# COURSE OVERVIEW IE1037
# Industrial Process Measurement and Control


**Course Title**
Industrial Process Measurement and Control

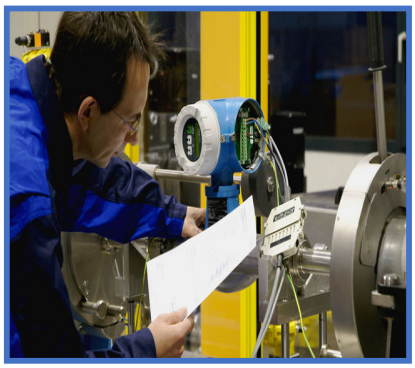
**Course Date/Venue**
Session 1: June 15-19, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE
Session 2: November 10-14, 2025/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE



**Course Reference**
IE1037

**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 Industrial Process Measurement & Control. It covers the importance and application of process control in industries; the basic process variables, temperature, pressure, flow and level; the P&ID symbols and the principles of measurement and various sensing technologies; the feedback and feedforward loops and calibration techniques and error management; and the temperature, pressure, flow, level and analytical measurement and the importance of safety instrumented systems.

During this interactive course, participants will learn the anatomy, characteristics and selection of control valve; the sizing parameters and calculations of control valve sizing and the function, types and selection of actuators and positioners; the control valve troubleshooting and preventive and predictive maintenance of valves; safe and environmentally responsible operations; the PID controllers, PID tuning techniques and advanced control strategies; the PLC and DCS systems, HMI and SCADA systems; the alarm management, maintenance strategies, instrument reliability and documentation and record keeping; the role of IOT, AI and big data in instrumentation and control; and the threats, challenges and safeguarding techniques of cybersecurity in industrial control systems.

## Course Objectives

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

- Apply and in-depth knowledge on industrial process measurement and control
- Discuss the importance and application of process control in industries
- Identify basic process variables covering temperature, pressure, flow and level
- Recognize and interpret P&ID symbols and explain the principles of measurement and various sensing technologies
- Identify feedback and feedforward loops and apply calibration techniques and error management
- Analyze temperature, pressure, flow, level and analytical measurement and discuss the importance of safety instrumented systems
- Describe the anatomy, characteristics and selection of control valve
- Carryout sizing parameters and calculations of control valve sizing and discuss the function, types and selection of actuators and positioners
- Employ control valve troubleshooting and preventive and predictive maintenance of valves
- Ensure safe and environmentally responsible operations
- Apply PID controllers, PID tuning techniques and advanced control strategies
- Recognize PLC and DCS systems including HMI and SCADA systems
- Carryout alarm management, maintenance strategies, instrument reliability and documentation and record keeping
- Identify the role of IOT, AI and big data in instrumentation and control and identify the threats, challenges and safeguarding techniques of cybersecurity in industrial control systems

## 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 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.

## Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course 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.

