

# COURSE OVERVIEW IE0030 Instrumentation & Control Engineering Certification

#### **Course Title**

Instrumentation & Control Engineering Certification

#### **Course Date/Venue**

October 26-30, 2025/Musandam Meeting Room, Royal Tulip Hotel, Muscat, Oman

o CEUs

(30 PDHs)

AWARD

# Course Reference

IE0030

**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 one of our state-of-the-art simulators.

Process control is becoming an increasingly important engineering topic, since the subject plays a crucial role in the design, operation and maintenance in areas such as power plants and chemical and industrial process plants. Control systems have advanced dramatically during the last decade. They become more modular and more sophisticated offering a vast variety of control functions for all the systems that operate within a modern "intelligent" facility. Enhanced functionality of the automation systems also means more complexity, interactive strategies, new technologies and systems management with resulting better control and improved reliability.

The course is designed to update participants with the latest technologies in instrumentation and process control. The course will describe the various types of sensors relating to level, pressure, flow and temperature. Also included is an in-depth look at control valves, actuators with associated accessories together with practical valve sizing and selection techniques. The topics of digital field communications and Smart transmitters form an integral part of this course.













A major part of the course is devoted to a detailed exposition of currently used control valves, the associated terminology, valve performance, valve and actuator types, control valve accessories as well as to the correct selection and sizing of control valves for a wide range of applications.

The course addresses the important issues related to valve installation and maintenance. In addition, this training course also utilizes an extensive collection of state-of-the-art, externally generated process management and video material concerned with all aspects of plant management, including smart wireless solutions to the collection of plant data. In addition, the subjects of digital control systems will be discussed with sections on Distributed Control Systems (DCS), Programmable Logic Controllers (PLC), SCADA systems and Safety Instrumented Systems (SIS).

#### **Course Objectives**

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

- Apply an in-depth knowledge and skills in process control and instrumentation
- List down the different technologies currently in use in pressure, temperature, level flow measurement
- Identify the types of control valve and use a system approach in actuator selection
- Determine the various process considerations for the instrumentation for industrial applications
- Review and apply the different types of control loop strategies and identify the features and application of Distributed Control System (DCS)
- Discuss the system components and operation of the Programmable Logic Controllers (PLC) and apply the configuration of the SCADA systems
- Maintain control systems for rotating equipment and acquire knowledge on Process Safeguarding including safety instrumented systems (SIS), safety integrity level (SIL) and loop safety considerations
- Identify the various trends in flow calibration and apply meter proving
- Maintain field instruments, become acquainted with field communications and employ proper testing and commissioning of field instruments

#### 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 for all significant aspects and considerations of process control and instrumentation for process control engineers and supervisors, instrumentation and control system engineers, automation engineers, instrumentation engineers and technologists. Further, process engineers, electrical engineers and supervisors and those involved in the design, implementation and upgrading of industrial control systems will also benefit from the practical aspects of this course.









## Course Certificate(s)

(1) Internationally recognized Competency Certificates 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.







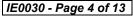
























#### **Certificate Accreditations**

Haward's 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**. 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.



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<sup>®</sup> (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:



Mr. Barry Pretorius is a Senior Instrumentation Engineer with almost 30 years of extensive experience within the Oil, Gas, Petrochemical, Refinery & Power industries. His expertise widely covers in the areas of Distributed Control System (DCS), DCS Operations & Techniques, Plant Control and Protection Systems, Process Control & Instrumentation, Cascade Control Loops, Split-Range Control Loops, Capacity Control & Other Advanced Control Schemes, Safety Instrumented Systems, Plant Automation Operations & Maintenance, 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), FactoryLink ECS, Modicon 484, Rockwell Automation, System Site Acceptance Test (SAT), SCADA HMI & PLC Control Logic, 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, Implementation, Systems Testing, Commissioning and Startup, Foxboro DCS & Triconics, SIS Systems, Advanced DC 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 Technical Director, Automation System's Software Manager, Site Manager, Senior Lead Technical Analyst, Project Team Leader, Automation Team Leader, Automation System's Senior Project Engineer, Senior Project & Commissioning Engineer, Senior Instrumentation & Control Engineer, Electrical Engineer, Project Engineer, Pre-Operations Startup Engineer, PLC Specialist, 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 **Bachelor** of **Technology** in **Electrical Engineering** (**Heavy Current**). Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), received numerous awards from various institutions 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.

