COURSE OVERVIEW IE0560
SCADA System

Course Title
SCADA System

Course Date/Venue
October 06-10, 2024/BoardRoom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

3.0 CEUs (30 PDHs) AWARD

H-STK© INCLUDED

Course Reference
IE0560

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.

Supervisory Control and Data Acquisition (SCADA) technology has evolved over the past 30 years as a method of monitoring and controlling large processes. SCADA refers to the combination of telemetry and data acquisition.

SCADA encompasses the collecting of the information via a RTU (Remote Terminal Unit), transferring it back to the central site, carrying out any necessary analysis and control and then displaying that information on a number of operator screens or displays. The required control actions are then conveyed back to the process.

SCADA systems consist of three functional components: communications equipment, Remote Terminal Units (RTUs), and Master Terminal Units (MTUs). Communications is the spine of SCADA technology. All information from remote sites must successfully negotiate the communications system to get from the RTU to the MTU.

The course offers overviews of SCADA Siemens component technologies, as well as details necessary to understand the big picture. SCADA processes cover areas that may be measured in the thousands of square miles, and have dimensions that may be hundreds, occasionally thousands, of mile long. Now a mature technology, SCADA includes, but is not limited to, software packages that can be incorporated in a larger system. After completing this course, participants should be conversant with SCADA Siemens nomenclature and architecture, understand the basic technology of the system's building blocks, understand its limitations, understand how it can benefit particular operations, and have a basis for selecting appropriate SCADA Siemens technologies for their operational requirements.

The course is designed to introduce the participants to the basics of SCADA Siemens by providing overviews of relevant topics where possible and details where necessary. Since SCADA Siemens consists of the elements of several different technologies, it is sometimes difficult to know where to stop when describing some of these technologies to the participants. The course attempts to focus on such technologies to the extent that they make SCADA Siemens more understandable. The course also identifies major differences between the SCADA systems of different industries. Because the basics of SCADA are much the same from one industry to another, however, examples from many industries have been included throughout the course.

The course will cover most popular PLC's used in the industry, such as Quantum, Allen Bradley, Siemens, Bristol, Emersons, Omron and Telemechanique Shneider Modicon with extended case studies for Allen Bradley and Siemens.

Course Objectives

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

- Apply and gain a comprehensive knowledge on SCADA and telemetry systems for industry
- Define and identify SCADA including applicable process, elements of a SCADA system, limited two-way system, development from telemetry and dependence on communications and computers
- Identify real time systems, remote control, communications and radio
- Differentiate between remote terminal units (RTUs) and master terminal units (MTUs)
- Illustrate sensors, actuators and wiring as well as applications and operator interface
- Determine SCADA economics including costs versus benefits, time value of money, capital costs, training and maintenance costs, SCADA operating costs, 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, 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 a wide understanding and deeper appreciation of SCADA and telemetry systems for industry for those who wish to learn the basics of SCADA systems. It is intended to be useful to managers, supervisors, engineers and other technical staff who contemplate coming in contact with SCADA systems.

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 **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. Sydney Thoresson, PE, BSc, is a **Senior Electrical & Instrumentation Engineer** with over **40 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, Instrumentation Engineering, Process Control (**PCI**) & Safeguarding, **Instrument Calibration & Maintenance**, **Instrumented Safety Systems**, High Integrity Protection Systems (**HIPS**), Process Controller, **Control Loop & Valve Tuning**, **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**), 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**, **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**, **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.

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.

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: ***Sunday, 06th of October 2024***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***What is SCADA?*** *Definition of SCADA • Applicable Processes • Elements of a SCADA System • A Limited Two-way System • Development from Telemetry • Dependence on Communications and Computers*
0930 – 0945	*Break*
0945 – 1100	***Real-Time Systems*** *What Really is Real Time? • Communications Access and "Master-Slave" • Determining Scan Interval • Where to Compute?*
1100 – 1230	***Remote Control – What Not to SCADA*** *Murphy's Law and Remote Control • Safety Instrumented Systems • Regulatory Requirements*
1230 – 1245	*Break*
1245 – 1420	***Communications*** *Communications Makes SCADA Possible • Data is Binary: Analog-to-Digital Conversion • Long Distance Communications is Serial • Communications System Components • Protocol • Modems • Synchronous or Asynchronous? • Telephone Cable or Radio?*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2: Monday, 07th of October 2024