## 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 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:

**Dr. Ahmed El-Sayed**, PhD, MSc, BSc, is a **Senior Electrical & Instrumentation Engineer** with over **30 years** of extensive experience in the **Oil**, **Gas**, **Power**, **Petroleum**, **Petrochemical** and **Utilities**. He specializes in **Instrumentation Protection Devices** Maintenance & Testing, **Protection Devices** Troubleshooting, Water **Meter Calibration**, Liquid & Gas Flowmetering & **Meter Calibration**, **Testing & Calibration of Energy Meters**, **DCS & ESD** System Architecture, **Distributed Control System**, **DCS** & **SCADA**, Distributed Control System (**DCS**) Selection & Troubleshooting, Advanced **DCS Yokogawa**, **Yokogawa CENTUM VP DCS**, **Modern Distributed Control System** (**DCS**) **& Process Instrumentation**, **Cyber Security** of Industrial System, **DCS System** (**Honeywell**), **DCS Experion** System, **DCS Siemens Telepherm XP**, **Relay Coordination Using ETAP Software**, **Power System Study on ETAP**, **ETAP-Power System Analysis**, **Flow Measurement** Foundation, **Hydrocarbon** Measurement & Sampling, **Gas Dosiers** Preparation, **Gas/Liquid Fuel** Measurement, **Instrumentation Measurement & Control System**, **Flow** Measurement, **Pressure** Measurement, **Level & Temperature** Measurement, **Measurement Devices & Control System**, **Instrumentation & Control** Systems, **Control System** Orientation, Uninterruptible Power Supply (**UPS**) **Battery Charger**, **Industrial UPS Systems Construction & Operation**, **Test Lead-Acid & Ni-cad Battery Systems**, **Hazards & Safe Work Practice**s, **Transformer** Operational Principles, Selection & Troubleshooting; **HV & LV Transformers**, **Control Valves & Actuators**, **Electrical Safety**, **Protection Relay Application**, **Maintenance & Testing**, **NEC** (National Electrical Code), **NESC** (National Electrical Safety Code), **Electrical Safety**, **Electrical Hazards Assessment**, **Electrical Equipment**, **Personal Protective Equipment**, Lock-Out & Tag-Out (**LOTO**), Confined Workspaces, Alerting Techniques, Electrical Transient Analysis Program (**ETAP**), 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**, **Generator Protection**, **GE Gas Turbines**, PLC, SCADA, DCS, Process Control, Control Systems & Data Communications, Instrumentation, Automation, Valve Tuning, SIS, SIL, ESD, Alarm Management Systems, Engine Management System, Bearing & Rotating Machine, Fieldbus Systems and Fiber Optics Technology. He is currently the **Systems Control Manager** of **Siemens** where he is in-charge of Security & Control of Power **Transmission Distribution** & **High Voltage** Systems and he further takes part in the Load Records Evaluation & Transmission Services Pricing.

During his career life, Dr. Ahmed has been actively involved in different Power System Activities including Roles in Power System Planning, Analysis, Engineering, **HV Substation** Design, Electrical Service Pricing, Evaluations & Tariffs, Project Management, Teaching and Consulting. His vast industrial experience was honed greatly when he joined many International and National Companies such as **Siemens**, **Electricity Authority** and **ACETO** industries as the **Instrumentation & Electrical Service Project Manager**, **Instrumentation & Control Engineer**, **Energy Management Engineer**, **Department Head**, **Assistant Professor**, **Instrumentation & Control Instructor**, **Project Coordinator**, **Project Assistant and Managing Board Member** where he focused more on dealing with Technology Transfer, System Integration Process and Improving Localization. He was further greatly involved in manufacturing some of **Power System** and **Control & Instrumentation Components** such as Series of Digital Protection **Relays**, MV **VFD**, **PLC** and **SCADA** System with intelligent features.

Dr. Ahmed is well-versed in different electrical and instrumentation fields like **ETAP**, Load Management Concepts, **PLC** Programming, Installation, Operation and Troubleshooting, **AC Drives** Theory, Application and Troubleshooting, Industrial Power Systems Analysis, AC & DC **Motors**, Electric Motor **Protection**, **DCS SCADA**, **Control** and Maintenance Techniques, Industrial Intelligent Control System, **Power Quality** Standards, Power Generators and Voltage Regulators, Circuit Breaker and Switchgear Application and Testing Techniques, **Transformer** and **Switchgear** Application, Grounding for Industrial and Commercial Assets, Power Quality and **Harmonics**, **Protective Relays** (O/C Protection, Line Differential, Bus Bar Protection and **Breaker Failure Relay**) and Project Management Basics (PMB).

Dr. Ahmed has **PhD**, **Master's** & **Bachelor's** degree in **Electrical Engineering** from the **University of Wisconsin Madison**, **USA** and **Ain Shams University**, respectively. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/ Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), an active member of IEEE and ISA as well as numerous technical and scientific papers published internationally in the areas of Power Quality, Superconductive Magnetic Energy Storage, SMES role in Power Systems, Power System **Blackout** Analysis, and Intelligent Load Shedding Techniques for preventing Power System Blackouts, HV **Substation Automation** and Power System Stability.

