COURSE OVERVIEW EE0418
ABB Gas-Insulated Switchgear (GIS): Operation and Maintenance

Course Title
ABB Gas-Insulated Switchgear (GIS): Operation and Maintenance

Course Date/Venue
Session 1: April 06-10, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: June 30-July 04, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
EE0418

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

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of ABB Gas-Insulated Switchgear (GIS) Operation and Maintenance. It covers the advantages of GIS over conventional switchgear and its basic components and functions; the types of GIS operating mechanism and electrical protection systems; the importance of gas insulation in GIS; the gas monitoring, handling procedures, safety precautions and its maintenance; the GIS mechanical components and the importance of GIS maintenance; and the routine, preventive and corrective maintenance including maintenance planning, scheduling and records management.

During this interactive course, participants will learn the GIS testing, GIS commissioning procedures, GIS troubleshooting and fault analysis; the circuit diagram, schematics, fault identification, isolation, repair and replacement procedure; the importance of safety in GIS operation and maintenance and the hazards associated with it; and the safety procedures during operation and maintenance including personal protective equipment (PPE), emergency procedures and safety regulations and standards.

Course Objectives

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

- Apply and gain an in-depth knowledge on ABB gas-insulated switchgear (GIS) operation and maintenance
- Discuss the advantages of GIS over conventional switchgear including its basic components and functions
- Identify the types of GIS operating mechanism and electrical protection systems
- Explain the importance of gas insulation in GIS and apply gas monitoring, handling procedures, safety precautions and maintenance
- Identify GIS mechanical components and the importance of GIS maintenance
- Carryout routine, preventive and corrective maintenance including maintenance planning, scheduling and records management
- Employ GIS testing procedures, GIS commissioning procedures and GIS troubleshooting and fault analysis
- Illustrate circuit diagram and schematics as well as fault identification, isolation, repair and replacement procedure
- Discuss the importance of safety in GIS operation and maintenance and the hazards associated with it
- Apply safety procedures during operation and maintenance including personal protective equipment (PPE), emergency procedures and safety regulations and standards

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 ABB gas-insulated switchgear (GIS) operation and maintenance for engineers, technicians, maintenance personnel and those who work in power utilities, renewable energy, oil and gas, and other industries where GIS is used for high-voltage power distribution and transmission.

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: -

- 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.

- 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.

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 & Control Engineer** with **45 years** of extensive experience in the **Power**, **Petrochemical**, **Refinery**, **Oil** and **Gas** industries. He specializes in **Plant Control** System, **Instrumented Control** System, **Process Control & Instrumentation**, **DCS**, **PLC**, **SCADA** Systems, **HMI**, Programmable Logic Controller (**PLC**) Operations, Maintenance & Troubleshooting (**Siemens Simatic S7-300/400**), **Allen Bradley**, Modern **PLC/SCADA** for **ATS**, **Generator Parallel** Operation, **Electricity Distribution Networks**, **Electrical Transmission & Tie Lines**, **HMI Wire**, **Wireless & Communication Network**, Modern **Instrumentations/Automatic Control Principals** for Water & Wastewater Lifting Plants and Water & Wastewater Treatment Plants, **Substation Automation** Systems & Its Applications, **Siemens SIMATIC S7** Maintenance & Configuration, Modern **Automation Control** Systems, **Hydrocarbon**, **Measurement** Instrumentation, **Pressure** Measurement, **Level & Flow** Measurement, **Temperature & Vibration** Measurement, **Analytical Instrumentation**, **Calibration & Testing** Safety Procedures, **Find Control Elements**, **Control Loop** Operation, **Industrial System** Equipment & Building Installation, **Artificial Intelligence** (**AI**), **Data Acquisition & Transmission**, **Electronics Technology**, **Power Systems** Control, **Modern Electric Power** Systems, **Power Systems Security**, **Series Reactors** in **Power System**, **Power Transmissions**, **Power Generation**, **Electrical Troubleshooting** Techniques, **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 & Control** international companies and universities as the **Senior Professor & Consultant**, **Lecturer/Trainer**, **Instrumentation & Control Engineer/Trainer** and **Electrical Engineer/Trainer**. 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**. Further, he is a **Certified Instructor/Trainer**, a **Certified Trainer/Assessor** by the **Institute of Leadership & Management** (**ILM**) and has further 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

