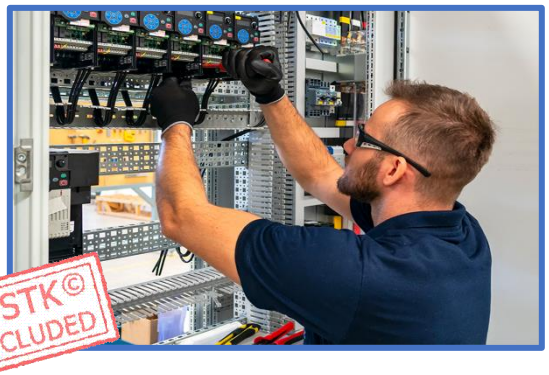
COURSE OVERVIEW IE1109
ABB ACS 1000/800 Drives

Course Title
ABB ACS 1000/800 Drives

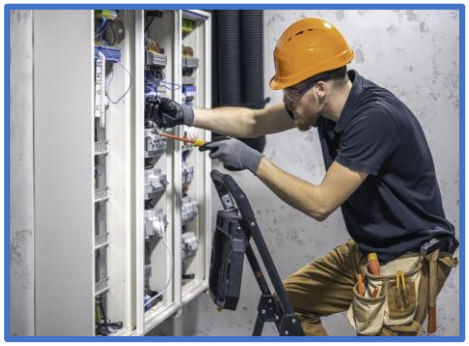


Course Date/Venue
Sesson 1: June 22-26, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE
Session 2: July 27-31, 2025/Glasshouse Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

Course Reference
IE1109

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 our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of ABB ACS 1000/800 Drives. It covers the medium voltage drives (MVDs), ABB ACS 1000 and ACS 800 drives and functional description and architecture; the drive types and applications, basic drive operations and control modes and drive safety, grounding and interlocks; the power supply and rectifier units, inverter unit and switching devices, motor-drive interface and control boards and internal bus communication; the cooling system design and maintenance, drive cabinet layout and wiring, pre-commissioning procedures and drive parameter setting and navigation; and the motor identification and autotuning, application macros and drive configuration, feedback devices and encoder integration and fieldbus and communication setup.

During this interactive course, participants will learn the drive monitoring and diagnostic tools, fault diagnosis and alarm handling, preventive and predictive maintenance and component-level troubleshooting; the motor troubleshooting with drive interface, backup and recovery procedures and advanced drive functions and features; and the energy efficiency and performance optimization, process integration and automation and industry applications and customization.

Course Objectives

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

- Apply and gain an in-depth knowledge on ABB ACS 1000/800 drives
- Discuss medium voltage drives (MVDs), ABB ACS 1000 and ACS 800 drives and functional description and architecture
- Identify the drive types and applications, basic drive operations and control modes and drive safety, grounding and interlocks
- Explain power supply and rectifier units, inverter unit and switching devices, motor-drive interface and control boards and internal bus communication
- Determine cooling system design and maintenance, drive cabinet layout and wiring, pre-commissioning procedures and drive parameter setting and navigation
- Carryout motor identification and autotuning, application macros and drive configuration, feedback devices and encoder integration and fieldbus and communication setup
- Identify drive monitoring and diagnostic tools, fault diagnosis and alarm handling, preventive and predictive maintenance and component-level troubleshooting
- Recognize motor troubleshooting with drive interface, backup and recovery procedures and advanced drive functions and features
- Discuss energy efficiency and performance optimization, process integration and automation and industry applications and customization

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 ABB ACS 1000/800 drives for maintenance engineers and technicians, commissioning and service engineers, automation and electrical engineers, project and system engineers, plant operators and supervisors and other technical staff.