## 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***

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|---|---|
| *0730 – 0800* | *Registration & Coffee* |
| *0800 – 0815* | *Welcome & Introduction* |
| *0815 – 0830* | ***PRE-TEST*** |
| *0830 – 0930* | ***Introduction to Process Control***<br>*Overview, Importance and Application in Industries* |
| *0930 – 0945* | *Break* |
| *0945 – 1030* | ***Basic Process Variables***<br>*Understanding Temperature, Pressure, Flow and Level* |
| *1030 – 1130* | ***Instrumentation Symbols & Nomenclature***<br>*Recognizing and Interpreting P&ID Symbols* |
| *1130 - 1230* | ***Measurement Principles & Sensors***<br>*Principles of Measurement and Various Sensing Technologies* |
| *1230 – 1245* | *Break* |
| *1245 – 1330* | ***Process Control Loops***<br>*Detailed Overview of Feedback and Feedforward Loops* |
| *1330 - 1420* | ***Error Analysis & Calibration***<br>*Calibration Techniques and Error Management* |
| *1420 – 1430* | ***Recap*** |
| *1430* | *Lunch & End of Day One* |

***Day 2***

| | |
|---|---|
| *0730 – 0830* | ***Temperature Measurement***<br>*Devices, Calibration and Maintenance* |
| *0830 – 0930* | ***Pressure Measurement***<br>*Technologies, Calibration and Troubleshooting* |
| *0930 – 0945* | *Break* |
| *0945 – 1100* | ***Flow Measurement***<br>*Devices, Applications and Accuracy* |
| *1100 - 1230* | ***Level Measurement***<br>*Principles, Instruments and Installation* |
| *1230 – 1245* | *Break* |

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|---|---|
| 1245 – 1330 | ***Analytical Measurement***<br>*pH, Conductivity and Composition Analysis* |
| 1330 – 1420 | ***Safety Instrumentation***<br>*Overview and Importance of Safety Instrumented Systems* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Two* |

***Day 3***

| | |
|---|---|
| 0730 – 0830 | ***Control Valve Fundamentals***<br>*Anatomy, Characteristics and Selection* |
| 0830 - 0930 | ***Control Valve Sizing***<br>*Sizing Parameters and Calculations* |
| 0930 – 0945 | *Break* |
| 0945 – 1100 | ***Actuators & Positioners***<br>*Function, Types and Selection* |
| 1100 – 1230 | ***Control Valve Troubleshooting***<br>*Common Issues and Solutions* |
| 1230 - 1245 | *Break* |
| 1245 – 1330 | ***Preventive & Predictive Maintenance of Valves***<br>*Approaches and Strategies* |
| 1330 - 1420 | ***Safety & Environmental Considerations***<br>*Ensuring Safe and Environmentally Responsible Operations* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Three* |

***Day 4***

| | |
|---|---|
| 0730 – 0830 | ***PID Controllers***<br>*Overview, Configuration and Applications* |
| 0830 - 0930 | ***PID Tuning Techniques***<br>*Methods and Practical Considerations* |
| 0930 – 0945 | *Break* |
| 0945 – 1100 | ***Advanced Control Strategies***<br>*Feedforward, Cascade and Ratio Control* |
| 1100 – 1230 | ***PLC & DCS Systems***<br>*Basics, Architecture and Applications* |
| 1230 – 1245 | *Break* |
| 1245 – 1330 | ***HMI & SCADA Systems***<br>*Overview, Design and Implementation* |
| 1330 - 1420 | ***Alarm Management***<br>*Strategies and Best Practices* |
| 1420 – 1430 | ***Recap*** |
| 1430 | *Lunch & End of Day Four* |

***Day 5***

| | |
|---|---|
| 0730 – 0830 | ***Maintenance Strategies***<br>*Preventive, Predictive, Reactive and Proactive Maintenance* |
| 0830 - 0930 | ***Instrumentation Reliability***<br>*Enhancing and Evaluating Instrument Reliability* |
| 0930 – 0945 | *Break* |
| 0945 – 1100 | ***Documentation & Record-Keeping***<br>*Effective Management of Maintenance Records* |