0730 - 0800	*Registration & Coffee*
0800 - 0815	*Welcome & Introduction*
0815 - 0830	***PRE-TEST***
0830 – 0930	***Introduction to ABB Gas Insulated Switchgear (GIS)*** *Definition of Gas Insulated Switchgear (GIS): GIS is a Type of Switchgear that Uses a Gas, such as Sulfur Hexafluoride (SF6), as the Insulating Medium Instead of Air • Advantages of GIS Over Conventional Switchgear • Basic Components of GIS • Functions of GIS*
0930 – 0945	*Break*
0945 - 1100	***ABB GIS Operating Mechanism*** *Types of GIS Operating Mechanisms • Spring-charged Mechanisms*
1100 – 1230	***ABB GIS Operating Mechanism (cont'd)*** *Hydraulic Mechanisms • Pneumatic Mechanisms*
1230 – 1245	*Break*
1245 - 1420	***ABB GIS Operating Mechanism (cont'd)*** *Operating Procedures • Safety Precautions during Operation*
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	*End of Day One*

Day 2

0730 – 0930	***ABB GIS Electrical Protection Systems*** *Importance of Electrical Protection Systems in GIS •Types of Electrical Protection Systems • Overcurrent Protection*
0930 – 0945	*Break*
0945 – 1100	***ABB GIS Electrical Protection Systems (cont'd)*** *Earth Fault Protection • Differential Protection • Gas Density Monitoring • Maintenance of Electrical Protection Systems*
1100 – 1230	***ABB GIS Gas Insulation System*** *Importance of Gas Insulation in GIS • Gas Insulated System Types • Properties of SF6 Gas • Gas Monitoring and Handling Procedures*

1230 – 1245	*Break*
1245 - 1420	***ABB GIS Gas Insulation System (cont'd)*** *Safety Precautions during Gas Handling and Monitoring • Maintenance of Gas Insulation System*
1420 - 1420	***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*
1420	*End of Day Two*

Day 3

0730 – 0930	***ABB GIS Mechanical Components*** *Types of GIS Mechanical Components • Circuit Breaker • Disconnector Switch*
0930 – 0945	*Break*
0945 - 1100	***ABB GIS Mechanical Components (cont'd)*** *Earthing Switch • Busbar • Maintenance of Mechanical Components*
1100 – 1230	***ABB GIS Maintenance Strategies*** *Importance of GIS Maintenance • Types of GIS Maintenance • Routine Maintenance • Preventive Maintenance*
1230 – 1245	*Break*
1245 - 1420	***ABB GIS Maintenance Strategies (cont'd)*** *Corrective Maintenance • Maintenance Planning and Scheduling • Maintenance Records Management*
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	*End of Day Three*

