COURSE OVERVIEW IE0223
IEC 61850 & Its Role in Smart Grid

Course Title
IEC 61850 & Its Role in Smart Grid

Course Date/Venue
December 08-12, 2024/Ajman Meeting Room, Khalidia Palace Hotel Dubai by Mourouj Gloria, Dubai, UAE

Course Reference
IE0223

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 IEC 61850 and its role in smart grid. It covers the importance of smart grid in the energy industry; the components of a smart grid system; the challenges facing traditional power systems; the benefits of a smart grid approach; the basics of IEC 61850 and its purpose in the smart grid; the different parts of the IEC 61850 standard; the benefits of using IEC 61850 in smart grid systems; the different communication protocols, data models and engineering processes used in IEC 61850; and the benefits and limitations of each communication protocol, data model and engineering process and their applications in smart grid systems.

During this interactive course, participants will learn the concept of substation automation and how it can be implemented using IEC 61850; creating, modifying and analyzing IEC 61850 data models; the IEC 61850 engineering processes; the role of IEC 61850 in distribution automation, demand response, renewable energy integration and cybersecurity; the different types of distribution automation systems, demand response programs, renewable energy sources and cybersecurity threats facing smart grid systems; and overcoming the challenges facing the implementation of IEC 61850 in distribution automation, demand response, renewable energy integration and cybersecurity.

Course Objectives

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

- Apply and gain an in-depth knowledge on IEC 61850 and its role in smart grid
- Discuss the importance of smart grid in the energy industry and identify the components of a smart grid system
- Recognize the challenges facing traditional power systems and the benefits of a smart grid approach
- Discuss the basics of IEC 61850 and its purpose in the smart grid as well as identify the different parts of the IEC 61850 standard
- Identify the benefits of using IEC 61850 in smart grid systems
- Recognize the different communication protocols, data models and engineering processes used in IEC 61850
- Discuss the benefits and limitations of each communication protocol, data model and engineering process and their applications in smart grid systems
- Explain the concept of substation automation and how it can be implemented using IEC 61850
- Create, modify and analyze IEC 61850 data models as well as implement IEC 61850 engineering processes
- Discuss the role of IEC 61850 in distribution automation, demand response, renewable energy integration and cybersecurity
- Identify the different types of distribution automation systems, demand response programs, renewable energy sources and cybersecurity threats facing smart grid systems
- Overcome the challenges facing the implementation of IEC 61850 in distribution automation, demand response, renewable energy integration and cybersecurity

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 IEC 61850 and its role in smart grid for those who work in the field of power systems engineering, including electrical engineers, power systems engineers, automation engineers, control engineers, and system integrators.

Accommodation

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

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: -

- 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.

- 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.

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:

Dr. Alaa Abdel Kerim, PhD, MSc, BSc, is a **Senior Electrical & Instrumentation Engineer** with over **35 years** of extensive experience in the **Power**, **Petrochemical**, **Refinery**, **Oil** and **Gas** industries. He specializes in Safety Procedures in **Water Networks**, **Water Networks** Operation & Maintenance, Network Management & Supervision, **Water Networks Design** Procedures, **Flow Measurement** Devices, **Flowmeter** Technologies, **Flowmeter** Accuracy & Performance, **Flowmeter** Calibration, **Solve Typical Flow Measurements Problems, SCADA Systems, PLC** Hardware & Software, **PLC** Systems Design, **Installation and Maintenance, PLC** Programming, Lab Programming on **Siemens SIMATIC & WinCC, Data Communications, SCADA System** Hardware**, DCS**, **PLC**, **HMI**, **Automation System**, **Process Control & Instrumentation**, **Hydrocarbon**, **Level & Flow Measurements**, **Analytical Instrumentation**, **Find Control Elements**, **Control Loop Operation**, **Data Acquisition & Transmission**, **Electronics Technology**, **Power Systems Control**, **Power Systems Security**, **Power Transmissions**, **Power Generation**, **Electrical Substations** and **MV/LV Electrical System**.

During his career life, Dr. Alaa has been practically and academically involved in different **Power System** and **Instrumentation international companies** and **Universities** as a **Senior Professor** & **Consultant**, **Instrumentation Engineer** and **Electrical Engineer**. His recent practical applications experience includes the design, supply, installation, operation of full **DCS**, **SCADA**, **PLC**, **HMI Automation System** for **Sumid Line Petroleum**, **Siemens USA**, **AREVA USA** to name a few. His experience also includes electrical coordination, protection level adjustments and electrical testing.

Dr. Alaa has a **PhD** degree in **Electrical Engineering** from the **Technical University of Gdansk**, **Poland** and has **Master's** and **Bachelor's** degree in **Electrical Machine & Power Engineering** from **Cairo University** and **Helwan University**, respectively. Further, he is a **Certified Instructor/Trainer** and delivered numerous 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, 08th of December 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0900	***Introduction to Smart Grid & Its Importance in the Energy Industry***
0900 – 0930	***The Components of a Smart Grid System, including Sensors, Communication Networks, & Control Systems***
0930 – 0945	*Break*
0945 – 1030	***The Challenges Facing Traditional Power Systems & The Benefits of a Smart Grid Approach***
1030 – 1115	***Basics of IEC 61850 & Its Purpose in the Smart Grid***
1115 – 1215	***The Different Parts of the IEC 61850 Standard, including Communication Protocols, Data Models, & Engineering Processes***
1215 – 1230	*Break*
1230 – 1330	***The Benefits of Using IEC 61850 in Smart Grid Systems, such as Improved Interoperability & Scalability***
1330 – 1420	***IEC 61850 Communication Protocols***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: ***Monday, 09th of December 2024***

