# COURSE OVERVIEW IE1037-4D
# Industrial Process Measurement

**Course Title**
Industrial Process Measurement

**Course Date/Venue**
October 14-17, 2024/ Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

**Course Reference**
IE1037-4D

**Course Duration/Credits**
Four days/2.4 CEUs/24 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.***

This course is designed to provide participants with a detailed and up-to-date overview of fundamentals of industrial process measurement and control. It covers the concepts of process control and documentation industrial measurement systems that include process measurement, standard signals and instrumental performance terminology; and the pressure measurements, level measurement, flow measurement and temperature measurement.

During this interactive course, participants will learn the various types of control valves, feedback control strategies and advanced control strategies; the control system hardware comprising of pneumatcontroller, electronic controller, single loop controller, DCS, PLC and personal computers for control; and the smart field devices that include current practice, typical smart D/P transmitter, smart temperature transmitter system, benefits, etc.

## Course Objectives

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

- Apply and in-depth knowledge on fundamentals of industrial process measurement and control
- Discuss the concepts of process control and review documentation
- Recognize industrial measurement systems covering process measurement, standard signals and instrumental performance terminology
- Carryout pressure measurements, level measurement, flow measurement and temperature measurement
- Identify the various types of control valves and apply feedback control strategies and advanced control strategies
- Discuss control system hardware comprising of pneumatic controller, electronic controller, single loop controller, DCS, PLC and personal computers for control
- Identify smart field devices that include current practice, typical smart D/P transmitter, smart temperature transmitter system, benefits, etc

## 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 fundamentals of industrial process measurement and control 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.

## 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 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 **2.4 CEUs** (Continuing Education Units) or **24 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 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. Attalla Ersan**, PEng, MSc, BSc, is a **Senior Engineer** with over **35 years** of extensive experience within the **Oil & Gas**, **Hydrocarbon** and **Petrochemical** industries. His expertise widely covers the areas of **Power Transformers**, **Power System** Analysis, **Power Supply** Substations, **Electric Power System** Operation, Fundamentals of **Power System Equipment**, **Power System Stability**, **Power System Harmonics** Analysis, Mitigation & Solution Strategies, **Power System**, Generation & Distribution, **AC & DC Motors**, **Substations, Switchgears & Distribution**, **Electro-mechanical Protection Relays**, Engineering Drawings, Industrial **Power System Coordination**, Distributed Control System (**DCS**), **Honeywell TDS 3000 DCS**, **Liquid** and **Gas Flowmetering**, **Meter** Calibration, **Process Analyzer & Analytic Instrumentation**, **Process Control**, Instrumentation, Troubleshooting & Problem Solving, **Process Plant** Operations, **Process Plant** Startup & Operating Procedure, **Control Room** Emergency Response, **SIL Criteria**, Calibration & Configuration of Installed Instrumentation, **PLC & DCS**, **Bearing** Replacement, **Control Valves**, **Emergency Response** Planning, **Boiler & Steam** System Management, **Process Control** Design & Plant Modelling, **Process** Instrumentation & Automation, **Process Control** Instrumentation, **Analyzer Measurement** Systems, **Pressure** Management and Selection & Sizing of all Instrumentation. Further, he is also well-versed in **Permit to Work** System, Hazard and Operability (**HAZOP**) Study, Process Hazards Analysis (**PHA**), **HAZOP** Facilitation, **Loss Prevention**, Consequence Analysis Application, **Gas Detectors** Operation, **Accident/Incident Investigation** (**Why Tree Method**), **Occupational Exposure** Assessment, **Fire Fighting & First Aid**, **Environmental** Management and Basic **Safety** Awareness. Project Management, Human Resources Consultancy, Manpower Planning, Job Design & Evaluation, Recruitment, Training & Development and Leadership, Creative Problem-Solving Skills, Work Ethic, Job Analysis Evaluation, Training & Development Needs, Bidding & Tendering, Technical Report Writing, Supervisory Leadership, Effective Communication Skills and Total Quality Management (TQM). He is currently the **CEO** of **Ersan Petrokimya Teknoloji Company Limited** wherein he is responsible for the design and operation of Biogas Process Plants.

