Procedures • Process Development • Procedures • Problem Solving
0930 - 0945	Break
0945 - 1100	What is a Variable Speed Drive?
1100 - 1230	Electronic Components: Diode, Thyristor, Transistor, IGBT Bridge Connection: Behavior on Ohmic and Inductive Load • Rectifier and Inverter Operation • Gating Angle, Commutation, Inverter Commutation Failure



1230 - 1245	Break
1245 - 1420	VSD of Oil Wells
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: Thursday, 27th of November 2025

0730 – 0930	Motors: Design, Function & Equivalent Circuit Diagram Speed, Torque and Current Control • V/f Control and Vector Control
0930 – 0945	Break
0945 - 1100	AC Converter: Design & Function Rectifier, DC Link, Inverter • Pulse Width Modulation, Pulse-edge and Space-Vector Modulation • Motor Limitations
1100 - 1230	AC Converter: Design & Function (cont'd) Load Considerations • Acceleration and Braking Requirements
1230 - 1245	Break
1245 - 1300	Maintenance, Repair & Troubleshooting of VSD
1300 - 1315	Course Conclusion Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course
1315 – 1415	COMPETENCY EXAM
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