0730 – 0830	***The Different Communication Protocols Used in IEC 61850, such as MMS & GOOSE***
0830 – 0930	***The Benefits & Limitations of Each Communication Protocol & Their Applications in Smart Grid Systems***
0930 – 0945	*Break*
0945 – 1030	***The Concept of Substation Automation & How it can be Implemented Using IEC 61850***
1030 – 1115	***IEC 61850 Data Models***
1115 – 1215	***The Different Data Models Used in IEC 61850, such as the Common Information Model (CIM) & The Substation Configuration Language (SCL)***
1215 – 1230	*Break*
1230 – 1330	***The Benefits & Limitations of Each Data Model & Their Applications in Smart Grid Systems***
1330 – 1420	***The Tools Used to Create, Modify, & Analyze IEC 61850 Data Models***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: ***Tuesday, 10th of December 2024***

0730 – 0830	***IEC 61850 Engineering Processes***
0830 – 0930	***The Different Engineering Processes Used in IEC 61850, such as System Configuration & System Integration***
0930 – 0945	*Break*
0945 – 1030	***The Benefits & Limitations of Each Engineering Process & Their Applications in Smart Grid Systems***

1030 – 1115	***The Tools Used to Implement IEC 61850 Engineering Processes, such as Configuration Tools & Test Tools***
1115 – 1215	***IEC 61850 & Distribution Automation***
1215 – 1230	*Break*
1230 – 1330	***The Role of IEC 61850 in Distribution Automation, including the Benefits of Using IEC 61850 for Fault Detection & Isolation, Load Balancing, & Asset Management***
1330 – 1420	***The Different Types of Distribution Automation Systems & Their Applications in Smart Grid Systems***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: ***Wednesday, 11th of December 2024***

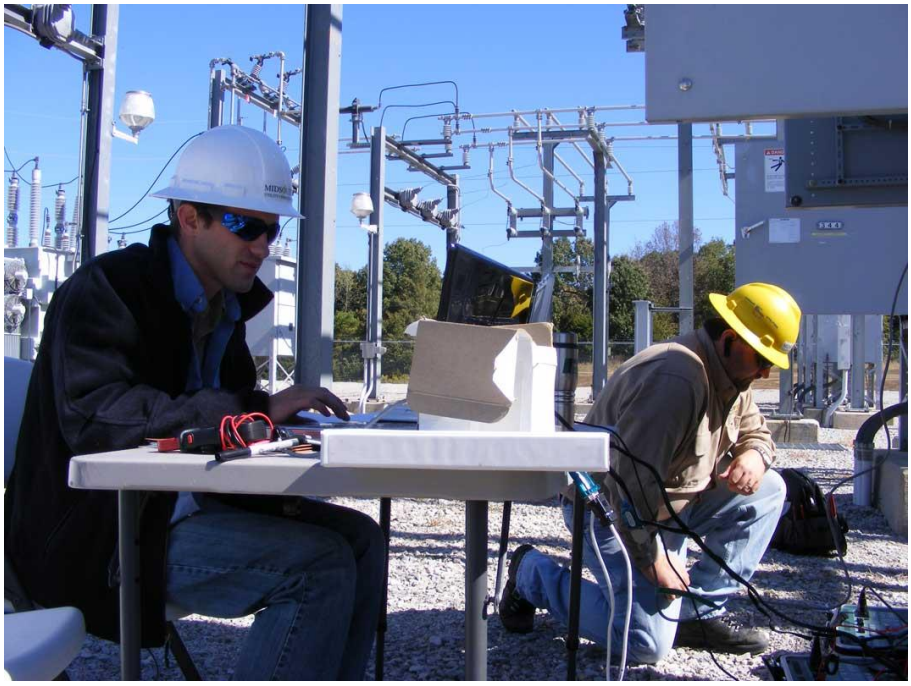
0730 – 0830	***The Challenges Facing the Implementation of IEC 61850 in Distribution Automation & The Best Practices for Overcoming these Challenges***
0830 – 0930	***IEC 61850 & Demand Response***
0930 – 0945	*Break*
0945 – 1030	***The Role of IEC 61850 in Demand Response, including the Benefits of Using IEC 61850 for Load Shedding & Peak Shaving***
1030 – 1115	***The Different Types of Demand Response Programs & their Applications in Smart Grid Systems***
1115 – 1215	***The Challenges Facing the Implementation of IEC 61850 in Demand Response & the Best Practices for Overcoming these Challenges***
1215 – 1230	*Break*
1230 – 1330	***IEC 61850 & Renewable Energy Integration***
1330 – 1420	***The Role of IEC 61850 in Renewable Energy Integration, including the Benefits of Using IEC 61850 for Grid Stability & Energy Management***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: ***Thursday, 12th of December 2024***

0730 – 0830	***The Different Types of Renewable Energy Sources & their Applications in Smart Grid Systems***
0830 – 0930	***The Challenges Facing the Implementation of IEC 61850 in Renewable Energy Integration & The Best Practices for Overcoming these Challenges***
0930 – 0945	*Break*
0945 – 1030	***IEC 61850 & Cybersecurity***
1030 – 1115	***The Role of IEC 61850 in Cybersecurity, including the Benefits of Using IEC 61850 for Secure Communication & Data Exchange***
1115 – 1215	***The Different Types of Cybersecurity Threats Facing Smart Grid Systems & The Best Practices for Mitigating these Threats***
1215 – 1230	*Break*
1230 – 1345	***The Challenges Facing the Implementation of IEC 61850 in Cybersecurity & The Best Practices for Overcoming these Challenges***
1345 – 1400	***Course Conclusion***
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

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