During his career life, Mr. Ersan has gained his practical and field experience through his various significant positions and dedication as the **Policy**, **Organization & Manpower Development Head**, **Training & Development**, **Head**, **Ethylene Plant – Pyrolysis Furnace Engineer**, **Production Engineer**, Process Training Coordinator, Ethylene Plant Shift Supervisor, Ethylene Plant Panel & Fit Operator, Process Training & Development Coordinator, **Technical Consultant**, and **Instructor/Trainer** for Qatar Vinyl Company Limited and Qatar Petroleum Company (QAPCO).

Mr. Ersan is a **Registered Professional Engineer** and has a **Master's degree** of **Education** in **Educational Training & Leadership** and a **Bachelor's degree** of **Petrochemical Engineering**. Further, he is a **Certified Instructor/Trainer** and has delivered numerous trainings, courses, workshops, conferences and seminars internationally.

## Course Fee

**US$ 4,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

## Course 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:*** ***Monday 14th of October 2024***

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|---|---|
| *0730 – 0800* | *Registration & Coffee* |
| *0800 – 0815* | *Welcome & Introduction* |
| *0815 – 0830* | ***PRE-TEST*** |
| *0830 – 0930* | ***Concepts of Process Control***<br>*Typical Industries • Definitions* |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Concepts of Process Control (cont'd)***<br>*Continuous vs. Batch • Feedback Loop* |
| *1100 – 1215* | ***Documentation***<br>*Instrument Line Symbols • Function Symbols • Identification Letters • Piping & Instrumentation Drawing (P&ID) • Loop Diagram* |
| *1215 – 1230* | *Break* |
| *1230 – 1420* | ***Industrial Measurement Systems***<br>*Process Measurement • Standard Signals • Instrument Performance Terminology • Repeatability and Accuracy • Zero, Span & Linearity Errors • Calibration Chart* |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day One* |

***Day 2:*** ***Tuesday 15th of October 2024***

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|---|---|
| *0730 – 0930* | ***Pressure Measurements***<br>*Concepts • Instruments • Differential Pressure Measurement • Pascal's Law • Absolute and Atmospheric Pressure • Relationship between Pressure and Column of Liquid* |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Pressure Measurements (cont'd)***<br>*Hydrostatic Head Pressure • U-Tube and Well Manometers • Bourdon Pressure Gage • Spiral and Helical Elements • Bellows and Diaphragm Elements* |
| *1100 – 1215* | ***Level Measurement***<br>*Dip Stick Level Measurement • Basic Sight Glasses • Float and Cable Arrangements • Ultrasonic •Capacitance Probe • Radiation Point • Rotating Paddle • Radar Level System • Interface Measurement • Hydrostatic Pressure • Open Tank Level • Zero Suppression/Elevation • Air Bubbler System* |
| *1215 – 1230* | *Break* |

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|---|---|
| 1230 – 1420 | ***Flow Measurement***<br>*Types of Flow • Reynolds Number • Differential Pressure Flowmeters • Concentric and Eccentric Orifaces • Flow Nozzle • Venturi and Pitot Tubes • Target Flowmeter •Rotameter or Variable Area Meter • Magnetic, Vortex, Turbine, and Ultrasonic Flowmeters • Doppler Effect • Flow Tube Vibration and Twist • Coriolis and Thermal Mass Flowmeters • Positive Displacement Flowmeters • Rotary Vane, Oval Gear, and Nutating Disc Designs • Open Channel Flow Measurement • Weirs • Parshall Flume • Flowmeter Selection* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Two* |

***Day 3: Wednesday 16th of October 2024***

| | |
|---|---|
| 0730 – 0930 | ***Temperature Measurement***<br>*Temperature Scales • Liquid-in-Glass, Filled Bulb, and Bimetallic Thermometers • Resistance Temperature Detectors (RTDs) • Reference Junction Compensation • Thermocouplers • Immersion and Insertion Lengths • Thermowells • Thermistors* |
| 0930 – 0945 | *Break* |
| 0945 – 1100 | ***Control Valves***<br>*Types • Valve Characteristics • Inherent Flow Characteristics • Actuators • Air to Extend/Retract • Positioners • I/P Transducer* |
| 1100 – 1215 | ***Feedback Control Strategies***<br>*Control Hierarchy • Process Dynamics • Lags • Dead Time •Strategies • Direct/Reverse Acting* |
| 1215 – 1230 | *Break* |
| 1230 – 1420 | ***Feedback Control Strategies (cont'd)***<br>*On-Off Control • Controller Modes • Proportional Control/Action • Level Control Offset • Integral and Derivative Action • Tuning* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Three* |

