COURSE OVERVIEW IE0712
Introduction to Signal (Radio Frequencies (RF)) Distribution, Management & Handling

Course Title
Introduction to Signal (Radio Frequencies (RF)) Distribution, Management & Handling

Course Date/Venue
Session 1: April 14-18, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: October 05-09, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
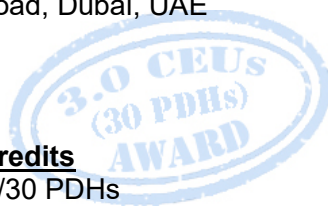
Course Reference
IE0712

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.

The HART Signals and communication protocol has become a widespread solution, allowing for convenient and efficient parameterization of smart (intelligent) measuring devices. Additionally, device-specific diagnostic signals and data can be read which provides information about the device's physical health and allow for predictive maintenance. Monitoring various device parameters is also possibility with the HART signals and protocol.

This course introduces participant to the technology, circuitry, signaling, command set, and device description language (DDL) of HART protocol. participant also learn about HART-compatible field devices such as transmitters, process receivers, and field controllers.

Further, the course will also discuss the operation of process control loop; the HART signals and protocol; the HART device networks covering HART-highway addressable remote transducer, 4-20 mA analog signal, point-to-point and multidrop modes, packet structure and master/slave protocol; the HART field devices, HART networks, HART performance summary, wireless HART and HART signals security; and the HART architecture covering device identification, electronic device description language (EDDL), accessing data, wiring parameters and commanding devices.

During this interactive course, participants will learn the HART communication modes comprising of request and response, burst mode, events and event notification, block data transfer and features of block data transfer; the HART network topologies including point-to-point network, multidrop network wireless mesh; the wireless HART commands and HART communication stack consisting of HART communication layers and wired protocol; the HART-compatible field devices covering transmitters, valve positioners, field controllers, configuration, installation, checkout, monitoring, control and safety; and the HART devices, monitoring current loops and the proper application and future trends.

Course Objectives

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

- Apply and gain a comprehensive knowledge on introduction to signal (radio frequencies (rf)) distribution, management and handling

- Operate process control loop and discuss HART signals and protocol

- Describe HART device networks in detail covering HART-highway addressable remote transducer, 4-20 mA analog signal, point-to-point and multidrop modes, packet structure and master/slave protocol

- Identify HART field devices, HART networks, HART performance summary, wireless HART and HART signals security

- Illustrate HART architecture covering device identification, electronic device description language (EDDL), accessing data, wiring parameters and commanding devices

- Recognize HART communication modes comprising of request and response, burst mode, events and event notification, block data transfer and features of block data transfer

- Identify HART network topologies including point-to-point network, multidrop network wireless mesh

- Discuss wireless HART commands and HART communication stack consisting of HART communication layers and wired protocol

- Identify HART-compatible field devices covering transmitters, valve positioners, field controllers, configuration, installation, checkout, monitoring, control and safety

- Calibrate HART devices, monitor current loops and apply proper application and future trends

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 introduction to signal (radio frequencies (rf)) distribution, management and handling for instrumentation, electrical, mechanical and chemical/process engineers, electronics and telecommunication engineers, project engineers, maintenance engineers, supervisors and those who are interested to acquire the knowledge in the field of HART signals and communication protocol.

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 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. Barry Pretorius is a **Senior Instrumentation Engineer** with almost **45** years of extensive experience within the **Oil**, **Gas**, **Petrochemical**, **Refinery** & **Power** industries. His expertise widely covers in the areas of **Cyber Security** Practitioner, **Cyber Security** of Industrial Control System, **IT Cyber Security** Best Practices, **Cybersecurity** Fundamentals, **Ethical Hacking & Penetration Testing**, **Cybersecurity** Risk Management, **Cybersecurity** Threat Intelligence, **OT Whitelisting** for Better Industrial Control System Defense, **NESA** Standard and Compliance Workshop, **OT**, **Cyber Attacks** Awareness - Malware/Ransom Ware / Virus /Trojan/ Philsing, **Information Security Manager**, **Security System** Installation and Maintenance, Security of Distributed Control System (**DCS**), Process Control, Instrumentation, Safeguarding & Security, Programmable Logic Controller (**PLC**), **Siemens PLC** Simatic S7-400/S7-300/S7-200, **PLC & SCADA** for Automation & Process Control, **Artificial Intelligence**, **Allen Bradley PLC** Programing and Hardware Trouble Shooting, Schneider **SCADA System**, **Wonder Ware**, **Emerson**, **Honeywell**, **Honeywell** Safety Manager PLC, **Yokogawa**, Advanced **DCS Yokogawa**, **Endress & Hauser**, Field Commissioning and Start up Testing Pre Operations, System Factory Acceptance Test (**FAT**), System Site Acceptance Test (**SAT**), **SCADA HMI & PLC** Control Logic, Implementation, Systems Testing, Commissioning and Startup, **Foxboro DCS & Triconics, SIS** Systems, **Drives**, Motion Control, **Hydraulics**, **Pneumatics and Control Systems** Engineering, **Electrical & Automation Control Systems**, **HV/MV Switchgear, LV & MV** Switchgears & Circuit Breakers, **High Voltage Electrical Safety**, **LV & HV Electrical System**, **HV Equipment** Inspection & Maintenance, **LV Distribution Switchgear & Equipment**, **Electrical Safety**, **Electrical** Maintenance, **Transformers**, **Medium & High Voltage Equipment**, **Circuit Breakers**, **Cable & Overhead Line** Troubleshooting & Maintenance, **Electrical Drawing & Schematics**, **Voltage Distribution**, **Power Distribution**, **Filters**, **Automation System**, **Electrical Variable Speed Drives**, **Power** Systems, **Power Generation**, **Diesel Generators**, **Power Stations**, Uninterruptible Power Systems (**UPS**), **Battery Chargers**, **AC & DC Transmission**, **CCTV** Installation, **Data & Fire Alarm** System, **Evacuation** Systems and **Electrical Motors & Variable Speed Drives**, & Control of Electrical and Electronic devices.

