COURSE OVERVIEW IE0105

Advanced Process Control & Loop Tuning

Course Title
Advanced Process Control & Loop Tuning

Course Reference
IE0105

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

Course Date/Venue

Session(s)	Date	Venue
1	May 18-22, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
2	July 07-11, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
3	October 05-09, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
4	December 08-12, 2025	Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

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 the advanced process control and loop tuning. It covers the APC systems and its elements comprising of distributed control system (DCSD) platforms, computer platforms, software and operator interfaces; the design parameters, input/output counts, scan and control frequencies, redundancies and backup; the loop tuning and its fundamentals; the different tuning rules and the comparison of the ten different rules; and the tables of typical tuning settings, when to use them/when not to use them and the rules of thumb in tuning.

During this interactive course, participants will learn the tuning of valves, automated tuning, self-tuning loops and adaptive control; the tuning of more complex systems covering cascade systems, feedforward, ratio and multivariable systems; the interactive loops tuning, dead time compensation and practical limitations; the good practice in loop tuning and good practice for common loop problems; and the flow control loop characteristics, level control loop characteristics, temperature control loop characteristics, pressure control loop characteristics and other less common loops.

Course Objectives

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

- Apply and gain an advanced knowledge on process control and loop tuning
- Recognize APC systems and its elements covering distributed control system (DCSD) platforms, computer platforms, software and operator interfaces, etc
- Discuss design parameters comprising of input/output counts, scan and control frequencies, redundancies and backup, etc
- Illustrate loop tuning and discuss its fundamentals, the different tuning rules and the comparison of the ten different rules
- Identify the tables of typical tuning settings, when to use them/when not to use them and the rules of thumb in tuning
- Explain the tuning of valves, automated tuning, self-tuning loops and adaptive control
- Recognize the tuning of more complex systems covering cascade systems, feedforward, ratio and multivariable systems
- Identify interactive loops tuning, dead time compensation and practical limitations
- Carryout good practice in loop tuning and good practice for common loop problems
- Describe flow control loop characteristics, level control loop characteristics, temperature control loop characteristics, pressure control loop characteristics and other less common loops

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 advanced process control and loop tuning for senior instrumentation & control maintenance engineers, senior maintenance planning engineers, instrumentation & control maintenance engineers, electrical engineers and instrumentation & control technicians.

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 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.