***Day 4: Thursday 17th of October 2024***

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|---|---|
| 0730 – 0930 | ***Advanced Control Strategies***<br>*Control Hierarchy • Cascade Control • Applications: With and Without Cascade • Ratio Control • Feedforward Control* |
| 0930 – 0945 | *Break* |
| 0945 – 1100 | ***Control System Hardware***<br>*Pneumatic Controller • Electronic Controller • Single Loop Controller • Distributed Control System (DCS) • Programmable Logic Controller (PLC) • Personal Computers for Control* |
| 1100 – 1215 | ***Smart Field Devices***<br>*Current Practice • Typical Smart D/P Transmitter • Smart Temperature Transmitter System • Benefits* |
| 1215 – 1230 | *Break* |
| 1230 – 1345 | ***Smart Field Devices (cont'd)***<br>*Innovative Applications • Fieldbus Foundation - H1 & H2 • How is Fieldbus Different? • Fieldbus Control System (FCS)* |
| 1345 – 1400 | ***Course Conclusion*** |
| 1400 – 1415 | ***POST-TEST*** |
| 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” and “Automation Simulator”.

Allen Bradley SLC 500 Simulator

Allen Bradley Micrologix 1000 Simulator (Digital)

Allen Bradley Micrologix 1000 Simulator (Analog)

