COURSE OVERVIEW EE1134
SIEMENS SINAMICS S120

Course Title
SIEMENS SINAMICS S120

Course Date/Venue
June 16-20, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
EE1134

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 SIEMENS SINAMICS S120. It covers the SINAMICS S120 drive system, hardware components, motor and encoder technologies and DRIVE-CLiQ topology; the safety integrated functions, compliance with international standards, safe torque off (STO) implementation and risk assessment and safety validation; the STARTER software installation and system requirements, user interface navigation, project creation and management and connecting to devices via PROFIBUS/PROFINE; and creating and organizing drive objects, assigning hardware components and parameter hierarchy and inheritance.

Further, the course will also discuss the parameterization techniques, control and setpoint channels and automatic motor optimization; the operating modes, data management, diagnostic tools in STARTER and basic positioner (EPOS); setting up PROFIBUS and PROFINET connections, configuring telegrams and data exchange; and establishing communication with PLCs and diagnosing communication issues.

During this interactive course, participants will learn the safety functions implementation, web server and remote access, firmware and software updates and PLC integration; the drive control chart (DCC) and advanced diagnostics, maintenance procedures and energy efficiency optimization; and adapting drive configurations for specific needs, scaling systems for different applications and integrate additional modules.

Course Objectives

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

- Apply and gain an in-depth knowledge on SIEMENS SINAMICS S120
- Discuss SINAMICS S120 drive system, hardware components, motor and encoder technologies and DRIVE-CLiQ topology
- Review safety integrated functions, compliance with international standards, safe torque off (STO) implementation and risk assessment and safety validation
- Recognize STARTER software installation and system requirements, user interface navigation, project creation and management and connecting to devices via PROFIBUS/PROFINE
- Create and organize drive objects, assign hardware components and apply parameter hierarchy and inheritance
- Carryout parameterization techniques, control and setpoint channels and automatic motor optimization
- Determine operating modes, data management, diagnostic tools in STARTER and basic positioner (EPOS)
- Set-up PROFIBUS and PROFINET connections, configure telegrams and data exchange, establish communication with PLCs and diagnose communication issues
- Carryout safety functions implementation, web server and remote access, firmware and software updates and PLC integration
- Identify drive control chart (DCC) and apply advanced diagnostics, maintenance procedures and energy efficiency optimization
- Adapt drive configurations for specific needs, apply scaling systems for different applications and integrate additional modules

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 SIEMENS SINAMICS S120 for electrical engineers, automation engineers, maintenance technicians, commissioning engineers, industrial control system integrators and other technical staff.

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

Haward's 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**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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. Ahmed El-Sayed, PhD, MSc, BSc, is a **Senior Instrumentation & Control Engineer** with over **30 years** of extensive experience in the **Oil**, **Gas**, **Power**, **Petroleum**, **Petrochemical** and **Utilities**. He specializes in **DCS & ESD** System Architecture, **Distributed Control System**, **DCS** & **SCADA**, Distributed Control System (**DCS**) Selection & Troubleshooting, **DCS**, **Process Control**, **Control Systems & Data Communications**, 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**, **Measurement Devices & Control** System, Quality Measurement Instruments (**QMI**) **Analysers & Sample** Systems, **Instrumentation & Control** Systems, **Control System** Orientation, **Instrumentation Protection Devices** Maintenance & Testing, **Protection Devices** Troubleshooting, **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, 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, 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.