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 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 inp 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 **3.5 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:

Mr. Herman Eksten, PE, PgDiP, is a **Senior Electrical**, **Instrumentation & Control Engineer** with over **30 years** of extensive experience within the **Petrochemical**, **Oil & Gas** and **Power** industries specializing in **Check System Equipment** for Field Operator, **Inspect Equipment** for Defects & Submit Reports, **Evaluate Equipment** Conditions & File Reports, **Conduct Equipment** Inspection & Reporting, Identify **Equipment Malfunctions & Prepare Reports**, **System Defect** Analysis & Reporting, Monitor & Report on **Equipment Deficiencies**, **Perform Equipment** Checks & Submit Reports, **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**, **Process Control & Safeguarding**, **Field Instrumentation**, **Instrumented Protective Devices** Maintenance & Testing, Instrumented Protective Function (**IPF**), **Refining & Rotating Equipment** and Distributed Control Systems (**DCS**). Further, he is also well-versed in **Electrical Safety**, Certified **HV Electrical Safety**, **Low Voltage Electrical Safety**, **Electrical Circuits**: Series and Parallel Connection, **Electrical Faults & Protective Devices**, Risk Control Methods, **LOTO – Breakers** Operation in Electricity Substation, **LOTO** Principles and Procedures, **Arc Flash Risk Assessment**, Safety in **Power Electronic Equipment & Lasers**, **Circuit Breakers & Switchgears**, **Switchgear Assets Management**, **Circuit Breakers Control Circuits**, **Substation Maintenance** Techniques, **High Voltage Operation, Electrical Protection**, **Overhead Lines & Substation**, **Power Supply**, **High Voltage Substation**, **Electrical Protection Design**, **Earthing & Lightning Protection Design, Underground Equipment**, **Distribution Network Maintenance & Construction**, **Transformers Operation & Maintenance**, **Electric Power System, Power Plant Management**, **Substation Commissioning & Troubleshooting**, **Cable Splicing & Termination, Electrical Installation & Maintenance**, **Power Generation Operation & Control, Switchgear Life Assessment**, **Structured Cabling, Electric Power System, Power System Stability, Power System Planning & Economics**, **Power Flow** Analysis, **Combined Cycle Power Plant**, **UPS & Battery System, Variable Speed Drives,** and **HV Motors & Transformers**. He is currently the **Lead Electrical Engineer** of **SNC-LAVALIN** wherein he is responsible for basic designs and successful implementation of electrical engineering to plant overhead lines and substations.

During his career life, Mr. Eksten held various positions such as the **Lead Electrical Engineer**, **Operations Manager**, **Project Engineer**, **Technical Specialist**, **Customer Executive**, **District Manager**, **Instrumentation Engineer**, **Electrical Protection Specialist**, **High-Voltage Operator** and **Apprentice Electrician** for FOX Consulting, UHDE (ThyssenKrupp Engineering), TWP Projects/Consulting (EPMC-Mining), ISKHUS Power, Rural Maintenance (PTY) Energia de Mocambique Lda., Vigeo (PTY) Ltd and ESKOM.

Mr. Eksten is a **Registered Professional Engineering Technologist** and has a Postgraduate Diploma in Management Development Programme and a National Higher Diploma (NHD) in Electrical Power Engineering. Further, he is a **Certified Instructor/Trainer**, a Senior member of the South African Institute Electrical Engineers (**SAIEE**) and holds a Certificate of Registration Membership Scheme from the Engineering Council of South Africa (**ESCA**). He has further delivered numerous trainings, courses, seminars, workshops and conferences internationally.

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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***Introduction to Medium Voltage Drives (MVDs)*** *Role & Applications of MVDs in Industry • Comparison with Low-Voltage Drives • Benefits of Variable Speed Control • Medium Voltage Safety & Operational Precautions*
0930 – 0945	*Break*
0945 – 1045	***Overview of ABB ACS 1000 & ACS 800 Drives*** *Key Features & Differences Between ACS 1000 & ACS 800 • Drive System Components & Modularity • Typical Installation Setups (Single Motor, Multi-Motor) • Standards & Ratings (IEC, NEMA, etc.)*
1045 – 1145	***Functional Description & Architecture*** *Power Section: Input Transformer, Rectifier, Inverter • Control Section: Drive Control Unit (DCU), PLC Interface • Cooling System Overview • Communication Interfaces (Modbus, Profibus, Ethernet)*
1145 – 1230	***Drive Types & Applications*** *Direct-To-Line Drives (ACS 1000 DTC) • Drive with Input Isolation Transformer (ACS 800 MV) • Regenerative & Non-Regenerative Options • Application Examples: Conveyors, Pumps, Compressors, Kilns*
1230 – 1245	*Break*