Day 4

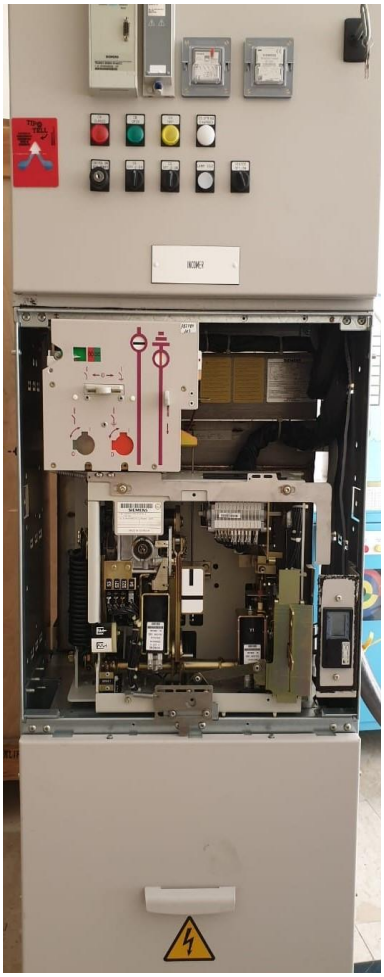
0730 – 0930	***ABB GIS Testing Procedures*** *Importance of GIS Testing • Types of GIS Testing • Insulation Resistance Testing • SF6 Gas Analysis • Circuit Breaker Testing*
0930 – 0945	*Break*
0945 - 1100	***ABB GIS Testing Procedures (cont'd)*** *Disconnector Switch Testing • Earthing Switch Testing • Busbar Testing • Testing Equipment and Procedures • Safety Precautions during Testing*
1100 – 1230	***ABB GIS Commissioning*** *Importance of GIS Commissioning • Commissioning Procedures • Gas Handling and Filling Procedures*
1230 – 1245	*Break*
1245 - 1420	***ABB GIS Commissioning (cont'd)*** *Electrical Testing Procedures • Mechanical Testing Procedures • Commissioning Documentation • Safety Precautions during Commissioning*
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*

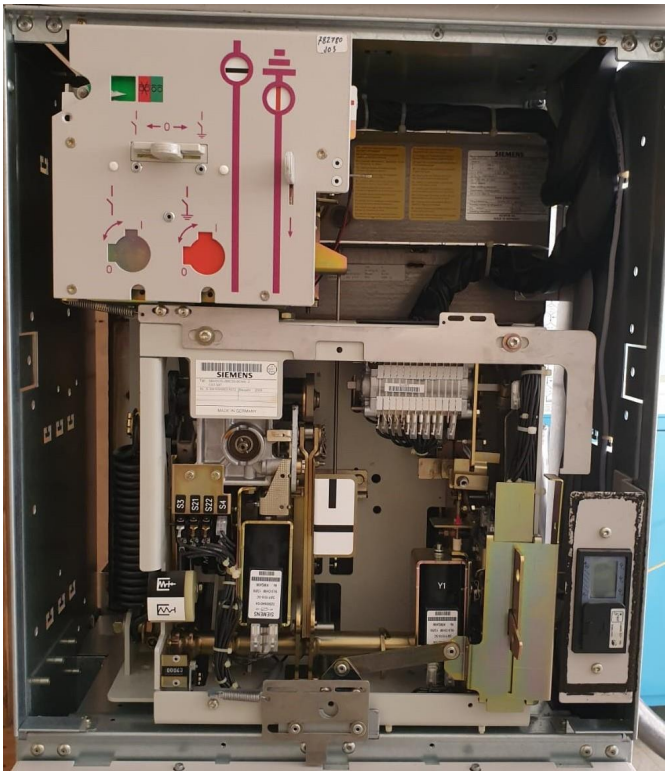
Day 5

0730 – 0930	***ABB GIS Troubleshooting & Fault Analysis*** *Importance of Troubleshooting and Fault Analysis in GIS • Types of Faults in GIS • Fault Analysis Techniques • Circuit Diagrams and Schematics*
0930 – 0945	*Break*
0945 - 1100	***ABB GIS Troubleshooting & Fault Analysis (cont'd)*** *Fault Identification and Isolation • Fault Repair and Replacement Procedures • Safety Precautions during Troubleshooting and Fault Analysis*
1100 – 1230	***ABB GIS Safety*** *Importance of Safety in GIS Operation and Maintenance • Hazards Associated with GIS Operation and Maintenance • Safety Procedures during Operation and Maintenance*
1230 – 1245	*Break*
1245 - 1345	***ABB GIS Safety (cont'd)*** *Personal Protective Equipment (PPE) • Emergency Procedures • Safety Regulations and Standards*
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	*End of Course*