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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 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 workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 16th of June 2025***

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Overview of SINAMICS S120 Drive System*** *Modular Design and Scalability • Application Areas: Motion Control, Automation, CNC • Comparison with Other SINAMICS Series • Integration within Siemens Automation Solutions*
0930 – 0945	*Break*
0945 – 1030	***Hardware Components*** *Control Units (CU320-2, CU310-2) • Line and Motor Modules • Sensor and Terminal Modules • DRIVE-CLiQ Communication Interface*
1030 – 1130	***Motor & Encoder Technologies*** *Types of Motors: Induction, Synchronous • Encoder Types and Feedback Systems • Motor Parameter Identification • Motor-Encoder Compatibility*
1130 – 1215	***DRIVE-CLiQ Topology*** *Network Structure and Addressing • Automatic Device Recognition • Topology Editor in STARTER • Troubleshooting Topology Errors*
1215 – 1230	*Break*
1230 – 1330	***Safety & Standards*** *Overview of Safety Integrated Functions • Compliance with International Standards • Safe Torque Off (STO) Implementation • Risk Assessment and Safety Validation*

1330 – 1420	***Basics of STARTER Software*** *Installation and System Requirements • User Interface Navigation • Project Creation and Management • Connecting to Devices via PROFIBUS/PROFINET*
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 One*

Day 2: Monday, 17th of June 2025

0730 – 0830	***Project Structuring in STARTER*** *Creating and Organizing Drive Objects • Assigning Hardware Components • Parameter Hierarchy and Inheritance • Saving and Backing up Projects*
0830 – 0930	***Parameterization Techniques*** *Manual Parameter Entry • Using Wizards for Setup • Importing/Exporting Parameter Sets • Understanding Parameter Dependencies*
0930 – 0945	*Break*
0945 – 1100	***Control & Setpoint Channels*** *Configuring Control Words • Setpoint Channel Setup • Signal Interconnections Using BICO • Monitoring Signal Flow*
1100 – 1215	***Automatic Motor Optimization*** *Running Motor Identification Routines • Adjusting Control Loops • Evaluating Optimization Results • Fine-Tuning Performance Parameters*
1215 – 1230	*Break*
1230 – 1330	***Operating Modes*** *Speed Control Mode Setup • Torque Control Configuration • Positioning Mode Basics • Switching Between Operating Modes*
1330 – 1420	***Data Management*** *Creating and Managing Data Sets (CDS, DDS) • Firmware Updates and Compatibility • Licensing Considerations • Using CompactFlash Cards for Storage*
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: Tuesday, 18th of June 2025

0730 – 0830	***Diagnostic Tools in STARTER*** *Using the Trace Function for Signal Analysis • Interpreting Fault and Alarm Messages • Monitoring Device Status and Health • Utilizing Diagnostic Buffers*
0830 – 0930	***Basic Positioner (EPOS)*** *Activating and Configuring EPOS • Setting Home Positions • Creating Positioning Sequences • Integrating with Higher-Level Controllers*
0930 – 0945	*Break*
0945 – 1100	***Communication Interfaces*** *Setting up PROFIBUS and PROFINET Connections • Configuring Telegrams and Data Exchange • Establishing Communication with PLCs • Diagnosing Communication Issues*

1100 – 1215	***Safety Functions Implementation*** *Configuring Safe Torque Off (STO) • Implementing Safe Stop 1 (SS1) • Monitoring Safety Signals • Testing and Validating Safety Functions*
1215 – 1230	*Break*
1230 – 1420	***Web Server & Remote Access*** *Accessing the Drive via Web Browser • Monitoring Parameters Remotely • Performing Diagnostics Over the Network • Security Considerations for Remote Access*
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: Wednesday, 19th of June 2025

0730 – 0830	***Firmware & Software Updates*** *Checking Current Firmware Versions • Updating Drive Firmware • Ensuring Compatibility with STARTER • Backing up and Restoring Configurations*
0830 – 0930	***PLC Integration*** *Establishing Communication with SIMATIC S7-1500 • Using TIA Portal for Integration • Mapping I/O Signals • Testing Communication Links*
0930 – 0945	*Break*
0945 – 1100	***Drive Control Chart (DCC)*** *Creating Custom Control Logic • Using Function Blocks • Simulating Control Sequences • Deploying DCC Programs to the Drive*
1100 – 1215	***Advanced Diagnostics*** *Analyzing Complex Fault Scenarios • Using Oscilloscopes and Multimeters • Interpreting Diagnostic Data • Developing Troubleshooting Strategies*
1215 – 1230	*Break*
1230 – 1420	***Maintenance Procedures*** *Regular Inspection Routines • Replacing Hardware Components • Cleaning and Environmental Considerations • Documenting Maintenance Activities*
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: Thursday, 20th of June 2025