0730 – 0930	***Radio*** *Simplex or Duplex? • Turn-On Time • Frequencies: Are they Available? • Path Studies and Seasonal Variations*
0930 – 0945	*Break*
0945 – 1100	***Radio (cont'd)*** *Solar Variations • Reliability and Maintenance • Satellite Communications • Cell Phones*
1100 – 1230	***Remote Terminal Units (RTUs)*** *What does an RTU Do? • Communications Interface • Protocol Detailed • Discrete Control • Analog Control • Pulse Control*
1230 – 1245	*Break*
1245 – 1420	***Remote Terminal Units (RTUs) (cont'd)*** *Serial Control • Monitor Discrete Signals • Monitor Analog Signals • Monitor Pulse Count Signals • Monitor Serial Signals • Non-RTU Functions*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3: Tuesday, 08th of October 2024

0730 – 0930	***Master Terminal Units (MTUs)*** *Communications Interface • Configuring a Picture of the Process*
0930 – 0945	*Break*
0945 – 1100	***Master Terminal Units (MTUs) (cont'd)*** *Some Simple Applications • Data Storage*
1100 – 1230	***Sensors, Actuators and Wiring*** *A Forgotten Cost • Special Considerations*
1230 – 1245	*Break*
1245 – 1420	***Sensors, Actuators and Wiring (cont'd)*** *Standardization • Maintenance*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4: Wednesday, 09th of October 2024

0730 – 0930	***Applications*** *Real Time Revisited • Accounting and Grade of Data • Scanning and Communications*
0930 – 0945	*Break*
0945 – 1100	***Applications (cont'd)*** *Some Automatic Control • Advisory Applications*
1100 – 1230	***Operator Interface*** *Local Security Considerations • System Security Considerations • Alarming • Control Change Screens*
1230 – 1245	*Break*
1245 – 1420	***Operator Interface (cont'd)*** *Status Screens • Graphics and Trending • Reports • Parallel Operator Interface*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5: **Thursday, 10th of October 2024**

0730 – 0800	***SCADA Economics*** *Costs versus Benefits • The Time Value of Money • Capital Costs • Training and Maintenance Costs • SCADA Operating Costs*
0930 – 0945	*Break*
0945 – 1100	***SCADA Economics (cont'd)*** *Benefits: Reduced Capital Costs • Benefits: Reduced Process Operating Costs • Benefits: Improved Facility Effectiveness • Tax Implications*
1100 – 1230	***What's Next?*** *Better Communications • Smarter RTUs • Smarter MTUs*
1230 – 1245	*Break*
1245 – 1345	***What's Next? (cont'd)*** *Local Area Networks (LANs) • External Applications • Spread-Spectrum Radio for SCADA*
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" and "PLCLogix 5000 Software".