During Mr. Pretorius's career life, he has gained his practical experience through several significant positions and dedication as the **Senior Technical Analyst, Team Leader, Pre-operations Startup Engineer, Automation System's Software Manager, Automation System's Senior Project Engineer, PLC Specialist, Site Manager, Senior Project & Commissioning Engineer, Technical Director, Project Engineer, Radio Technician**, **A T E Technician** and **Senior Instructor/Trainer** from various companies like the ADNOC Sour Gas, Ras Al Khair Aluminum Smelter, Johnson Matthey Pty. Ltd, Craigcor Engineering, Unitronics South Africa Pty (Ltd), Bridgestone/Firestone South Africa Pty (Ltd) and South African Defense Force.

Mr. Pretorius's has a Higher Diploma in **Electrical Engineering Heavy Current**. Further, he is a **Certified Instructor/Trainer** and delivered numerous trainings, courses, workshops, seminars and conferences internationally.

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.

Accommodation

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

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 and Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Operation of Process Control Loop***
0930 – 0945	*Break*
0945 – 1100	***HART Signals & Protocol Overview*** *Evolution of HART ● Wired HART Simultaneous Analog & Digital Communication*
1100 – 1230	***HART Signals & Protocol*** *HART Technology ● HART Signaling*
1230 – 1245	*Break*
1245 – 1420	***HART Signals & Protocol (cont'd)*** *HART Command Set ● HART Device Description Language (DDL)*
1420 - 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0930	***Hart Device Networks in Detail*** *HART-Highway Addressable Remote Transducer ● What is a 4-20 mA Analog Signal? ● Why is the Current loop Used?*
0930 – 0945	*Break*
0945 – 1100	***Hart Device Networks in Detail (cont'd)*** *Point-To-Point and Multidrop Modes ● Packet Structure of HART Signals ● Master/Slave Protocol*

1100 - 1230	**Hart Device Networks in Detail (cont'd)** *HART Field Devices ● HART Networks ● HART Performance Summary*
1230 – 1245	*Break*
1300 – 1420	**Hart Device Networks in Detail (cont'd)** *Wireless HART ● HART Signals Security*
1420 - 1430	**Recap**
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	**HART Architecture** *Device Identification ● Electronic Device Description Language (EDDL)*
0830 – 0845	*Break*
0945 – 0945	**HART Architecture (cont'd)** *Accessing Data ● Wiring Parameters & Commanding Devices*
0945 – 1230	**Hart Communication Modes** *Request/Response ● Burst Mode ● Events & Event Notification*
1230 – 1245	*Break*
1245 – 1420	**Hart Communication Modes (cont'd)** *Block Data Transfer ● Features of Block Data Transfer*
1420 - 1430	**Recap**
1430	*Lunch & End of Day Three*

Day 4

0730 - 0930	**HART Network Topologies** *Point-to-Point Network ● Multidrop Network*
0930 – 0945	*Break*
0945 – 1100	**HART Network Topologies (cont'd)** *Wireless Mesh*
1100 - 1230	**HART Commands** *Wireless HART Commands*
1230 – 1245	*Break*
1245 – 1420	**HART Communication Stack** *HART Communication Layers ● Wired Protocol*
1420 - 1430	**Recap**
1430	*Lunch & End of Day Four*

Day 5

0730 – 0930	**HART-Compatible Field Devices** *Transmitters ● Valve Positioners ● Field Controllers ● Configuration, Installation & Checkout ● Monitoring, Control & Safety*
0930 – 0945	*Break*
0945 – 1130	**Calibrating HART Devices**
1130 - 1230	**Monitoring Current Loops**
1230 – 1245	*Break*
1245 – 1300	**Application & Future Trends**
1300 – 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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