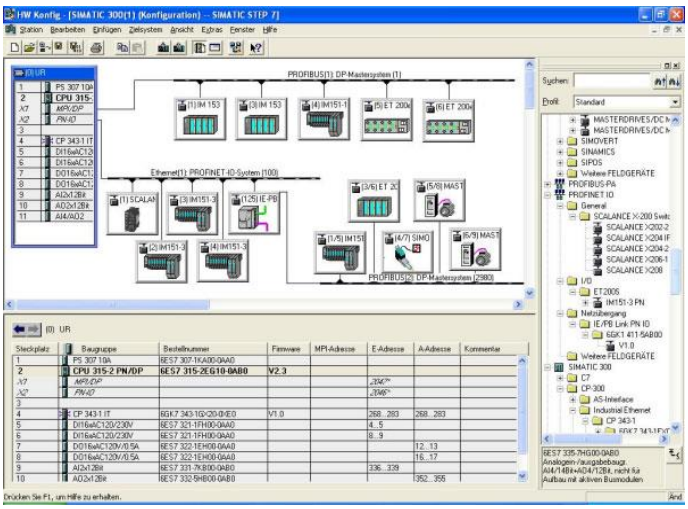
0730 – 0930	***Energy Efficiency Optimization*** *Adjusting Parameters for Energy Savings • Monitoring Energy Consumption • Implementing Energy-Efficient Operating Modes • Evaluating Energy-Saving Results*
0930 – 0945	*Break*
0945 – 1100	***Hands-on Lab Exercises*** *Commissioning a Drive System • Simulating Faults and Performing Diagnostics • Integrating with a PLC • Implementing a Basic Positioning Task*
1100 – 1215	***Real-World Application Scenarios*** *Case Studies of SINAMICS S120 Implementations • Discussion of Challenges and Solutions • Best Practices in Various Industries • Lessons Learned from Field Applications*
1215 – 1230	*Break*

1230 – 1345	***Customization & Scalability*** *Adapting Drive Configurations for Specific Needs • Scaling Systems for Different Applications • Integrating Additional Modules • Planning for Future Expansions*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about t Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

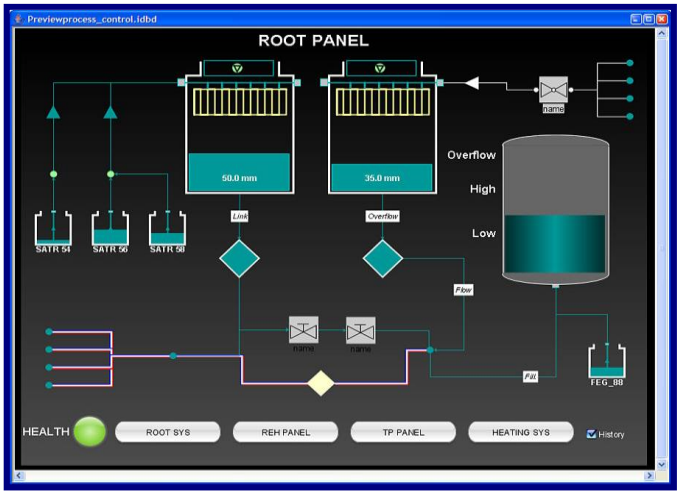
Simulator (Hands-on Practical Sessions)

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 "SINAMICS S120", "Siemens SIMATIC Step 7 Professional Software" and "HMI SCADA".

SINAMICS S120



Siemens SIMATIC Step 7 Professional Software



HMI SCADA

Course Coordinator

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