COURSE OVERVIEW IE0105
Advanced Process Control & Loop Tuning

Course Title
Advanced Process Control & Loop Tuning

Course Date/Venue
Session 1: October 14-18, 2024/ Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: October 21-25, 2024/ Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 3: October 27-31, 2024/ Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Course Reference
IE0105

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.

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, sample video clips of the instructor's actual lectures & practical sessions during the course 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 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 Certificate(s)

Internationally recognized Competency Certificates and Plastic Wallet Cards 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. Successful candidate will be certified . Certificates are valid for 5 years. .

- 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.

- 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. Pan Marave, PE, MSc, BEng, is a **Senior Electrical & Instrumentation Engineer** with over **40 years** of extensive experience in **Oil**, **Gas**, **Petrochemical**, **Refinery** & **Power** industries. His expertise includes **CEMS** Operations and Maintenance, **ABB 11KV Distribution Switchgear**, Operation & Maintenance of **Rotork make MOVS**, **Maintaining Instrument Air Compressors**, **Circuit Breaker**, **HV Switchgear Maintenance**, **HV/LV Electrical** Authorisation, Basic **Electricity**, **Electrical & Special Hazards**, **Personnel Protection**, **HV/LV Equipment**, **Motor Controllers**, **Electrical Switching** Practices, **Emergency Planning**, **Safety Management**, Safety Instrumented Systems (**SIS**), Safety Integrity Level (**SIL**), Emergency Shutdown (**ESD**); **DCS**, **SCADA** & **PLC**; **Measurement** (**Flow**, **Temperature**, **Pressure**); **Process Analyzers** & **Analytical Instrumentation**; **Process Control**, **Instrumentation** & **Safeguarding**; **Process Controller**, **Control Loop & Valve Tuning**; Industrial **Distribution Systems**; Industrial **Control & Control Systems**, Power Systems **Protection & Relaying**; **Earthing**, **Bonding**, **Grounding**, **Lightning & Surge Protection**; Electric Power **Substation** & **Systems**; Electrical Engineering Principles; **Motor Control Circuit**; **Electrical Fault Analysis**; Electrical Networks & Distribution **Cables**; **Circuit Breakers**, **Switchgears**, **Transformers**, **Hazardous Areas Classification** and **Detailed Engineering Drawings**, **Codes** & **Standards**. Furthermore, he is also well-versed in Microprocessors Structure, Lead Auditor (**ISO 9000:2000**), **ISO 9002**, Quality Assurance, and Projects & Contracts Management.

Presently, Mr. Marave is the **Technical Advisor** of **Chamber of Industry & Commerce** in Greece. Prior to this, he gained his thorough practical experience through several positions as the **Technical Instructor**, **Engineering Manager**, **Electronics & Instruments Head**, **Electrical**, **Electronics & Instruments Maintenance Superintendent**, **Assistant General Technical Manager** and **Engineering Supervisor** of various international companies such as the **Alumil** Mylonas, **Athens Papermill**, **Astropol** and the **Science Technical Education**.

Mr. Marave is a **Registered Professional Engineer** and has **Master's** and **Bachelor's** degrees in **Electrical Engineering** from the **Polytechnic Institute of New York** and **Pratt Institute of New York** (**USA**) respectively. 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 **Technical Chamber** and the Institute of Electrical and Electronics Engineer (**IEEE**) in Greece. He has presented and delivered **numerous international** courses, conferences, trainings and workshops worldwide.

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

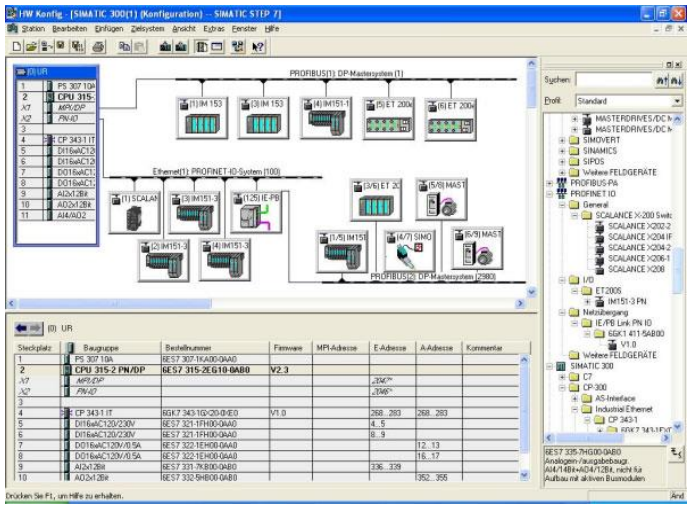
0730 – 0800	***Tuning of Valves & Automated Tuning***
0800 – 0830	***Valve Tuning***
0830 – 0930	***Automated Tuning***
0930 – 0945	*Break*
0945 – 1030	***Self-Tuning Loops***
1030 – 1100	***Adaptive Control***
1100 – 1130	***Tuning of More Complex Systems***
1130 – 1215	***Cascade Systems – Tuning of 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

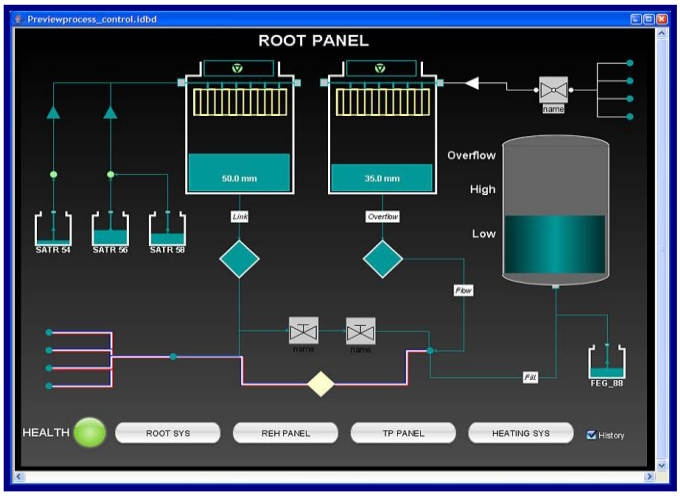
0730 – 0800	***Dead Time Compensation***
0800 – 0830	***Practical Limitations***
0830 – 0930	***Good Practice in Loop Tuning***
0930 – 0945	*Break*
0945 – 1030	***Good Practice for Common Loop Problems***
1030 – 1100	***Flow Control Loop Characteristics***
1100 – 1130	***Level Control Loop Characteristics***
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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