Allen Bradley SLC 5/03

Allen Bradley WS5610 PLC Simulator PLC5

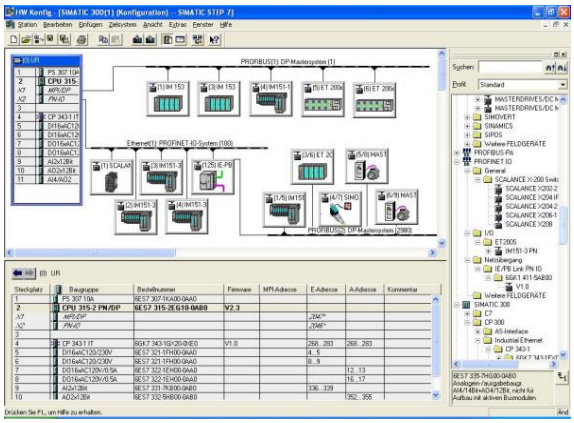
Siemens S7-1200 Simulator

**Siemens S7-400 Simulator**

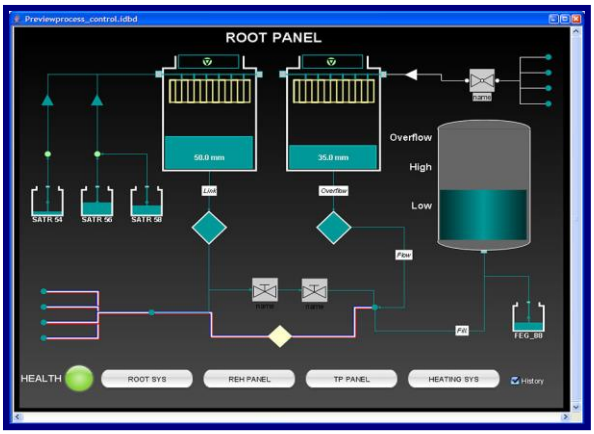
**Siemens SIMATIC S7-300**

**Siemens S7-200 Simulator**

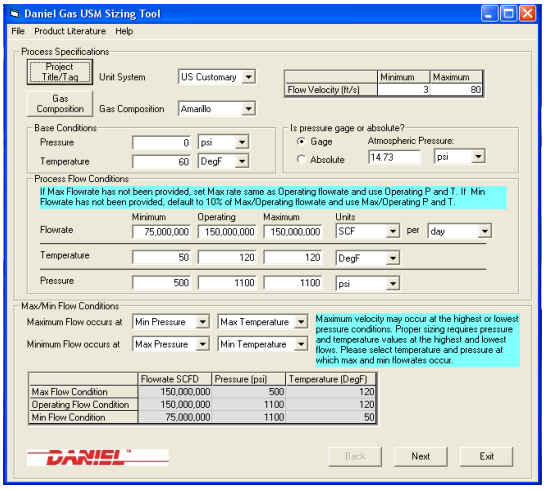
**GE Fanuc Series 90-30 PLC Simulator**



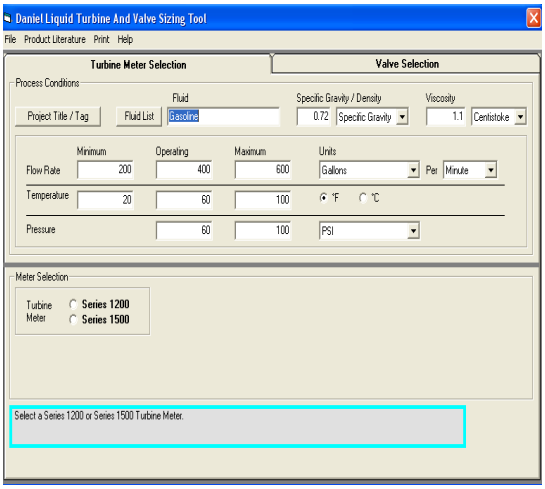
**Siemens SIMATIC Step 7 Professional Software**



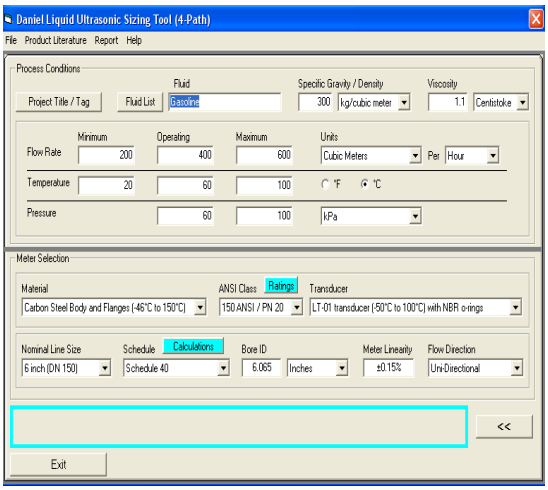

**HMI SCADA**



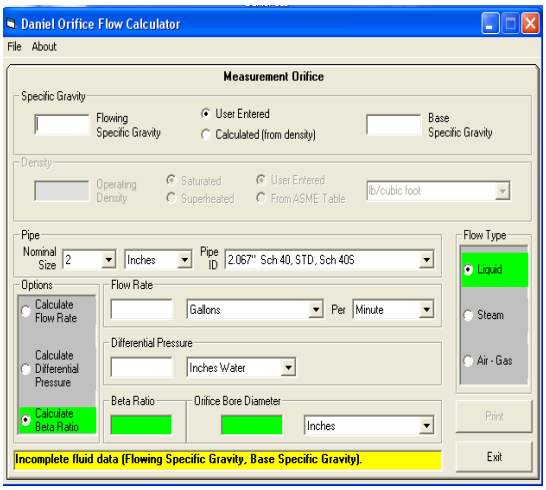

**Gas Ultrasonic Meter (USM) Sizing Tool Simulator**



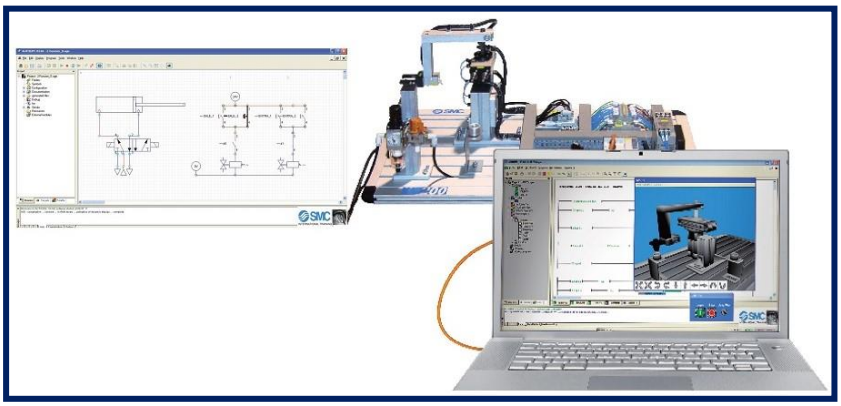

**Liquid Turbine Meter and Control Valve Sizing Tool Simulator**




**Liquid Ultrasonic Meter Sizing Tool Simulator**




**Orifice Flow Calculator Simulator**



**AutoSIM – 200 Automation Simulator**

## Course Coordinator

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