#### **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: Sunday, 26th of October 2025

Day 1.	Suriday, 26 <sup>th</sup> Of October 2025
0730 - 0800	Registration & Coffee
0800 - 0815	Welcome & Introduction
0815 - 0830	PRE-TEST
0830 - 0900	<i>Introduction</i> Course Content ● Objectives of Course
0900 - 0930	Introduction to Process Control  Control History • The Process of Control • Basic Measurement Definitions • P&ID Symbols • Control Loops • Typical Applications
0930 - 0945	Break
0945 - 1100	Pressure Measurement         Basic Principles ● Definition of Terminology ● Pressure Elements ● Pressure         Transducers ● Installation Considerations ● Summary
1100 - 1230	Temperature Measurement  Principles ● Thermocouples ● RTD's ● Thermistors Thermometer ● Infra-Red Thermometry ● Installation Considerations
1230 - 1245	Break
1230 - 1330	Level MeasurementMain Types• Sight Glass Method• Buoyancy Tape Systems• HydrostaticPressure• Ultrasonic Measurement• Radar Measurement• ElectricalMeasurement• Installation Considerations
1330 – 1420	Video Presentation Radar Level Measurement
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, 27<sup>th</sup> of October 2025

Duy L.	monday, 21 or october 2020
0730 – 0830	Flow Measurement  Differential Pressure Flowmeters • Oscillatory Flow Measurement • Non- Intrusive Flowmeters • Mass Flow Meters • Positive Displacement Meters • Installation Considerations • Selection Guidelines
0830 - 0930	Video Presentation Coriolis Effect Mass Flowmeter
0930 - 0945	Break
0945 - 1100	Control Valve Types Rotary ● Linear ● Control Valve Selection
1100 – 1230	Actuator Selection Introduction ● Types of Actuators ● Linear Actuators ● Rotary Actuators ● Actuator Forces ● Positioners ● Fail Safe Actuators
1230 - 1245	Break
1245 – 1330	Process Considerations  End Connections ● Face to Face Criteria ● Materials Selection ● Modes of Failure ● Leakage Rates
1330 - 1420	Practical Session Control Valve Sizing
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, 28th of October 2025

Day 3.	Tuesday, 26 Of October 2025
0730 – 0830	Control Loop Strategies Introduction ● Variables ● Basic Elements ● Manual Control ● Feedback Control ● System Responses ● ON-OFF Control ● Three Term Control
0830 - 0930	Video Presentation Three Term Control
0930 - 0945	Break
0945 - 1030	Distributed Control Systems Introduction ● Traditional Process Controllers ● Three Term Control ● Architecture of Controllers ● Software ● Programming ● Execution Time ● Programming vs. Configuration ● Function Blocks
1030 - 1130	Video Presentation Distributed Control Systems
1130 - 1230	Programmable Logic Controllers Introduction • Today's Position • Principles of Operation • System Components • I/O Interfaces • Configuration
1230 - 1245	Break
1245 - 1345	SCADA Systems  Basic Definitions • Level of Hierarchy • Communication Systems • SCADA Configuration
1345 - 1420	Maintain Control Systems for Rotating Equipment
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











Wednesday, 29th October 2025 Day 4:

0730 – 0830	Safety Instrumented Systems (SIS)   Introduction • Overview • Ensuring Safety • Layers of Safety • Factors
	Affecting Safety • Anatomy of a Disastaer • Disaster Prevention
0830 - 0930	Safety Integrity Level (SIL)
	<i>Introduction</i> ● <i>Definition</i> ● <i>Selection Procedure</i> ● <i>Practical Examples</i>
0930 - 0945	Break
0945 – 1100	Loop Safety Considerations
	Intrinsic Safety • Explosion-Proof • Approval Standards • Oxygen Service
	Flow Calibration
1100 - 1230	General • Trends in Calibration • Types of Calibration Test Rigs • In-Situ
	Calibration • Turbine Meters
1230 – 1245	Break
1245 - 1420	Meter Proving
	Practical Exercise
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

Thursday 30th of October 2025

Day 5:	Inursday, 30" of October 2025
0730 – 0800	Field Communications  Analogue Signals • Digital Communications • Fieldbus Technologies • Future Trends
0800 - 0830	Maintain Field Instruments
0830 - 0900	Video Presentation HART Protocol
0900 - 0930	Testing & Commissioning Field Instruments
0930 - 0945	Break
0945 – 1015	Case Studies Bhopal Gas Tragedy ● Piper Alpha Disaster ● Chernobyl Catastrophe ● Buncefield Oil Depot Explosion
1015 – 1100	Video Presentation BP Texas City – Refinery Explosion
1100 – 1115	Break
1115 - 1300	Addendums Review of Course • Valve Sizing Exercise • Choke Valves • Any Other Subjects
1300 - 1315	Review Session & 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









# Simulator (Hands-on 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 one of our state-of-the-art simulators "Allen Bradley SLC 500", "AB Micrologix 1000 (Digital or Analog)", "AB SLC5/03", "AB WS5610 PLC", "Siemens S7-1200", "Siemens S7-400", "Siemens SIMATIC S7-300", "Siemens S7-200", "GE Fanuc Series 90-30 PLC", "Siemens SIMATIC Step 7 Professional Software", "HMI SCADA", "Gas Ultrasonic Meter Sizing Tool", "Liquid Turbine Meter and Control Valve Sizing Tool", "Liquid Ultrasonic Meter Sizing Tool", "Orifice Flow Calculator", "Automation Simulator" and "PLCLogix 5000 Software".