1245 – 1330	***Basic Drive Operations & Control Modes*** *Scalar Control (V/f), Vector Control, DTC (Direct Torque Control) • Open-Loop versus Closed-Loop Control • Starting Methods & Torque Control • Drive Protection Mechanisms*
1330 – 1420	***Drive Safety, Grounding & Interlocks*** *MV Drive Safety Guidelines • Interlocking Logic & Fail-Safe Design • Earthing & Shielding Requirements • Isolation, Lockout-Tagout (LOTO) & Discharge Procedures*
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

0730 – 0830	***Power Supply & Rectifier Units*** *MV Input Requirements & Transformer Design • Rectifier Topology: Diode, Thyristor-Based, Regenerative • Harmonics & Power Factor Considerations • Fuse Protection & Inrush Limiting*
0830 – 0930	***Inverter Unit & Switching Devices*** *IGBT versus IGCT Switching Principles • Multilevel Inverter Topology in ACS 1000 • Snubber Circuits & Protection Components • Heat Management & Cooling Requirements*
0930 – 0945	*Break*
0945 – 1100	***Motor-Drive Interface*** *Motor Compatibility (Induction, Synchronous) • Insulation Coordination & Voltage Stress • Cable Length Limitations & DV/DT Filtering • Motor Parameter Identification & Auto-Tuning*
1100 – 1230	***Control Boards & Internal Bus Communication*** *Control Unit (Drive Control Unit – DCU) • Fiber-Optic Communication Links Between Boards • Feedback Devices (Encoder, Resolvers) • Role of Auxiliary Power Supplies*
1230 – 1245	*Break*
1245 – 1330	***Cooling System Design & Maintenance*** *Air-Cooled versus Liquid-Cooled Configurations • Cooling Fans, Heat Exchangers, Flow Sensors • Cleaning Schedules & Maintenance Indicators • Alarm & Trip Conditions for Cooling Failures*
1330 – 1420	***Drive Cabinet Layout & Wiring*** *Main Components & Layout within Cabinet • Terminal Blocks, Wiring Routes, Signal Segregation • Busbar Connections & Insulation Levels • Troubleshooting via Physical Inspection*
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 – 0830	***Pre-Commissioning Procedures*** *Inspection & Verification Checklist • Insulation Resistance Testing (IR, PI Values) • Drive-Motor Rotation Checks • Drive Software & Firmware Verification*
0830 – 0930	***Drive Parameter Setting & Navigation*** *Drive Human Machine Interface (HMI) Operation • Parameter Groups & Categories • Key Parameters: Motor Data, Limits, Protection, Control Mode • Saving, Uploading, Downloading Parameter Sets*
0930 – 0945	*Break*
0945 – 1100	***Motor Identification & Autotuning*** *Static & Dynamic Autotuning Modes • Tuning for Scalar & Vector Control • Autotune Safety Precautions • Parameter Adjustment Post-Tuning*
1100 – 1230	***Application Macros & Drive Configuration*** *Selection of Macros (Pump, Fan, Conveyor, etc.) • Customizing Logic for Process-Specific Needs • Drive Sequences & Interlocks • Fixed Speed & PID Control Setup*
1230 – 1245	*Break*
1245 – 1330	***Feedback Devices & Encoder Integration*** *Selection & Installation of Encoders • Parameterization of Encoder Feedback • Speed & Position Loop Tuning • Encoder Fault Diagnosis*
1330 – 1420	***Fieldbus & Communication Setup*** *Setting Up Modbus/Profibus Parameters • Drive Address, Baud Rate, Parity Configuration • Mapping Control/Status Words • Integration with DCS or SCADA*
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 – 0830	***Drive Monitoring & Diagnostic Tools*** *ACS Drive Composer & Drive Window Tools • Parameter Trending & Real-Time Monitoring • Event & Fault Logs • Scope Function for Waveform Capture*
0830 – 0930	***Fault Diagnosis & Alarm Handling*** *Common Faults: Overvoltage, Overcurrent, Earth Fault, Undervoltage • Alarm Codes & Interpretation • Trip Reset Procedures • Root Cause Analysis Flowchart*
0930 – 0945	*Break*
0945 – 1100	***Preventive & Predictive Maintenance*** *Inspection Routines for Cabinet & Boards • Cleaning & Filter Replacement • Vibration & Thermal Inspections • Lifetime Estimation of Power Semiconductors*
1100 – 1230	***Component-Level Troubleshooting*** *Rectifier/Inverter Fault Isolation • Fiber-Optic Communication Faults • Fan & Sensor Failure Diagnosis • Power Board & DC Link Issues*
1230 – 1245	*Break*