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

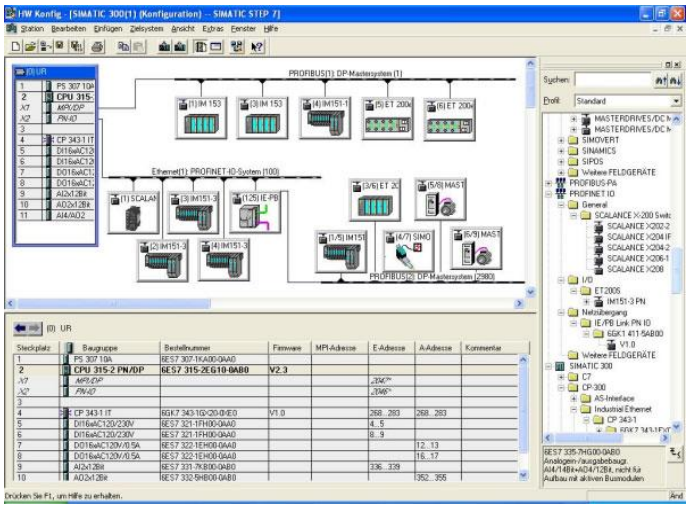
Siemens S7-1200 Simulator

Siemens S7-400 Simulator

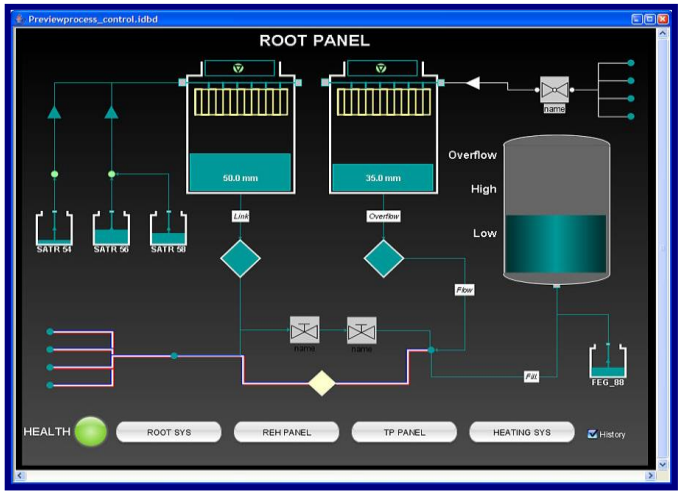
Siemens SIMATIC S7-300

Siemens S7-200 Simulator

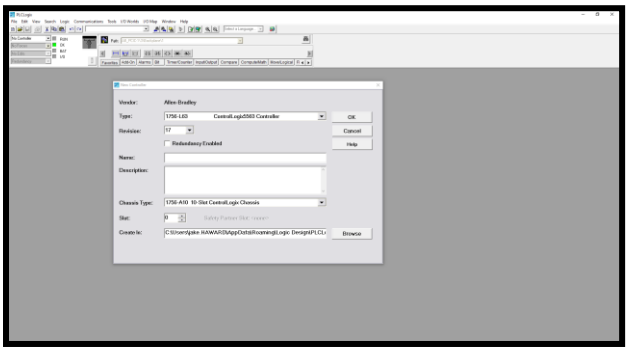
GE Fanuc Series 90-30 PLC Simulator

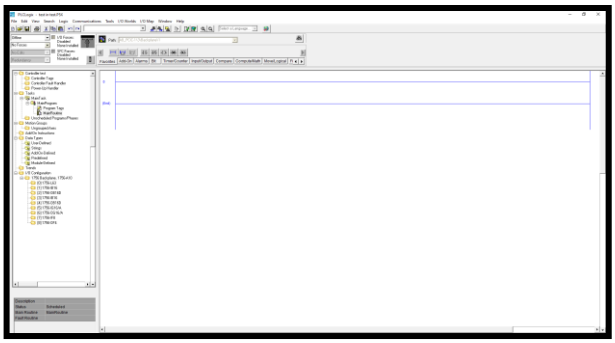


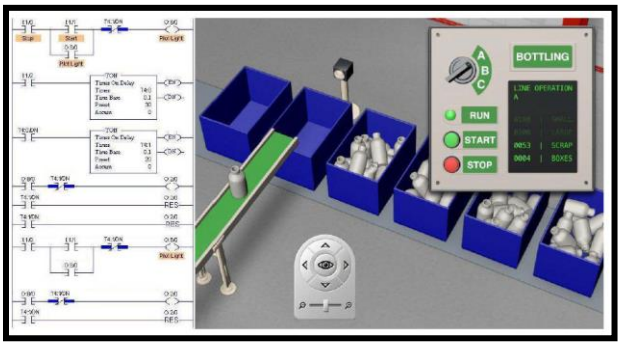
Siemens SIMATIC Step 7 Professional Software

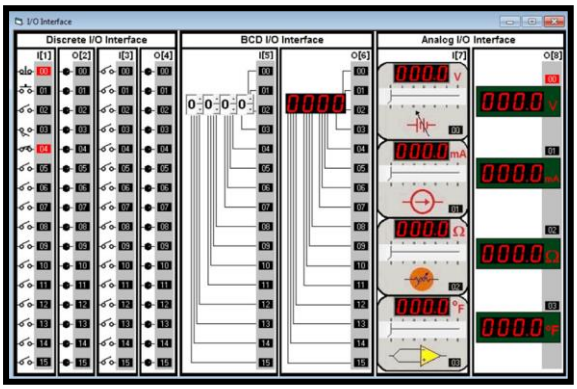


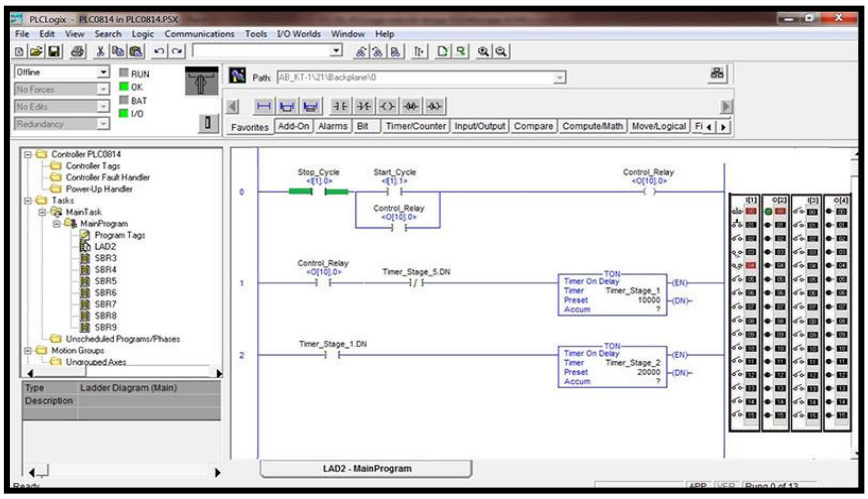
HMI SCADA











PLCLogix 5000 Software

Course Coordinator

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