**Allen Bradley SLC 500 Simulator** 



Allen Bradley Micrologix 1000 Simulator (Analog)



Allen Bradley WS5610 PLC **Simulator PLC5** 



Allen Bradley Micrologix 1000 Simulator (Digital)



Allen Bradley SLC 5/03



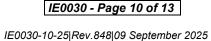
Siemens S7-1200 Simulator























Siemens S7-400 Simulator



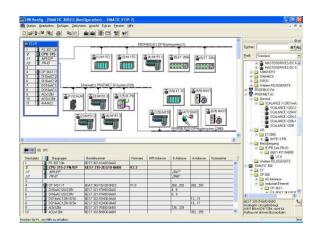
**Siemens SIMATIC S7-300** 



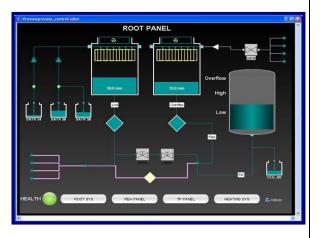
Siemens S7-200 Simulator



**GE Fanuc Series 90-30 PLC Simulator** 



**Siemens SIMATIC Step 7 Professional Software** 



**HMI SCADA** 



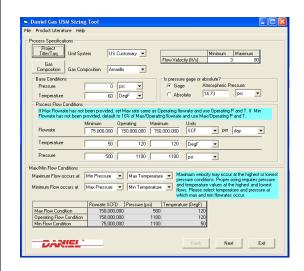




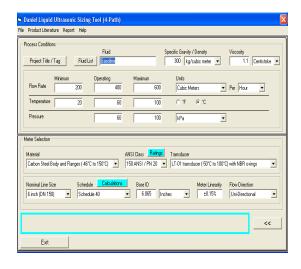




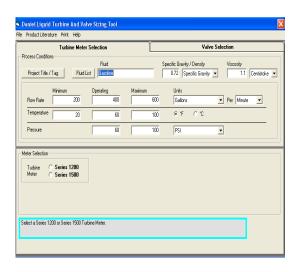




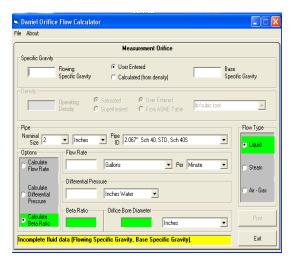
# Gas Ultrasonic Meter (USM) Sizing **Tool Simulator**



**Liquid Ultrasonic Meter Sizing Tool Simulator** 



**Liquid Turbine Meter and Control Valve Sizing Tool Simulator** 



**Orifice Flow Calculator Simulator** 



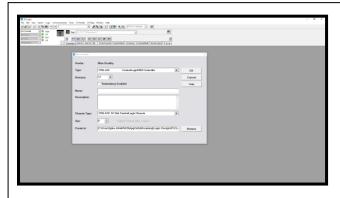
**AutoSIM – 200 Automation Simulator** 

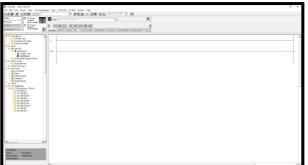


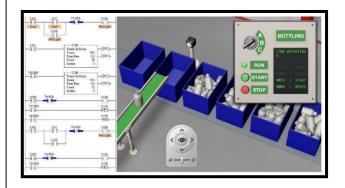


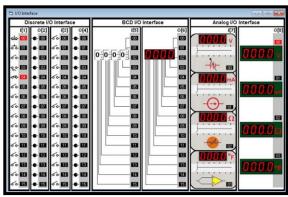


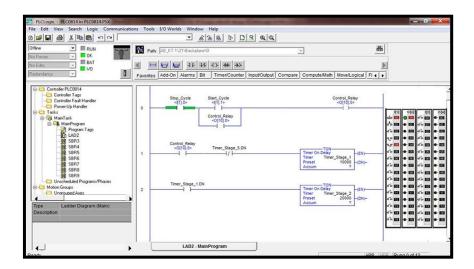












**PLCLogix 5000 Software** 

# **Course Coordinator**

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