Accommodation

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

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. Sydney Thoresson, PE, BSc, is a **Senior Electrical & Instrumentation Engineer** with over **30 years** of extensive experience within the **Petrochemical**, **Utilities**, **Oil**, **Gas** and **Power** industries. His specialization highly evolves in **Process Control Instrumentation**, **Process Instrumentation & Control**, **Process Control**, **Instrumentation**, **Troubleshooting** & Problem Solving, Process **Instrumentation** and Control Techniques, **Instrumentation** for Process Optimization and Control, Process Automation and **Instrumentation** Systems Integration, Troubleshooting in Process Control Systems**,** Process Control & Safeguarding, **Troubleshooting Instrumentation** and Control Systems, GC Processes **Troubleshooting** and Control Systems, Practical **Troubleshooting** and Repair of Electronic Circuits**,** Process Control, **Troubleshooting** & **Problem Solving.** Process Control (**PCI**) & Safeguarding, **Control Loop & Valve Tuning**, **Controller Maintenance** Procedures, High Integrity Protection Systems (**HIPS**), **Instrument Calibration & Maintenance**, **Instrumented Safety Systems**, **Compressor Control & Protection**, **Control Systems**, Programmable Logic Controllers (**PLC**), **SCADA System**, **PLC & SCADA** - Automation & Process Control, **PLC & SCADA** Systems Application, Technical **DCS/SCADA**, **PLC-SIMATIC S7 300/400**: Configuration, Programming and Troubleshooting, **PLC, Telemetry and SCADA** Technologies, Cyber Security of Industrial Control System (**PLC, DCS, SCADA & IED**), Basics of **Instrumentation Control System, DCS**, **Distributed Control System** - Operations & Techniques, Distributed Control System (**DCS**) Principles, Applications, Selection & Troubleshooting, Distributed Control Systems (**DCS**) especially in **Honeywell DCS**, **H&B DCS**, **Modicon, Siemens**, **Telemecanique**, **Wonderware** and **Adrioit,** Safety Instrumented Systems (**SIS**), Safety Integrity Level (**SIL**), Emergency Shutdown (**ESD**), **Emergency Shutdown** System, Variable Frequency Drive (**VFD**), **Process Control & Safeguarding**, **Field Instrumentation**, **Instrumented Protective Devices** Maintenance & Testing, Instrumented Protective Function (**IPF**), **Refining & Rotating Equipment**, **Equipment Operations**, **Short Circuit Calculation**, **Voltage Drop Calculation**, **Lighting Calculation**, **Hazardous Area Classification**, **Intrinsic Safety**, **Liquid & Gas Flowmetering**, **Custody Measurement**, **Ultrasonic Flowmetering**, **Loss Control**, **Gas Measurement**, **Flowmetering & Custody Measurement**, **Multiphase Flowmetering**, **Measurement and Control**, **Mass Measuring System Batching** (**Philips**), Arc Furnace Automation-Ferro Alloys, Walking Beam Furnace, Blast Furnace, Billet Casting Station, Cement Kiln Automation, Factory Automation and Quality Assurance Accreditation (**ISO 9000** and **Standard BS 5750**). Further, he is also well-versed in **Electrical Safety**, **Electrical Hazards Assessment**, **Electrical Equipment**, **Personal Protective Equipment**, Log-Out & Tag-Out (**LOTO**), **ALARP & LOPA** Methods, Confined Workspaces, Power **Quality**, Power **Network**, Power **Distribution**, **Distribution Systems**, **Power Systems Control**, **Power Systems Security**, Power **Electronics**, Electrical **Substations**, **UPS** & **Battery System**, **Earthing & Grounding**, Power **Generation**, **Protective Systems**, **Electrical Generators**, **Power** & **Distribution Transformers**, **Electrical Motors**, **Switchgears**, **Transformers**, **AC** & **DC Drives**, **Variable Speed Drives** & **Generators** and **Generator Protection**. He is currently the **Projects Manager** wherein he manages projects in the field of electrical and automation engineering and in-charge of various process hazard analysis, fault task analysis, FMEA and HAZOP study.

During Mr. Thoresson's career life, he has gained his thorough and practical experience through various challenging positions and dedication as the **Contracts & Projects Manager**, **Managing Director**, **Technical Director**, **Divisional Manager**, **Plant Automation Engineer**, **Senior Consulting Engineer**, **Senior Systems Engineer**, **Electrical & Instrumentation Engineer**, **Consulting Engineer**, **Service Engineer** and **Section Leader** from several international companies such as **Philips**, **FEDMIS**, **AEG**, **DAVY International**, **BOSCH**, **Billiton** and **Endress/Hauser**.

Mr. Thoresson is a **Registered Professional Engineering Technologist** and has a **Bachelor's** degree in **Electrical & Electronics Engineering** and a **National Diploma** in **Radio Engineering**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**) and an active member of the International Society of Automation (**ISA**) and the Society for Automation, Instrumentation, Measurement and Control (**SAIMC**). He has further delivered numerous trainings, courses, seminars, conferences and workshops worldwide.

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 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 – 0900	***APC Systems***
0900 – 0930	***What APC is NOT***
0930 – 0945	*Break*
0945 – 1030	***What APC Really is***
1030 – 1100	***Where it is Used***
1100 – 1130	***APC System Elements***
1130 – 1215	***Distributed Control System (DCS) Platforms***
1215 – 1230	*Break*
1230 – 1300	***Computer Platforms***
1300 – 1330	***Software***
1330 – 1420	***Operator Interfaces***
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0800	***Analyzers & Process Models***
0800 – 0830	***Multivariable Control Technology***
0830 – 0900	***Optimization***
0900 – 0930	***Constraint Control***
0930 – 0945	*Break*
0945 – 1030	***Design Parameters***
1030 – 1100	***Input/Output Counts***
1100 – 1130	***Scan Frequencies***
1130 – 1215	***Control Frequencies***
1215 – 1230	*Break*
1230 – 1330	***Redundancies & Backup***
1330 – 1420	***Data History Storage***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0800	***Plant Segmentation & Size***
0800 – 0830	***Information System Links***
0830 – 0930	***Loop Tuning***
0930 – 0945	*Break*
0945 – 1030	***Fundamentals of Tuning***

