

COURSE OVERVIEW IE0038

Process Control, Troubleshooting & Problem Solving

Course Title

Process Control, Troubleshooting & Problem Solving

Course Reference

IE0038

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Date/Venue

Session(s)	Date	Venue
1	July 13-17, 2025	Boardroom, Sheraton Dubai Creek Hotel & Towers, Dubai, UAE
2	August 17-21, 2025	Safir Meeting Room, Divan Istanbul, Taksim, Turkey
3	October 19-23, 2025	Olivine Meeting Room, Fairmont Nile City, Cairo, Egypt

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.



Production processes consist of many complex apparatuses involving both moving and static parts as well as interconnecting pipes, control mechanisms and electronics, mechanical and thermal stages, heat exchangers, waste and side product processing units, power ducts and many others. Bringing such a complicated unit online and ensuring its continued productivity requires substantial skill at anticipating, detecting and solving acute problems. Failure to identify and resolve these problems quickly can lead to lost production, off-spec product, equipment loss, and even catastrophic accidents. Therefore, the ability to troubleshoot process operations is one of the most valuable skills operations personnel can possess.



Troubleshooting is the process used to diagnose the fault safely and efficiently, decide on corrective action and prevent the fault from reoccurring. Process engineering, especially troubleshooting, is different from most other branches of technology in another respect: It is not advancing very quickly.



The principles of distillation, hydraulics, phase separation, and heat transfer, as they apply to process applications, have been well known for quite some time. The challenge in troubleshooting consists of untangling the influence that human error, mechanical failure, and corrosion have on these well-known principles. The aspect of the job that makes it so difficult is that most process problems are initiated by human error – a never-ending source of surprise.

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.

This course is designed to provide instruction in process control, instrumentation and the different types of troubleshooting techniques, procedures, and methods used to solve process problems. Participants will use existing knowledge of equipment, systems and the instrumentation to understand the troubleshooting process operations of an entire unit in a facility. Participants study concepts related to troubleshooting commissioning, normal startup, normal operations, normal shutdown, turnarounds, and abnormal situations, as well as the Process team role in performing tasks associated with these concepts within an operating unit.

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) and SCADA systems.

Course Objectives

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

- Apply and gain an in-depth knowledge on process control, troubleshooting and problem solving
- Discuss process control covering process control benefits, basic measurement definitions, control loops and typical applications
- List down the different technologies currently in use in pressure, temperature, level and flow measurement
- Identify the various types of control valve and use a system approach in actuator selection
- Determine flow characteristics, valve accessories, control valve sizing and leakage rates



- Review and employ the different types of control loop strategies, PID control mode and learn the features and application of Distributed Control System (DCS)
- Discuss the system components and operation of the Programmable Logic Controllers (PLC) and describe the configuration of the SCADA systems
- Employ process troubleshooting, process control maintenance, effective methods for troubleshooting and best practices for maintaining process control equipment
- Discuss the most famous problem with process control equipment and apply preventive maintenance procedures

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 a complete and up-to-date overview of the process control, instrumentation and various troubleshooting techniques and procedures used to solve process problems. Process control engineers, instrumentation engineers, control system engineers, automation engineers and process engineers will definitely benefit from the engineering problem solving approach of the course. Supervisors, technologists and other technical and operational staff will gain an excellent knowledge 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.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

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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.

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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

Dubai	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.
Istanbul	US\$ 6,000 per Delegate + VAT . This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Cairo	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:



Mr. Mahmoud Fattah, is a **Senior Instrumentation & Control Engineer** with over **30 years** of extensive experience within the **Oil & Gas, Petrochemical and Fertilizer** industries. His expertise widely covers the **Process Control Loop, Control Valves, Control Systems, Actuators & Valve Selection, Process Control & Automation, Batch Process & Sequential Control, Analog Control, Operator Interfaces, Data Communication, System Checkout & Testing, Advanced Control with PLC's, Ladder Logic, Process Instrumentation & Control, Control Valve Maintenance, Process Automation & Control Instrumentation, Foxboro, ABB, Rosemount, Yokogawa, Pneumatic & Electronic, Level Measurement, Pressure Measurement, Temperature & Flow Measurement, Actuators & Positioners, Control Room Instruments, Panel Controllers, Indicators & Recorders, Control Systems Installation, Control Valves Maintenance, Analytical Analyzers, Transmitters, Controllers, Smart Instruments and PLC & PID Control.** Further, he is also well-versed in **Turbine, Pumps & Compressors, Pump Maintenance & Water Tanks, Turbines & Generators, Pressure Switch & Gauge Cabinet Calibration, Lube/Seal Oil Control System and Hydrogen Generation.**

During his career life, Mr. Fattah has gained his practical and field experience through his various significant positions and dedication as the **General Manager, Technical Director, Technical Officer, Process Field & Panel Instruments, Maintenance Director, Maintenance Engineer, Instrumentation Trainer, Technical Officer, Instrument Specialist, Instrument Expert/Trainer, Instructor/Trainer** for El Mansourah Main Water Plant, SEMADCO, Creol Production Service International (CPSI), Saudi Consolidated Electric Co. (SCECO), Delta Co., General Fertilizer Company (GFC) and International Expertise Association (INTEX).

Mr. Fattah has a **Bachelor's** degree in **Mechanical Power Engineering**. Further, he is a **Certified Instructor/Trainer**, an active member of Egyptian Engineering Syndicate and delivered numerous trainings, courses, workshops, conferences and seminars internationally.