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|---|---|
| *1100 – 1230* | ***Introduction to Industry 4.0***<br>*Role of IoT, AI and Big Data in Instrumentation and Control* |
| *1230 – 1245* | *Break* |
| *1245 – 1315* | ***Cybersecurity in Industrial Control Systems***<br>*Threats, Challenges and Safeguarding Techniques* |
| *1315 - 1345* | ***Course Summary, Q&A & Feedback***<br>*Wrapping Up and Assessing Understanding* |
| *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**

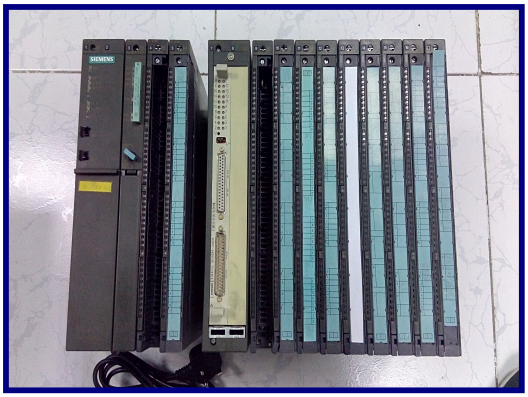
**Allen Bradley Micrologix 1000 Simulator (Digital)**

**Allen Bradley Micrologix 1000 Simulator (Analog)**

**Allen Bradley SLC 5/03**

**Allen Bradley WS5610 PLC Simulator PLC5**

**Siemens S7-1200 Simulator**

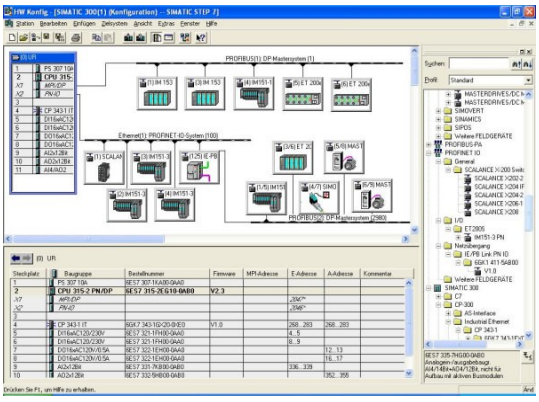


