



COURSE OVERVIEW IE0560 Integrating & Optimizing SCADA Systems

Course Title

Integrating & Optimizing SCADA Systems

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

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.

This 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 Telemecanique 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 integrating and optimizing SCADA systems
- 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 conveniently saved in a **Tablet PC**.

Who Should Attend


This course provides an overview of all significant aspects and considerations of integrating and optimizing SCADA 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: -

- 
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 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. Alaa Abdel Kerim, PhD, MSc, BSc, is a Senior Electrical & Instrumentation Engineer with over 30 years of extensive experience in the Power & Water Utilities and Other Energy Sectors. He specializes in Electrical Safety, HV Cable Design, Cable Splicing & Termination, Cable Jointing Techniques, High Voltage Electrical Safety, Electrical Drawing & Schematics, Electrical Power, Electrical Wiring, Machines, Transformers, Motors, Power Stations, Substation Site Inspection, HV/MV Cable Splicing, High Voltage Circuit Breaker Inspection & Repair, Cable & Over Head Power Line, High Voltage Power System Safe Operation, High Voltage Safety, High Voltage Transformers, Safe Operation of High Voltage & Low Voltage Power Systems, Fundamentals of Electricity, Electrical Standards, Practical High Voltage Safety Operating Procedures, Modern Power System Protective Relaying, Electrical & Control System Testing, Design, Commissioning, Operation and Maintenance of Switchgears, Transformers, Substations, Medium & High Voltage Equipment and Circuit Breakers, Electrical Motors & Variable Speed Drives, Power System Equipment, Distribution Network System, Electric Distribution System Equipment, Practical Troubleshooting of Electrical Equipment & Control Circuits, Electrical & Control System Testing & Commissioning, LV/MV/HV Circuit Breakers Inspection & Maintenance, Electrical Power Substation Maintenance, Power Stations, Uninterruptible Power Systems (UPS), Battery Chargers and AC & DC Transmission, DCS, PLC, SCADA, HMI, Automation System, Process Control & Instrumentation, Hydrocarbon, Level & Flow Measurements, Analytical Instrumentation, Find Control Elements, Control Loop Operation, Data Acquisition & Transmission, Electronics Technology, Power Systems Control, Power Systems Security, Power Transmissions, Power Generation, Electrical Substations and MV/LV Electrical System.

During his career life, Dr. Alaa has been practically and academically involved in different **Power System** and **Instrumentation international companies** and **Universities** as a **Senior Professor & Consultant, Instrumentation Engineer** and **Electrical Engineer**. His recent practical applications experience includes the design, supply, installation, operation of full **DCS, SCADA, PLC, HMI Automation System** for **Sumid Line Petroleum, Siemens USA, AREVA USA** to name a few. His experience also includes electrical coordination, protection level adjustments and electrical testing.

Dr. Alaa has a **PhD** degree in **Electrical Engineering** from the **Technical University of Gdansk, Poland** and has **Master's** and **Bachelor's** degrees in **Electrical Machine & Power Engineering** from **Cairo University** and **Helwan University**, respectively. Further, he is a **Certified Instructor/Trainer** and delivered numerous trainings 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

0730 – 0800	<i>Registration & Coffee</i>
0800 – 0810	<i>Welcome & Introduction</i>
0810 – 0825	PRE-TEST
0825 – 0900	What is SCADA? <i>Definition of SCADA • Applicable Processes • Elements of a SCADA System • A Limited Two-way System • Development from Telemetry • Dependence on Communications and Computers</i>
0900 – 0915	<i>Break</i>
0915 – 1100	Real-Time Systems <i>What Really is Real Time? • Communications Access and “Master-Slave” • Determining Scan Interval • Where to Compute?</i>
1100 – 1230	Remote Control – What Not to SCADA <i>Murphy’s Law and Remote Control • Safety Instrumented Systems • Regulatory Requirements</i>
1230 – 1245	<i>Break</i>
1245 – 1420	Communications <i>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?</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 One</i>