1030 – 1100	***The Different Tuning Rules***
1100 – 1130	***Ten Different Rules Compared***
1130 – 1215	***Tables of Typical Tuning Settings***
1215 – 1230	*Break*
1230 – 1330	***When to Use Them/When Not to Use Them***
1330 – 1420	***Rules of Thumb in Tuning***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

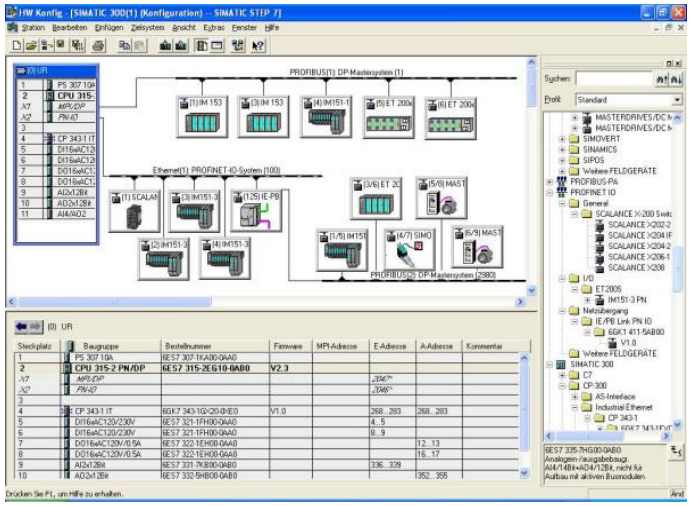
0730 – 0800	***Tuning of Valves & Automated Tuning***
0800 – 0830	***Valve Tuning***
0830 – 0930	***Automated Tuning***
0930 – 0945	*Break*
0945 – 1030	***Self-Tuning Loops***
1030 – 1100	***Adaptive Control***
1100 – 1130	***Tuning of More Complex Systems***
1130 – 1215	***Cascade Systems – Tuning of Them***
1215 – 1230	*Break*
1230 – 1330	***Feedforward, Ratio, Multivariable Systems***
1330 – 1420	***Interactive Loops Tuning***
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

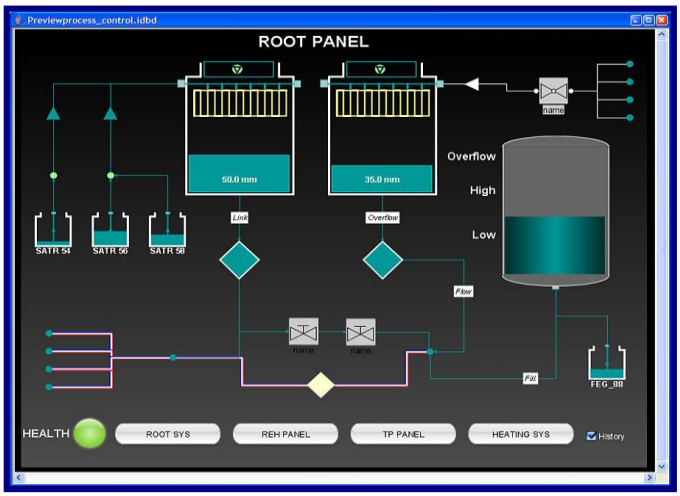
0730 – 0800	***Dead Time Compensation***
0800 – 0830	***Practical Limitations***
0830 – 0930	***Good Practice in Loop Tuning***
0930 – 0945	*Break*
0945 – 1030	***Good Practice for Common Loop Problems***
1030 – 1100	***Flow Control Loop Characteristics***
1100 – 1130	***Level Control Loop Characteristics***
1130 – 1215	***Temperature Control Loop Characteristics***
1215 – 1230	*Break*
1230 – 1300	***Pressure Control Loop Characteristics***
1300 – 1345	***Other Less Common Loops***
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 "Siemens SIMATIC Step 7 Professional Software" and "HMI SCADA".



Siemens SIMATIC Step 7 Professional Software



HMI SCADA

Course Coordinator

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