1245 – 1330	***Motor Troubleshooting with Drive Interface*** *Stator & Rotor Faults Detection via Drive Parameters • No-Load & Full-Load Test Analysis • Use of Impedance & Current Analysis • Drive Feedback Interpretation*
1330 – 1420	***Backup & Recovery Procedures*** *Parameter Backup to Memory Card or PC • Firmware Update & Rollback • Restore Factory Settings • Creating Drive Commissioning Reports*
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 – 0830	***Advanced Drive Functions & Features*** *Flying Start, Brake Chopper, Flux Optimization • Torque Boosting, Flux Braking, Catch-on-the-fly • Pump Cleaning & Sleep Functions • Load Sharing for Multiple Drives*
0830 – 0930	***Energy Efficiency & Performance Optimization*** *Drive System Losses & Energy Audit • Load Profiling & Optimization • Drive versus Throttling or Damper Control • ROI Calculation for MV Drive Retrofits*
0930 – 0945	*Break*
0945 – 1100	***Process Integration & Automation*** *Drive Integration with PLC/DCS Systems • Using Drive for Process PID Control • Remote Monitoring & Diagnostics • ABB Ability & Digital Twin Platforms*
1100 – 1215	***Industry Applications & Customization*** *Cement Kilns, ID/FD Fans, Mills, Conveyors • Oil & Gas: Compressors, Pumps • Water & Wastewater: Aerators, Blowers • Mining: Crushers, Hoists, Conveyors*
1215 – 1230	*Break*
1230 – 1345	***Case Studies & Failure Analysis*** *Real-World Failure Modes & Resolutions • Commissioning Challenges & Lessons Learned • Parameter Misconfiguration Impacts • Thermal & Harmonic Case Evaluations*
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”, “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