Siemens S7-400 Simulator

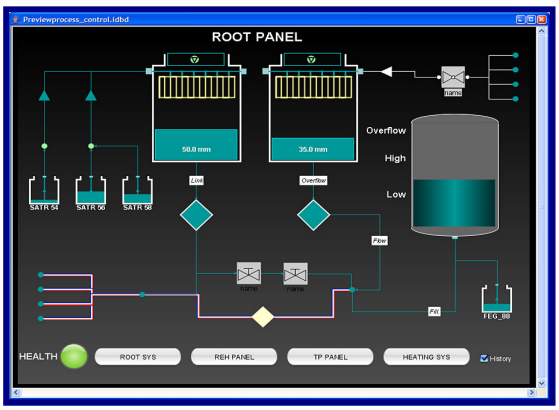
Siemens SIMATIC S7-300

Siemens S7-200 Simulator

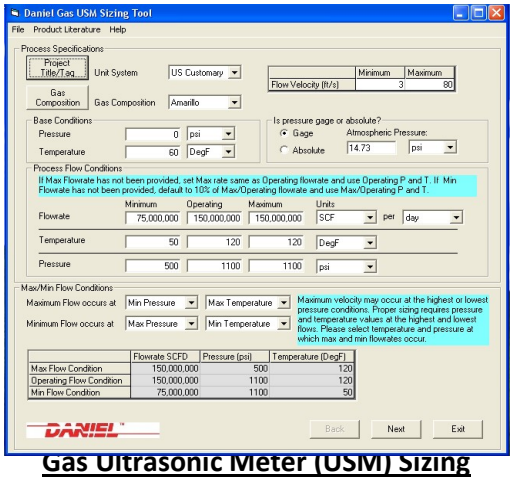
GE Fanuc Series 90-30 PLC Simulator



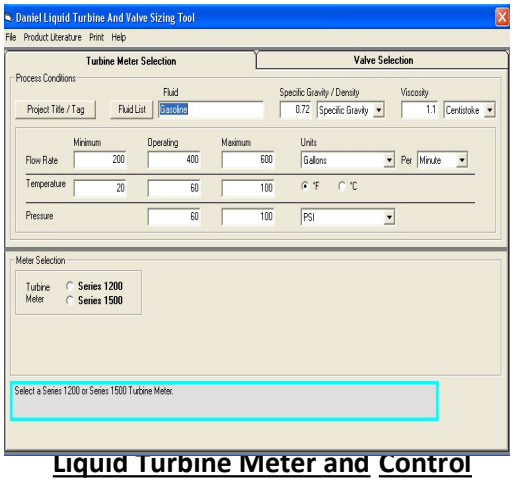
Siemens SIMATIC Step 7 Professional Software



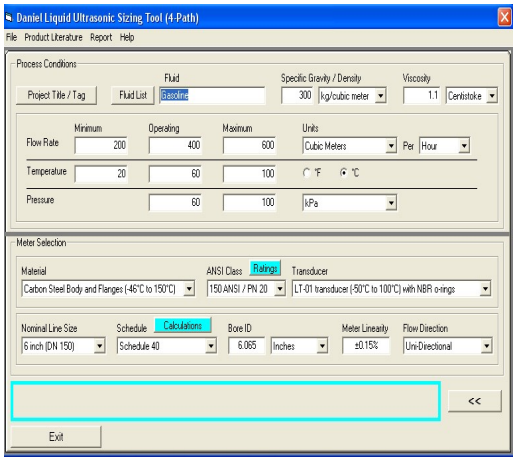

HMI SCADA



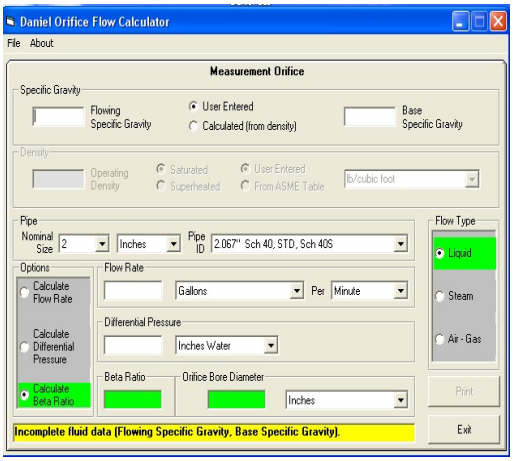

**Gas Ultrasonic Meter (USM) Sizing Tool Simulator**



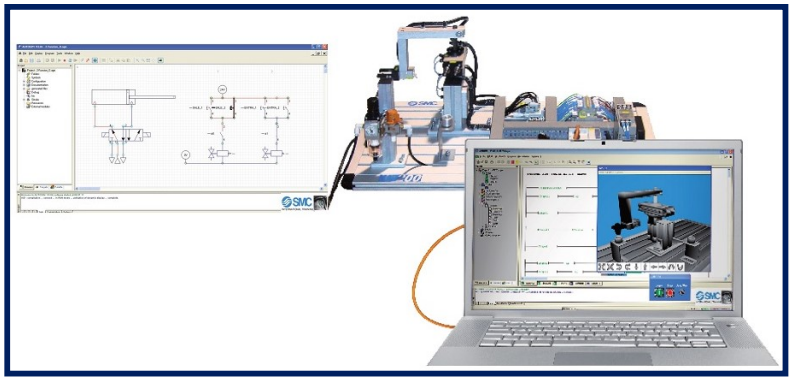

**Liquid Turbine Meter and Control Valve Sizing Tool Simulator**




**Liquid Ultrasonic Meter Sizing Tool Simulator**




**Orifice Flow Calculator Simulator**



**AutoSIM – 200 Automation Simulator**

**Course Coordinator**

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