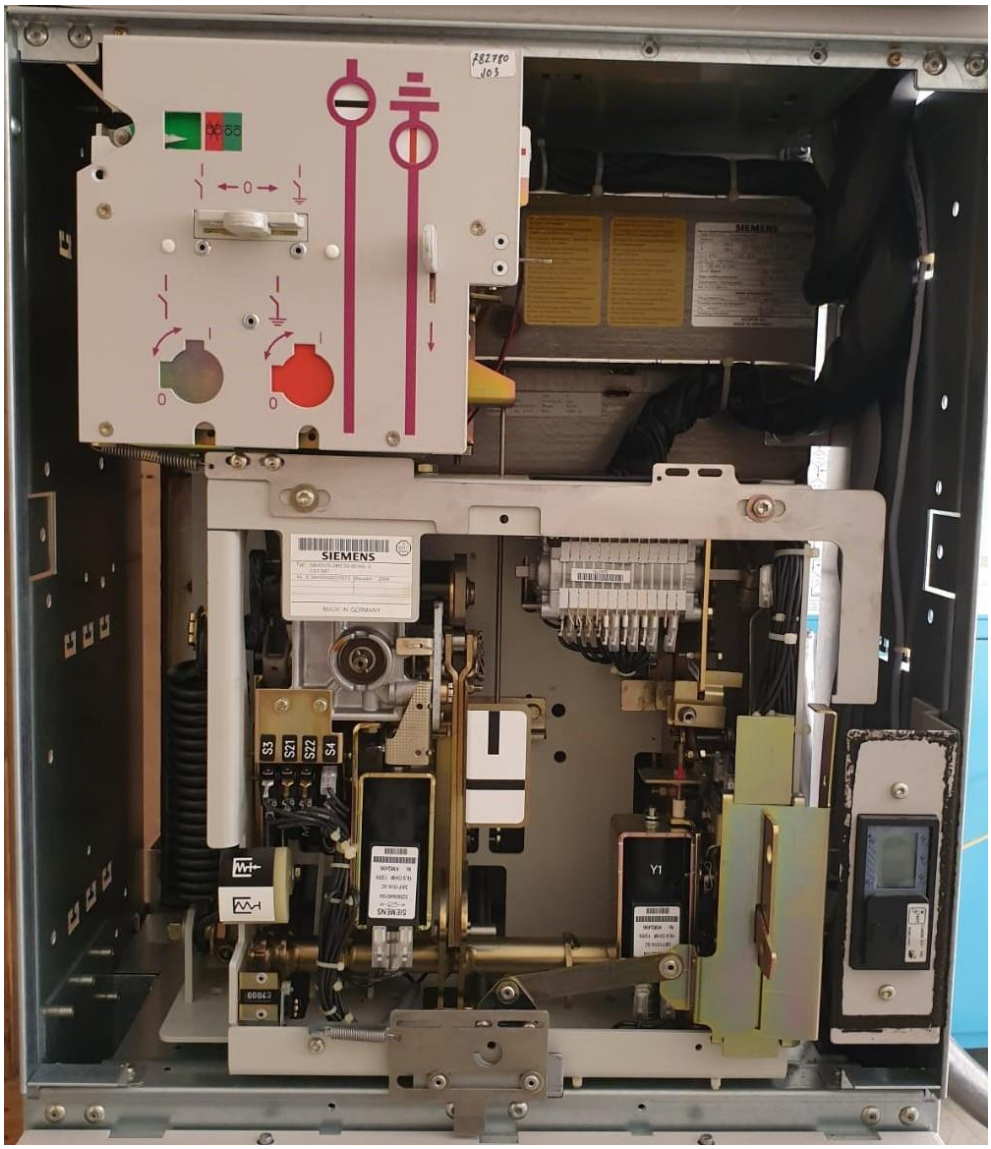
Simulators (Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art “Switchgear Simulator”, “GE Multilin Relay 469” and “GE Multilin Relay 750”.





Switchgear Simulator



Switchgear Simulator

GE Multilin Relay 469 Simulator

GE Multilin Relay 750 Simulator

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