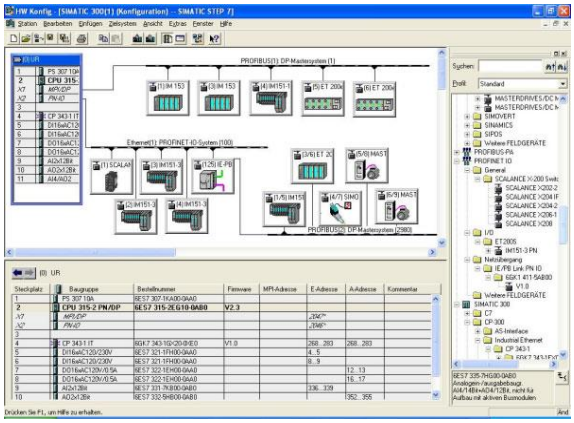
Siemens S7-1200 Simulator

Siemens S7-400 Simulator

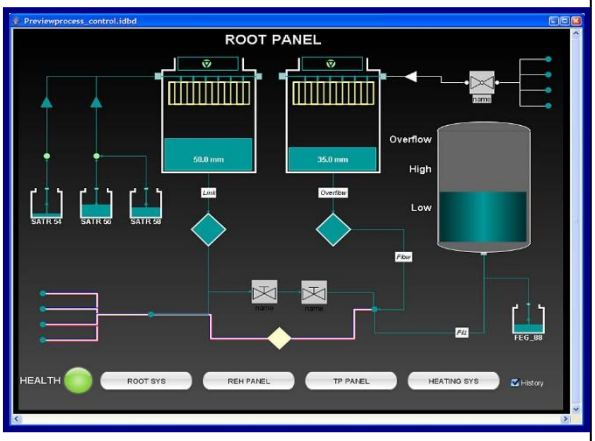
Siemens SIMATIC S7-300

Siemens S7-200 Simulator

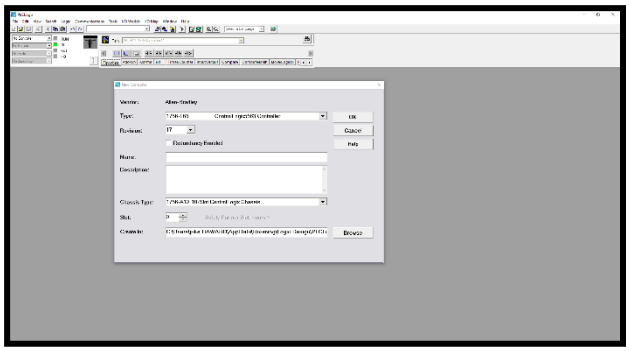
GE Fanuc Series 90-30 PLC Simulator

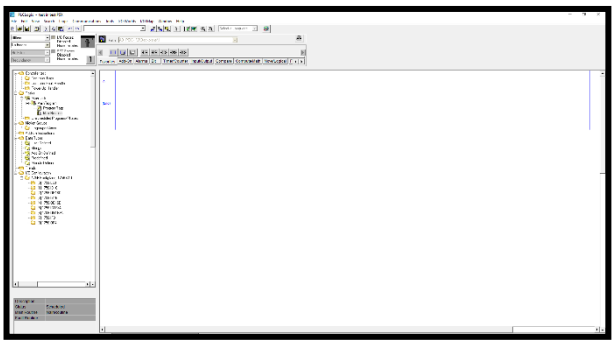


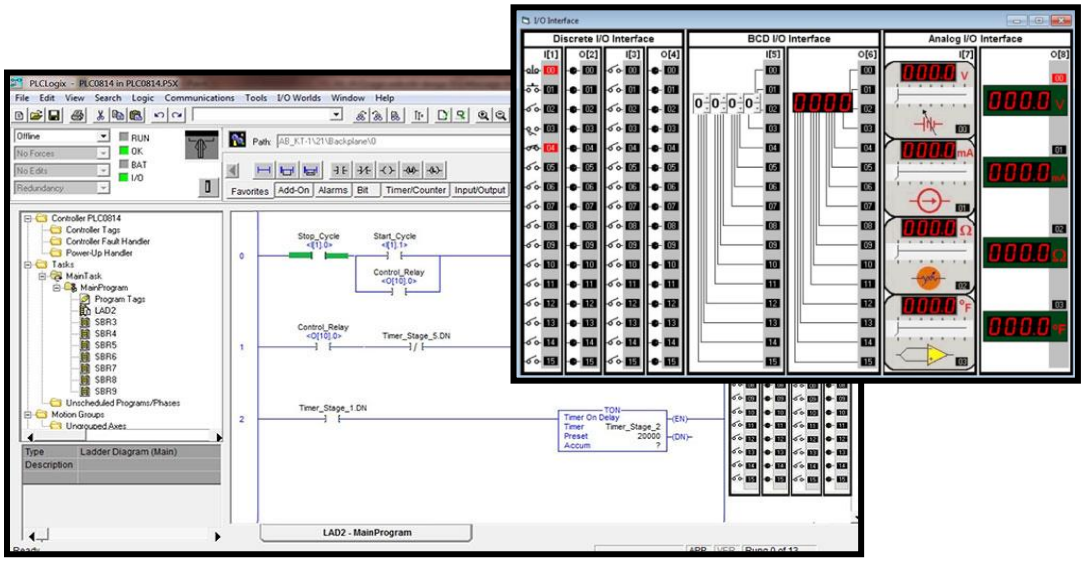
Siemens SIMATIC Step 7 Professional Software



HMI SCADA







PLCLogix 5000 Software

Course Coordinator

Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org