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
0815 – 0830	Introduction Course Content • Objectives of Course
0830 – 0930	Introduction to Process Control Process Control Definition • Process Control Benefits • Basic Measurement Definitions • Process Control History • Control Loops • Typical Applications
0930 – 0945	Break
0945 – 1100	Pressure Measurement Basic Principles • Definition of Terminology • Pressure Elements • Pressure Transducers • Installation Considerations • Summary
1100 – 1215	Temperature Measurement Principles • Thermocouples • RTD's • Thermistors Thermometer • Infra-Red Thermometry • Installation Considerations
1215 – 1230	Break
1230 – 1330	Level Measurement Main Types • Sight Glass Method • Buoyancy Tape Systems • Hydrostatic Pressure • Ultrasonic Measurement • Radar Measurement • Electrical Measurement • 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

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 – 1215	Actuator Selection Introduction • Types of Actuators • Linear Actuators • Rotary Actuators • Actuator Forces • Positioners • Fail Safe Actuators
1215 – 1230	Break
1230 – 1330	Control Valves Basic Terminology • Flow Characteristics • Valve Accessories • Control Valve Sizing • 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

0730 – 0830	Control Loop Strategies Introduction • Variables • Basic Elements • Manual Control • Feedback Control • System Responses • ON-OFF Control • PID Control Mode
0830 – 0930	Video Presentation PID Control
0930 – 0945	Break
0945 – 1100	Distributed Control Systems Introduction • Traditional Process Controllers • DCS Definition • Architecture of Controllers • Software • DCS Network • DCS Application • DCS Operator WorkStation • Function Blocks
1100 – 1215	Video Presentation Distributed Control Systems
1215 – 1230	Break
1230 – 1330	Programmable Logic Controllers Introduction • Today's Position • Principles of Operation • System Components • I/O Interfaces • Configuration and Programming Languages
1330 – 1420	SCADA Systems Basic Definitions • Level of Hierarchy • Communication Systems • SCADA Benefits
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

Day 4

0730 – 0930	Process Troubleshooting Troubleshoot Process Control Issues • Effective Methods of Troubleshooting
0930 – 0945	Break
0945 – 1130	The Process Control Maintenance Maintenance Definition • Types of Maintenance • Preventive Maintenance
1130 – 1215	Effective Methods for Troubleshooting Identify the Problem • Check the Software • Check the Process • Check the Human Factors • Apply the Solutions
1215 – 1230	Break



1230 – 1420	Best Practices for Maintaining Process Control Equipment <i>Plan and Schedule Maintenance Activities • Train and Equip Maintenance Staff • Monitor and Inspect Process Control Equipment</i>
1420 – 1430	Recap <i>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</i>
1430	<i>Lunch & End of Day Four</i>

Day 5

0730 – 0930	Most Famous Problems with Process Control Equipment <i>Control Valves Problems and Methods of Solution • Pressure Transmitter Problems with its Solution • Capillary DPT • Calibration</i>
0930 – 0945	<i>Break</i>
0945 – 1145	Preventive Maintenance Procedures <i>PM Procedure for Pressure Transmitter • PM Procedure for Temperature Transmitter</i>
1145 – 1215	Case Studies - Working in Groups
1215 – 1230	<i>Break</i>
1230 – 1345	Case Studies - Working in Groups
1345 – 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

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”, and “HMI SCADA”.



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



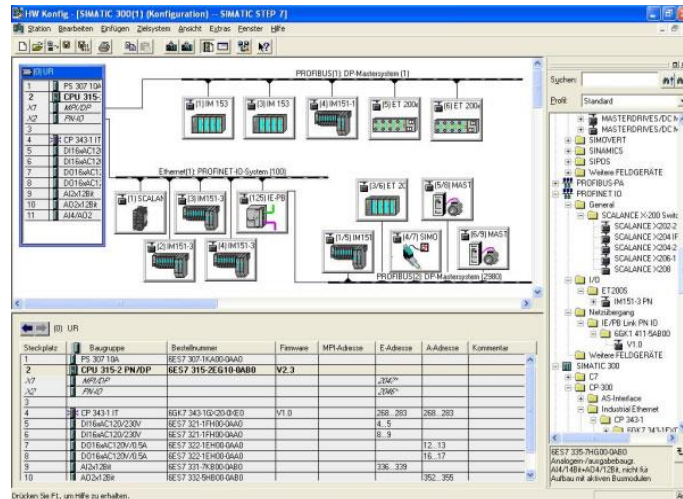
Siemens SIMATIC S7-300



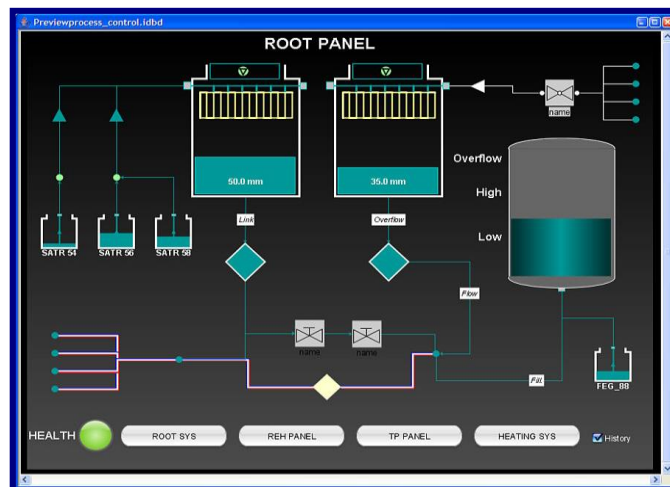
Siemens S7-200 Simulator



GE Fanuc Series 90-30 PLC Simulator



Siemens SIMATIC Step 7 Professional Software



HMI SCADA

Course Coordinator

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