Day 2

0730 – 0900	Radio Simplex or Duplex? • Turn-On Time • Frequencies: Are they Available? • Path Studies and Seasonal Variations
0900 – 0915	Break
0915 – 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 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 – 0900	Master Terminal Units (MTUs) Communications Interface • Configuring a Picture of the Process
0900 – 0915	Break
0915 – 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 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 – 0900	Applications Real Time Revisited • Accounting and Grade of Data • Scanning and Communications
0900 – 0915	Break
0915 – 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 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 Four

Day 5

0730 – 0900	SCADA Economics Costs versus Benefits • The Time Value of Money • Capital Costs • Training and Maintenance Costs • SCADA Operating Costs
0900 – 0915	Break
0915 – 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 Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course
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”, and “HMI SCADA”.



Allen Bradley SLC 500 Simulator



Allen Bradley Micrologix 1000 Simulator (Digital)



Allen Bradley Micrologix 1000 Simulator (Analog)



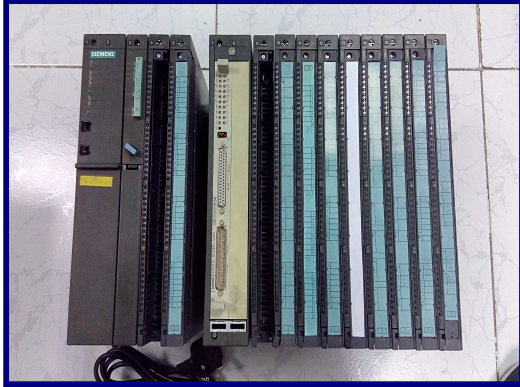
Allen Bradley SLC 5/03



Allen Bradley WS5610 PLC Simulator PLC5



Siemens S7-1200 Simulator



Siemens S7-400 Simulator



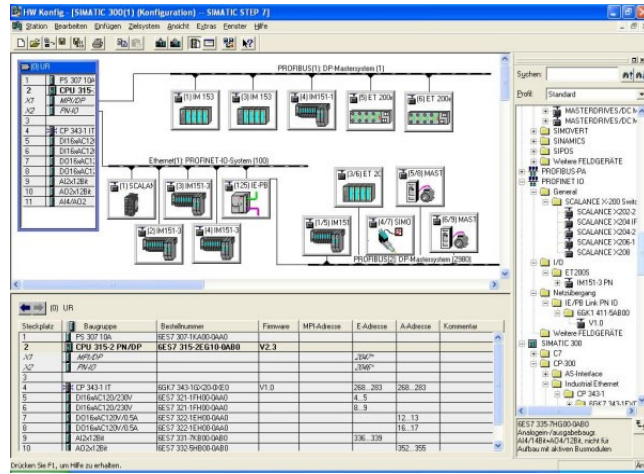
Siemens SIMATIC S7-300



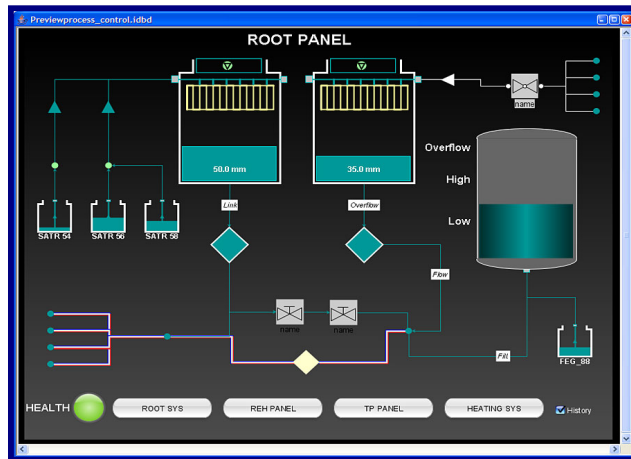
Siemens S7-200 Simulator



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

